WICHITA AREA METROPOLITAN PLANNING ORGANIZATION

WAMPO

In Partnership With:

CEDBR
Center for Economic Development and Business Research

JEO CONSULTING GROUP

WAMPO Economic Development Report - Energy

May 2023

Contents

Introduction

The report provides an overview of the energy sector in Wichita, Kansas, focusing on its employment trends, productivity, skills required, transportation infrastructure, balance of trade, and general industry landscape.

In terms of employment, Wichita experienced a decline in energy sector jobs from 2015 to 2021, with an overall decrease of 5%. The largest three sectors within energy employment saw significant changes during this period, with oil and gas extraction and support activities for mining experiencing declines, while the petroleum lubricating oil and grease sector remained relatively stable. Other sectors, such as other chemical products and preparation and geophysical surveying and mapping services, also experienced slight declines.

Productivity in the energy sector showed growth in most subsectors, particularly in oil and gas extraction, driven by investments in equipment and technology. The report emphasizes the need for adaptability and strategic planning to navigate the dynamic nature of the industry.

The balance of trade analysis reveals an increase in energy imports and exports in Kansas, with oil and gas having the highest import value. Other chemical products and preparations also saw an increase in imports, while soaps, cleaning compounds, and toilet preparations experienced some volatility. The broader economic context shows stable wages, marginal revenue growth, and an increased number of establishments in the energy sector over the past decade.

Examining the industry through the lens of economic forces, the report identifies high capital requirements, government regulations, and proprietary technology as barriers to entry for new companies. The threat of substitutes is low, and the bargaining power of buyers and suppliers is moderate. Rivalry among existing firms is high, accompanied by high barriers to entry.

Overall, the energy sector is a vital part of Wichita's economy, but it faces challenges such as declining employment and wage trends. Adapting to market dynamics, investing in technology, and addressing infrastructure needs are key to promoting growth and stability in the sector.

Industry Landscape

The following NAICS codes, provided by the Greater Wichita Partnership, constitute the category of energy, which includes production, manufacturing, and service sectors. These codes were used to extract specific industry data related to these subsections.

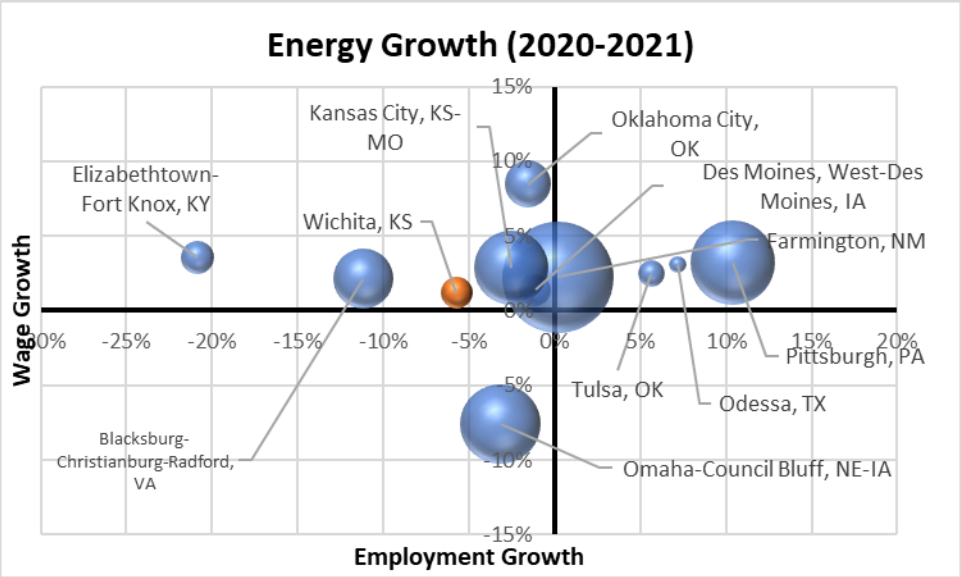
Energy		
NAICS	Description	Subsector
2111	Oil and Gas Extraction	Production, Processing, and Distribution
2131	Support Activities for Mining	Production, Processing, and Distribution
4861	Pipeline Transportation of Crude Oil	Production, Processing, and Distribution
4862	Pipeline Transportation of Natural Gas	Production, Processing, and Distribution
4869	Other Pipeline Transportation	Production, Processing, and Distribution
324110	Petroleum Refineries	Production, Processing, and Distribution
541360	Geophysical Surveying and Mapping Services	Production, Processing, and Distribution
3255	Paint, Coating, and Adhesive Manufacturing	Petroleum-based Products
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	Petroleum-based Products
3259	Other Chemical Product and Preparation Manufacturing	Petroleum-based Products
324191	Petroleum Lubricating Oil and Grease Manufacturing	Petroleum-based Products
325130	Synthetic Dye and Pigment Manufacturing	Petroleum-based Products

Key Energy Communities
Blacksburg-Christiansburg-Radford, VA MSA
Des Moines-West Des Moines, IA MSA
Elizabethtown-Fort Knox, KY MSA
Farmington, NM MSA
Kansas City, KS-MO MSA
Odessa, TX MSA
Oklahoma City, OK MSA
Omaha-Council Bluff, NE-IA MSA
Pittsburgh, PA MSA
Tulsa, OK MSA
Wichita, KS MSA

The comparison cities were selected based on the following criteria: employment concentration, size of the town, and preference for Midwest. Furthermore, all of the communities were vetted with the Greater Wichita Partnership as communities that the Wichita area competes within the respective sector.

