Coal

What Is Coal?

Coal is a **fossil fuel** formed from the fossilized remains of plants that lived and died millions to hundreds of millions of years ago, when parts of the Earth were covered with huge swampy forests. Coal is called a **nonrenewable** energy source because it takes millions of years or more to form.

The energy we get from coal today came from the energy that plants absorbed from the sun hundreds of millions of years ago. All living plants store energy from the sun. After the plants die, this energy is usually released as the plants decay. Under certain conditions, however, the decay is interrupted, preventing the release of the stored solar energy.

A few millions to four hundred million years ago, plants that fell to the bottom of the swamp began to decay as layers of dirt and water were piled on top. Heat and pressure from these layers caused a chemical change to occur, eventually creating coal, a **sedimentary** rock, over time.

History of Coal in America

Indigenous Americans used coal long before the first settlers arrived in the New World. The Hopi Tribe used coal to bake the pottery they made from clay.

European settlers discovered coal in North America during the first half of the 1600s. They used very little coal at first. Instead, they relied on water wheels and burning wood to power colonial industries.

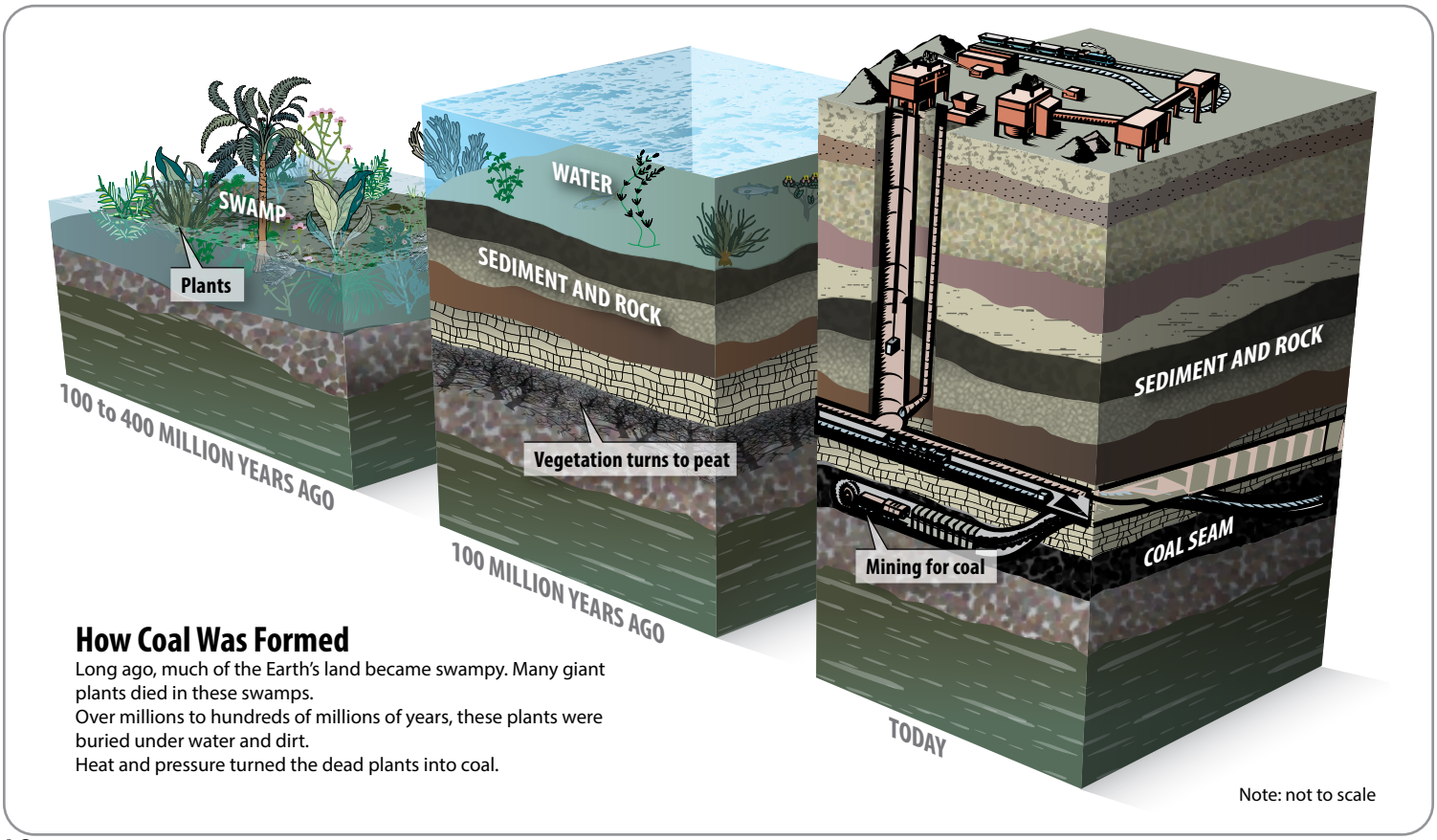
Coal became a powerhouse by the 1800s. People used coal to manufacture goods and to power steamships and railroad engines. By the time of the American Civil War, people also used coal to make iron and steel. And by the end of the 1800s, people began using coal to make electricity.

