OHIO GEOLOGY

GeoFacts No. 14

OHIO DEPARTMENT OF NATURAL RESOURCES • DIVISION OF GEOLOGICAL SURVEY

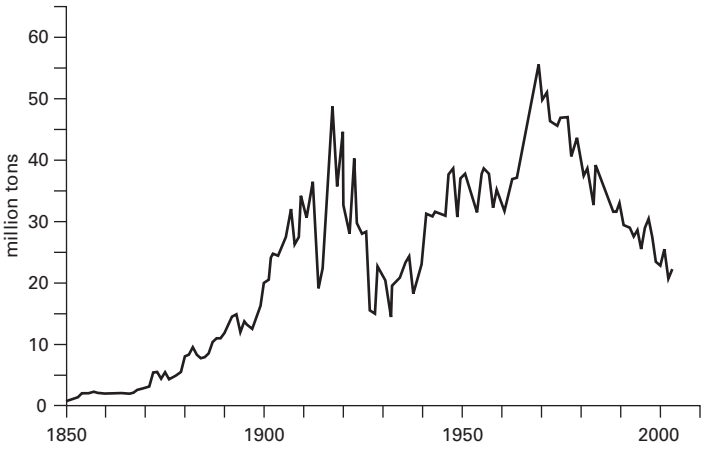
HISTORY OF COAL MINING IN OHIO

Coal has long been an important fossil fuel for the nation and Ohio. The existence of coal in Ohio was first noted as early as 1748 by frontiersmen and travelers who told of a coal mine on fire at the mouth of Lamanshikola Creek (present-day Sandy Creek) near Bolivar, Tuscarawas County. *A Map of the Middle British Colonies in America* published in 1755 noted the word "coals" along the Hockhocking River (present-day Hocking River) in the approximate location of Athens County. Also, the Moravians knew about the occurrence of coal in the Tuscarawas Valley before they made their settlement at Schoenbrunn in 1772.

Although the date when coal in Ohio was first mined will probably never be known, the first reported production of coal was in 1800, three years prior to Ohio's entrance as the 17th state of the Union. This reported production amounted to 100 tons of coal mined from Jefferson County. Since 1800, 3.7 billion tons of coal have been mined in Ohio. This tonnage consists of 2.3 billion tons produced from underground mines and 1.4 billion tons from surface mines.

Belmont County is the all-time leader in coal production in Ohio. More than 824.9 million tons have been produced from this county since 1816. In 2003, Belmont County led the state in coal production, as it has in most years, mining over 10.9 million tons. The second and third highest coal-producing counties historically are Harrison and Jefferson, followed by Perry, Athens, Tuscarawas, Guernsey, Meigs, Muskingum, and Noble Counties.

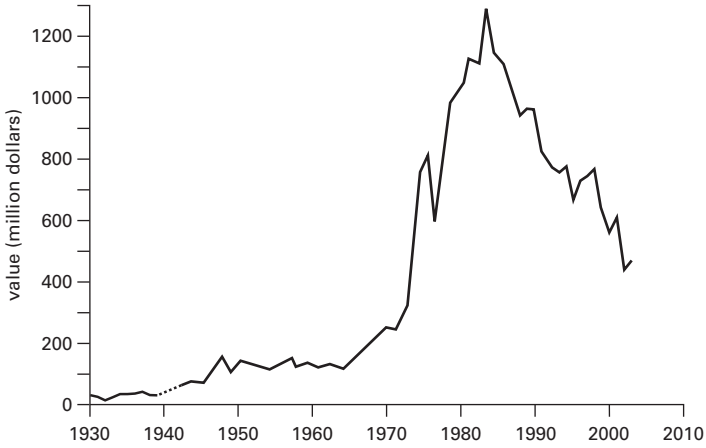
From its modest beginning in 1800, Ohio's coal production grew steadily but very slowly, never exceeding 1 million tons mined annually until the mid-1800's. During the first half of the 19th century, Ohio's early coal miners, primarily of English, Scottish, and Welsh descent, cut and loaded coal entirely by hand and moved the coal to local markets by means of wagons, carts, flatboats, and canal boats.



