Petroleum Refining and Chemicals in Texas

About the Petroleum Refining and Chemicals Sector

The Petroleum Refining and Chemicals sector is focused on the conversion of crude oil into petroleum products, including chemicals, fuel, and plastics. Within the Petroleum Refining and Chemicals sector, the state has identified three target clusters: Industrial Chemical Products, Petroleum Refining, and Plastics.

Texas' abundance of natural resources and raw materials, along with our supportive regulatory environment, afford the state a strong competitive advantage in these clusters. Industrial Chemical Products, Petroleum Refining, and Plastics have all seen a rise in exports and are projected to continue to grow. Though the sector experienced decline in some areas during the COVID-19 pandemic, the clusters recovered post-pandemic as global petroleum demand rebounded and are poised for future growth.

Petroleum Refining and Chemicals Target Clusters

- Industrial Chemical Products
- Petroleum Refining
- Plastics

Target Clusters Fast Facts

	Workforce	GDP	Exports
Magnitude	**111K** *Total Employment (2021)*	**$68B** *GDP Contribution (2021)*	**$38B** *Foreign Exports (2021)*
Share	**11%** *Share of U.S. Cluster Total Employment (2021)*	**24%** *Share of U.S. Cluster GDP (2021)*	**22%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**9%** *Total Employment Growth (2011 – 21)*	**-33%** *GDP Growth (2011 – 21)*	**18%** *Foreign Export Growth (2011 – 21)*

Data Sources: IMPLAN, Regions Industry Data, Texas and United States, (2011-21); Guidehouse Analysis

Sector Opportunities

Strengths

Texas is home to a robust supply chain supporting the production of petroleum and chemical products.
Texas' long history of oil and gas leadership has created a robust supply chain supporting activities from extraction to manufacturing.

Texas has an abundance of natural resources.
Texas' access to petroleum reserves and other necessary raw materials make it a natural hub for petroleum products and refining.

Petroleum and chemical products are some of Texas' top exports.
Texas' strategic location and transportation network, along with a robust transportation and materials moving workforce, equip Texas to export petroleum and related products efficiently and at scale.

Opportunities

Texas is well-positioned to grow petroleum-based industries.
To further grow its Petroleum Refining and Chemicals sector, the state can continue to nurture and promote not only extraction and refining but also manufacturing of petroleum-based products.

Texas can promote sector interconnectivity.
By promoting Texas' strengths in the Petroleum Refining and Chemicals sector, the state can attract a variety of other industries, like pharmaceuticals, that require petroleum-based chemicals.

Texas can bolster infrastructure and trade relationships.
By continuing to improve infrastructure and expand trade through relationships with international partners, Texas can ensure the sector remains a major driver of exports.

Quantitative and qualitative research was performed May 2023 through May 2024; data cited reflects the then-most current and/or granular information for the time periods noted.

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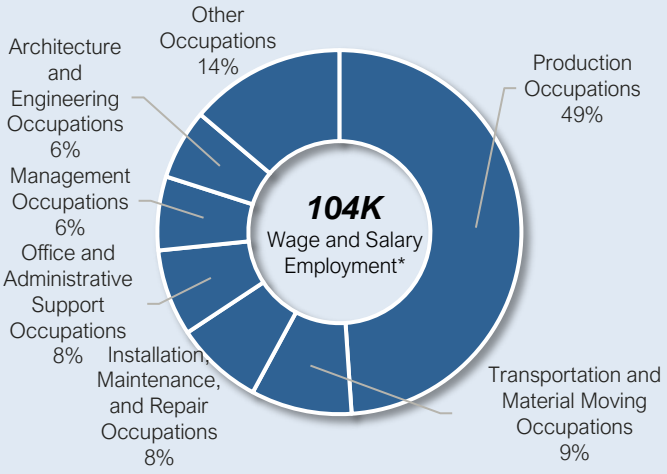
Target Sector Workforce Landscape

The target clusters within Texas' Petroleum Refining and Chemicals target clusters are supported by a relatively concentrated workforce. As shown in the chart at right, production occupations represent nearly half of total wage and salary employment. Top occupations in this sector enable the movement and manipulation of raw materials, including metal workers and plastic workers, material moving workers, assemblers and fabricators, and plant and system operators.

The most in-demand competency areas for these target clusters are technical and communication skills, including production and processing, mechanical knowledge, and English language. In recent years, knowledge of transportation, building and construction, and computers and electronics have grown in importance for the sector. Top occupations and competencies are identified in the tables below.