In order to capture the broad industry landscape and recent competitiveness of the aerospace manufacturing sector within the Wichita area, this study developed a growth matrix. The matrix captures the relative growth and size of the market compared to the selected comparable communities. Any city within the top right quadrant should be considered in a growth mode. Those in the bottom left quadrant are in declining sectors. The other two quadrants, bottom right and top left, identify economic weaknesses that must be addressed.

Pittsburgh has the strongest position on the chart, as they had growth in both wages and employment along with a robust size of workers. Tulsa and Odessa also saw growth in both wages and employment despite having smaller workforces. Compared to other cities, Wichita's employment within the energy sector was smaller than most other communities being analyzed. While wages did grow from 2020-2021, employment declined by 6% in the Wichita region.



Labor

In the realm of energy employment, Wichita, KS MSA, experienced a decline in job numbers from 2015 to 2021. Over the period from 2015 to 2021, Wichita experienced an overall decrease of 5% in energy employment. Additionally, there was a continued decline of 6% in 2021 compared to the previous year. These figures highlight the challenges faced by the energy industry in Wichita and the need for efforts to promote growth and stability in the sector.

Energy Employment									
								Annualized growth	
	2015	2016	2017	2018	2019	2020	2021	2015-21	2020-21
Blacksburg-Christiansburg-Radford, VA MSA	7,341	7,510	7,410	5,955	5,852	5,787	5,140	-4%	-11%
Des Moines-West Des Moines, IA MSA	1,214	1,345	1,327	1,367	1,443	1,421	1,405	2%	-1%
Elizabethtown-Fort Knox, KY MSA	3,583	2,160	2,338	2,786	2,920	1,956	1,547	-8%	-21%
Farmington, NM MSA	20,019	19,879	19,503	19,205	19,098	18,326	18,358	-1%	0%
Kansas City, KS-MO MSA	8,469	8,897	8,411	8,491	8,231	8,117	7,913	-1%	-3%
Odessa, TX MSA	379	407	353	360	364	348	373	0%	7%
Oklahoma City, OK MSA	4,763	4,084	4,290	4,115	3,909	3,128	3,079	-5%	-2%
Omaha-Council Bluff, NE-IA MSA	10,271	8,038	10,204	12,872	13,979	9,609	9,305	-1%	-3%
Pittsburgh, PA MSA	10,806	9,480	10,278	11,310	11,063	9,384	10,359	-1%	10%
Tulsa, OK MSA	787	797	817	782	818	869	918	2.4%	6%
Wichita, KS MSA	2,118	2,035	1,645	1,601	1,604	1,495	1,409	-5%	-6%

Source: CEDBR, BLS- QCEW

When examining the largest three sectors within energy employment, there were significant trends and changes between 2015 and 2021. In the oil and gas extraction sector, employment numbers experienced a decline from 477 jobs in 2015 to 290 jobs in 2021, resulting in an overall decrease of 6% during the period. Similarly, the support activities for the mining sector witnessed a significant decrease, starting at 722 jobs in 2015 and dropping to 248 jobs in 2021, with an overall decline of 9%. In contrast, the petroleum lubricating oil and grease sector remained relatively stable with 526 jobs in 2015 and maintaining the same number of jobs in 2021. Other sectors, such as other chemical products and preparation and geophysical surveying and mapping services, experienced slight declines in employment. At the same time, pipeline transportation of natural gas saw a modest 2% increase in jobs from 2015 to 2021. These figures reflect the dynamic nature of the energy industry, with shifts in employment across various sectors emphasizing the need for adaptability and strategic planning.

Energy Employment									
								Annualized growth	
	2015	2016	2017	2018	2019	2020	2021	2015-21	2020-21
Oil and gas extraction	477	425	374	348	337	315	290	-6%	-8%
Support activities for mining	722	725	341	368	383	297	248	-9%	-16%
Petroleum refineries									
Petroleum lubricating oil and grease	526	530	534	538	542	546	546	1%	0%
Synthetic dye and pigment									
Paint, coating, and adhesive									
Soap, cleaning compound, and toilet									
Other chemical product and preparation	18	16	15	16	16	17	17	-1%	1%
Pipeline transportation of crude oil									
Pipeline transportation of natural gas	89	92	94	97	99	102	104	2%	2%
Other pipeline transportation	161	161	194	147	147	149	141	-2%	-5%
Geophysical surveying and mapping services	125	86	93	87	79	70	63	-7%	-10%