Ohio coal production, 1850-2000

Completion of Ohio's canal system during the 1830's and 1840's allowed the development of distant markets for coal mined from the interior of the state. Gradually coal replaced wood as a fuel for home heating and cooking, boilers in salt production, blast furnaces, steam mills, sawmills, some oil and gas drilling rigs, and steamboats on the Great Lakes and the Ohio River. The first coal-fired steamboat, the *Bazaleel Wells*, was built in 1820 at Steubenville, Ohio. In addition, coal was distilled to produce coal oil for home lighting or gas for street lighting.

During the mid-1800's, Ohio experienced a transformation from an agricultural to an industrial economy. This transformation provided a great boost to the development of Ohio's coal industry, making Ohio one of the largest coal-producing



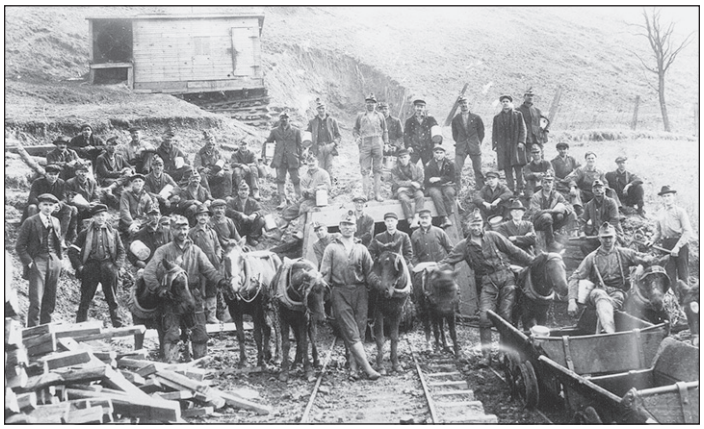
Value of Ohio coal, 1930-2000

and coal-consuming states in the nation. This transformation was triggered by the manufacture of equipment for railroads, machinery for increased farm mechanization, and supplies for the Civil War. By the mid-1800's, coal was recognized as an abundant, accessible, and inexpensive fuel, especially for the generation of steam power.

In the late 1800's, steam power was adapted to generate electricity. The first coal-fired electric-generating plant in the United States, the Thomas A. Edison Pearl Street Station in New York City, went on line in September 1883. The first coal-fired power plant in Ohio, the Tiffin (Seneca County) Edison Electrical Illuminating Plant, went on line in December 1883. Since the 1880's, the amount of coal consumed by power plants has increased such that currently 80 percent of the coal produced nationally is burned to generate electricity. The electric utility industry consumes 90 percent of the coal mined in Ohio.

From Civil War times to the Great Depression of the 1930's, Ohio's coal production steadily and rapidly increased because of improved methods of transportation and mining. Between 1850 and 1880, Ohio's railroad system grew at a tremendous rate, facilitating the movement of coal to market as well as becoming a major consumer of coal for steam-generated locomotion. By the late 1800's, mechanized mining equipment had been successfully introduced into many of Ohio's underground coal mines.

From 1800 to about 1948, most of Ohio's coal was mined underground. During most of the 19th century, coal was mined by



Mules, horses, oxen, goats, and dogs were used to haul coal in Ohio coal mines in the 19th and early 20th centuries (from Crowell, 1995, p. 68).

hand with the aid of animals such as mules, ponies, goats, oxen, and even dogs. Animals were used to haul coal from the working face to the tipple where the coal was loaded for shipment. By the 1930's, many of Ohio's underground coal mines had become fully mechanized with the introduction of coal-loading machinery.

The first account of surface mining of coal in Ohio was from a ravine near Tallmadge, Summit County, in 1810. Early surface mining in Ohio consisted of mining coal that was exposed along hillsides, using picks and shovels and in some cases horse-drawn scrapers. The coal and cover material was excavated back into the hillside, perhaps 10 feet or more, until removal of the cover was too impractical or difficult. At this point, the coal was mined by underground methods.

Early surface mining consisted of extracting coal that was exposed along a hillside, using picks and shovels (from Crowell, 1995, p. 18).

Following the Great Depression of the 1930's, coal production continued to grow, reaching a record of 55 million tons in 1970. This increase in Ohio's coal production was due primarily to larger, more efficient surface-mining equipment, such as the "Mountaineer" shovel and the "Big Muskie" dragline, and improved methods of transportation, such as conveyors and 20- and 40-ton trucks.

