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Private Equity's Losing Bet on PJM Coal Plants

Challenging Economics, Rising Competition Undercutting Region's Coal-fired Power Plants

Executive Summary

This is shaping up to be an extraordinarily difficult year for the private equity firms operating in the PJM power market—especially those that own some of the region's aging coal-fired power plants.

One key financial support, the price PJM pays for capacity (essentially a payment that power plants receive for promising to be available when needed), will drop from $140 per megawatt-day to just $50 this month for the 2022-23 delivery year. This will reduce revenues for generators across the board, but it is particularly troublesome for the region's coal plants, which are struggling to remain competitive in the day-to-day energy market as well.

The degree of financial distress is already evident, even before the looming drop in capacity payments. For example:

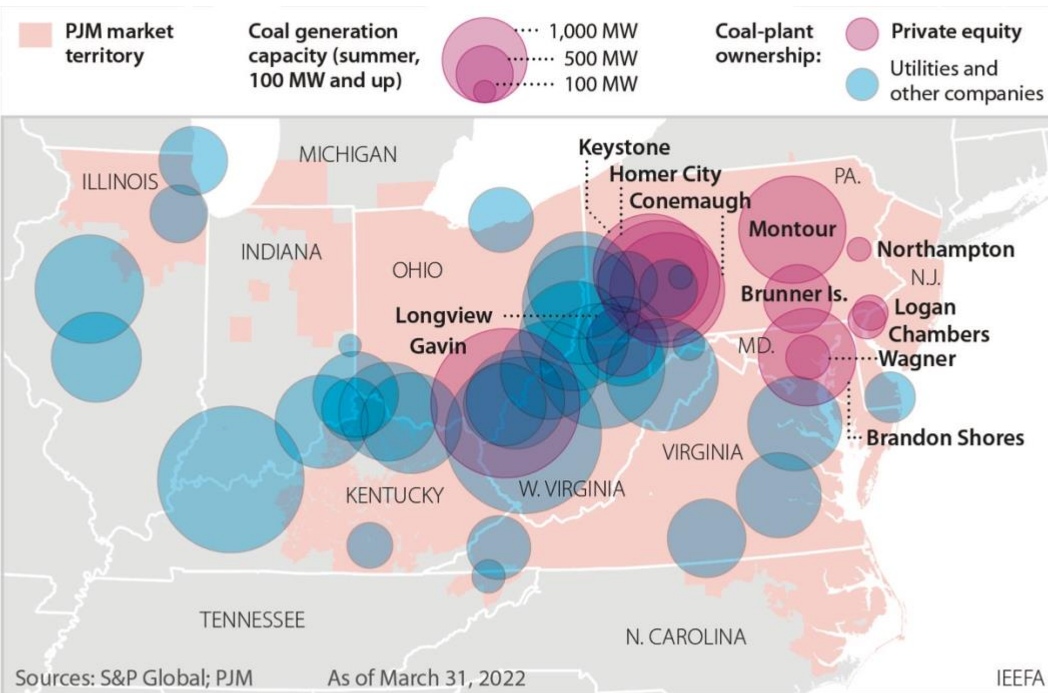
- Talen, which owns four coal-fired power plants in PJM and has stakes in two others, filed for bankruptcy in May. Riverstone, a major private equity (PE) firm, took Talen private in 2016.
- Lightstone, the firm backed by private equity firms ArcLight and Blackstone that owns the two-unit, 2,680-megawatt (MW) Gavin coal plant in Ohio, has approached its lenders about extending the repayment date of its $1.7 billion loan by three years.[1]
- The owners of Homer City, a three-unit, 1,888MW coal-fired facility in Pennsylvania, which has already gone through bankruptcy twice, said earlier this year they might have to close one or more of the plant's boilers. They have since backtracked, but the plant's capacity factor has averaged less than 30% since the current owners took control in 2017—a clear indication of its relative uncompetitiveness.
- In March, Atlantic City Electric received New Jersey regulatory approval to buy out the contracts of two private equity-owned coal-fired cogeneration plants, a deal that will close the last two coal plants in the state at the end of May and save ratepayers millions of dollars, according to the utility.