Source: CEDBR, BLS- QCEW

Energy Establishments

Communities	Annual 2020	Annual 2021	YR/YR %
Blacksburg-Christiansburg-Radford, VA MSA	106	103	-3%
Des Moines-West Des Moines, IA MSA	7	7	0%
Elizabethtown-Fort Knox, KY MSA	166	169	2%
Farmington, NM MSA	515	521	1%
Kansas City, KS-MO MSA	242	240	-1%
Odessa, TX MSA	9	10	11%
Oklahoma City, OK MSA	182	173	-5%
Omaha-Council Bluff, NE-IA MSA	401	381	-5%
Pittsburgh, PA MSA	378	383	1%
Tulsa, OK MSA	30	28	-7%
Wichita, KS MSA	172	166	-3%

Source: CEDBR, BLS- QCEW

Energy Wages

Community	2015	2016	2017	2018	2019	2020	2021
Blacksburg-Christiansburg-Radford, VA MSA	$105,732	$106,933	$110,746	$108,245	$111,801	$113,023	$115,432
Des Moines-West Des Moines, IA MSA	$71,051	$72,946	$66,175	$69,274	$68,699	$70,791	$71,772
Elizabethtown-Fort Knox, KY MSA	$86,405	$80,937	$88,870	$95,434	$97,011	$98,251	$101,760
Farmington, NM MSA	$83,619	$78,862	$80,611	$84,029	$92,340	$92,797	$94,879
Kansas City, KS-MO MSA	$92,939	$93,451	$98,779	$99,170	$102,874	$105,961	$108,987
Odessa, TX MSA	$79,111	$76,091	$69,929	$72,011	$69,970	$72,296	$74,536
Oklahoma City, OK MSA	$76,732	$77,525	$80,686	$82,057	$82,984	$87,690	$95,131
Omaha-Council Bluff, NE-IA MSA	$78,481	$78,809	$89,758	$93,824	$98,421	$100,284	$92,678
Pittsburgh, PA MSA	$79,153	$80,023	$88,880	$84,447	$86,147	$88,866	$91,724
Tulsa, OK MSA	$51,027	$51,515	$54,148	$55,401	$56,925	$57,993	$59,427
Wichita, KS MSA	$69,743	$70,078	$70,500	$73,086	$75,842	$76,883	$77,788

Souce: CEDBR, BLS - QCEW

For occupations within the Energy industry, Wichita had an above-average location quotient for each listed. Most notably, Wichita had the strongest location quotient for operating engineers and other construction equipment operators.

Key Occupations

Occupation	Wichita MSA Employment	US Employ
First-Line Supervisors of Construction Trades and Extraction Workers	1,730	28,450
Operating Engineers and Other Construction Equipment Operators	1,390	22,920
Roustabouts, Oil and Gas	80	33,740

Source: CEDBR: BLS, OES

A location quotient is a statistical measure used to compare the concentration or specialization of a particular industry or occupation in a specific geographic area relative to its concentration in a larger reference area, typically a region or a nation. It is calculated by dividing the proportion of employment in a specific industry or occupation in the target area by the proportion of employment in the same industry or occupation in the reference area, and then comparing the result to a value of one. A location quotient greater than 1 indicates a higher concentration of the industry or occupation in the target area compared to the reference area, suggesting specialization or a comparative advantage in that particular sector. Conversely, a location quotient of less than 1 indicates a lower concentration, less specialization in the industry or occupation in the target area.

2021 Labor Costs - Energy

Occupation (SOC code)	Mean Wage	10th Percentile Wage	90th Percentile Wage	Location Quotient
First-Line Supervisors of Construction Trades and Extraction Workers(471011)	$70,050	$46,580	$98,330	1.2
Operating Engineers and Other Construction Equipment Operators(472073)	$49,120	$34,440	$68,350	1.64
Roustabouts, Oil and Gas(475071)	$46,940	$29,490	$85,310	1.02

Source: CEDBR, BLS-OES

Productivity is an important component of the labor discussion. Using national figures, the following list of occupations has been detailed for the energy sector, where productivity is compared against the base year 2012. Those sectors with increasing productivity, as represented by rates above 100, are growing and have the opportunity for increased wages and profitability.

Of the seven subsectors within the energy, six have increasing productivity rates. The most significant growth was within oil and gas extraction. An underlying factor for the energy sector's growth across most of the subsectors was a mature sector, an aging workforce, and a technology shift called fracking. All three forces forced the industry to invest in equipment and technology, dramatically increasing the value-added per worker.

