DATA DISPATCH

Solar starts to rise as more coal plants shutter in Kentucky

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By Taylor Kuykendall and Stephanie Tsao
Market Intelligence

A surface coal mine in Kentucky in various stages of the mining and land reclamation process.
Source: S&P Global Market Intelligence

Kentucky, long a state where coal was as ubiquitous as bourbon and horses, is increasingly turning toward other energy sources, including solar, as its manufacturing base pushes for more sustainable power to drive its business.

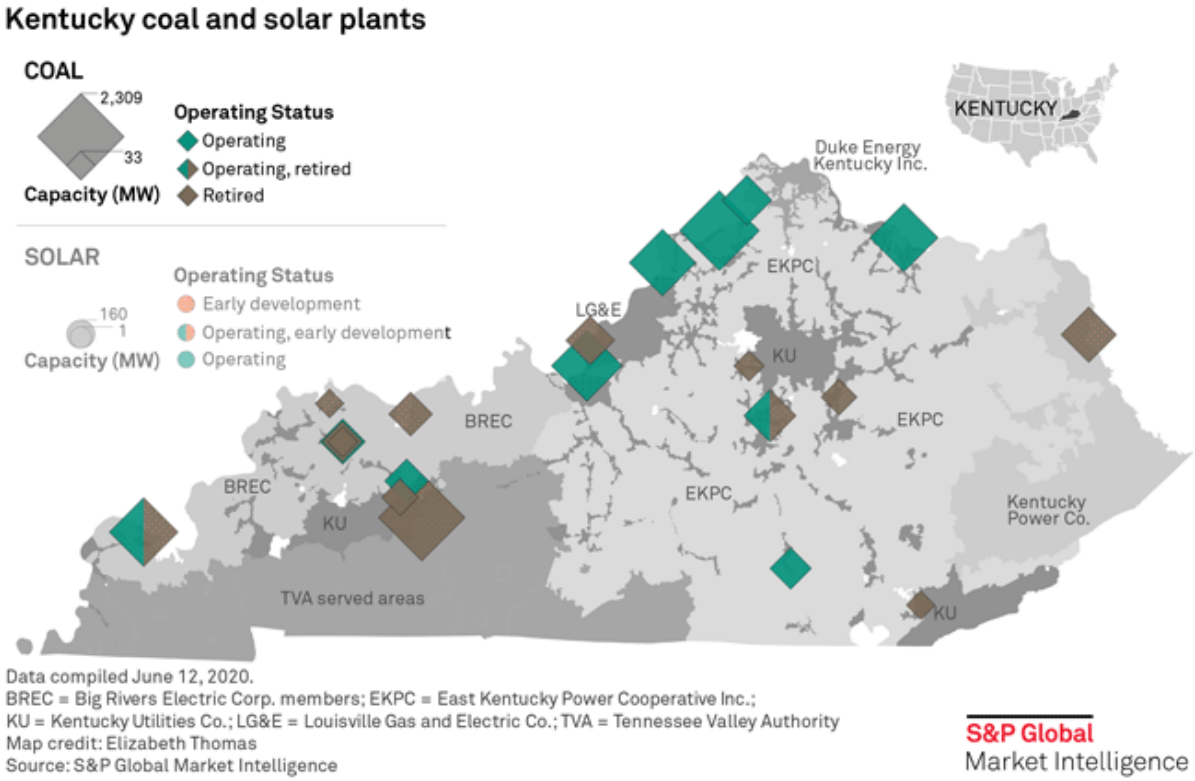
Coal still accounted for 73% of Kentucky's power generation in 2019 — the fourth-highest share behind West Virginia, Wyoming and Missouri — according to preliminary data reported to the U.S. Energy Information Administration. But solar energy is making substantial gains as coal plant retirements continue to limit the options for burning coal in the state. Coal has long been controversial for its emissions, but increasingly, more businesses are specifically seeking out renewable resources as they become less costly and pressure mounts to act on climate change.

Mary Anne Hitt is the director of the Sierra Club's Beyond Coal campaign, a driving force that alongside economic conditions is contributing to accelerated coal plant closures. Hitt said solar beginning to out-compete coal in a place like Kentucky is an indicator of the profound shift in energy economics that has occurred across the U.S.

"Whether it's political structures or the market structures, there are some rules of the game that are written in favor of coal," Hitt said. "But even that sort of fortress of protection that the industry has enjoyed for a long time is starting to crack as renewables become so competitive."