[1] Moody's Investors Service. Moody's assigns B2 rating to Lightstone Holdco LLC's proposed amended and extended term loans; affirms B2 on existing senior secured debt. The outlook remains negative. May 2, 2022.

The problems are particularly noteworthy given the recent runup in natural gas prices. Coal generation across PJM through the first four months of 2022 is lower than the 2021 figure, even though overall demand in the region is up, another indication of the sector's growing economic difficulties.

IEEFA believes difficulties are only going to grow. The next capacity auction, for generation availability from June 1, 2023 to May 31, 2024, is scheduled for June 2022. Although the results remain uncertain, it is not likely there will be a significant increase—if any—in regional capacity prices, given PJM's existing robust capacity reserves and predictions of slow demand growth. In its latest outlook, published in January, PJM projected summer peak demand in the region would grow 0.4% annually through 2032—and more than 90% of the growth is expected in just one area, Dominion's sub-region in Virginia and North Carolina.

Figure 1: PJM Coal Plants, 100 MW or More



Looking past this year, the region's recent decision to freeze its interconnection queue, which is overflowing with projects from renewable energy developers, is a negative for many stalled projects. But it should speed the process, bringing new wind, solar and solar-plus-storage projects onto the regional grid. In turn, this should help lower power prices, further undercutting PJM's already threatened coal-fired capacity.

A little further out, thousands of megawatts of new offshore wind capacity will be coming online, adding to the economic threats for coal- and, increasingly, gas-fired capacity in PJM.

In short, the difficulties now facing PJM's PE-owned coal capacity will only mount. Instead of trying to stave off the inevitable, current owners should be planning to close these facilities and working with local communities to reuse their existing grid infrastructure to bring cleaner resources to the regional grid. Banks and other lenders need to acknowledge this reality, as well. The economics of the region's coal plants are not going to improve in the future, meaning there will be growing risks that any new or revised funding will not be repaid.

Contents

Coal Power in the PJM Market

Total installed capacity in PJM at the end of March was 197,976MW. Of this, coal-fired capacity amounted to 47,871MW, down sharply from a decade ago but still accounting for almost 25% of the system's installed generation.[2] The region's coal plants are also old: Seventy-six percent have been operating for at least 40 years, a point after which plant performance tends to decline and production costs tend to increase.[3]

In this report, we identified the ownership of all the region's coal-fired power plants. Eleven of the plants, accounting for 13,116MW of the capacity, are owned by private equity firms largely immune from public scrutiny, given the lack of financial information they must file and the efforts they make to obscure plant ownership and operational data.

This report is divided into two sections. First, we present an overview of regional factors that have undercut the economics for PE-owned coal plants, and that we believe will continue to do so in the years to come. These include:

- Falling capacity payments, a particular problem this year with the drop to $50/MW-day. Forecasts do not see any major increase in payments in the next several years.
- A significant planned increase in renewable generation, including offshore wind. PJM is studying how to integrate more than 100,000MW of renewable energy capacity in the next 15 years.
- Continued low-growth expectations.
- The rising difficulty in financing coal-related infrastructure.
- The age of the plants.

Following that, the report takes a deeper look at the PE-owned coal plants, examining their ownership, past performance and future expectations.