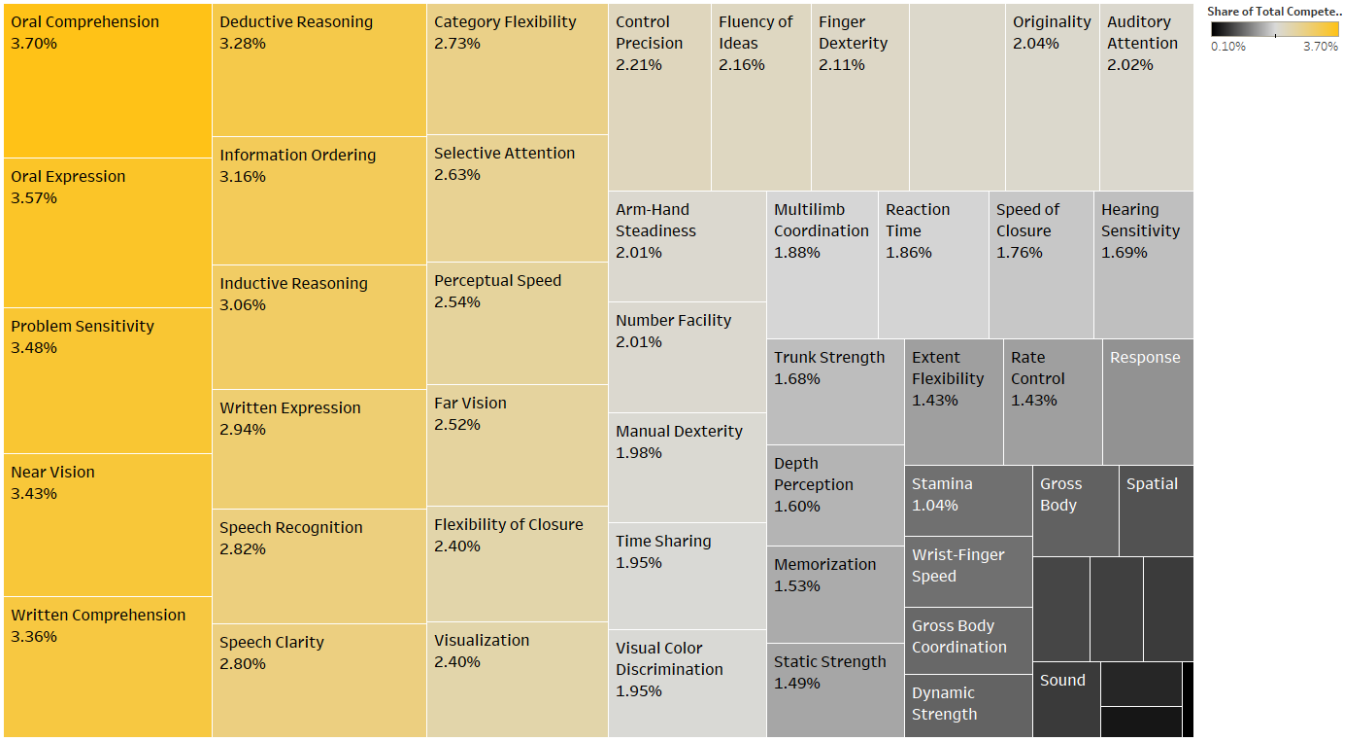
Energy Productivity

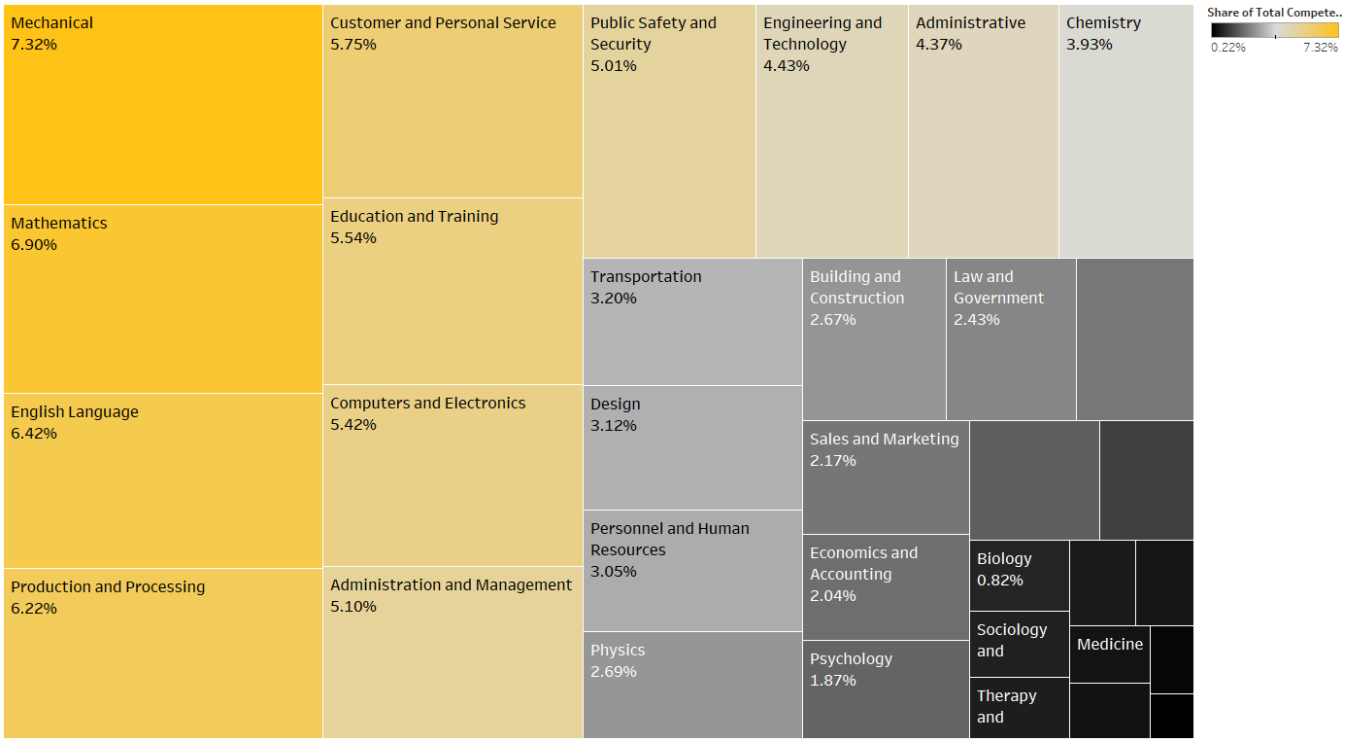
Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Oil and gas extraction	110.9	100.2	100.0	110.7	129.0	148.5	163.4	188.7	222.1	237.6	262.6	307.9
Support activities for mining	82.2	90.5	100.0	112.2	121.7	96.0	75.0	94.5	106.3	106.7	94.4	113.5
Petroleum and coal products	110.2	110.1	100.0	110.2	113.3	116.3	117.6	118.1	116.1	112.4	106.1	112.2
Basic chemicals	97.6	97.3	100.0	103.3	98.9	98.0	102.7	99.5	95.9	88.1	91.6	104.6
Paint, coatings, and adhesives	110.4	108.8	100.0	95.2	103.4	109.3	114.1	110.4	103.9	100.3	100.6	109.9
Soaps, cleaning compounds, and toilet preparations	112.3	115.9	100.0	103.1	103.3	96.6	100.5	96.5	92.7	97.6	87.4	85.9
Other chemical products and preparations	100.8	102.9	100.0	99.7	102.8	100.0	99.1	102.7	100.0	97.0	104.2	107.3