Workforce Distribution by Occupation Type (2021)



Key Detailed Occupations

Top Occupations by Emp. (2021)	Emp. (2021)
Other Production Occupations	20,990
Metal Workers and Plastic Workers	12,390
Material Moving Workers	7,000
Other Installation, Maintenance, and Repair Occupations	6,690
Supervisors of Production Workers	5,480

Top Occupations by Jobs Added (2018-21)	Jobs Added (2018-21)
Other Production Occupations	1,340
Material Moving Workers	1,210
Occupational Health and Safety Specialists and Technicians	530
Business Operations Specialists	380
Assemblers and Fabricators	280

Key Competencies

Top In-Demand Competency Areas (2021)		
Rank	**Knowledge Area**	**Skill Area**
1	Production and Processing	Active Listening
2	Mechanical	Reading Comprehension
3	English Language	Critical Thinking
4	Mathematics	Monitoring
5	Customer & Personal Service	Speaking

High Growth Competency Areas (2018-21)		
Rank	**Knowledge Area**	**Skill Area**
1	Transportation	Social Perceptiveness
2	Building and Construction	Operation and Control
3	Computers and Electronics	Active Listening
4	Administration and Management	Time Management
5	Customer & Personal Service	Quality Control Analysis

Data Sources: IMPLAN, Data Library, Texas, (2018-21); Guidehouse Analysis

Workforce Themes

Specialized Workforce

Nearly half of all target sector employees are in production occupations.

Technical Skillsets

Petroleum Refining and Chemicals businesses require a highly technical workforce.

Growth in Technology

Computer and electronic skills have been growing in importance for this sector.

Note: Wage and Salary Employment is a headcount of salaried or wage-earning employees. This figure does not include Proprietor Employment, which represents proprietors, partners, and tax-exempt cooperative members.

CLUSTER Profile

Petroleum Refining and Chemicals in Texas

Industrial Chemical Products

Though often an unsung hero in our economy, the Industrial Chemical Products cluster plays a crucial role in providing raw materials and feedstock for products used in nearly every industry, ranging from fertilizers used in agricultural applications to industrial gases used in aerospace engineering. The same resources that make Texas a hub for energy and manufacturing give it a competitive advantage in the Industrial Chemical Products cluster, and demand for these products across Texas as well as an ability to export goods to global markets make our state a prime location for chemical companies to build and grow.

The Industrial Chemical Products cluster is comprised of seven industries that encompass the manufacturing of various chemical products, including petrochemicals, industrial gas, synthetic rubber, phosphatic fertilizer, pesticide and agricultural chemicals, and other organic and inorganic chemicals.

Texas has many Industrial Chemical Products hubs across the state and is home to large industrial chemical companies such as Dow, Philips 66, and Eastman Chemical Company. While some regions like the High Plains show concentrations in industries like inorganic chemical and phosphatic fertilizer manufacturing, most of the state's concentrations of cluster activity are driven by petrochemical manufacturing, which has a significant presence in most Texas regions and is linked to the strength of the state's Oil and Gas Extraction, Production, and Transportation cluster.

Texas' competitive advantage in the sector stems from our rich supply of petroleum resources, which are used in the manufacturing of chemicals like benzene and ethylene. The cluster also benefits from Texas' robust commerce and transportation infrastructure, which facilitates the export of these chemical products around the globe.

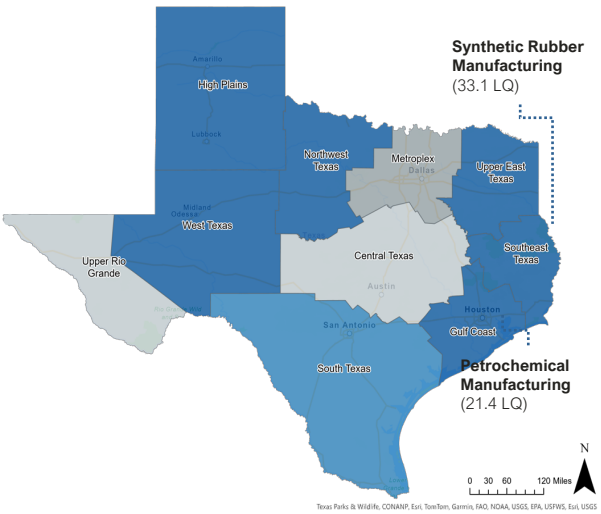
Investments from universities and nonprofits alike in laboratories and research have spurred industrial chemical innovation in Texas. Texas is seeing innovation at the micro level, with advancements like novel chemical catalysts and polymers, as well as the macro level, with AI and robotic innovations improving efficiency and safety in the manufacturing of these products.

