

Oklahoma's mineral resources, produced in all 77 counties, include: nonfuel minerals such as limestone, gypsum, salt, clays, iodine, and sand and gravel; coal; and petroleum (crude oil and natural gas). In recent years, the mineral industry has been the State's greatest source of revenue. In 2004, the combined value of petroleum, coal, and nonfuel minerals produced in Oklahoma was about \$12 billion; it reached a high of nearly \$13 billion in 1982 and 1984. Total production of all minerals since statehood (1907) is valued at \$231 billion.

Although Oklahoma petroleum production accounts for about 95% of Oklahoma's annual mineral output, nonfuel minerals and coal represent a significant part of the State's current economy and an important source of future wealth. The total estimated value of

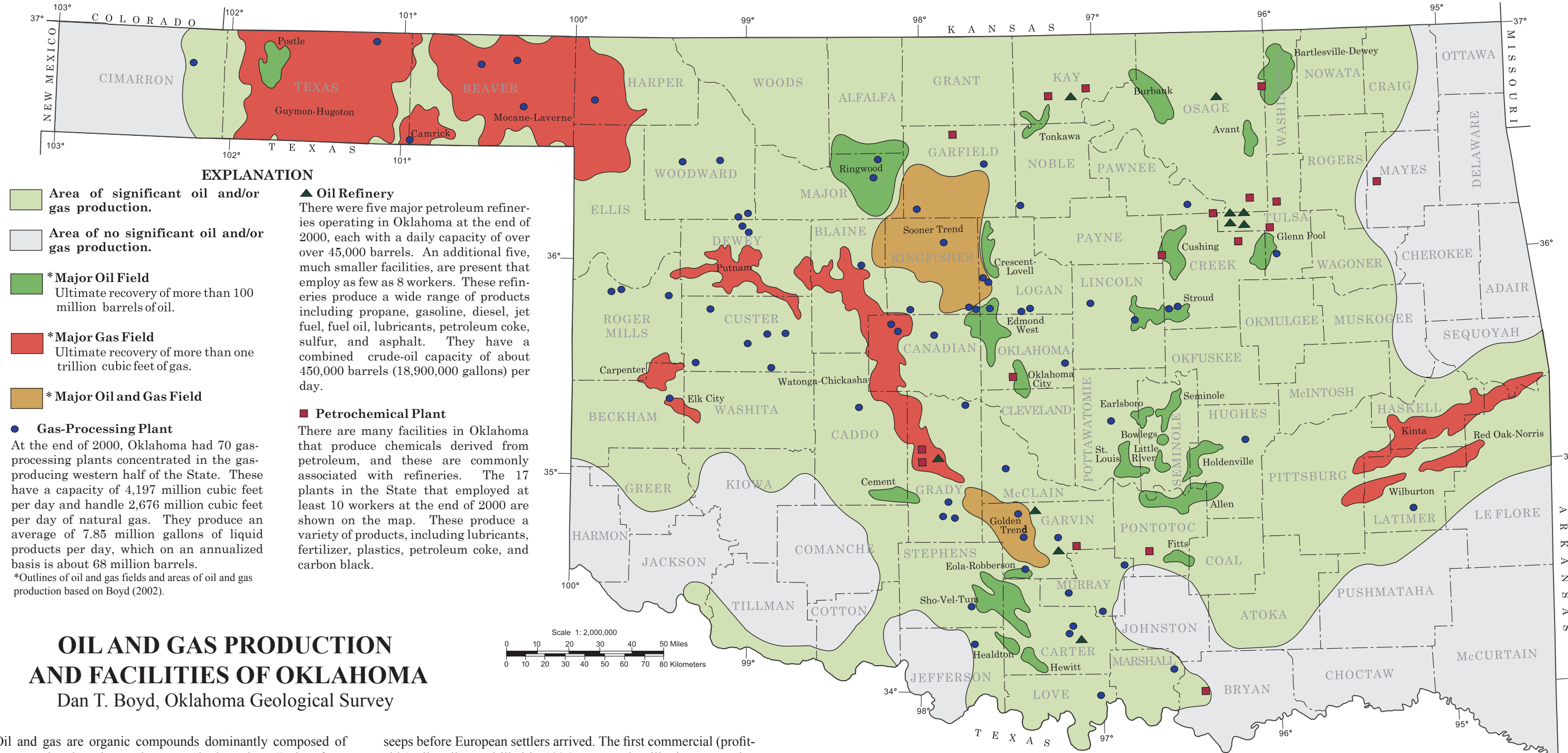
nonfuel-mineral and coal production in Oklahoma during 2004 was \$558 million. Leading commodities produced during 2004 were crushed stone (valued at \$195 million), portland cement (production data withheld), construction sand and gravel (\$54 million), coal (\$51 million), industrial sand and gravel (\$32 million), gypsum (\$21 million), and iodine (\$16 million). Other commodities now produced in Oklahoma, or for which there are current mining permits, include clays and shale, salt, lime, granite, rhyolite, dolomite, sandstone, volcanic ash, and tripoli. Deposits and resources that are not mined now, or with no current mining permits, include asphalt, lead, zinc, copper, iron, manganese, titanium, and uranium. Oklahoma ranked first in U.S. production of gypsum and iodine (Oklahoma is the only producer of iodine in the U.S.); second in tripoli production; fourth

in feldspar; seventh in common clays produced; and eighth in industrial sand and gravel.

