



**Institute for Energy Economics  
and Financial Analysis**

# **U.S. on Track to Close Half of Coal Capacity by 2026**

**Seth Feaster**, Energy Data Analyst

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## Key Findings

**The U.S. is on track to close half of its coal-fired generation capacity by 2026, just 15 years after its 2011 peak.**

**Roughly 40%, about 80.6 gigawatts, of remaining U.S. coal-fired capacity is set to close by the end of 2030.**

**Fewer than 200 large-scale coal-fired units (50 MW or more) remain without announced retirement dates, and 118 of those are at least 40 years old.**

**Coal use by U.S. electric-power producers is falling quickly again after a short-lived post-pandemic recovery, possibly falling to only 400 million tons in 2023—less than half of what was used just 10 years ago.**



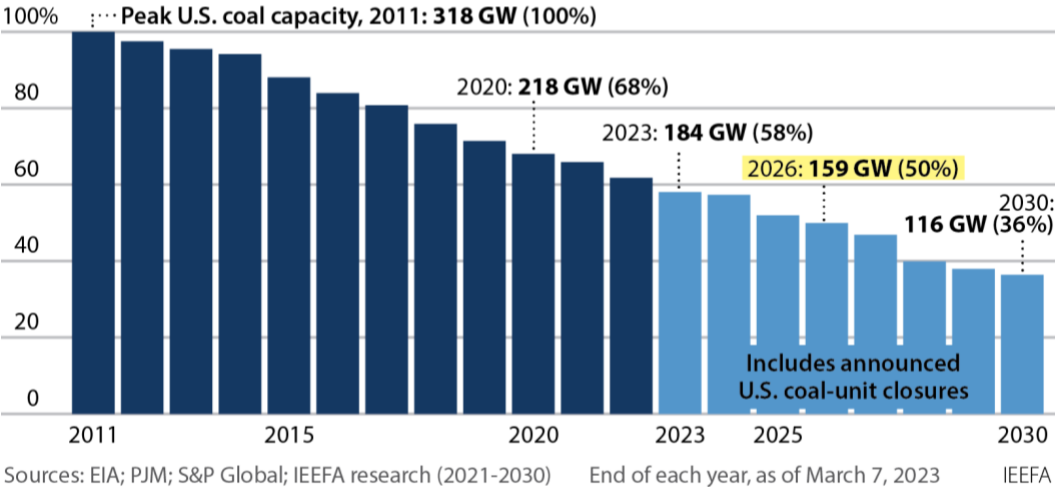
# Executive Summary

The United States is rapidly approaching a milestone in the electricity sector’s energy transition: By the end of 2026, it will have closed half of its coal generation capacity, which peaked in 2011. This is now the earliest date for this milestone since IEEFA began closely tracking coal-plant retirements, and it has moved up despite pandemic-induced supply disruptions that have led to delays in the completion of new generation resources and significant price volatility for gas, both of which contributed to some shifting dates for plant closures. By another measure—actual electricity generation—the U.S. has cut coal use even faster, producing less than 50% of coal’s 2011 power level in both 2020 and 2022.

By the end of 2026, based on current announcements from utilities, coal capacity will fall to 159 gigawatts (GW), down from 318GW in 2011. It is set to fall to just 116GW by 2030. And coal generation may continue to fall faster, as aging units face higher operation and maintenance costs, and utilities increasingly favor the responsiveness of gas generation and battery storage to complement the variable output from solar and wind, both of which continue to be built at a rapid clip.

**Figure 1: Half of Peak Coal-Fired Generation Capacity to Close in U.S. by 2026**

The peak of coal’s power generation capacity was in 2011, at 317.6 GW. Just 15 years later, in 2026, half of that capacity will be gone — replaced by gas, wind and utility-scale solar.