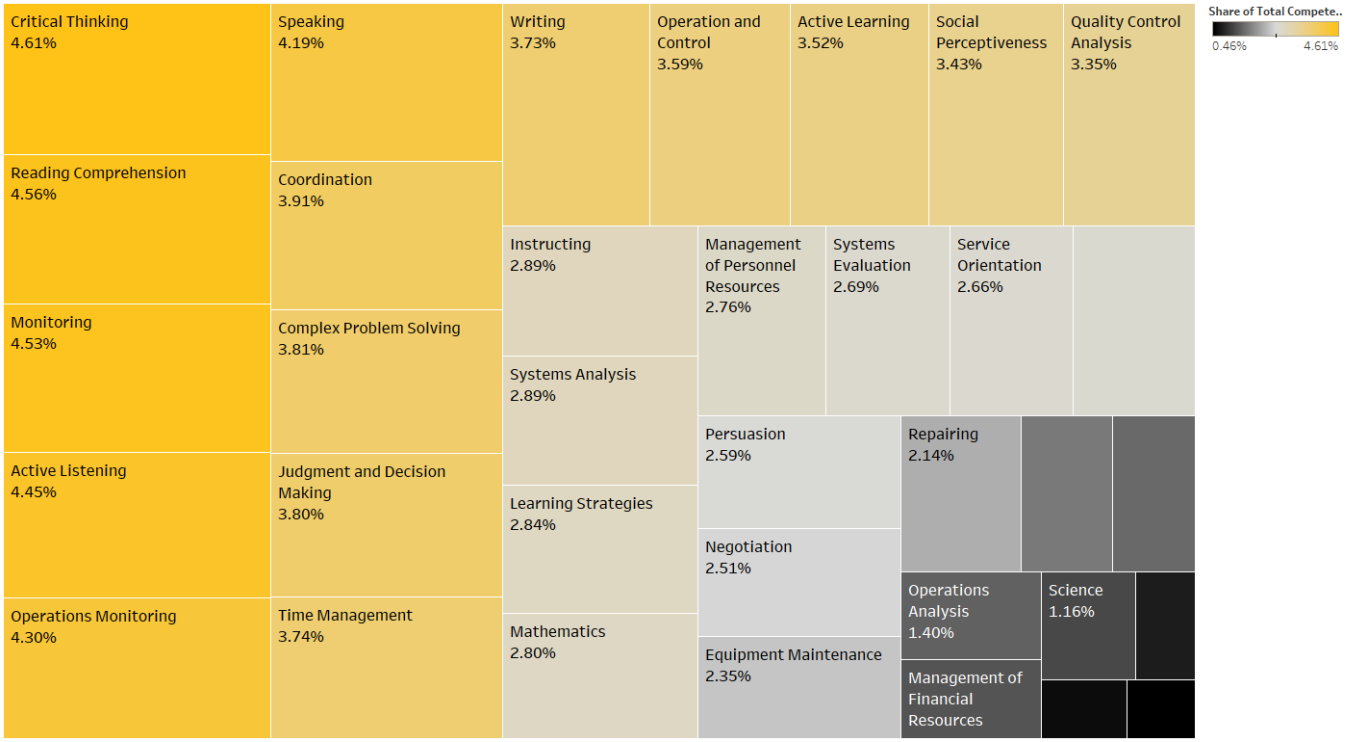
Note: Data only available for some sectors at 4-digit level

Source: CEDBR - BLS

Another component of the labor discussion is the skills, knowledge, and abilities required for the sector of the workforce. The most important skills in the agricultural sector were oral comprehension and expression. The most crucial knowledge components were mechanical and mathematics. Finally, the most essential abilities were critical thinking and reading comprehension.