The PJM Capacity Auction

In last year's capacity auction, the base clearing price for the region was just $50 per megawatt-day for the delivery year from June 1, 2022, through May 31, 2023.[4] The price was a sharp decline from the prior auction, when the base clearing price was $140/MW-day. The auction, which is designed to ensure the region has sufficient

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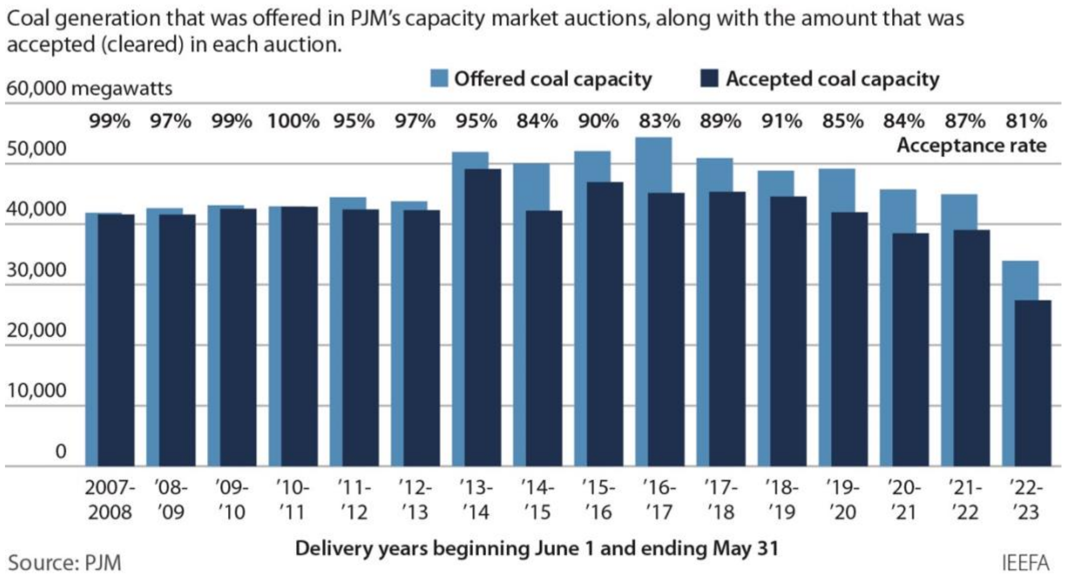
[2] Monitoring Analytics LLC. State of the Market Report for PJM, Q1 2022. March 2022, p. 645.
[3] U.S. Department of Energy. Staff Report to the Secretary on Electricity Markets and Reliability. August 2017, p. 155.
[4] Different subregions across PJM can end up with higher clearing prices, generally driven by transmission constraints that limit electricity flows into/out of a given location. In Commonwealth Edison's Illinois service territory, for example, the clearing price was $68.96/MW-day. The PE coal-fired plants profiled in this report are all located in areas where the auction clearing price was $50/MW-day.

power supplies to meet demand in the future, essentially pays power generators to be available. It is a key revenue source for many plants in the region, particularly for older, more expensive, coal-fired power plants that already have trouble competing in the daily energy market.

The vital role played by the capacity market in propping up older, less competitive generators was highlighted in the aftermath of last year's auction. According to PJM, 10 coal plants failed to clear in that auction; in other words, they would not be receiving their availability payment. Within 30 days of the auction's conclusion, nine of the 10 plants had notified PJM that they intended to close.

