Rare Earth Elements and Mineral Mining in Texas

About the Rare Earth Elements and Mineral Mining Sector

The Rare Earth Elements and Mineral Mining sector is focused on the extraction of both metal and nonmetal elements, including a variety of metal ores, crushed stone, sand, and rare earth elements. Within this sector, the state has identified two clusters positioned for growth in Texas: Metal Mining and Nonmetal Mining.

The clusters within the Rare Earth Elements and Mineral Mining sector play an important part in the development of infrastructure and provide vital inputs for a variety of businesses. Metal mining supports high-tech and defense industries essential to economic and national security, and nonmetal mining products are essential to construction and oil extraction. Texas' deposit of natural resources combined with its mining expertise have positioned it as a leader within Rare Earth Elements and Metal Mining.

Rare Earth Elements & Mineral Mining Clusters

- Metal Mining
- Nonmetal Mining

Target Clusters Fast Facts

	Workforce	GDP	Exports
Magnitude	**40K** *Total Employment (2021)*	**$25B** *GDP Contribution (2021)*	**$0B** *Foreign Exports (2021)*
Share	**17%** *Share of U.S. Cluster Total Employment (2021)*	**32%** *Share of U.S. Cluster GDP (2021)*	**4%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**-10%** *Total Employment Growth (2011 – 21)*	**14%** *GDP Growth (2011 – 21)*	**-31%** *Foreign Export Growth (2011 – 21)*

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

Sector Opportunities

Strengths

Texas has a mining legacy.
Texas' long history with mining has resulted in a robust network of sector resources and businesses.

Texas is leading in mining innovation.
Educational institutions and businesses in Texas are advancing mining practices to improve their safety and efficiency.

Texas' workforce is equipped to support the sector.
The sector's workforce includes a mix of specialized occupations that enable the extraction, manipulation, and transportation of raw materials.

Opportunities

Texas is positioned to capitalize on the growing demands on the sector.
Texas is equipped to capitalize on the increasing demand for onshoring production of rare earth elements and mineral mining.

Texas can support innovation dissemination and commercialization.
Supporting the commercialization and adoption of new innovations can help grow the sector and increase productivity.

The state can prepare the workforce for high-demand roles.
Advocating for the development of mining-related degrees and certifications can help prepare for increased demand for occupations related to rare earth element mining.

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.

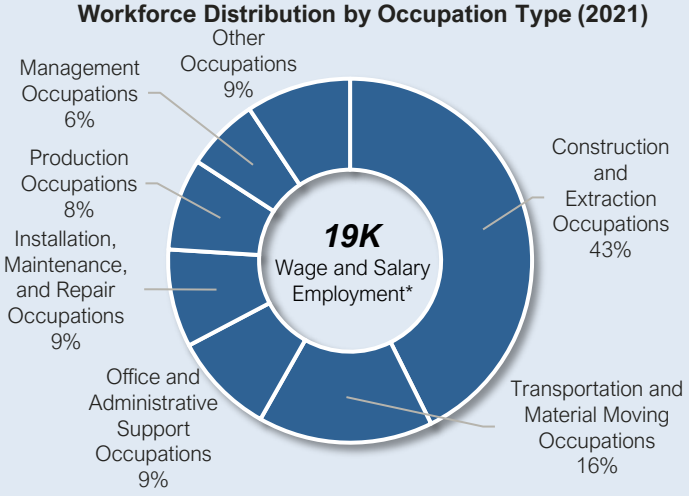
Rare Earth Elements and Mineral Mining in Texas

Target Sector Workforce Landscape

The target clusters that make up Texas' Rare Earth Elements and Mineral Mining sector are supported by a relatively small and specialized workforce. As shown in the chart at right, over 40% of total wage and salary employment is represented by construction and extraction occupations. Top occupations in this sector enable the extraction and transportation of raw materials, including extraction workers and material moving occupations.

In-demand competency areas include mechanical skills, customer and personal service, mathematics, and public safety and security. In recent years, target clusters in the Rare Earth Elements and Mineral Mining sector have added jobs in areas that support operations, including top executives, business operations specialists, and supervisors of construction and extraction workers. Top occupations and competencies for the target clusters are identified in the tables below.