Oral Comprehension 3.70%
Deductive Reasoning 3.28%
Category Flexibility 2.73%
Control Precision 2.21%
Fluency of Ideas 2.16%
Finger Dexterity 2.11%
Originality 2.04%
Auditory Attention 2.02%
Share of Total Compete..
0.10%
3.70%
Oral Expression 3.57%
Information Ordering 3.16%
Selective Attention 2.63%
Arm-Hand Steadiness 2.01%
Multilimb Coordination 1.88%
Reaction Time 1.86%
Speed of Closure 1.76%
Hearing Sensitivity 1.69%
Problem Sensitivity 3.48%
Inductive Reasoning 3.06%
Perceptual Speed 2.54%
Number Facility 2.01%
Trunk Strength 1.68%
Extent Flexibility 1.43%
Rate Control 1.43%
Response
Written Expression 2.94%
Far Vision 2.52%
Manual Dexterity 1.98%
Depth Perception 1.60%
Stamina 1.04%
Gross Body
Spatial
Near Vision 3.43%
Speech Recognition 2.82%
Flexibility of Closure 2.40%
Time Sharing 1.95%
Memorization 1.53%
Wrist-Finger Speed
Written Comprehension 3.36%
Speech Clarity 2.80%
Visualization 2.40%
Visual Color Discrimination 1.95%
Static Strength 1.49%
Gross Body Coordination
Dynamic Strength
Sound


Mechanical 7.32%
Customer and Personal Service 5.75%
Public Safety and Security 5.01%
Engineering and Technology 4.43%
Administrative 4.37%
Chemistry 3.93%
Share of Total Compete..
0.22%
7.32%
Mathematics 6.90%
Education and Training 5.54%
Transportation 3.20%
Building and Construction 2.67%
Law and Government 2.43%
English Language 6.42%
Computers and Electronics 5.42%
Design 3.12%
Sales and Marketing 2.17%
Personnel and Human Resources 3.05%
Economics and Accounting 2.04%
Biology 0.82%
Production and Processing 6.22%
Administration and Management 5.10%
Physics 2.69%
Psychology 1.87%
Sociology and
Medicine
Therapy and



To summarize the labor conversation through the framework of this particular sector, it is important to consider where the workforce is commuting throughout the day. Therefore, a list of all organizations within this sector with 100 employees or more has been collected. With knowledge of these particular businesses' locations and workforce density, WAMPO can leverage this list to analyze what thoroughfares can be strengthened to propagate the industry.

Key WAMPO players

Company Name	Location Employee Size
Koch Industries Inc	3,000
Frontier El Dorado Refining	375
Oxychem	300
BG Products Inc	200
Koch Energy Svc LLC	102

Source: CEDBR, Data Axle

Key WAMPO Thoroughfares

Koch Industries, and more specifically Flint Hills Resources, is a major employer in the Wichita area. Inbound goods are likely to be brought by either light freight or heavy highway with outbound goods having a demand for heavy highway traffic. The main labor access points are along 37th St via Oliver St and Hillside St via K-96.

Occidental Chemical, or OxyChem, is a chemical plant in the Southwest area of Wichita. Both inbound and outbound goods are likely to be transported via rail and heavy highway. The main labor access is along Ridge Road via Southwest Blvd.

Balance of Trade

In 2018, the total value of energy imports was $105.1 million, and it increased to $242.1 million by 2022. Among the subsectors, Oil & Gas has the highest import value, with $27.4 million in 2018, which decreased to $13.0 million in 2019 but saw a significant increase to $142.9 million in 2022.

In contrast, the other three subsectors have relatively stable import values over the years. The subsector with the second-highest import value was Other Chemical Products & Preparations, which accounted for $49.1 million in 2018 and increased to $63.9 million in 2022. The subsector of Soaps, Cleaning Compounds & Toilet Preparations experienced some volatility over the past 5 years, with an import value of $25.8 million in 2018, before rising to $31.6 million in 2022. Paints, Coatings &

Adhesives had the lowest import value among the subsectors, with a total of $2.9 million in 2020, increasing to $3.9 million in 2021 and then declining to $3.6 million in 2022.