Because of advances in surface-mining technology, near-surface coal can be mined more easily, more quickly, more inexpensively, and with fewer people than coal from underground mines. As a result, there are now fewer underground mines and fewer coal miners. For example, in 1898 there were 1,155 underground mines operating in Ohio, compared to 7 in 2003; in 1908, there were 50,267 coal miners employed in Ohio coal mines, compared to 2,279 in 2003.

Throughout the 20th century, coal's dominant hold on the fuels market was repeatedly challenged and somewhat eroded by petroleum in the form of diesel fuel. However, as utility companies became major consumers of coal for the steam generation of electricity (see GeoFacts No. 16), Ohio's coal industry was able to survive the challenge in the competitive fuel market, and, in fact, coal production soared until 1970.

The cost of coal on a per-ton basis remained low and stable throughout most of the 20th century; since 1970, the price per ton of coal has skyrocketed nearly 470 percent to its present average price of about $25 per ton. This dramatic increase in price is a result of increased costs related to health and safety regulations, reclamation regulations, coal-mine permitting procedures, severance tax increases on underground and surface-mined coal, labor costs, inflation, and transportation costs.

Since 1970, Ohio's annual coal production has declined nearly 59 percent to its present (2003) level of 22.3 million tons. This drop in production is, to a lesser extent, due to the increasing regulation of surface-mine activity, reclamation, and health and safety issues, but is primarily the result of the Federal Clean Air Act of 1970 and its amendments in 1977 (CAAA77) and in 1990 (CAAA90), which placed stringent controls on the sulfur dioxide emissions from burned coal.

A modern coal miner kneeling to work in the Sterling Mining Company Sterling mine. Although today's underground coal mines are highly mechanized and automated through computers, a significant amount of work is done by hand just as it was in Ohio mines more than 100 years ago (from Crowell, 1995, p. 66).

What is the future of Ohio's coal-mining industry? There are those who say that the heyday of coal mining in Ohio has passed and the industry as a whole is on the wane. They cite as their evidence for a dying industry: Ohio's coal generally contains high amounts of sulfur (3.5 percent sulfur or greater), Ohio's coal production has steadily declined to about half of its 1970 level, several large underground mines have closed, coal companies have reorganized or downsized into smaller operations, some major companies have moved their operations from Ohio to other states, and stringent air-pollution-control legislation passed in 1990. All these factors have caused some to speculate that Ohio's coal production and the number of Ohio coal miners will continue to decline.

Although Ohio's coal-production level of 21 million tons in 2002 has not been lower since 1940, there are some who are optimistic about the future of coal mining in Ohio. These optimists cite as evidence for a promising future: the demand for electricity is expected to increase 2.3 percent per year through 2010; prices for natural gas are expected to double by 2010; reserves of domestic natural gas are expected to become depleted over the next 30-70 years; nuclear power plants are very expensive to operate, extremely expensive to build, and their 30-year licenses are very difficult to obtain; no nuclear power plants are planned for construction in Ohio; deregulation of the electric utility industry allows utilities to compete against one another in an open market for electric consumers and they may turn to Ohio coal as a least-cost fuel; and clean-coal technology, including scrubbers and fluidized-bed combustors (see GeoFacts No. 16), is available that would enable the burning of Ohio coal. Furthermore, Ohio has 25 coal-fired power plants that have 91 operating boilers. By 2010, more than half of Ohio's coal-fired boilers will be more than 50 years old and may be in need of retirement. There is growing speculation that these boilers will be replaced by boilers using clean-coal technology and that Ohio coal will be chosen as the fuel for these boilers.

FURTHER READING

Crowell, D. L., 1995, History of the coal-mining industry in Ohio: Ohio Division of Geological Survey Bulletin 72, 203 p.

_____ 1997, Coal: Ohio Division of Geological Survey Educational Leaflet 8 (revised edition).

_____ 1997, Coal mining and reclamation: Ohio Division of Geological Survey GeoFacts 15.

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• This GeoFacts compiled by Douglas L. Crowell • Revised May 2005 •

The Division of Geological Survey GeoFacts Series is available on the World Wide Web: http://www.OhioGeology.com