

THE COAL FLEET AS AN INSURANCE POLICY

(Part 4 in a series from Americas Power)

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Insurance (noun) – a protective measure.ⁱ

The nation needs a fleet of coal-fired power plants fleet because the coal fleet produces affordable electricity, contributes to fuel diversity, ensures grid reliability and resilience, and maintains large stockpiles of fuel onsite that guarantee fuel security. In addition, people sometimes forget the fleet also serves as an insurance policy: first, as protection (or hedge) against the risk of spikes in the price of other fuels and, second, as protection against the possibility of electricity shortages during times, such as extreme weather, when other electricity sources are unable to obtain fuel.

Over the past several months, the Department of Energy's National Energy Technology Laboratory (NETL) and electricity grid operator PJM—which serves



65 million customers—have engaged in an enlightening back and forth about the importance of the PJM coal fleet during the 13-day Bomb Cyclone one year ago.ⁱⁱ About one-fourth of the nation's coal fleet is located within PJM's 13-state footprint (figure to the left).ⁱⁱⁱ

NETL's analysis concluded that PJM would have experienced "interconnect-wide blackouts" if coal-fired generation had not been available to meet the increased

electricity demand caused by the Bomb Cyclone.^{iv} On the other hand, PJM maintains that natural gas-fired power plants could have satisfied the increased demand for electricity, but the plants were not dispatched because natural gas was too expensive at the time. *Basically, they both agree the PJM coal fleet was important ... they just have different opinions as to why it was important.*

Electricity Shortages

According to NETL, the PJM region would have experienced electricity shortages during the Bomb Cyclone were it not for the region's coal fleet, which is underutilized during periods of normal electricity demand or when natural gas

prices are low. Based on their analysis, NETL concluded that pipeline capacity for delivering natural gas would not have been sufficient to supply enough fuel to PJM's gas-fired power plants, thus proving the resilience of the coal fleet and its importance as insurance against the possibility of electricity shortages.^v

High Gas Prices

Natural gas and power prices spiked dramatically during this period of unusually high electricity demand. For the last several days of the storm, higher demand for natural gas caused prices to exceed \$20/MMBtu.^{vi} On January 5, 2018, when PJM demand hit its storm-driven peak, natural gas prices were 30 to 40 times higher than gas prices just before the storm.^{vii} Importantly, NETL noted that prices would have been even higher if lower-cost coal-fired generation had not been available to replace gas-fired generation.

Our Take and Recommendations

The problem we want to highlight is not the disagreement between NETL and PJM about why the coal fleet was important during the Bomb Cyclone, but rather the fact that we're losing the coal fleet and the insurance it provides. We and others have raised concerns about the continuing retirement of fuel-secure electricity sources, especially the coal fleet. Nationwide, more than 600 coal-fired generating units in 43 states—40 percent of the nation's coal fleet—have retired or announced plans to retire. The NETL reports highlight the importance of fuel-secure electricity sources and the need to better understand risks to the electricity grid as we become increasingly reliant on sources that are not fuel secure.

Fortunately, PJM's 65 million customers did not have to find out what might have happened during the Bomb Cyclone if PJM had not had a coal fleet as insurance. However, some 29,000 megawatts (MW) of coal-fired generation in PJM have retired, so far. This is equivalent to shutting down the entire electricity supply of Ohio, Michigan, or Indiana.^{viii}

As to the disagreement between the two organizations, PJM president and CEO Andy Ott focused on the big picture when he testified before the Senate Energy and Natural Resources Committee last year shortly after the Bomb Cyclone: "The reality is ... 45,000 MW of the electricity that PJM delivered, which is 40 percent or more, was coal-fired. We could not have served customers without the coal-fired resources."^{ix}

We've offered recommendations in the past to help assure the electricity grid is reliable and resilient. Here are three of them again:

- Establish resilience **criteria**. Markets can use the criteria to value resilience attributes—such as fuel security—in the same manner they currently value reliability attributes. The Federal Energy Regulatory Commissions (FERC) could establish criteria; the North American Electric Reliability Corporation (NERC) could do it; grid operators could do it; or even Congress could do it.