Figure 2: Coal Generation and the PJM Capacity Market



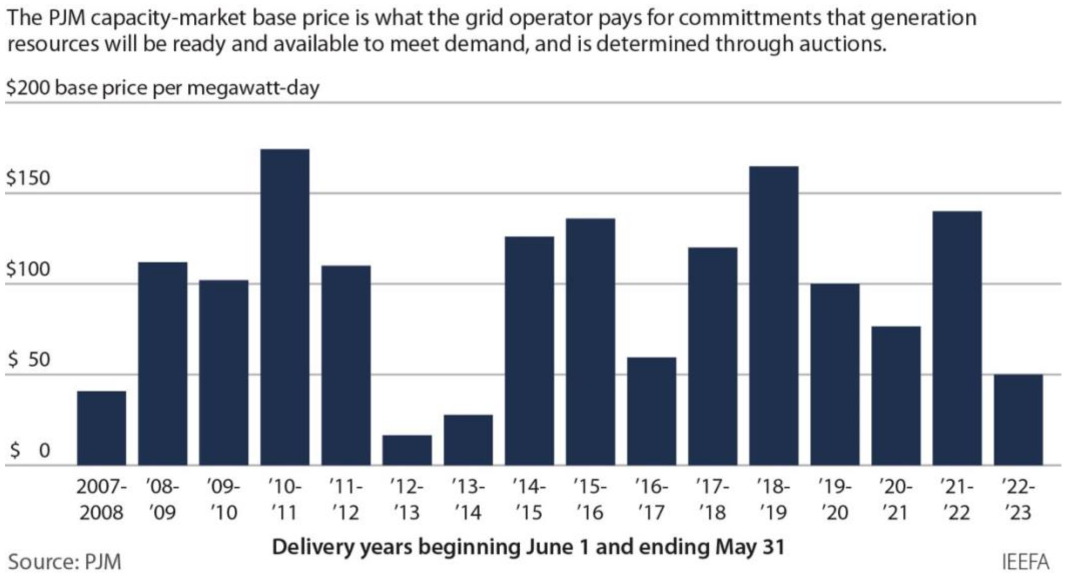
One of those plants was the 1,333 MW William H. Zimmer coal plant owned by Vistra Corp., an independent power producer based in Texas. Zimmer, originally planned as a nuclear power plant, was converted to coal and began commercial operations in 1991. Even though it is not an old facility, its average capacity factor (the ratio of the amount of power produced by a plant compared to its theoretical maximum, expressed as a percentage) fell steadily during the 2010s. It averaged 66% from 2010-13, then 57% from 2014-17, and then dropped to 47% from 2018-21.

This is an indication that the plant was having trouble competing in the regional energy markets. The plant's failure to clear the 2021 auction was the final straw for Vistra.

In a presentation to the local community about the company's closure decision, Brad Watson, Vistra's senior director of community affairs, was blunt: "If there is a potential buyer out there willing to buy … an old plant that is losing money, we'd love to talk to that buyer.

"There's a reason why you have two plants in Adams County, then Beckjord, just along the Ohio River, closing. No one is going to buy them. They're too costly to run."[5]

Figure 3: PJM Capacity Market Auction: Base Clearing Prices



This year's capacity auction is scheduled for June 8, with results expected later in the month. While pricing remains uncertain, changes to the bidding process, particularly a revised market seller offer cap (MSOC), and a reduction in expected peak demand in the coming year are expected to keep capacity prices low.

For example, both Fitch and S&P expect results in the coming auction to be weaker than last year's already-low level. Fitch, writing in its analysis of the recent Talen bankruptcy filing (see details below) said it assumed "weaker results for the 2023/2024 auction."[6]

S&P is more detailed, estimating in its latest outlook that capacity prices could drop to just $25/MW-day in the coming auction—and remain below the current $50 mark through 2027.[7] S&P acknowledges that this forecast "may be an aggressive implementation of the MSOC,"[8] but even the possibility that capacity prices could remain close to the current $50 level will continue the financial squeeze on PJM's coal-fired power plants, perhaps triggering another round of retirements.

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[5] WCPO. Clermont officials question Zimmer's tax value in heated meeting over plant closure. March 29, 2022.
[6] Fitch Ratings. Fitch Downgrades Talen to 'D' on Bankruptcy Filing. May 11, 2022.
[7] S&P Global Market Intelligence. PJM capacity prices projected to drop due to auction parameter, market updates. May 10, 2022.
[8] *Ibid.*

