Energy Evolution in Texas

About the Energy Evolution Sector

The Energy Evolution sector is centered on the production and transmission of energy of all kinds, including oil, gas, and renewables. The sector composition reflects Texas' all-of-the-above energy strategy and positions the state to maintain its role as a global energy leader for generations to come. Within the Energy Evolution sector, the state has identified three target clusters: Electric Power Generation and Transmission; Oil and Gas Extraction, Production, and Transportation; and Renewables.

Texas' Energy Evolution sector powers the state, the country, and the world. Texas is the leading producer of oil, gas, wind, and utility-scale solar energy in the U.S. and home to large energy companies and innovative startups alike. Texas is internationally recognized for its strength in energy, and the sector will continue to be a cornerstone of our economy in the coming decades.

Energy Evolution Target Clusters

- Electric Power Generation and Transmission
- Oil and Gas Extraction, Production, and Transportation
- Renewables

Target Clusters Fast Facts

	Workforce	GDP	Exports
Magnitude	**819K** *Total Employment (2021)*	**$390B** *GDP Contribution (2021)*	**$58B** *Foreign Exports (2021)*
Share	**15%** *Share of U.S. Cluster Total Employment (2021)*	**22%** *Share of U.S. Cluster GDP (2021)*	**42%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**0%** *Total Employment Growth (2011 – 21)*	**-1%** *GDP Growth (2011 – 21)*	**152%** *Foreign Export Growth (2011 – 21)*

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

Sector Opportunities

Strengths

Texas is a global leader in the energy sector.
Our state has a long legacy as an energy sector leader. Texas represents over 40% of foreign exports produced by industries within the Energy Evolution target clusters across the U.S.

Texas' rich resources and mature infrastructure support the success of energy businesses of all types.
Texas' availability of land, network of infrastructure, and diversity of resources position the state to lead in a mix of energy clusters.

Texas is currently leading in oil, gas, wind, and utility-scale solar energy production.
In addition to being the top oil- and gas-producing state, Texas leads the nation in wind energy production and is growing in solar energy.

Opportunities

The state can continue to invest in Texas' energy leadership.
To remain a global leader in energy, the state must continue to bolster critical infrastructure that supports the growth of both historically strong and emerging energy clusters.

The state can continue to support diversified energy growth.
As global demand for energy rises, the state can invest in the growth of a variety of energy sources, including oil, gas, and renewables.

Texas is well-positioned to lead in hydrogen, geothermal, battery storage, and other renewables.
Texas can grow as a leader by continuing to expand its renewables and support new industries such as battery storage and hydrogen.

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.

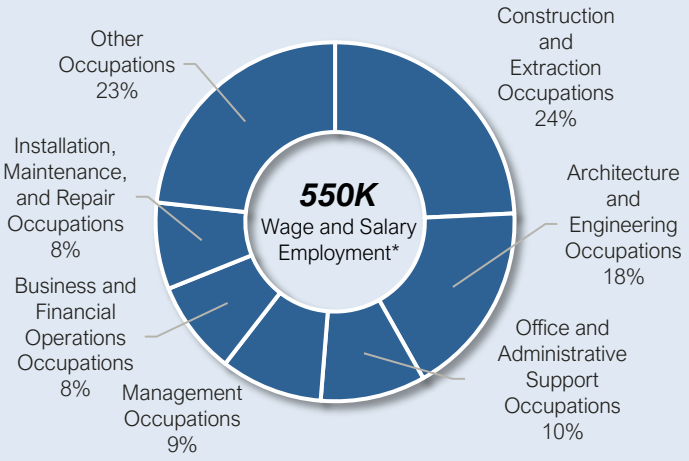
Energy Evolution in Texas

Target Sector Workforce Landscape

Texas' Energy Evolution sector offers a wide range of employment opportunities. The target clusters within the sector employ a diverse workforce, drawing from a variety of occupation areas including construction, extraction, architecture, engineering, administration, and management. Top occupations in the target clusters support the design, construction, and operation of machinery used in extracting natural resources, including construction trades workers, engineers, and extraction workers.

The most in-demand competency areas for Energy Evolution clusters include customer and personal service, mathematics, and the English language. In recent years, knowledge and skill areas that support problem-solving and decision-making, such as systems analysis and evaluation, are growing in importance to Energy Evolution clusters.

