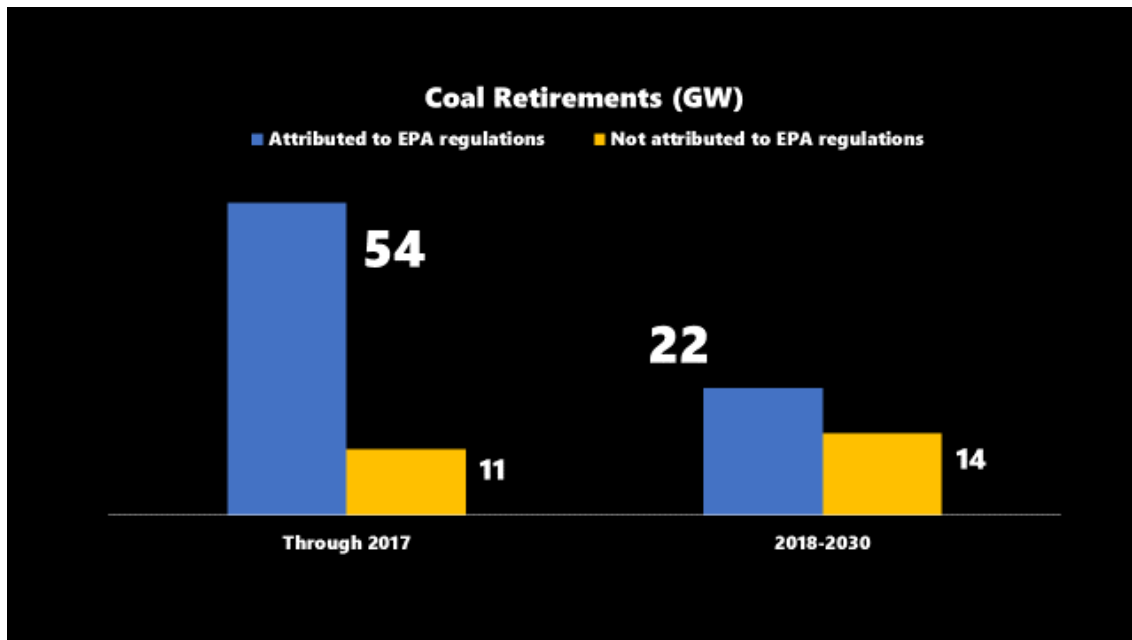


Retirement of Coal-Fired Electric Generating Units June 11, 2017

ACCCE has closely tracked the retirement of coal-fired electric generating units (“coal retirements”) for the past six years. We summarize coal retirements on a quarterly basis and share the information widely. The retirement information that follows is based on official announcements, statements, and regulatory filings by the owners of the retiring coal units; SNL Energy data; and publicly available information from other reliable sources.

In 2010, the U.S. coal fleet totaled 317,000 MW of electric generating capacity. Since that time, some 101,000 MW (581 electric generating units) have either retired or announced intentions to retire.ⁱ As of the date of this paper, 65,000 MW had actually retired and 36,000 MW are still slated for retirement. Power plant owners have cited a variety of reasons, often in combination, for these retirements. The reason (or reasons) usually fall into the following categories: cost to comply with EPA regulations; NSR settlements with EPA; regional haze settlements with EPA; low natural gas prices; age of the units; settlements with environmental groups; low demand for electricity; and electricity market conditions. The chart below shows retirements attributed to EPA regulations (blue) and retirements that have *not* been attributed to EPA regulations (gold).



EPA regulations have been cited in the case of 54,000 MW out of 65,000 MW of coal that have retired so far. Of the 36,000 MW not yet retired, 22,000 MW