In May, Kentucky regulators approved agreements for PPL Corp. utilities Louisville Gas and Electric Co. and Kentucky Utilities Co. to sell power from the planned 100-MW Rhudes Creek Solar Project in Hardin County to two industrial customers. Replacing Kentucky coal-fired generation with a mix of renewable energy and natural gas is a part of a companywide effort to reduce carbon emissions by 80% from 2010 levels by 2050, PPL spokesperson Ryan Hill said. The company's actions across

its organization, including retiring 4,000 MW of coal-fired resources — 1,200 MW in Kentucky — have already dropped PPL's carbon dioxide emissions by 56%, Hill said.



Hill said the company is not at a point where renewables can compete on a replacement capacity basis in Kentucky, although that is changing rapidly. The company plans to follow coal with renewables and natural gas and has no plans to build new coal-fired resources.

Hill said PPL sees incremental but steadily increasing demand for more solar options in the state. Its two Kentucky utilities are rolling out programs to allow residential and business customers to support the growth of solar.

"We expect the transition to renewable energy will continue to take place in a more incremental way in Kentucky than may occur elsewhere, but it will clearly play a bigger role in the state's energy future going forward," Hill said.

Consumer demand driving shift from coal

Marketing materials for the state regularly tout its "electrifying power rates" being among the lowest in the U.S. and the lowest for the industrial sector east of the Mississippi River. With industrial retail rates roughly 18% lower than the national average in 2018, according to the EIA, businesses that consume substantial amounts of power often count cheap electricity among the benefits of locating in Kentucky.

PPL's Kentucky utilities will sell power from the Rhudes Creek solar project to manufacturing facilities in the state that are owned by subsidiaries of Toyota Motor Corp. and Dow Inc. as they push toward greener operations. Rhudes Creek is scheduled to come online in 2021 and is owned by German developer ibV Energy Partners.

Large energy users are leading the push elsewhere toward more renewable resources.

"When procured competitively, renewable energy allows us to save money, meet the expectations of our investors and customers, and do our part to be more responsible stewards of the environment," technology companies including Microsoft Corp., Apple Inc. and LinkedIn Corp. said in a letter written in May 2019 criticizing Dominion Energy Inc.'s resource plan for its Virginia electric utility.

Jennifer Keach, director of communications and community relations at Kentucky-based utility Big Rivers Electric Corp., said

the company has made proposals to about 50 economic development candidates over the past three years. In the first half of that period, there were no specific requests for renewable energy resources, but by the second half of that same period, about 25% of economic development candidates were making some sort of request or inquiry about renewable energy availability.

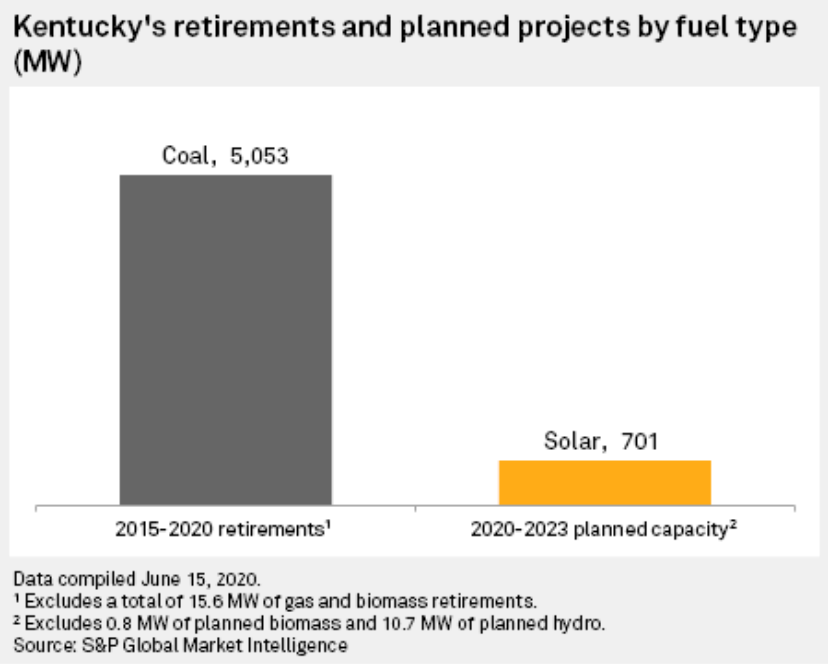
"Big Rivers envisions that economically competitive solar energy projects will play a growing role in Kentucky's energy future as a part of a well-diversified portfolio of generation assets," Keach said.