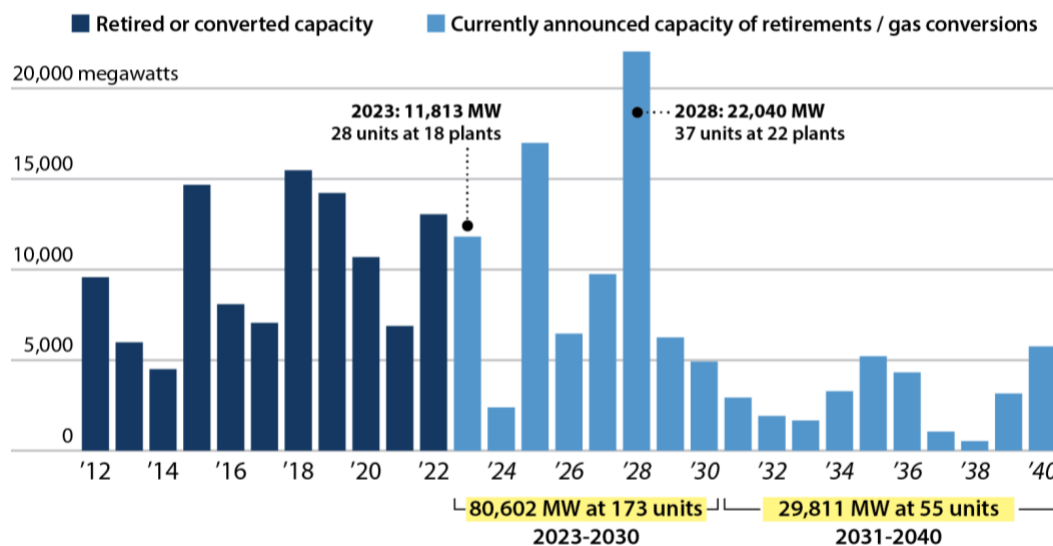
Together, these milestones portend an ongoing and deep restructuring of the U.S. coal industry as demand for the fuel continues to drop quickly. It is likely to result in significant mine closures, layoffs, and falling tax and royalty payments in coal-producing states.

## 80 GW of Coal Retirements Planned From 2023 Through 2030

From 2023 through the end of 2030, more than 80GW of coal generation is currently set to close, with about 10.5GW of that expected to be converted to run exclusively on gas. While there have been some delays to retirement dates over the past year (partly from replacement power projects missing construction deadlines), there has also been an acceleration in retirement dates at other plants. As a result, the overall pace of retirements has remained steady, but will be quite variable from year to year. For example, record levels of closures may occur in 2025, with 17GW announced, followed by just 6GW in 2026, and then surging to 22GW in 2028. Overall, utilities appear increasingly committed to these coal unit retirement plans as their long-term spending and resource plans are implemented. In fact, the most significant shift has been the addition of more planned wind, utility-scale solar, and battery storage capacity as utilities respond to financial incentives in the Inflation Reduction Act passed last year by Congress.

**Figure 2: Coal-Fired Electric Generation Retirements and Conversions**

173 coal-fired units in the U.S., with a total capacity of 80.6 gigawatts, are currently expected to close or stop using coal between this year and the end of 2030, according to utility announcements and filings.



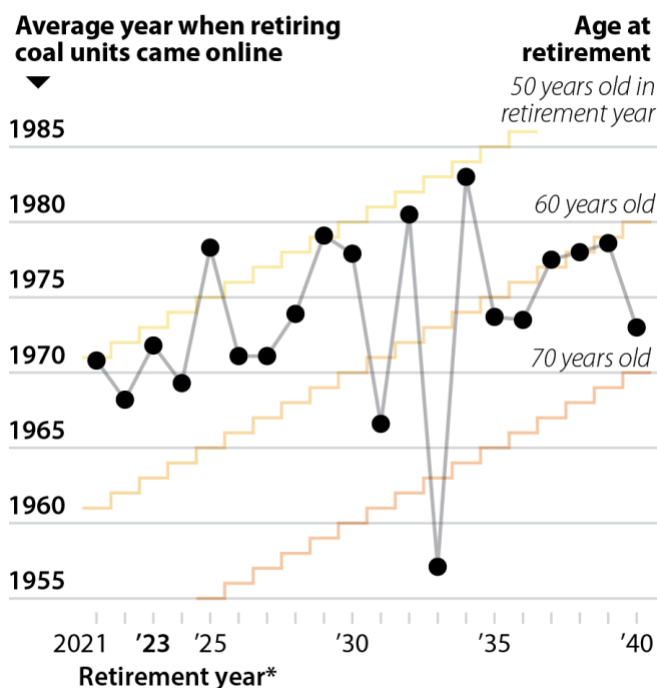
Sources: EIA; PJM; S&P Global; company reports; IEEFA research (2017-2040) As of March 10, 2023 IEEFA

Overall, the closures are widespread. The 173 coal-fired units closing between now and 2030 are located in 33 states, and another 55 units with announced closure dates between 2031 and 2040 are spread across 17 states. The closures also reflect the aging of the U.S. coal fleet. In most years, the average in-service date of the retiring units occurred in the 1970s—meaning that the majority of units will be more than 50 years old when they are closed. Into the 2030s, the average age at retirement rises to 60 years or more. For utilities, the rising cost of maintaining and operating these units, especially when cheaper, more flexible, and far more technologically advanced generation alternatives are available, makes retirement an increasingly attractive option.