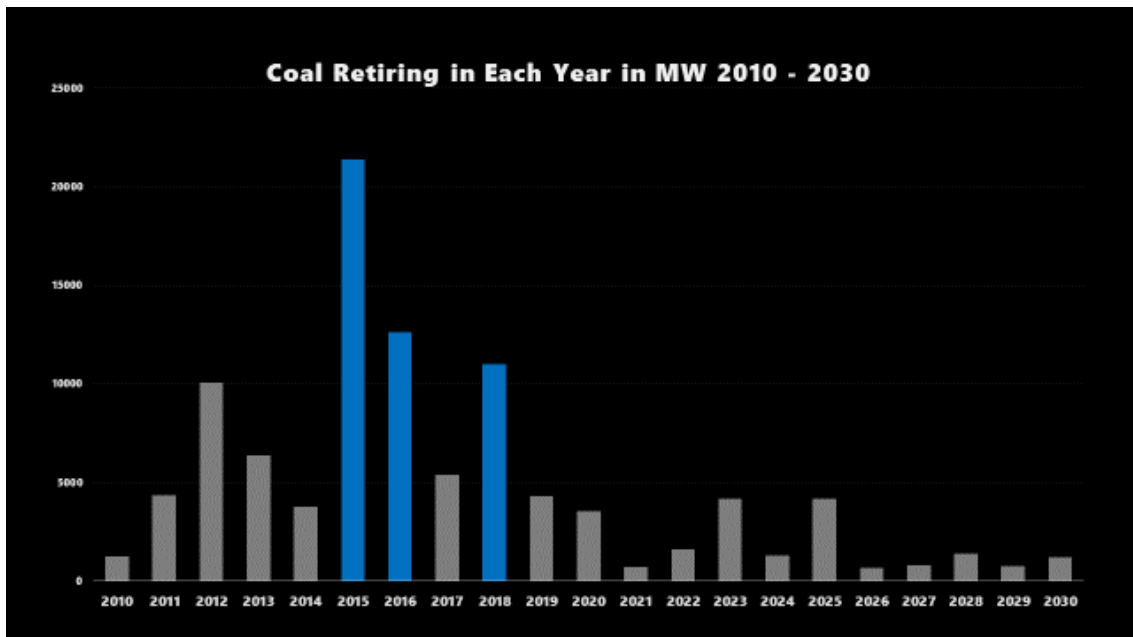
have been attributed to EPA regulations. Thus, EPA regulations have been cited for 80% of all coal retirements.

EPA Regulations Beginning 2010, EPA proposed and finalized a number of major regulations for the coal fleet, including the following:ⁱⁱ

- Cross State Air Pollution Rule — Proposed 2010; finalized 2011
- Coal Combustion Residuals — Proposed 2010; finalized 2015
- Mercury and Air Toxics Standards — Proposed 2011; finalized 2012
- Effluent Limitations Guidelines — Proposed 2013; finalized 2015
- Clean Power Plan — Proposed 2014; finalized 2015

In 2011, EPA estimated the cost of *all* air quality regulations for the electric power sector would total \$11 billion in 2020.ⁱⁱⁱ Later that same year, EPA estimated the MATS rule *alone* would cost \$10 billion per year.^{iv} Some analyses of the Clean Power Plan projected even higher compliance costs than for MATS.^v (By comparison, two major Bush-43 regulations for the electric power sector — the Clean Air Interstate Rule and the Clean Air Mercury Rule — were projected to cost \$4.6 billion and \$126 million, respectively, for the year 2015.^{vi}) Therefore, it is reasonable to conclude that the unprecedented cost of Obama-era regulations for the coal fleet would be a compelling reason for many coal units to retire, rather than incur substantial compliance costs.

Timing of Coal Retirements The chart below shows coal-fired generating capacity that has retired or has announced intentions to retire each year from 2010 to 2030.



The chart shows a dramatic spike in retirements in 2015 (blue) and 2016 (blue) totaling almost 35,000 MW of coal retirements. These spikes are consistent with MATS compliance deadlines, which were April 15, 2015, with the possibility of a one-year extension to April 15, 2016. It is also likely that the first ELG deadline in 2018 could account for another spike of more than 10,000 MW of retirements announced for 2018 (blue).

Statements by Plant Owners ACCCE has catalogued each announced coal retirement and retains documentation for each announcement. Announcements that cite EPA regulations as a reason for coal retirements include press statements, newspaper or online articles; filings with the Securities and Exchange Commission such as 10-K's and 8-K's; and integrated resource plans (IRP) filed with public utility commissions. Below are a few representative examples of announcements or filings:

- **First Energy** — In January and February 2012, First Energy announced the retirement of 21 coal-fired units totaling 3,300 MW. The announcements cited MATS, which was signed by the EPA Administrator in December 2011: “We ... determined that additional investments to implement MATS and other environmental rules would make these older plants even less likely to be dispatched under market rules. As a result, it was necessary to retire the plants ...”^{vii} Later, the president of First Energy Generation stated at an investor presentation that “MATS put these units out of business.”^{viii}
- **Georgia Power Company** — In 2013, Georgia Power Company issued a news release stating that it would seek approval from the Georgia PSC for the retirement of 15 coal-fired and oil-fired generating units: “The Company expects to ask for decertification of the units ... by the April 16, 2015 effective date of ... (MATS) ... Several factors, including the cost to comply with existing and future environmental regulations, recent and forecasted economic conditions, and lower natural gas prices contributed to the decision to close these units.”^{ix} Georgia Power Company retired or converted 12 coal units totaling 2,503 MW in 2015 as a result of this 2013 announcement. The IRP Georgia Power Company filed the same year with the PSC stated, “Unfortunately, the projected costs to comply with the MATS rule ... have placed significant pressure on the economic viability of several of the Company’s fossil generating units to the point that retirement is the most cost-effective approach.”^x

- **AEP** — In March 2012, American Electric Power (AEP) issued a news release stating that it had notified PJM and SPP of its “plan to retire more than 4,600 MW of coal-fueled power generation, primarily to comply with a series of ... (EPA) regulations.”^{xi} AEP also included these announcements in its 2013 Form 10-K (filed with the SEC), stating the intent of the company to retire 6,533 MW of coal capacity.^{xii}
- **TVA** – In April 2011, EPA announced a settlement with TVA regarding alleged NSR violations at 11 of its coal-fired power plants in Alabama, Kentucky, and Tennessee. The settlement required TVA to install controls, repower, or retire 51 units at these plants.^{xiii} Thus far, TVA has retired or announced the retirement of 32 units totaling 6,690 MW.

ⁱ Some 14,350 MW have converted or announced plans to convert to other fuels, primarily natural gas. We characterize these conversions as retirements for purposes of simplifying the narrative in this paper.

ⁱⁱ In addition, EPA has implemented regional haze regulations over the past eight years, starting with a formal “Finding of Failure to Submit State Implementation Plans” issued to 37 states in January 2009. In November 2011, EPA entered into a consent decree with environmental groups establishing a schedule to act on 45 SIPs (either approving them, or disapproving them and issuing FIPs). Over the past several years, EPA has disapproved numerous SIPs and imposed FIPs on coal-fired power plants in several Western states.

ⁱⁱⁱ EPA, *The Benefits and Costs of the Clean Air Act from 1990 to 2020*, April, 2011, Table 3-2. (Most of these costs are incurred by the coal fleet.) Figures in Table 3-2 are in 2006\$; we inflated them to 2010\$ using the U.S. Bureau of Economic Analysis’ Gross Domestic Product Implicit Price Deflator.

^{iv} EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, December 2011. (\$9.6 billion cost in 2006\$ is equivalent to \$10 billion in 2010\$.)

^v For example, NERA Economic Consulting projected annual compliance costs of \$29 billion to \$39 billion based on a number of scenarios for implementing the CPP. (NERA, *Energy and Consumer Impacts of EPA’s Clean Power Plan*, November 7, 2015.)

^{vi} 70 *Fed. Reg.* 25,166 (May 12, 2005); 70 *Fed. Reg.* 28,639 (May 18, 2005). Costs in 1999\$ for these rules were converted to 2010\$.

^{vii} Lehmann, Jason, “First Energy to retire 2,700 MW of coal capacity, citing EPA mercury standards,” *SNL Energy*, January 26, 2012.

^{viii} Poszywak, Amy, “First Energy exec: ‘MATS put these units out of business,’” *SNL Energy*, February 29, 2012.

^{ix} Georgia Power, “Georgia Power seeks approval to retire generating units at four plants,” January 7, 2013.

^x Georgia Power, “Georgia Power Company’s 2013 Integrated Resource Plan and Application for Decertification of Plant Branch Units 3 and 4, Plant McManus Units 1 and 2, Plant Kraft Units 1-4, Plant Yates Units 1-5, Plant Boulevard Units 2 and 3, and Plant Bowen Unit 6,” January 31, 2013.

^{xi} AEP, “AEP Notifies Reliability Organization Of Planned Plant Retirements,” March 22, 2012.

^{xii} American Electric Power Company, Form 10-K, for the fiscal year ended December 31, 2013.

^{xiii} EPA, *Tennessee Valley Authority Clean Air Act Settlement*, April 14, 2011.