Workforce Distribution by Occupation Type (2021)



Key Detailed Occupations

Top Occupations by Emp. (2021)	Emp. (2021)
Construction Trades Workers	65,170
Engineers	53,780
Extraction Workers	41,300
Business Operations Specialists	37,110
Other Installation, Maintenance, & Repair Occupations	30,800

Top Occupations by Jobs Added (2018-21)	Jobs Added (2018-21)
Business Operations Specialists	7,940
Occupational Health & Safety Specialists & Technicians	2,920
Top Executives	2,200
Mathematical Science Occupations	350
Advertising, Marketing, Promotions, Public Relations, & Sales Managers	290

Key Competencies

Top In-Demand Competency Areas (2021)

Rank	Knowledge Area	Skill Area
1	Customer & Personal Service	Active Listening
2	Mathematics	Critical Thinking
3	English Language	Reading Comprehension
4	Administration and Management	Speaking
5	Mechanical	Monitoring

High Growth Competency Areas (2018-21)

Rank	Knowledge Area	Skill Area
1	Sales and Marketing	Systems Analysis
2	Administration and Management	Speaking
3	Computers and Electronics	Systems Evaluation
4	Customer & Personal Service	Writing
5	Design	Complex Problem Solving

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

Workforce Themes

Diverse Workforce

Energy Evolution businesses employ a wide variety of occupational types.

Engineering & Construction

Energy Evolution industries rely on a large engineering and construction workforce.

Growth in Optimization

Systems evaluation and problem-solving are growing in importance to the 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.

Energy Evolution in Texas

Electric Power Generation and Transmission

The Electric Power Generation and Transmission cluster is crucial to the Energy Evolution sector, as it converts the state's energy sources to usable power. Texas is the only state in the contiguous U.S. with its own power grid, which provides roughly 90% of the state's electricity. Strong energy demand combined with abundant and diverse natural resources for production, including oil, gas, and renewable sources, make Texas a prime location to grow an energy business.

The Electric Power Generation and Transmission cluster includes nine industries: eight industries representing electric power generation from different energy sources (biomass, fossil fuel, geothermal, hydroelectric, nuclear, solar, wind, and others) and one industry focused on power transmission and distribution. This cluster does not include the extraction of the raw materials that provide the electric power or any supporting activities. For example, the extraction of natural gas falls under the Oil and Gas Extraction, Production, and Transportation cluster. Notably, some industries in this cluster overlap with industries within the Renewables cluster.

Texas' electric power landscape is unlike that of any other state. It is served by a deregulated energy market, which allows providers to compete to provide the best and most efficient energy plans to customers. A network of power companies serve Texas' regions, with some of the largest providers including Oncor (North and West Texas), AEP (Central and South Texas), and CenterPoint (Gulf Coast). Texas' unique energy structure and competitive power prices are beneficial to industries of all types, particularly energy-intensive industries such as manufacturing.

Nearly all of Texas' regions have a competitive advantage in the Electric Power Generation and Transmission cluster; however, each region offers a unique specialization. West Texas and the High Plains, for example, have a very high concentration of wind power generation, while Upper East Texas is a hub of fossil fuel energy generation.

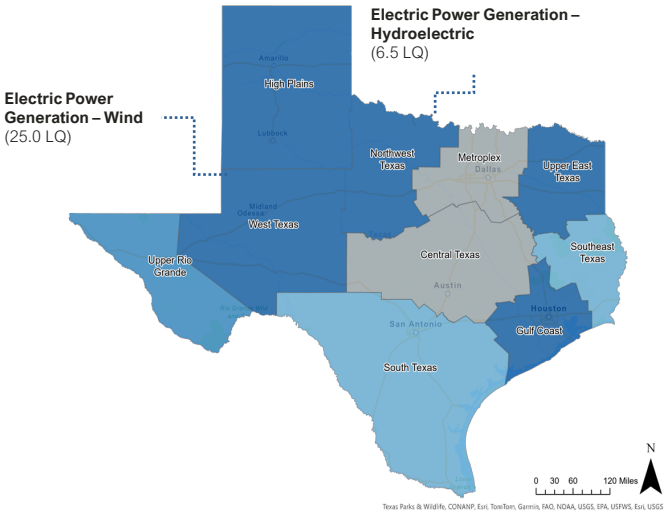
Texas is well-positioned for power generation and energy grid innovation, with various universities conducting research in this area. For example, Texas A&M University has a Smart Grid Center dedicated to researching optimal ways to store and transmit energy, and The University of Texas at Austin is partnering with the City of Austin and Austin Energy to launch a demonstrative smart grid program within the city.