As in past years, IEEFA expects the list of announced coal unit closures to continue to grow, shortening the list of the remaining units. The closure of the coal-fired units means a permanent shift in the mix of fuels used to power the U.S. electrical grid, since no new coal plants are being built to replace them. In 2011, when the peak of U.S. coal-fired generation capacity of 317.6GW was reached, coal was easily the most important fuel for the electric sector, responsible for 44% of the power produced.<sup>1</sup> But a boom in gas plants—largely using inexpensive gas from fracking—and the rapid growth in wind and utility-scale solar facilities has put an end to coal’s supremacy. By the end of 2022, U.S. coal-fired capacity fell below 200 GW, a 38% decline.<sup>2</sup> Power production has fallen even faster: In 2022, coal produced only 20% of the sector’s electricity, less than half its market share a decade ago.<sup>3</sup> Already this year, the U.S. Energy Information Administration (EIA) expects coal’s market share to fall to 17%, and with another 80GW closing by 2030, IEEFA estimates that there is a strong possibility that coal’s power-market share will fall to 10% or lower.<sup>4</sup>

**Figure 3: Average Coal Unit Retirement Age is 50+**

On average, most of the retiring coal-fired units were completed in the 1970s, and will be more than 50 years old by the time they are closed.



Source: IEEFA research

IEEFA

<sup>1</sup> 2011 Electric-sector total power production: 3,948 million megawatt hours. Coal: 1,718 MWh, or 44% (EIA [Electricity Data Browser](#)).

<sup>2</sup> Capacity figure from EIA, [February 2023 Electric Power Monthly](#), Table 6.2.C, Net Summer Capacity of Utility Scale Units Using Primarily Fossil Fuels and by State, December 2022 and 2021.

<sup>3</sup> 2022 market share calculated from net generation for electric power sector, 2022 (EIA [Electricity Data Browser](#)).

<sup>4</sup> 2023 market share calculated from EIA’s [March 2023 Short-Term Energy Outlook](#), Table 7d part 1, U.S. Regional Electricity Generation, Electric Power Sector.

## Fewer Than 200 Coal-Fired Units Are Left Without Retirement Dates

Currently, fewer than 200 electric sector coal-fired units rated at 50MW or more remain without announced closure dates, totaling 80.3GW of capacity—about the same as what is set to retire by 2030. Almost half of these remaining units are getting so old that they are unlikely to remain economically viable for much longer. At least 40, with 12GW of capacity, started running in the 1950s or 1960s, making the youngest at least 50 years old. Another 46 units, with 24GW of capacity, are now more than 40 years old, having come online in the 1970s.

In fact, there are not many coal plants among these that could be considered relatively new. This is a frequently overlooked aspect of the discussion around using carbon capture and storage (CCS) in an effort to make coal plants somewhat less polluting. Setting aside the high costs and limited technical success of CCS with coal plants, there are just 39 units that began operating after 2000 that do not yet have an announced retirement date, totaling less than 18GW. Of these, the youngest is the 933MW Sandy Creek Unit 1 in Texas, which came online in 2013. Even if this plant were to get a CCS system and it could be built within the next 10 years to be operational by 2033, the unit would already be 20 years old, limiting the future number of years over which the cost of a CCS system could be recovered, and almost certainly raising the price of electricity from the plant to uncompetitive levels.

With such a limited pool of potential candidates, adding CCS to coal plants is unlikely to be tried at more than a handful, undercutting any potential for the technology to be a savior for the coal industry.

## After a Surprisingly Muted Rebound, Coal Consumption Is Falling Quickly Again

From 2003 through 2008, U.S. utilities burned more than 1 billion tons of coal annually, and plants were run at high rates. This year, the EIA expects the power sector to use only 402 million tons, a 61% decline.<sup>5,6</sup> This is reflective of not just the number of coal unit retirements, but also how much less the remaining units are being used.