On May 28, Big Rivers signed two power purchase agreements for a total of 260 MW of solar resources to be in service by the end of 2023. Earlier in May, the Tennessee Valley Authority secured the output of the planned Simpson County Solar Project owned by Spanish renewable developer Opdenergy SA under a 15-year agreement as part of the utility's Green Invest program. The program helps companies meet their sustainability goals by supplying power through long-term contracts with renewable energy projects.

Overall, Kentucky has at least 700 MW of solar in the pipeline, S&P Global Market Intelligence data shows.

The transition is creating some unique juxtapositions. The Kentucky Coal Mining Museum in Benham is powered by solar panels, and researchers at the University of Kentucky are exploring new means to extract rare earth minerals from coal for use in technologies, including applications in renewable energy and battery storage.

Out with the coal



Since 2015, 5,053 MW of coal-fired generating capacity in Kentucky has been retired, based on Market Intelligence records. For example, in February, the TVA closed its 1,017-MW Paradise unit 3 after 50 years of operation.

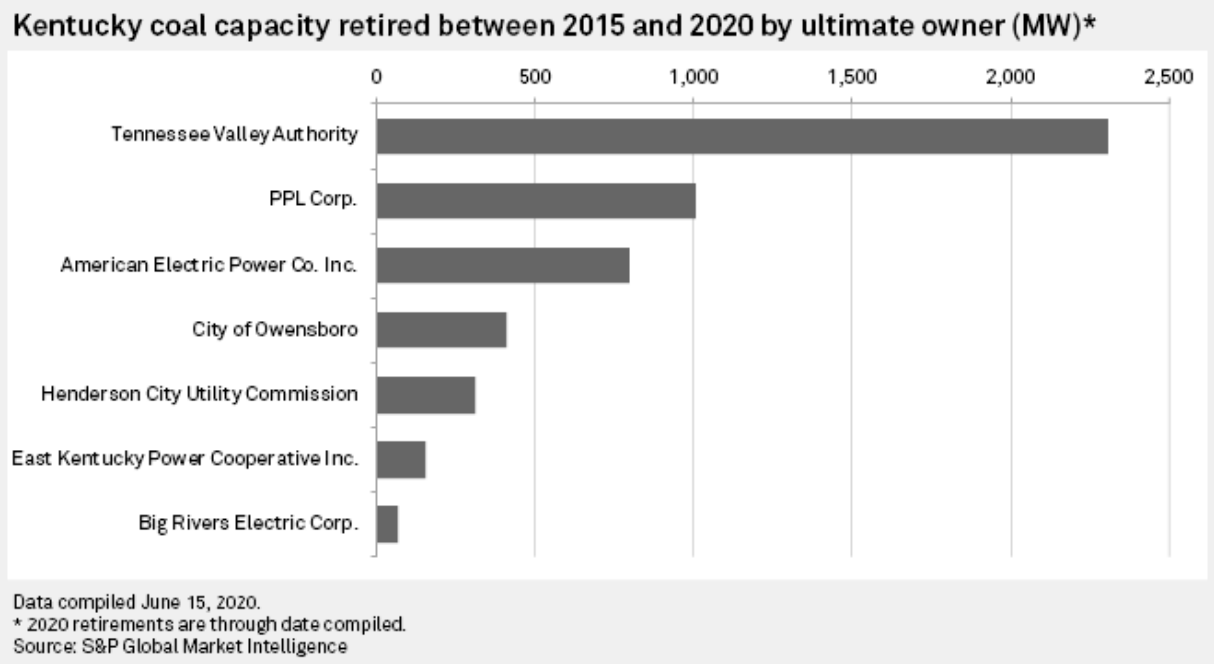
The TVA, a government-owned corporation with operations in multiple states, has retired more than half of its coal fleet since 2011, spokesperson Scott Brooks said in an email to S&P Global Market Intelligence. Brooks said economic factors drive the TVA's decision-making, and the agency shut down coal plants not already outfitted with air emissions technology.

The TVA did spend $1 billion to outfit four units at its Gallatin plant near Nashville, which remains in operation, and Brooks said coal would remain a "valuable part of our diverse generation portfolio for the decades to come." However, Brooks added that renewable energy has a "bright future" in the TVA's service territory.