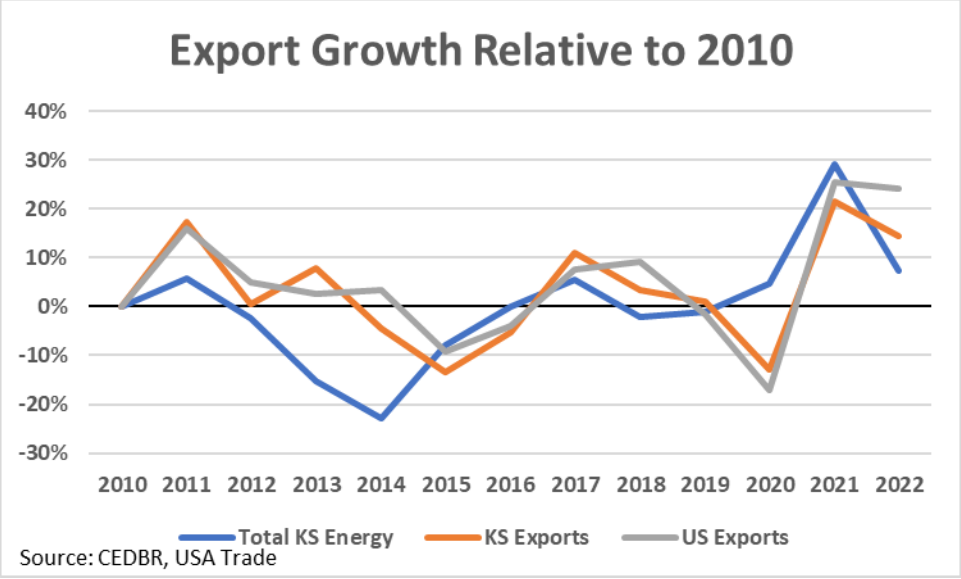
In terms of the broader economic context, the total value of energy imports in Kansas increased from $97.9 million in 2019 to $120.9 million in 2021 before experiencing a significant increase to $242.1 million in 2022. Similarly, Kansas energy exports saw a similar increase from $565 million in 2018 to $940 million in 2023.

Imports - Energy					
Subsector	2018	2019	2020	2021	2022
2111 Oil & Gas	$27,376,844	$13,013,909	$9,859,937	$30,900,541	$142,974,598
3255 Paints, Coatings & Adhesives	$2,876,875	$2,628,469	$2,913,033	$3,869,415	$3,627,691
3256 Soaps, Cleaning Compounds & Toilet Preparations	$25,817,897	$35,391,060	$32,568,951	$25,144,868	$31,592,114
3259 Other Chemical Products & Preparations	$49,069,178	$46,866,580	$43,003,402	$60,973,254	$63,883,537
Total Energy Imports	**$105,140,794**	**$97,900,018**	**$88,345,323**	**$120,888,078**	**$242,077,940**
Total Kansas Exports	**$12,291,983,874**	**$12,129,842,417**	**$10,393,505,709**	**$12,135,488,835**	**$13,438,371,455**
Total US Exports	**$2,536,145,273,678**	**$2,491,699,567,726**	**$2,330,836,392,063**	**$2,831,110,526,625**	**$3,246,431,588,450**

*Data not available for all subsectors
Source: CEDBR - USA Trade

Exports - Energy					
Subsector	2018	2019	2020	2021	2022
2111 Oil & Gas	$21,166,950	$11,665,302	$15,408,180	$75,367,471	$106,730,290
3255 Paints, Coatings & Adhesives	$11,616,101	$13,519,235	$11,703,595	$11,529,487	$13,656,398
3256 Soaps, Cleaning Compounds & Toilet Preparations	$36,244,195	$41,198,143	$39,058,018	$52,884,288	$61,655,876
3259 Other Chemical Products & Preparations	$42,927,273	$42,097,139	$24,389,694	$31,145,836	$45,307,712
3241 Petroleum & Coal Products	$60,726,437	$47,145,206	$45,437,499	$35,838,284	$36,396,684
3251 Basic Chemicals	$393,287,687	$399,256,940	$463,115,102	$664,651,164	$676,274,590
Total KS Energy	**$565,968,643**	**$554,881,965**	**$599,112,088**	**$871,416,530**	**$940,021,550**
Total KS Exports	**$11,581,768,320**	**$11,681,205,948**	**$10,405,315,895**	**$12,540,570,549**	**$13,965,084,671**
Total US Exports	**$1,665,786,886,956**	**$1,645,940,338,649**	**$1,428,518,279,410**	**$1,754,300,367,662**	**$2,062,937,260,943**