As recently as 2014, the average U.S. coal plant was run at more than 60% of its potential.<sup>7</sup> But in the following years, despite the closure of dozens of—presumably—the least-economic and least-efficient plants in the country, the remaining coal fleet was still being used less and less, running at

<sup>5</sup> Total coal consumption for electric power figures from [EIA Electricity Data Browser](#).

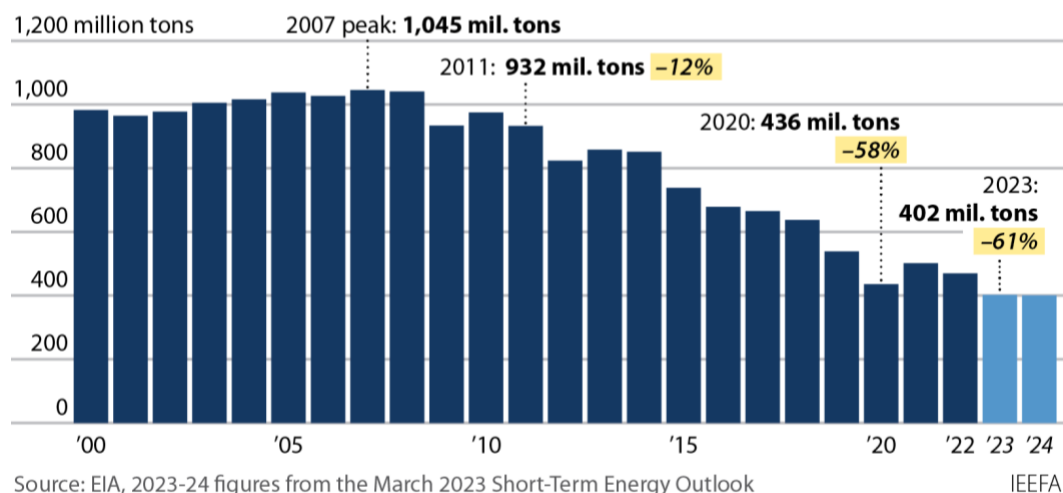
<sup>6</sup> EIA, [March 2023 Short-Term Energy Outlook](#), Table 6, U.S. Coal Supply, Consumption, and Inventories.

<sup>7</sup> Capacity factor figures from EIA, [Short-Term Energy Outlook](#), January 2023 and earlier issues of the Electric Power Monthly.

just 47.5% in 2019, when domestic coal consumption fell to 538 million tons, half of the amount used just a decade earlier.

#### Figure 4: Coal Consumption by the U.S. Electric Power Sector

U.S. power generators used over a billion tons of coal in 2003 through 2008, but then started to cut back quickly. In 2023 and 2024, the EIA forecasts electric-sector coal use to fall to about 400 million tons.



For coal companies, the worst was yet to come. In 2020, as the pandemic hit, demand for electricity fell sharply, and utilities across the country chose to idle their coal plants first, a sure sign that they were among their most expensive and least flexible sources of power available. Coal plants were used at just 40.5% of their potential generating ability in 2020, and coal consumption plummeted to 436 million tons, its lowest level in decades. Despite a rebound in 2021, coal use has started falling again and the EIA expects coal consumption by the power sector to be nearly 35 million tons below the 2020 level this year.<sup>8</sup> And coal use could be cut in half by the end of the decade, to about 200 million tons, based on the amount of coal-fired retirements, the scale of wind, solar and battery projects in development, the imminent startup of two big new nuclear units in Georgia, and the fact that overall U.S. power consumption has not been growing.

What's most surprising about this decline is how many factors—including soaring gas prices, spurts of very high power demand from heat waves, and a robust post-pandemic economic recovery—should have aligned in 2022 to provide one of the better opportunities for a coal rebound. Instead, it appears to have slipped away in the face of railroad-based delivery troubles; labor shortages; a resistance or inability to ramp up production; and the apparent reluctance of utilities to switch back to coal from gas. Even though the silver lining for the coal industry was higher prices that lifted industry profits and balance sheets after years of shaky finances, the benefits will likely be brief as the long-term structural decline resumes.