In late May, Owensboro Municipal Utilities closed the second unit at its coal-fired Elmer Smith plant three years before originally planned and began receiving power from Big Rivers. The first unit at the Elmer Smith plant was closed a year prior.

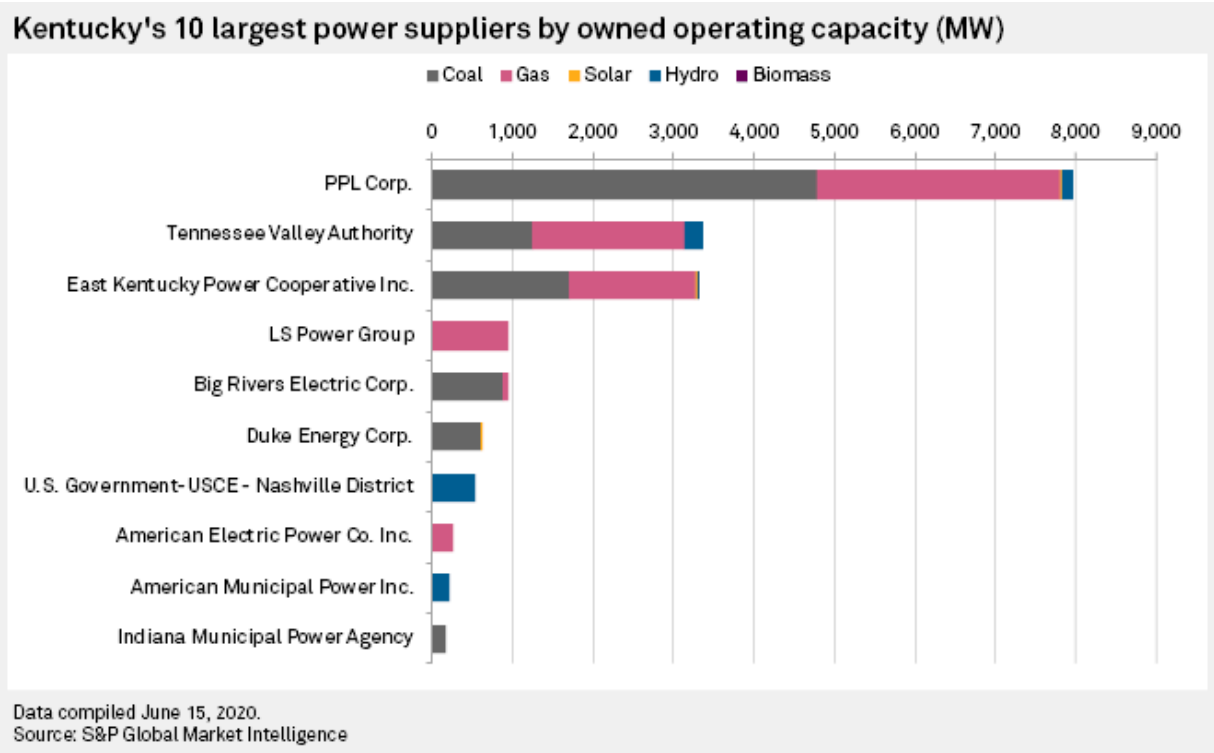
"Continuing to operate our own coal-fired production facilities would, according to extensive review, continue to increase rates for our customer-owners," the utility said in deciding to shut the plant, which had been operating since 1964.

Henderson Municipal Power and Light, owned by the city of Henderson, Ky., retired a coal plant in 2019 and earlier this year was negotiating a power purchase agreement for 50 MW of solar resources.



What is happening at utilities in Kentucky is part of a broader trend of the once coal-heavy southeastern U.S. power system moving away from the fuel. In October 2019, the Institute for Energy Economics and Financial Analysis said coal could be approaching "complete obsolescence in the region." Within the next decade and perhaps even earlier, coal-fired power plants will disappear entirely from many of the states in the Southeast, the sustainable energy think tank projected.

"This is just the opening act in what is essentially a two-stage transition that will further erode coal's generation market share in the region over the next five years and beyond — a trend that in several of the states affected could lead to the zeroing out of coal generation," the institute wrote. "The second act will be driven by solar, which, while still a modest contributor to regional electric output, is poised to grow substantially through the 2020s."