Important reserves of certain high-purity minerals suitable as raw materials for manufacture of various chemicals include high-calcium limestone, high-purity dolomite, and glass sand in south-central and eastern parts of Oklahoma; gypsum and salt are widespread in western Oklahoma. Under proper economic conditions, the abundance and purity of these minerals would enable the manufacture of caustic soda, soda ash, chlorine, sulfur, sulfuric acid, lime, sodium silicate, and other chemicals. Oil, natural gas, and water, which are needed to manufacture these products, are plentiful in most of Oklahoma, and bituminous coal is abundant in eastern Oklahoma.

Historically, lead, zinc, and copper were very important to the

economy of Oklahoma, although metals are no longer produced. The Miami-Picher area of Ottawa County was a center for lead-zinc production in the world-famous Tri-State Mining District of northeastern Oklahoma, southeastern Kansas, and southwestern Missouri. Ottawa County's underground mines produced approximately 1.3 million tons of lead and 5.2 million tons of zinc between 1891 and 1970, when the last mine was closed. Oklahoma led the nation in zinc production almost every year from 1918 through 1945. In the southwest corner of the State, near Altus (Jackson County), a surface copper mine produced approximately 1.88 million tons of ore between 1964 and 1975. A decline in copper prices and an increase in production costs caused the mine to close.



OIL AND GAS PRODUCTION AND FACILITIES OF OKLAHOMA

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Oil and gas are organic compounds dominantly composed of hydrogen and carbon, hence the name “hydrocarbons.” They form from microscopic organisms, deposited with sediments that later become sedimentary rocks after deep burial in a geologic basin. Temperature and pressure increase with depth of burial, and over geologic time the organic remains convert to oil and gas through thermal alteration. The oil and gas migrate from fine-grained source rocks into coarser, more permeable rocks. Because oil and gas are buoyant, they migrate upward until impermeable rocks block the path of movement. Such a barrier (seal) blocks further migration; the geometry of the seal is a factor that determines the size of the hydrocarbon trap in which oil and gas accumulate. Most Oklahoma oil and gas production comes from sedimentary basins of Pennsylvanian age (287–320 million years ago). Reservoirs across Oklahoma, however, range from Precambrian (more than 570 million years ago) to Cretaceous (65–146 million years ago).

Native Americans in Oklahoma discovered and used oil from seeps before European settlers arrived. The first commercial (profitable) oil well was drilled in 1896 near Bartlesville, in present-day Washington County. Oil production increased rapidly after 1900, providing the impetus for statehood in 1907. Annual production peaked at 278 million barrels in 1927 with many intermediate highs and lows since then. Statewide production declined continuously since 1984, near the end of the last major drilling boom. Cumulative oil production in Oklahoma is about 14.7 billion barrels, with a 2005 production rate of 167,000 barrels per day. In 2005 the average production rate per oil well in Oklahoma was just more than 2 barrels per day, highlighting the maturity of the industry. Consumption of petroleum products in Oklahoma is about 50% greater than its production of crude oil.

Oklahoma’s 2005 annual crude-oil production of about 61 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 1927 peak. At

an average price of \$50 per barrel, annual production has a value of more than \$3.0 billion. At the end of 2005, the U.S. Department of Energy placed Oklahoma’s proved oil reserves at 588 million barrels.

Natural gas, almost always associated with oil, was considered a nuisance or drilling hazard in the early days. Exploration did not target natural gas widely in Oklahoma until the second half of the twentieth century. Cumulative gas production through 2005 is 95.6 trillion cubic feet; annual production peaked in 1990 at about 6.2 billion cubic feet per day. In 2005, production averaged about 4.4 billion cubic feet per day. Oklahoma’s natural-gas industry is relatively young. Drilling in Oklahoma, especially for exploration, is dominated now by wells with gas objectives. Gas production is

likely to remain strong well into the 21st century. In 2005, annual natural-gas production was about 1.6 trillion cubic feet, about 8% of U.S. production, making Oklahoma the third largest U.S. gas producer. The 2005 production rate is about two-thirds the peak reached in 1990. At a market price of about \$5 per thousand cubic feet, the 2005 volume has a value of nearly \$8 billion. At the end of 2005, the U.S. Department of Energy reported proved gas reserves in Oklahoma at 17.1 trillion cubic feet. Statewide gas production is about three times consumption.

Data cited here are from records compiled and maintained by the Oklahoma Corporation Commission, the Oklahoma Department of Commerce, and the Energy Information Administration of the U.S. Department of Energy.