The Electric Power Generation and Transmission cluster grew moderately from 2011 to 2021 and is projected to experience an 11% growth in GDP from 2022 to 2032.

Cluster Fast Facts

	Workforce	GDP	Exports
Magnitude	**43K** *Total Employment (2021)*	**$26B** *GDP Contribution (2021)*	**$0B** *Foreign Exports (2021)*
Share	**10%** *Share of U.S. Cluster Total Emp. (2021)*	**9%** *Share of U.S. Cluster GDP (2021)*	**10%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**8%** *Total Employment Growth (2011 – 21)*	**10%** *GDP Growth (2011 – 21)*	**-45%** *Foreign Export Growth (2011 – 21)*

Cluster Employment Concentration (2021)



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

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

Energy Evolution in Texas

Oil and Gas Extraction, Production, and Transportation

In 1901, the discovery of the Spindletop gusher in Beaumont marked the beginning of the Oil Age in Texas. Throughout the early 20th century, wildcatters across the state began finding major oil deposits from West Texas to the Gulf Coast, transforming Texas into the globally recognized oil and gas powerhouse it is today. An abundance of natural resources, skilled workforce, and mature network of cluster infrastructure support Texas' international leadership in oil and gas production and transportation.

The Oil and Gas Extraction, Production, and Transportation cluster consists of six industries, including the manufacturing of oil and gas field machinery and equipment, drilling and extraction of oil and gas, pipeline transportation, and other support activities.

If Texas were a country, it would be the world's fifth-largest oil producer and the third-largest producer of natural gas. The Permian Basin, which underlies West Texas and parts of surrounding regions, and the Eagle Ford Shale, which spans from South Texas to the edge of Upper East Texas, are home to some of the largest oil reserves in the world. Additionally, the coastal regions, especially the Gulf Coast, are hubs of offshore oil production. The state is connected by strong networks of cluster infrastructure, including 586,690 miles of oil and gas pipelines and 17,000 miles of natural gas pipelines.

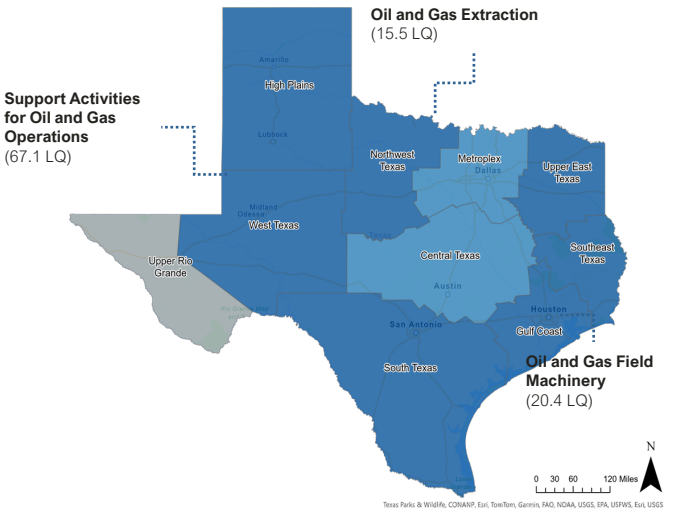
While many clusters are concentrated in one or two regions in Texas, Oil and Gas Extraction, Production, and Transportation is strong in nearly every region in the state. Different regions specialize in different components of the value chain. For example, the Gulf Coast region is a hub of oil and gas field machinery manufacturing, whereas West Texas is focused on extraction and supporting activities. Texas' natural resources have attracted large multinational oil and gas producers such as Chevron and Shell and enabled home-grown businesses such as Pioneer Natural Resources and XTO Energy to start up and expand in the Lone Star State. In most regions, the cluster's high concentration is driven by extraction and supporting activities, though the Gulf Coast and some other regions have highly concentrated field machinery manufacturing industries as well.

Texas is also a leader in oil and gas innovation. With an increasing global demand for sustainable energy, Texas' oil and gas producers have implemented practices like thermal desorption and oil reclamation, reducing the environmental impacts of the production process. Though the Oil and Gas Extraction, Production, and Transportation cluster saw minor drops in employment from 2011 to 2021, Texas remains a global cluster leader and is expected experience future growth. The cluster is projected to grow in both employment (20%) and GDP (43%) from 2022 to 2032.