Though the cluster's GDP growth saw a decline from 2011 to 2021, employment and exports both experienced increases in this period. Cluster GDP is projected to grow by 25% from 2022 to 2032.

Cluster Fast Facts

	Workforce	GDP	Exports
Magnitude	**38K** *Total Employment (2021)*	**$28B** *GDP Contribution (2021)*	**$13B** *Foreign Exports (2021)*
Share	**22%** *Share of U.S. Cluster Total Emp. (2021)*	**36%** *Share of U.S. Cluster GDP (2021)*	**23%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**11%** *Total Employment Growth (2011 – 21)*	**-24%** *GDP Growth (2011 – 21)*	**5%** *Foreign Export Growth (2011 – 21)*

Cluster Employment Concentration (2021)



Less Concentrated		National Average		Highly Concentrated
(0.00 to 0.50)	(0.51 to 0.90)	(0.91 to 1.10)	(1.11 to 1.50)	(1.51+)

Data Sources: IMPLAN, Regions Industry Data, Texas and United States, (2011-21); Guidehouse Analysis

Petroleum Refining and Chemicals in Texas

Petroleum Refining

Texas is a national leader in the Petroleum Refining cluster, responsible for nearly one-third of the nation's refining capacity. The rich petroleum reserves in our state serve as the foundation for a wide array of goods, such as gasoline, plastics, and chemical products. Texas' decades of cluster leadership are supported by 27 refineries, including ExxonMobil, which was ranked third in the 2023 Fortune 500. Texas' natural petroleum supply, highly specialized and well-equipped workforce, and friendly regulatory environment contribute to Texas' long-standing success and leadership within the cluster.

The Petroleum Refining cluster includes just two industries — petroleum refineries and other petroleum and coal products manufacturing — but represents a significant contribution to the state's GDP. Notably, Petroleum Refining does not include the oil extraction industry, which is located within the Oil and Gas Extraction, Production, and Transportation cluster.

Petroleum refining is ubiquitous throughout Texas, with eight of the 10 regions having very high concentrations of cluster activity. In Southeast Texas, the petroleum refinery industry is 35 times more concentrated in the region than the national average. The Gulf Coast is home to four of the 10 largest oil refineries in the United States, including the Motiva Port Arthur Manufacturing Complex, and Texas refineries process nearly 5.9 million barrels of crude oil per day. This strong concentration of petroleum refineries attracts complementary energy-related firms and thought leaders, further advancing cluster growth.

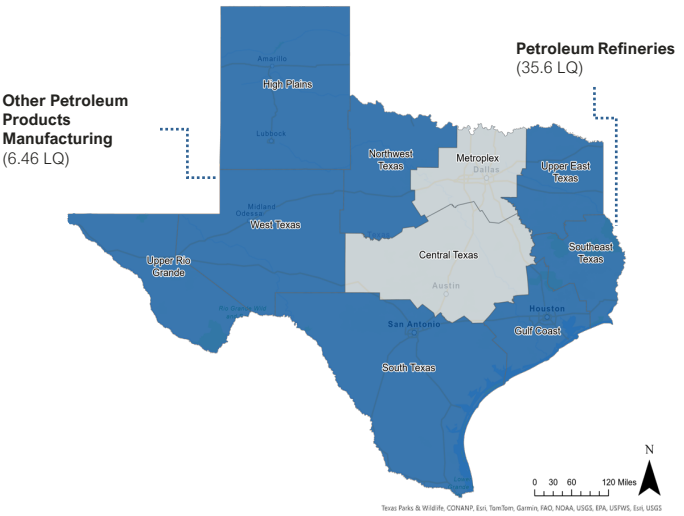
Texas' leadership in Petroleum Refining is supported by educational institutions throughout the state, which are heavily invested in research and development related to the cluster. Rice University, Texas A&M University, The University of Texas at Austin and at Tyler, and the University of Houston all have research and development programs dedicated to trailblazing new refining techniques and technologies. Innovation in the cluster includes exploration of the use of blockchain, data analytics, and AI to improve the efficiency of refining operations.