Workforce Distribution by Occupation Type (2021)



Key Detailed Occupations

Top Occupations by Emp. (2021)	Emp. (2021)
Extraction Workers	5,240
Construction Trades Workers	1,910
Motor Vehicle Operators	1,800
Material Moving Workers	1,040
Supervisors of Construction and Extraction Workers	1,030

Top Occupations by Jobs Added (2018-21)	Jobs Added (2018-21)
Top Executives	170
Motor Vehicle Operators	130
Occupational Health and Safety Specialists and Technicians	120
Sales Representatives, Services	50
Business Operations Specialists	50

Key Competencies

Top In-Demand Competency Areas (2021)

Rank	Knowledge Area	Skill Area
1	Mechanical	Active Listening
2	Customer & Personal Service	Critical Thinking
3	English Language	Monitoring
4	Mathematics	Operation and Control
5	Public Safety and Security	Operations Monitoring

High Growth Competency Areas (2018-21)

Rank	Knowledge Area	Skill Area
1	English Language	Speaking
2	Customer & Personal Service	Operation and Control
3	Public Safety and Security	Time Management
4	Telecommunications	Reading Comprehension
5	Administration and Management	Active Listening

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

Workforce Themes

Specialized Workforce

Nearly half of Rare Earth Elements and Mineral Mining cluster employees are in construction and extraction occupations.

Movement of Goods

Top occupations in Rare Earth Elements and Mineral Mining enable the extraction and movement of raw materials.

Growth in Operations

The Rare Earth Elements and Mineral Mining sector has added jobs in operations roles in recent years.

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.

Rare Earth Elements and Mineral Mining in Texas

Metal Mining

From the silver mines of the Upper Rio Grande to the copper mines in the Northwest portion of the state, metal mining has helped shape Texas' economy for centuries. Texas is a national leader in the Metal Mining cluster, accounting for 32% of the total cluster GDP in the United States. Texas' Metal Mining cluster is entering a new era of importance as the state sits on a deposit of rare earth elements (REEs) and critical minerals. Federal and state leaders are prioritizing the onshore development of REEs and other critical materials due to their importance to industries vital to our economic and national security. For example, cobalt is essential for manufacturing smartphones and is an important component of permanent magnets used in military technologies such as aircraft and precision-guided missiles.

The Metal Mining cluster includes six industries that encompass the mining of copper, nickel, metal, lead, zinc, iron, gold, silver, uranium-radium-vanadium, and other metal ores.

Texas has an overall higher concentration of Metal Mining employment than the national average, with the highest concentration seen in the Gulf Coast region. Notably, the region is being considered for the development of a deep-sea mining processing plant that would harvest nickel, cobalt, copper, and manganese. Though it does not have a current concentration of metal mining employment, the Upper Rio Grande region is a historical hub for mining and well-positioned for cluster growth. The Upper Rio Grande's large deposit of REEs, including the large Round Top deposit in Sierra Blanca, makes it an attractive destination for domestic REE mining businesses.

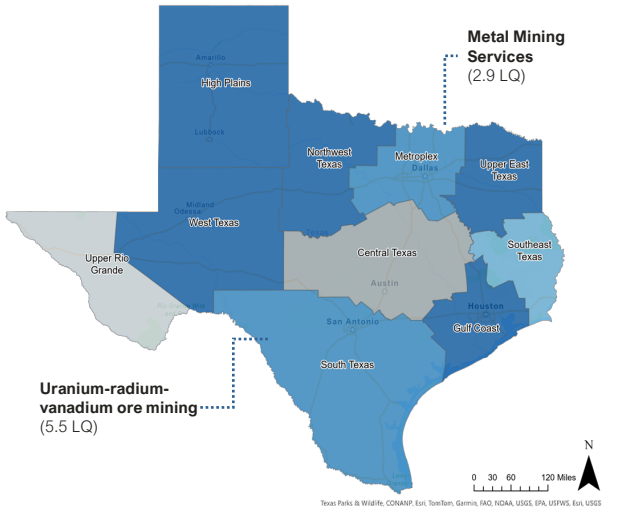
Texas is also leading innovation within the cluster. As a part of the Mining Innovations for Negative Emissions Resource Recovery program, The University of Texas at Austin is collaborating with top universities across the globe to develop market-ready technologies that will increase domestic supplies of critical elements. The research is being supported by a $5 million grant from the U.S. Department of Energy.