Today, coal provides 9.1 percent of America's energy needs, and 16.6 percent of our electricity comes from coal-fired **power plants**.

Coal Mining

Coal companies use two methods to mine coal: surface mining and underground mining.

Surface mining is used to extract about 60 percent of the coal in the United States. Surface mining can be used when the coal is buried less than 200 feet underground. In surface mining, the topsoil and layers of rock are removed to expose large deposits of coal. The coal is then removed by huge machines. Once the mining is finished, the mined area is **reclaimed**. The dirt and rock are returned to the pit, the topsoil is replaced, and the area is seeded. The land can then be used for croplands, wildlife habitats, recreation, or offices and stores.



How Coal Was Formed

Long ago, much of the Earth's land became swampy. Many giant plants died in these swamps.
Over millions to hundreds of millions of years, these plants were buried under water and dirt.
Heat and pressure turned the dead plants into coal.

Note: not to scale

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Underground (or deep) mining is used when the coal is buried deep within the Earth. Some underground mines are 1,000 feet deep! To remove coal from underground mines, miners are transported down mine shafts to run machines that dig out the coal.

Processing and Transporting Coal

After coal comes out of the ground, it goes to a preparation plant for cleaning. The plant removes rock, ash, sulfur, and other impurities from the coal. Cleaning improves the heating value of coal.

After cleaning, the coal is ready to be shipped to market. Trains are used to transport most coal. Sometimes, river barges and trucks are used to ship coal. For short distances, coal can also be moved using conveyors. Deciding how to ship coal is very important because it can cost more to ship than to mine it.

Coal Reserves and Production

Coal **reserves** are beds of coal still in the ground that can be mined. The United States has the world's largest known coal reserves. Depending on consumption rates, the U.S. has enough coal to last over 400 years.

Coal production is the amount of coal that is mined and sent to market. Coal is mined in 21 states. Wyoming mines the most, followed by West Virginia, Pennsylvania, Illinois, and Montana.

How Coal Is Used

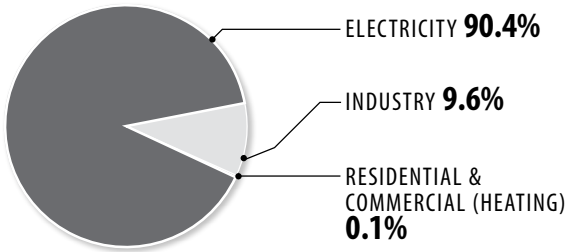
Roughly 90 percent of the coal mined in the U.S. today is used to make electricity. The steel and iron industries use coal for **smelting** metals. Other industries use coal, too. Paper, brick, limestone, and cement industries all use coal to make products. Very little coal is used for heating homes and buildings.

Coal and the Environment

Burning coal produces emissions that can pollute the air. It also produces carbon dioxide, a greenhouse gas. When coal is burned, a chemical called sulfur may also be released. Sulfur mixes with oxygen to form sulfur dioxide, a chemical that can affect trees and water when it combines with moisture to produce acid rain.

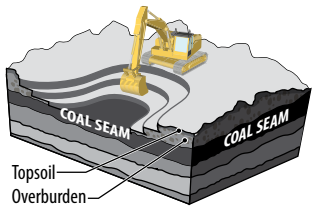
Coal companies look for low-sulfur coal to mine. They work to remove sulfur and other impurities from the coal. Power plants install machines called **scrubbers** to remove most of the sulfur from coal smoke so it doesn't get into the air. Other byproducts, like the ash that is left after coal is burned, once were sent to landfills, but this ash can be harmful to water supplies. Now the coal ash is being used to build roads, make cement, and make ocean reefs for animal habitats.

U.S. Coal Consumption by Sector, 2025

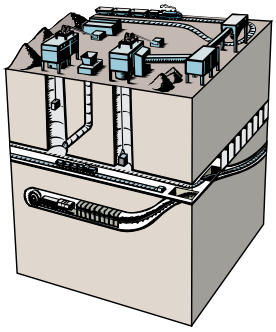


Data: Energy Information Administration
*Total does not equal 100% due to independent rounding.

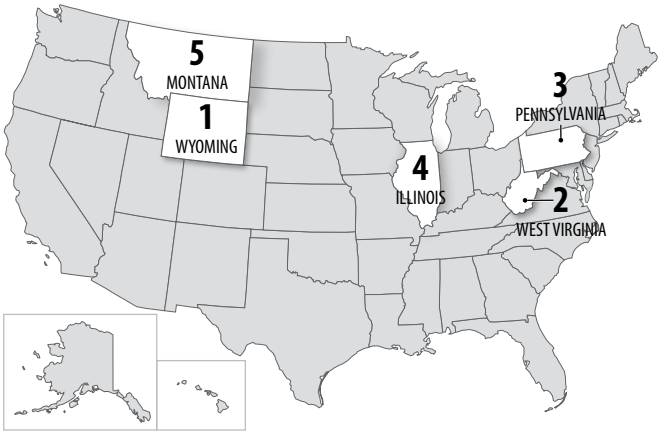
Surface Mining



Deep Mining



Top Coal-Producing States, 2024



Data: Energy Information Administration
*2024 is the most current data available at the time of publication.

COAL MINERS



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