Clinch River Plant's three generating units each have capacity of 235 megawatts (MW), for total plant capability of 705 MW. Two units were placed into operation in 1958 and the third in 1961. The plant has five mechanical draft cooling towers.

Clinch River Plant made power generation history in 1960 when it became the first power station ever to operate over a full calendar year at a heat rate below 9,000 British thermal units (Btu) per kilowatt-hour (kwh) generated. Heat rate is a measure of plant thermal efficiency. The lower the heat rate, the more efficiently the plant converts coal to electric energy. More than 30 years later, in 1993, Clinch River was the most efficient plant on the AEP System with a heat rate of 9,293 Btu/kwh. It has been the most efficient AEP plant 13 different years.

As part of Appalachian Power’s efforts to comply with the U.S. EPA’s Mercury and Air Toxics Standards (MATS), Units 1 and 2 are being converted to run on natural gas. The two units will have a combined capacity of 484 MW. Unit 3 will be retired in mid-2015.

*Quick Facts* About Clinch River Plant

- **Location:** Along the Clinch River near Carbo (Russell County), Virginia
- **Capacity:** 705 megawatts (MW)
- **Stack height:** Two stacks, both of which are 459 feet high
- **Cooling tower:** Cools 110,000 gallons per hour, 20 degrees F.
- **Average annual coal consumption:** 1.6 million tons
- **Coal yard storage capacity:** 435,000 tons
- **Average daily coal consumption:** 5,200 tons per day (at full capacity)
- **Number of employees:** 58

**How We Generate Electricity**

Coal arrives by rail or truck from nearby mines and is stored in the plant’s coal yard. Conveyor belts carry the coal into the plant where pulverizers grind the coal into a fine, talcum powder-like consistency. The powdered coal is injected into the boilers where it burns at high temperatures, turning water that circulates in the boilers to steam.

The steam is directed into the turbines, where it turns blades (much like wind turning a windmill). The spinning turbine drives a generator that produces electricity.

Clinch River’s generators produce electricity at 15,500 volts. Transformers outside the plant step up the voltage to 138,000 volts so that it can be transmitted efficiently to customers’ homes and businesses.

American Electric Power

American Electric Power is one of the largest electric utilities in the United States, delivering electricity to more than 5 million customers in 11 states. AEP ranks among the nation’s largest generators of electricity, owning nearly 36,000 megawatts of generating capacity in the U.S. AEP also owns the nation’s largest electricity transmission system, a nearly 39,000-mile network that includes more 765 kilovolt extra-high voltage transmission lines than all other U.S. transmission systems combined. AEP’s headquarters are in Columbus, Ohio.
Clinch River Plant employees take great pride in providing electricity while protecting air and water quality, recycling materials and maintaining an exemplary record of public and work safety.

- Low NOx burners and overfired air systems reduce nitrogen oxide (NOx) emissions by up to 60 percent. The low NOx burners control the way coal is burned to reduce the formation of NOx, and the overfired air design injects air after the burning zone to enhance combustion. This infusion of air limits the formation of nitrogen dioxide, thereby reducing the formation of NOx, a precursor to ozone.

- In 2009, selective non-catalytic reduction (SNCR) systems began operating on all three units. SNCR technology injects a solution of urea (an ammonia-based compound used in common fertilizer) and water into the boiler at specific locations to create a chemical reaction that converts NOx into nitrogen and water.

- Electrostatic precipitators remove more than 99 percent of fly ash particles produced by coal combustion. In precipitators, fly ash from burning coal passes through electrically-charged plates, which pull the ash particles out of the exhaust gas stream. The precipitator installations were complete in 1975 at a cost of $25 million and replaced mechanical collectors installed at the time the plant was built.

- Clinch River operates a sulfur dioxide mitigation system that was installed in 2008-9 at a cost of $25 million.

- A dry fly ash collection system on each precipitator is designed to remove 50 tons of fly ash per hour continuously through the 32 hoppers on each unit. This dry fly ash is collected in an ash silo 80 feet high and 36 feet in diameter, capable of holding 2,000 tons.

- Clinch River Plant generates approximately 223,000 tons of fly ash and bottom ash each year. Much of the ash is landfilled and a small amount is sold for beneficial use.

- Clinch River Plant uses an automated Continuous Emission Monitoring System (CEMS) to monitor stack gas emissions. This highly accurate system helps monitor sulfur dioxide, NOx and carbon dioxide emissions and opacity. The system was installed in 1994 at a cost of $3.1 million.

- Mechanical draft cooling towers provide the plant with a closed cycle cooling system. The plant uses water from the Clinch River to cool the steam back into water so that it can be re-circulated – reused in the power generation process. The closed system also means that heated water is not discharged back into the river.