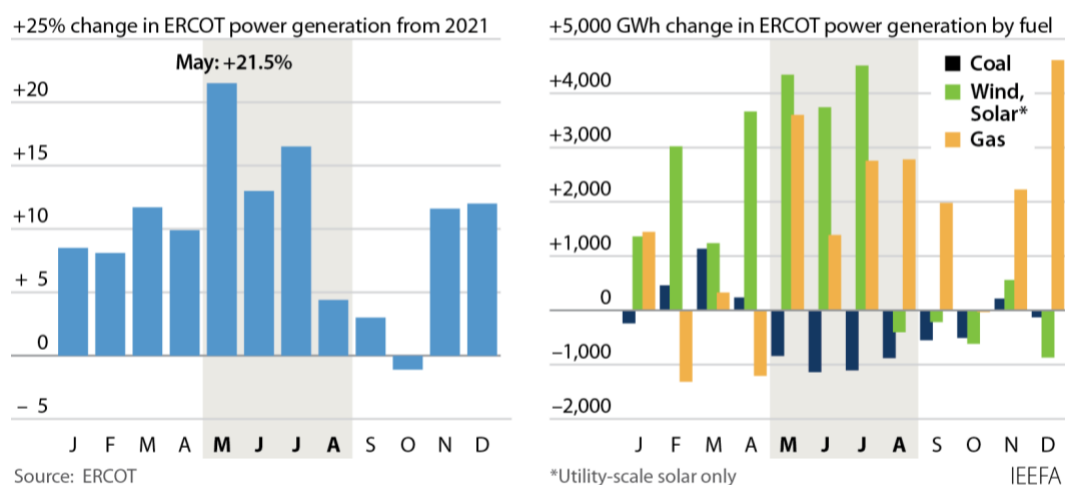
<sup>8</sup> EIA, [Short-Term Energy Outlook](#), March 2023.



One notable example of how coal-fired power underperformed in 2022 comes from Texas. The state is by far the largest power market in the U.S. The Electric Reliability Council of Texas, or ERCOT, is the grid system that supplies 90% of the state’s power. Texas is also the largest coal-consuming state in the country, burning 62 million tons in 2021, or more than 12% of all the coal burned by the electric power sector in the U.S. That’s almost twice as much as the next-closest coal burning state, Missouri, which burned 34 million tons in 2021.<sup>9</sup>

**Figure 5: Weather in Texas Drove Up Electric Demand in 2022, But Coal-Fired Power Was Down**

Even as electricity demand rose 9.8% in Texas for 2022, especially in early summer, coal-fired generation was actually down 4.4% for the year — and declined the most during key months of increased demand: May, June, July and August.



According to recently-released figures from ERCOT, power demand soared in 2022, up an astonishing 9.8% over 2021, largely the result of a series of heat waves.<sup>10</sup> Texas had the hottest July average monthly temperature in 128 years in 2022, and that came after an April, May and June that were all much higher than average.<sup>11</sup> Yet coal-fired power generation actually declined 4.4% for the year compared to 2021, and fell the most exactly when power demand was increasing—meaning that all of the extra power was supplied from other sources.

<sup>9</sup> EIA. [Electricity Data Browser](#).

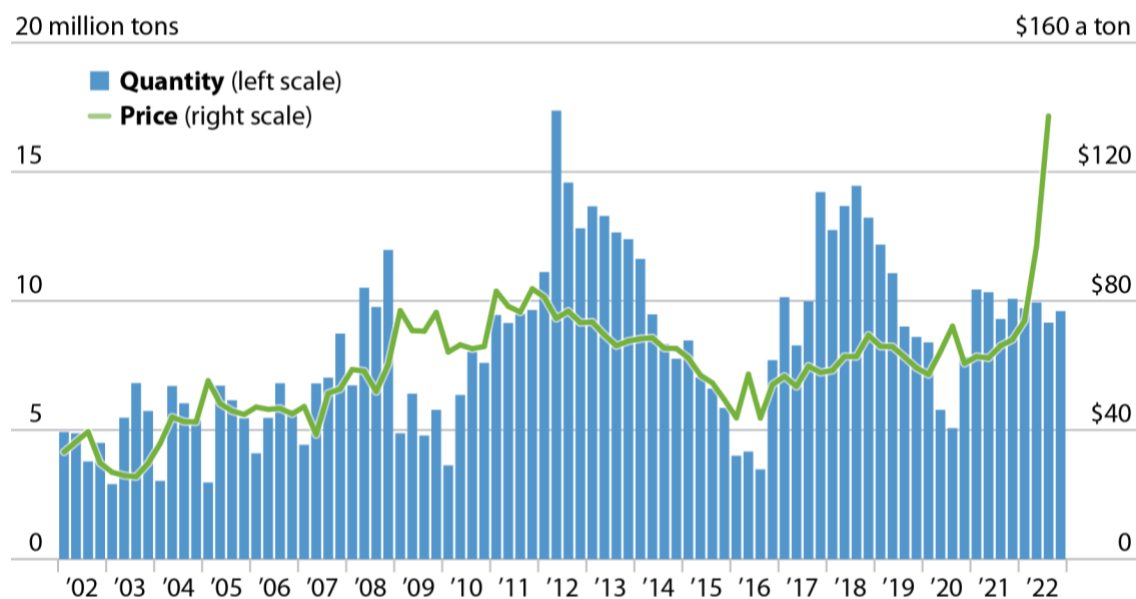
<sup>10</sup> ERCOT, [2021 and 2022 Demand and Energy Reports](#).