Between 2011 and 2021, the cluster experienced a decline in employment and an 8% increase in GDP. However, by 2032, cluster GDP is estimated to grow to $20 billion, representing a 27% increase from 2022.

Cluster Fast Facts

	Workforce	GDP	Exports
Magnitude	**14K** *Total Employment (2021)*	**$11B** *GDP Contribution (2021)*	**$0B** *Foreign Exports (2021)*
Share	**16%** *Share of U.S. Cluster Total Emp. (2021)*	**32%** *Share of U.S. Cluster GDP (2021)*	**1%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**-24%** *Total Employment Growth (2011 – 21)*	**8%** *GDP Growth (2011 – 21)*	**-67%** *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

Rare Earth Elements and Mineral Mining in Texas

Nonmetal Mining

The foundation of Texas' communities and industries are formed in part by the Nonmetal Mining cluster. Stone and clay — which are principal components in the manufacturing of cement — are used in the development of our streets and sidewalks. Sand is an essential ingredient in the construction of our homes, businesses, and schools. Sand is also a critical component in the extraction of oil and even used as an ingredient in toothpaste. Every industry depends on the Nonmetal Mining cluster, and development in Texas wouldn't be possible without the businesses and workers essential to the cluster's success.

The Nonmetal Mining cluster is comprised of eight industries, including the mining and extraction of a variety of nonmetal materials such as stone, sand, clay, potash, and phosphate.

Most regions in Texas have a higher concentration of Nonmetal Mining employment than the national average. The High Plains region is home to a Nonmetal Mining hub, supported by large deposits of valuable natural resources. The nonmetallic mineral service industry is seven times more concentrated in the High Plains region than the national average.

An increasing demand for sand to support the oil and gas industry has contributed to cluster growth. West Texas, which is located on the Permian Basin, has seen an increase in sand mines in recent years. As of 2022, the West Texas region was home to an estimated 24 sand mines. Of these, seven were mobile mines — innovative temporary mines designed to transport sand to oil and gas wells from nearby sand deposits, thereby reducing the cost and emissions associated with drying and transporting sand over longer distances.

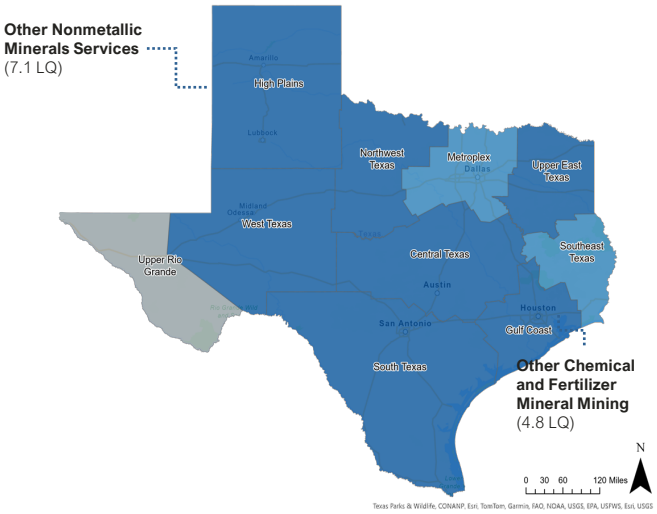
With Texas universities leading the way, mining technology has matured to incorporate machine learning, robotics, and automation to improve safety and efficiency. Within the Nonmetal Mining cluster, there is a particular emphasis on innovating to improve recycling to ensure resources are not exhausted and environmental impacts are minimized.

The cluster experienced 17% GDP growth from 2011 to 2021. By 2032, the cluster is expected to contribute $24 billion to the state's GDP, which would represent a 25% increase from 2022.

Cluster Fast Facts

	Workforce	GDP	Exports
Magnitude	**26K** *Total Employment (2021)*	**$14B** *GDP Contribution (2021)*	**$0B** *Foreign Exports (2021)*
Share	**18%** *Share of U.S. Cluster Total Emp. (2021)*	**32%** *Share of U.S. Cluster GDP (2021)*	**15%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**0%** *Total Employment Growth (2011 – 21)*	**17%** *GDP Growth (2011 – 21)*	**-18%** *Foreign Export Growth (2011 – 21)*

Cluster Employment Concentration (2021)



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