Although employment and GDP declined in the Petroleum Refining cluster between 2011 to 2021, the cluster experienced a 15% growth in total foreign exports during that period. The cluster also experienced significant GDP growth from 2021 to 2022 as the economy recovered from the impacts of the COVID-19 pandemic and global petroleum demand rebounded. By 2032, the cluster is expected have a GDP contribution of $66 billion, an increase of 28% from 2022.

Cluster Fast Facts

	Workforce	GDP	Exports
Magnitude	**19K** *Total Employment (2021)*	**$31B** *GDP Contribution (2021)*	**$19B** *Foreign Exports (2021)*
Share	**26%** *Share of U.S. Cluster Total Emp. (2021)*	**29%** *Share of U.S. Cluster GDP (2021)*	**28%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**-19%** *Total Employment Growth (2011 – 21)*	**-36%** *GDP Growth (2011 – 21)*	**15%** *Foreign Export Growth (2011 – 21)*

Cluster Employment Concentration (2021)



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Petroleum Refining and Chemicals in Texas

Plastics

Used in its various forms — rigid, foam, liquid — plastic plays a critical role in many industries, from packaging to tools and protective equipment. As a leading plastics manufacturer, Texas produces products that deliver benefits to companies, industries, and consumers across the county. Our ample natural supply of the raw materials and feedstocks for plastic make Texas a prime location for manufacturers to start and grow a plastics business.

The Plastics cluster includes 12 industries that reflect plastic's many uses and forms. Activities within this cluster include the manufacturing of various types of plastics, including resin, polystyrene foam, and urethane, as well as plastic products, materials, sheets, and pipes.

Several regions across Texas are home to concentrations of plastics manufacturing. Northwest Texas has a concentration of businesses within the Plastics cluster, with a urethane manufacturing industry that is nearly 10 times more concentrated in the region than the national average. Urethane is critical to supporting several industries, including but not limited to apparel, construction, and distribution. The Upper Rio Grande also has a strong concentration of plastics and is home to a number of plastic shaping companies including Plastic Molding Technology, Venture Plastics, and Summit Plastic Molding.

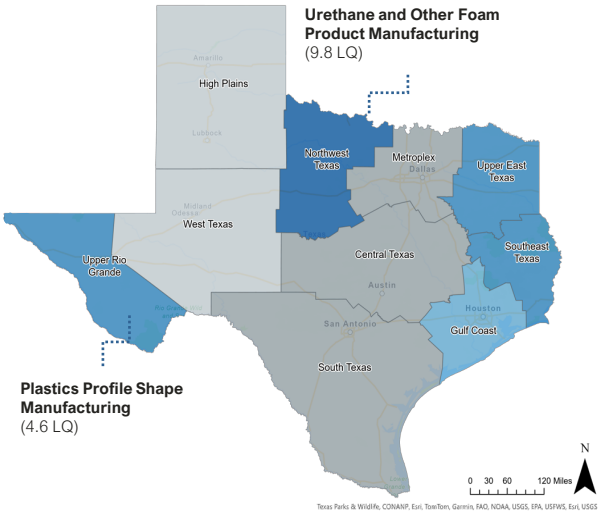
Texas businesses are leading in innovation within the Plastics cluster. In addition to improving manufacturing speed and efficiency, entities across the state are working to improve cluster recycling efforts. Public-private partnerships throughout Texas are using new sorting and recycling technologies to increase the amount of plastic that is recycled. In 2022, ExxonMobil opened one of the largest advanced recycling facilities in North America in Baytown. The facility uses cutting-edge technologies to break down hard-to-recycle plastics and is capable of processing more than 80 million pounds of plastic waste per year, with an expected capacity of 1 billion pounds of plastic waste per year by 2026.

The Plastics cluster experienced steady growth between 2011 to 2021 with employment increasing by 22%, GDP increasing by 26%, and total foreign exports increasing by 51%. The momentum is expected to continue with a projected cluster GDP of $14 billion by 2032, representing 28% growth from 2022.

Cluster Fast Facts

	Workforce	GDP	Exports
Magnitude	**55K** *Total Employment (2021)*	**$9B** *GDP Contribution (2021)*	**$7B** *Foreign Exports (2021)*
Share	**8%** *Share of U.S. Cluster Total Emp. (2021)*	**10%** *Share of U.S. Cluster GDP (2021)*	**14%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**22%** *Total Employment Growth (2011 – 21)*	**26%** *GDP Growth (2011 – 21)*	**51%** *Foreign Export Growth (2011 – 21)*

Cluster Employment Concentration (2021)



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