

Cardinal Plant: How We Generate Electricity



Coal arrives at the station by truck, rail, or barge and is stored in the 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 steam generators, where it burns at high temperatures, turning water into steam.

The steam is then directed into the turbines, where it turns blades, much like wind turns a windmill. The spinning turbine drives a generator that produces electricity. Exhaust steam from the turbine is cooled in the condenser and returned to the steam generator to start the process again.

Electricity is generated the instant that a customer needs it. Cardinal's generators produce electricity at 23,000 to 25,000 volts. Transformers outside the plant step up the voltage to 138,000 and 345,000 volts, so that it can be transmitted efficiently to customers' homes and businesses.

Cardinal Station occupies a unique place in the history of electric power generation. It represents the first-ever alliance of an investor-owned electric utility — **American Electric Power (AEP)** — and a member-owned electric utility — **Buckeye Power**, the power generation arm of **Ohio's Electric Cooperatives, Inc.** — to construct and operate a power station to serve both sets of consumers. Buckeye Power is comprised of 25 rural electric cooperatives.

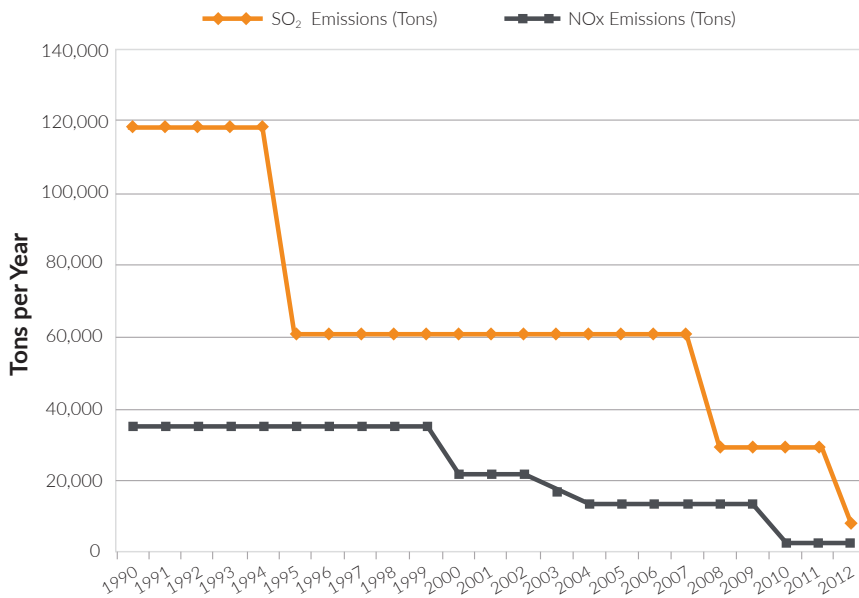
Cardinal Unit 1 is owned by AEP Generation Resources Inc., AEP's competitive generation affiliate. The unit was placed in commercial service in late 1967. Unit 2 was placed in commercial operation later that same year, and is owned by Buckeye Power. Each unit has generation capacity of 590 megawatts (MW). Unit 3, also owned by Buckeye Power, began operation in 1977, and has generating capacity of 620 MW. AEP operates the facility on behalf of all owners.

Ohio's Electric Cooperatives

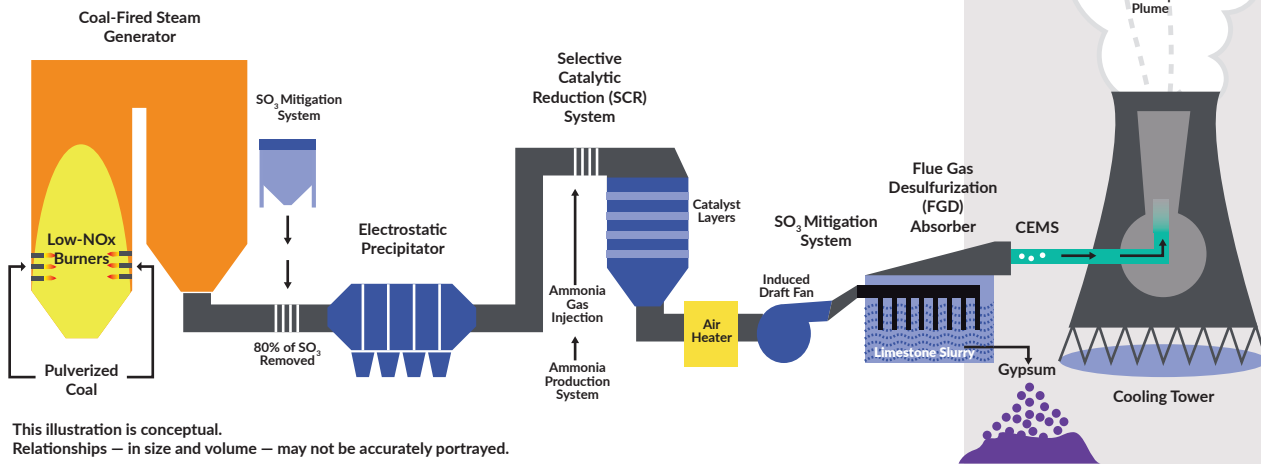
Buckeye Power is a member-owned generation and transmission cooperative supplying electricity to the electric distribution cooperatives in Ohio. The cooperatives' certified service territory covers nearly 40 percent of the land area in the state and encompasses 77 of Ohio's 88 counties. The cooperatives serve more than 380,000 homes, farms, businesses and industries.



SO₂ and NO_x Emissions Trends from Buckeye's Cardinal Energy



Unit 2 Cardinal Station Emission Control Systems — \$1.2 billion



Quick Facts About Cardinal Station

- Location: Along the Ohio River, south of Brilliant, Ohio
- Capacity: 1,800 MW total
- Stack height: units 1&2 — 1,000 feet
- Unit 3 cooling tower capacity: 16.8 million gallons per hour
- Average annual coal use: 5.2 million tons
- Coal yard storage capacity: 1.3 million tons
- Average daily coal use: 15,800 tons
- Employees: 310