<sup>11</sup> National Oceanic and Atmospheric Administration. [National Temperature and Precipitation Maps](#).

## Exports: Despite High Prices, Volumes Remain Small

**Figure 6: U.S. Thermal Coal Exports, Quarterly**

Prices for U.S. thermal coal exports (used for power generation) were the highest in more than two decades in the third quarter of 2022, but volumes remain small, just 6%–7% of total coal production.



Source: Energy Information Administration

IEEFA

In the third quarter of 2022, the average price for U.S. thermal coal exports (the type of coal used at power plants) soared to \$137 a ton, double the typical price during most of the past decade.<sup>12</sup> That's proven to be a financial windfall for the coal companies that are able to ship their product overseas. Yet volumes remain relatively muted—about 10 million tons a quarter, considerably lower than during past export booms in 2012-2013 and 2017-2018. That's just 6%-7% of total U.S. coal production, and less than 10% of the amount of coal used by U.S. power plants in the same period.

Export volumes are also no match for how quickly the U.S. power sector is cutting coal use. Currently, the EIA expects thermal coal exports to be about 43 million tons this year, up about 5 million tons from 2022. At the same time, the EIA expects domestic coal consumption to fall more than 70 million tons, from 513 million tons in 2022 to 441 million tons this year, almost entirely because of lower use for power generation—and that's before the largest waves of coal unit retirements arrive in 2025 and 2028.

<sup>12</sup> EIA, [Coal Data Browser](#), Quantity and Price of Steam Coal Imports and Exports, quarterly.

## The Pace of Retirements Signals a Vastly Diminished Role for Coal in the U.S. by 2030

By the end of this decade, more than 200GW of the 318GW of peak coal-fired power will have been retired, based on current announcements. Coal consumption by the power sector could fall to just half of this year's expected level, to about 200 million tons, both because of the retirements and continued low use at existing plants due to low-cost competition from gas, renewables, and batteries.

Even further out, there are already 30GW of coal-fired retirements planned for 2031 through 2040, and more are likely, since more than half of the 80GW of coal units that do not yet have retirement dates will be at least 50 years old, and are facing growing maintenance and operations costs that will limit their economic viability.



Quite simply, utilities no longer see coal as part of their future.

For the mining companies that supply coal to power plants, and the communities where mines are located, this reduction in coal use signals more lean years of restructuring and downsizing are ahead, a trajectory that is becoming increasingly locked in. Some coal mining companies, well aware of the trend, have pivoted to focus on metallurgical coal, a much lower-volume but higher-priced market that serves the global steelmaking industry, mostly through exports. Meanwhile, U.S. utilities, all of which are engaged in long-term generation planning and capital spending budgets, have been finalizing their energy portfolio decisions: Most now include deep cuts or a complete phaseout in coal use (if they still have any), big buildouts of wind, solar, and battery storage, and a reliance on existing gas generation plants.

Reading through dozens of utility resource plans, financial statements, and announcements, the picture is clear: Quite simply, utilities no longer see coal as part of their future.

## About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. [www.ieefa.org](http://www.ieefa.org)

## About the Author

### Seth Feaster

Energy Data Analyst Seth Feaster has 25 years of experience creating visual presentations of complex data at the New York Times and more recently at the Federal Reserve Bank of New York. Feaster specializes in working with financial and energy data. He lives in New York.

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