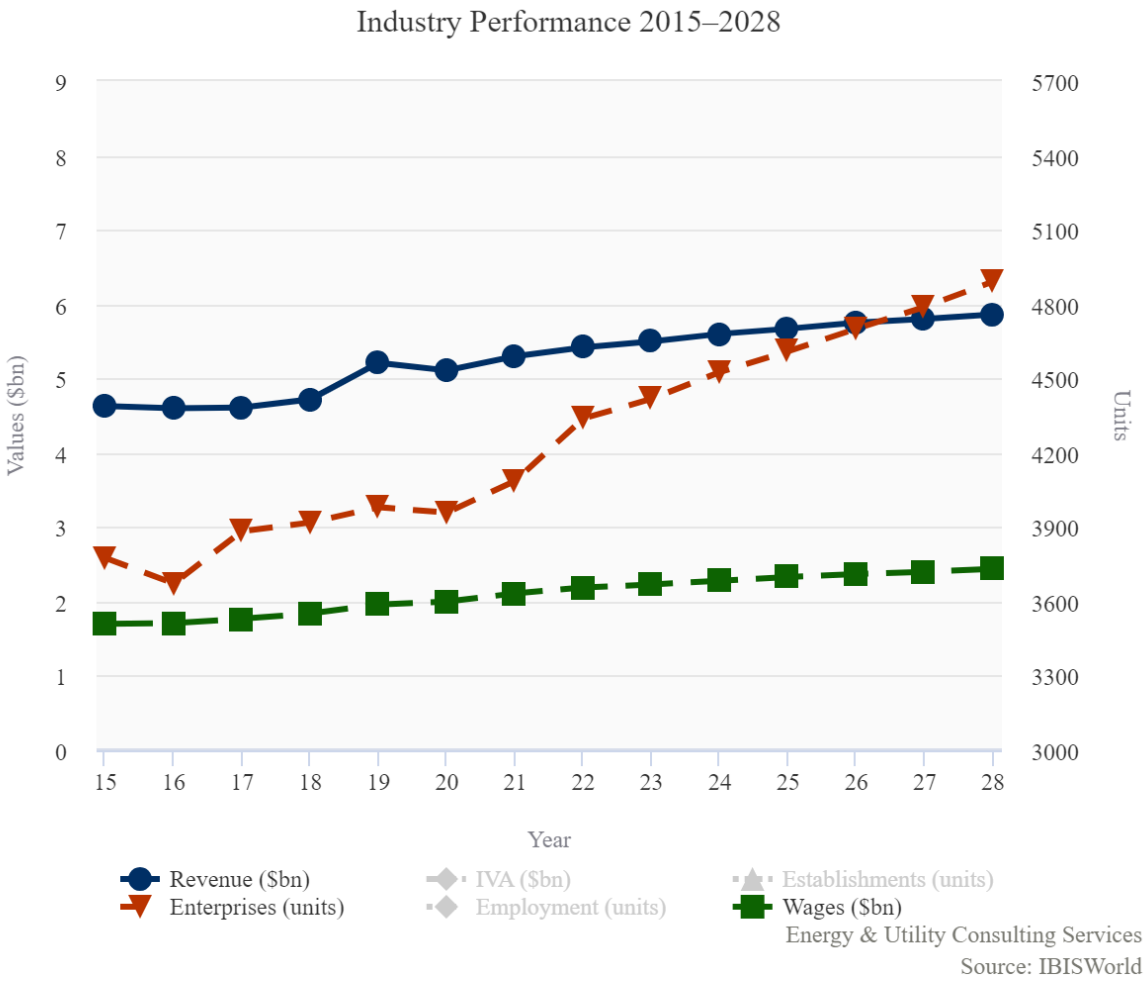
*Data not available for all subsectors
Source: CEDBR - USA Trade



General US Trends

To assess the potential growth of the energy sector, this study examined five economic forces at the national level. Those broad economic conditions were then applied to the regional market, firms, and trends to provide the context of its economic competitiveness.

Evaluating overall industry performance, the energy sector has had stable wages, yet marginally increasing wages. Meanwhile, the same can be said for the total revenue, with a small dip in 2020 likely due in part to the effects of the COVID-19 pandemic. However, the number of total establishments has increased over the past decade, which is expected to continue.



To coincide with the sectors outlined by the Greater Wichita Partnership, oil and gas processing and chemical manufacturing are the two constituents of the energy sector with the greatest prominence for discussion. These can be analyzed through the framework of economic forces to add deeper insights.

Threat of new entrants

- High capital requirements: The energy sector, specifically oil and gas, is capital-intensive, requiring large investments in research and development, manufacturing, and marketing. For example, the cost of developing a new energy technology can range from $100 million to $1 billion.
- Government regulations: The energy sector is heavily regulated, making it difficult for new companies to comply with all the requirements. For example, the Environmental Protection Agency (EPA) regulates the emissions of pollutants from energy facilities.

- Proprietary technology: The energy sector is characterized by proprietary technology, which gives existing companies a competitive advantage. For example, Koch Industries has proprietary technology in the production of ethanol.

Threat of substitutes

- Low threat of substitutes: The threat of substitutes in the energy sector is low, as there are no close substitutes for energy. For example, there are limited other means to power homes, businesses, and transportation.

Bargaining power of buyers

- Moderate bargaining power of buyers: The bargaining power of buyers in the energy sector is moderate, as there are few major buyers, such as utilities and industrial companies. However, buyers have some bargaining power, as they can choose to buy from other suppliers if they are unsatisfied with the price or quality of the products or services.

Bargaining power of suppliers

- Moderate bargaining power of suppliers: The bargaining power of suppliers in the energy sector is moderate, as there are a limited number of major suppliers, such as oil and gas companies, coal companies, and nuclear power companies. However, suppliers have some bargaining power, as they can choose to sell to other companies if they are unsatisfied with the price or volume of orders.

Rivalry among existing firms

The energy sector in Wichita is a competitive industry with a high level of rivalry among existing firms. The industry is also characterized by high barriers to entry, which make it difficult for new companies to enter the market. The threat of substitutes is low, as there are no close substitutes for energy. The bargaining power of buyers and suppliers is moderate.

The energy sector is a vital part of the Wichita economy, and it is a major employer in the area, with a large portion of the labor market commuting to Frontier El Dorado Refining, OxyChem, and Koch Industries (Flint Hills Resources). The industry is also a source of innovation and technology, and it plays an important role in the national and global economy.