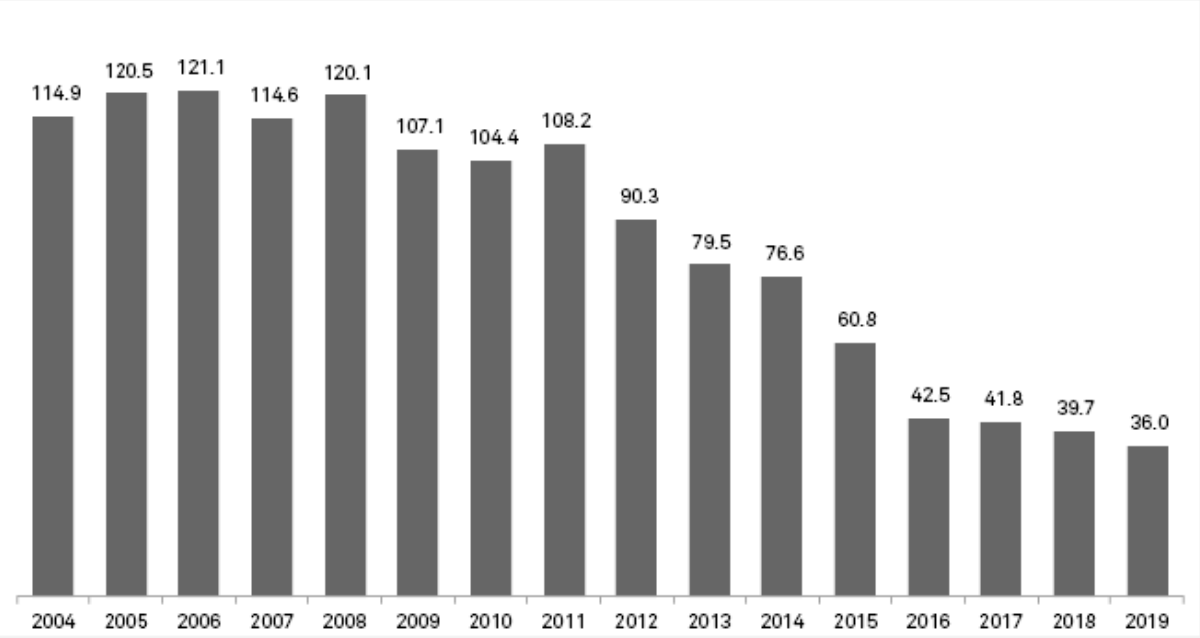


The decline of coal-fired power generation has had a substantial impact on coal mined in the Bluegrass State. Kentucky was

the third-largest producer of coal in the U.S. in 2015, mining 60.8 million tons of coal, Market Intelligence data shows. However, in 2016, as the state's production continued to slide, it fell to fifth place as Pennsylvania and Illinois coal companies produced more than Kentucky miners for the first time in modern history.

As recently as 2008, the state produced 120.1 million tons of coal, but that figure fell to just 36.0 million tons by 2019, Market Intelligence data shows. That is a decline of nearly three-fourths of the state's coal production in just over a decade.

Annual production from Kentucky coal mines (million tons)



Data compiled June 15, 2020.
Source: S&P Global Market Intelligence

When President Donald Trump visited Kentucky during his first presidential campaign in 2016, he promised that coal miners would be back to work. Shortly after Trump's inauguration, a Paringa Resources Ltd. affiliate touted it would have the first thermal coal mine to open under the new administration.

However, despite a regulatory approach that has been friendly to the coal industry, Paringa's Hartshorne Mining Group LLC was forced to file for bankruptcy in February, citing market forces and operational challenges. The company conducted an auction process for its assets in June but found no interested buyers.

Federal Energy Regulatory Commission Chairman Neil Chatterjee, a Trump appointee who previously was an energy adviser to U.S. Senate Majority Leader Mitch McConnell, R-Ky., held an energy-focused event in the state in 2019 to start a conversation about drawing some of the capital flowing into the nationwide transition from coal to other energy resources into Kentucky as well.

"I see big potential for new energy technologies, the jobs they produce, and some of the harder hit communities," Chatterjee said in comments previewing the meeting to a group of southern state lawmakers gathered in Kentucky in late 2019. "I know we have a talent here — not only to run the mines and the plants, but also to build and maintain transmission lines, battery storage facilities, wind turbines and whatever new technology come next."

Liz Thomas contributed to this article.

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