Cluster Fast Facts

	Workforce	GDP	Exports
Magnitude	**550K** *Total Employment (2021)*	**$181B** *GDP Contribution (2021)*	**$58B** *Foreign Exports (2021)*
Share	**19%** *Share of U.S. Cluster Total Emp. (2021)*	**35%** *Share of U.S. Cluster GDP (2021)*	**45%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**-4%** *Total Employment Growth (2011 – 21)*	**-5%** *GDP Growth (2011 – 21)*	**157%** *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

Energy Evolution in Texas

Renewables

Texas is rich not only in oil and gas, but also in a wide range of renewable energy sources, including solar, wind, hydroelectric, and biofuels. The state's skilled labor force, abundance of natural resources, and plentiful land make Texas an ideal place to grow a renewable energy business.

The Renewables cluster includes 16 industries, encompassing renewable power produced via a variety of sources — biomass, geothermal, hydroelectric, solar, wind, and others — along with support activities for renewable energy sources such as construction of power and communication structures and turbine and generator manufacturing.

Since 2006, Texas has been the nation's leading producer of renewable energy, harnessing the power of its natural resources and geographies to generate more wind and solar power than any other state in the U.S. With energy demands in Texas and the country on the rise, Texas' all-of-the-above approach to energy production keeps the state powered up and builds our nation's energy independence.

Though all 10 of Texas' regions boast a competitive advantage in the Renewables cluster, each region offers a unique cluster strength. West Texas and its adjacent regions are leaders in solar and wind power. Regions in East Texas — and particularly Southeast Texas — have strength in other types of renewable energy such as biomass, supported by the area's agriculture and logging industries. Investments by major multinational renewable companies, such as a large wind farm built by E.ON in South Texas, as well as Texas-grown startups like Criterion Energy Partners in Houston, contribute to a rapidly growing Renewables cluster in the state.

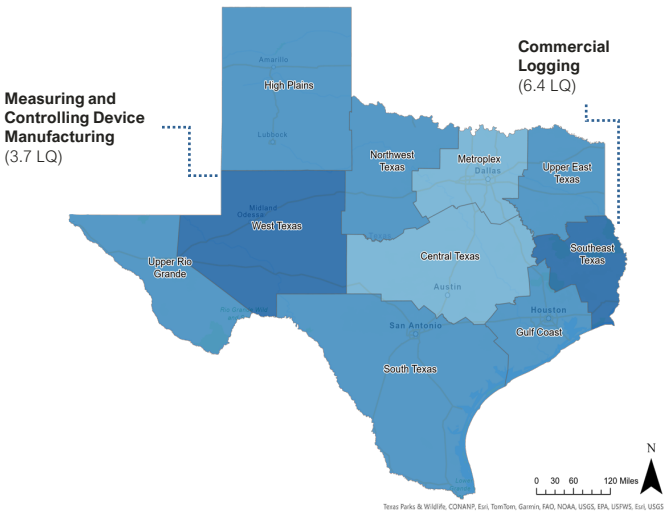
New innovations in renewable energy pose an opportunity for companies in the cluster. Breakthroughs like turbine-solar power units and solar canals pave the way for more efficient renewable energy production, and university programs like The University of Texas at Austin Energy Institute and the University of Houston's Energy and Innovation Division are investing in research into novel technologies to harness new power sources.

The cluster experienced moderate gains in employment (9%) and GDP (19%) from 2011 to 2021. The cluster is anticipated to show similar growth patterns in the coming decade, with a projected employment growth of 9% and GDP growth of 14% from 2022 to 2032.

Cluster Fast Facts

	Workforce	GDP	Exports
Magnitude	**260K** *Total Employment (2021)*	**$43B** *GDP Contribution (2021)*	**$1B** *Foreign Exports (2021)*
Share	**10%** *Share of U.S. Cluster Total Emp. (2021)*	**10%** *Share of U.S. Cluster GDP (2021)*	**6%** *Share of U.S. Cluster Foreign Exports (2021)*
Growth	**9%** *Total Employment Growth (2011 – 21)*	**19%** *GDP Growth (2011 – 21)*	**-23%** *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