



OKLAHOMA OIL AND GAS PRODUCTION AND INFRASTRUCTURE

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Major Oil Field - Ultimate recovery of more than 100 million barrels of oil

Major Gas Field - Ultimate recovery of more than one trillion cubic feet

Gas Processing Plant

At the end of 2000 Oklahoma had 70 gas processing plants concentrated in the gas-producing western half of the State. These have a capacity of 4,197 million cubic feet per day and handle 2,676 million cubic feet per day of natural gas. They produce an average of 7.85 million gallons of liquid products per day, which on an annualized basis is about 68 million barrels.

Oil Refinery

There were five major petroleum refineries operating in Oklahoma at the end of 2000, each with a daily capacity of over 45,000 barrels. An additional five, much smaller facilities are present that employ as few as 8 workers. These refineries produce a wide range of products including propane, gasoline, diesel, jet fuel, fuel oil, lubricants, petroleum coke, sulfur and asphalt. They have a combined crude-oil capacity of about 450,000 barrels (18,900,000 gallons) per day.

Petrochemical Plant

There are many facilities in Oklahoma that produce chemicals derived from petroleum, and these are commonly associated with refineries. The 17 plants in the State that employed at least 10 workers at the end of 2000 are shown on the map. These produce a variety of products, including lubricants, fertilizer, plastics, petroleum coke, and carbon black.

Oil and gas are organic compounds dominantly composed of hydrogen and carbon, hence, the name “hydrocarbons”. They form from microscopic organisms deposited with the sediments that make up sedimentary rocks as they are deeply buried in a geologic basin. Temperature and pressure increase with depth of burial, and over geologic time the organic remains are converted to oil and gas through thermal alteration. As oil and gas are generated they migrate from fine-grained source rocks into and through coarser, more permeable rocks. Because they are buoyant, if unimpeded they migrate upward until impermeable rocks block the path of movement. When such a barrier (seal) blocks further migration, its limits help to determine the size of the hydrocarbon trap into which the oil and gas accumulate. Most of Oklahoma’s oil and gas production comes from sedimentary basins of mostly Pennsylvanian age (about 290 to 323 million years). However, reservoirs across the State range in age from Precambrian (more than 570 million years) to Cretaceous (146 to 65 million years).

Oil seeps were known in Oklahoma long before the arrival of settlers. However, the first commercial (profitable) well was not drilled until 1896 near the city of Bartlesville, in present-day Washington County. Oil production throughout what was then known as the Indian Territories rose rapidly after the turn of the century, providing the impetus towards the granting of statehood in 1907. Annual production peaked at 278 million barrels in 1927, with many intermediate highs and lows seen since that time. Statewide production has declined continuously since 1984, near the end of the last major drilling boom. Cumulative oil production is about 14.5 billion barrels, with a 2002 production rate of 187,000 barrels per day. The maturity of the industry is highlighted by the fact that in 2002 the average production rate for an oil well in Oklahoma is only slightly more than 2 barrels per day. Consumption of petroleum products in Oklahoma is about 50% greater than the State’s production of crude oil.

Oklahoma’s 2001 annual crude-oil production of about 66 million barrels represents slightly more than 3% of the national output and makes the State the fifth largest crude oil producer in the country. This production rate represents one quarter of the peak reached in 1927. Using an average price of \$25 per barrel, annual production has a value of more than 1.5 billion dollars. At the end of 2000 the United States Department of Energy placed Oklahoma’s proved oil reserves at 610 million barrels.

Geologic Time Table

<u>Eon</u>	<u>Era</u>	<u>Period</u>	<u>Age</u> <u>(Millions of Years)</u>
Phanerozoic	Cenozoic	Quaternary	0
		Tertiary	1.6
	Mesozoic	Cretaceous	66
		Jurassic	140
		Triassic	210
		Permian	250
		Pennsylvanian	290
	Paleozoic	Mississippian	325
		Devonian	360
		Silurian	410
		Ordovician	440
		Cambrian	500
			590
	Precambrian		4550

Natural gas is almost always associated with oil, but in the early days was usually looked upon more as a nuisance or drilling hazard. In Oklahoma exploration did not target natural gas widely until the second half of the twentieth century. Cumulative gas production through 2001 is 89.2 trillion cubic feet, with annual production peaking in 1990 at a rate of about 6.2 billion cubic feet per day. 2002 production averages about 4.4 billion cubic feet/day. In contrast to the maturity of its oil industry, Oklahoma's natural gas industry is relatively young. Drilling in the State, especially exploratory drilling, is dominated by wells with gas objectives. For this reason gas production in the State is likely to remain strong well into the 21st century.

Oklahoma's 2001 annual natural gas production of about 1.6 trillion cubic feet represents about 8% of total U.S. production and makes the State the third largest gas producer in the country. This production rate is about two thirds of the peak rate reached in 1990. This volume, at a market price of about \$3 per thousand cubic feet, has a value of nearly five billion dollars. At the end of 2000 the United States Department of Energy placed Oklahoma's proved gas reserves at 13.7 TCF. Statewide gas production is about three times consumption.

The data cited here are taken from records compiled and maintained by the Oklahoma Corporation Commission, the Oklahoma Department of Commerce and the Energy Information Administration of the United States Department of Energy.

Glossary:

Barrel:	42 U.S. gallons.
Crude Oil:	Unrefined hydrocarbons that exist as a liquid in the subsurface reservoir.
Cubic Feet (of gas):	Amount of gas that will occupy a cubic foot at atmospheric pressure (sea level - 14.73 psi.) and 60 degrees Fahrenheit.
Geologic Basin:	A persistent depression in the surface of the earth into which sediments are deposited. It is also the focus for the generation of oil and natural gas.
Geologic Time:	Time of a wider scale than that spanned by human history. It is usually measured in millions or billions of years.
Mineral Spirits:	Alcohol-based petrochemical commonly used as a solvent.
Natural Gas:	Hydrocarbons that exist as a gas or vapor at ordinary surface temperatures and pressures.
Organic Compounds:	Material derived from biological processes. In a geologic sense this usually refers to hydrocarbons buried in sedimentary rocks.
Permeable:	Capable of transmitting a fluid.
Petroleum:	Hydrocarbons that exist as a liquid at surface temperature and pressure.
Sedimentary Rock:	Rock composed of the fragments, or sediment, produced from the erosion, and later compaction, of pre-existing rocks (ex: sandstone, shale). Also includes rocks formed from the secretions of ancient organisms (ex: limestone), and those formed through the evaporation of water (ex: gypsum).