- Lay out a resilience **roadmap**. FERC initiated a resilience docket 12 months ago, but stakeholders don't know what the next steps are or the timing of those steps.^x More transparency is needed. FERC should establish milestones that include a deadline for completing its review of grid resilience.
- Do resilience **analysis**. It's hard to understand why all grid operators don't do analysis to determine whether their grids are resilient during high impact low frequency events. Both PJM and ISO New England are doing this kind of analysis right now.^{xi} What about the Midcontinent Independent System Operator (MISO), the Southwest Power Pool (SPP), and the Electric Reliability Council of Texas (ERCOT)? Why doesn't FERC require all grid operators to do resilience analysis?

There are a lot of reasons why there should be a greater sense of urgency in addressing grid resilience: more coal retirements, increasing dependence on fuel-insecure sources of electricity, increasing instances of severe weather, and physical and cyber threats to the grid. More than 15,000 MW of coal-fired generation in 13 states retired last year, and at least 14,000 MW have announced plans to retire over the next five years.^{xii} We think coal retirements are likely to be even greater unless steps are taken soon to prevent or minimize them. To its credit, NERC is evaluating the potential consequences of premature coal and nuclear retirements.^{xiii} It's past time for FERC, MISO, SPP, and ERCOT to step up to the plate too.

ⁱ YourDictionary.com.

ⁱⁱ *Reliability, Resilience and the Oncoming Wave of Retiring Baseload Units*, NETL, March 13, 2018. *Perspective and Response of PJM Interconnection to NETL Report Issued March 13, 2018*, PJM, April 13, 2018. *A Review of PJM Interconnection's April 13, 2018, Response*, NETL, November 7, 2018.

ⁱⁱⁱ PJM coordinates the movement of electricity through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. PJM's electric generating capacity is comprised of approximately 75,000 MW of natural gas-fired generation, 59,000 MW of coal-fired generation, almost 34,000 MW of nuclear generating capacity, approximately 18,000 MW of renewables, and about 7,000 MW of other electricity sources. Source: SNL data base.

^{iv} *Reliability, Resilience and the Oncoming Wave of Retiring Baseload Units*, NETL, March 13, 2018.

^v NETL examined natural gas pipelines supplying PJM and found there was not enough physical capacity available during the Bomb Cyclone to supply the gas-fired power plants that would be needed in lieu of coal-fired generation. NETL noted that "natural gas pipelines are essentially full by the time they cross into Ohio, serving primarily space heating demand, and cannot be used to serve power generation demand farther east" and "as pipes move east, their capacity had become fully or over-subscribed, resulting in not only spiking gas prices but spiking electricity prices ..."^v Basically, NETL concluded that PJM's reserve natural gas generating capacity, though "mechanically available," would not have had enough fuel to serve load.

^{vi} *A Review of PJM Interconnection's April 13, 2018, Response*, NETL, November 7, 2018.

^{vii} *Ibid*, page 6.

^{viii} According to EIA's State Electricity Profiles, Indiana's electric generating capacity is almost 26,000 MW; Michigan's is almost 30,000 MW; and Ohio's is 30,000 MW. Data are for 2017. EIA's release date for the data was January 8, 2019.

^{ix} Senate Energy and Natural Resources Committee, "Full Committee Hearing to Examine the Performance of the Electric Power System Under Certain Weather Conditions," January 23, 2018. "FERC Initiates New Proceeding on Grid Resilience, Terminates DOE NOPR Proceeding," FERC, January 8, 2018.

^{xi} PJM, *Valuing Fuel Security*, April 30, 2018. ISO New England, *Operational Fuel Security Analysis*, January 17, 2018.

^{xii} ACCCE tracks announcements of coal retirements. For example, see our most recent summary at www.AmericasPower.org.

^{xiii} "Generation Retirement Scenario, Special Reliability Assessment," NERC, December 18, 2018.