

Coal Ash in North Carolina



According to the U.S. Energy Information Administration, about 37 percent of all electricity generated in the United States comes from coal. In the Carolinas, Duke Energy produces about 28 percent of its electricity from coal, and that number is expected to drop to 25 percent by 2015.

All coal naturally contains inorganic matter from the rocks and minerals in the coal seam where it was mined. Coal-fired power plants burn coal to make steam, and the steam turns turbines to generate electricity. When that coal is burned, the inorganic matter in the coal becomes coal ash. Coal ash has been accumulating at sites throughout the United States for more than nine decades.

Different types of coal ash

Coal combustion results in two forms of ash:

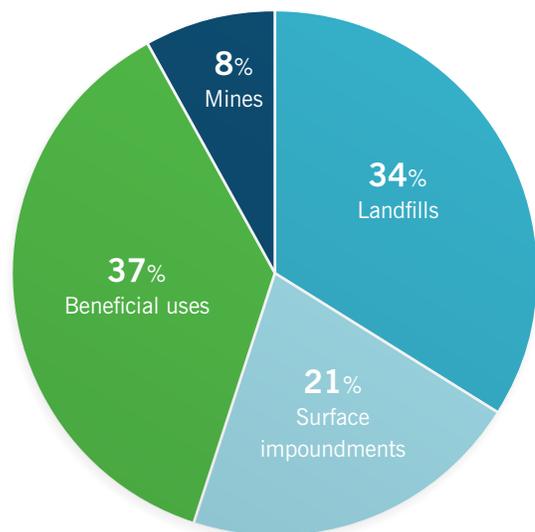
- **Fly ash** — a fine material similar to the consistency of talcum powder. Fly ash accounts for about 78 percent of the coal ash generated annually in the United States.
- **Bottom ash** — a coarser material collected from the bottom of coal-fired boilers.

In addition to fly ash and bottom ash, some power plants also produce synthetic gypsum as a byproduct. This happens at coal-fired plants that have emissions-control equipment called scrubbers installed to remove sulfur dioxide emissions.

A state and national issue

- Duke Energy has approximately 102 million tons of coal ash stored in North Carolina in 33 ash basins. According to the U.S. Environmental Protection Agency (EPA), there are approximately 676 ash basins throughout the United States.
- The head of EPA's waste office testified in February 2013 that "coal ash is one of the largest waste streams generated in the United States," with almost 136 million tons generated in 2008. Approximately 46 million tons are landfilled; 29 million tons are disposed of in surface impoundments, such as ash basins; 50 million tons are beneficially used; and 11 million tons are placed in mines.

Destinations of coal ash generated in the US



Storage, monitoring and safety

If the ash is not being reused or recycled, it can be stored dry in landfills or in water in ash basins. Duke Energy has already transitioned its larger coal-fired units to store fly ash in dry landfills and has multiple measures in place to safely and effectively manage the ash that is stored in basins. For example:

- **Ash dam inspections:** Inspections are conducted by company engineers and government regulators every year and by independent third parties every five years.
- **Surface water monitoring:** We routinely sample upstream and downstream of our coal-fired power plants.
- **Groundwater monitoring:** We have voluntarily monitored groundwater at our plants for years, expanding those efforts in 2010.
- **Fisheries monitoring:** We also sample fish tissue annually at several sites near our coal plants across North Carolina to monitor the health of aquatic life.

Closing ash basins

Electric utilities have several options when closing ash basins. Ultimately, the solution for basins is based on site-specific factors and may include a combination of the methods below. Any solution also must comply with federal regulations.

- Beneficial use
- Capping the ash with soil or a synthetic barrier
- Excavating and relocating the ash to a lined landfill

Reuse and recycling

Fly ash, bottom ash and synthetic gypsum are often grouped together and called coal combustion products, and the EPA has affirmed that these products are safe to reuse. In 2012, more than 51.9 million tons of these products were beneficially reused in the United States. In 2013, Duke Energy produced approximately 3.3 million tons of coal combustion products at its North Carolina plants, and almost 74 percent of those products were reused or recycled.

Fly ash can be reused in concrete products and projects, including roads, bridges and buildings. It also can be used as structural fill such as embankments or trenches that are built when native soil at a site or a roadway is not strong enough to support a structure. Bottom ash is often used to replace sand or gravel and can be used to manufacture concrete blocks, along with structural fills and embankments.

The synthetic gypsum from coal plant scrubbers is often used for wallboard manufacturing. About 40 percent of the gypsum wallboard manufactured in the United States uses synthetic gypsum from coal-fired power plants. In fact, the gypsum from the Roxboro Plant in Person County, N.C., is used at a wallboard manufacturing facility that was built next to the plant because of the nearby supply of synthetic gypsum.

Sources:

- Electric Power Research Institute
- Edison Electric Institute
- American Coal Ash Association
- U.S. Energy Information Administration
- Industrial Resources Council
- Duke Energy statistics