The Coming Wave of Renewable Generation

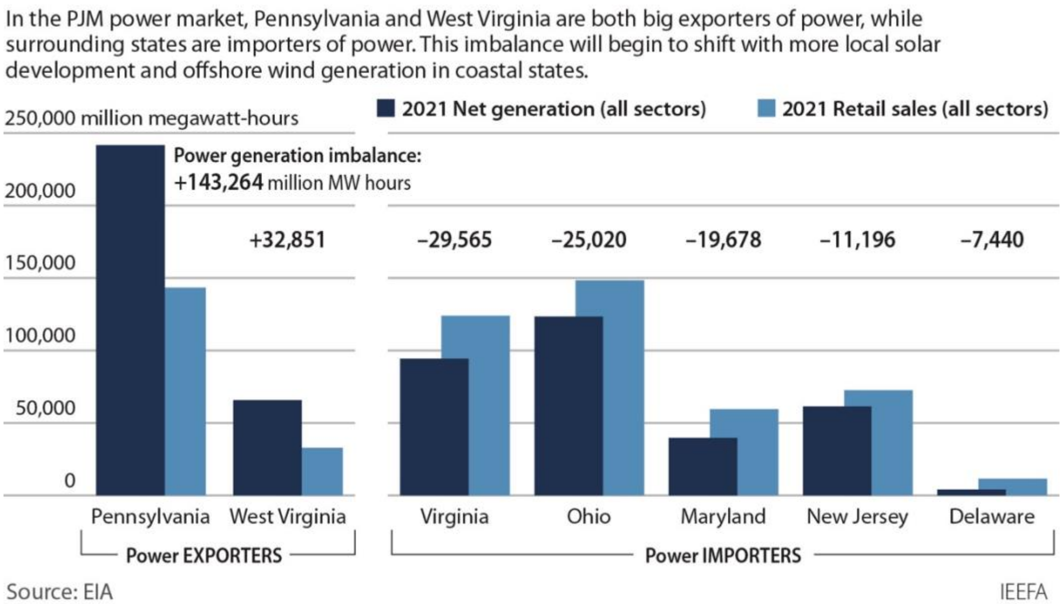
A second, longer-term threat for the region's PE-backed coal plants is the almost-certain buildout of significant amounts of no-fuel-cost renewable energy throughout the region.

There still is little installed solar and wind capacity in PJM. According to Monitoring Analytics LLC, the system's independent market monitor, as of the end of March there was 4,603MW of installed wind and solar—less than 2.5% of the total installed capacity of 185,768MW.[9,10] But that is about to change, in a big way.

In a planning document released in May, PJM pointed out that a majority of the states it serves "are moving toward a decarbonized grid over the course of the next 20-30 years." Even in historically fossil-intensive states, it added, renewables now dominate the resource queues.[11]

PJM said the impact will be dramatic: "Nonetheless, the estimated impact, based on PJM's energy transition analysis, is that wind and solar resources will grow between three and eight times (in installed capacity terms) over the course of the next 15 years, potentially adding another 105,000MW to the existing level of roughly 15,000MW of renewable wind, solar and storage resources."[12]

Figure 4: Net Generation vs. Retail Sales in Selected PJM States



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[9] This figure reflects the capacity credit given by PJM to the wind and solar capacity installed in the region. The total amount of nameplate capacity is larger, but because the resources are intermittent the system operator discounts the total for planning purposes.
[10] Monitoring Analytics LLC, *op. cit.*, March 2022, p. 319.
[11] PJM. Grid of the Future: PJM's Regional Planning Perspective. May 10, 2022.
[12] *Ibid.*

Of particular importance here is the study's examination of current offshore wind plans in PJM. Maryland, New Jersey, and Virginia (all part of the PJM market) have established targets for offshore wind totaling 14,722.5MW by 2035. Of this, more than half is already under development, with tentative online dates between 2025 and 2028. Another development, a 2,500MW merchant project by Avangrid Renewables off the northern coast of North Carolina, will tie into the PJM grid in southern Virginia, with plans to bring the power onshore in Virginia Beach.

PJM said the added resources "will fundamentally change how power flows over the transmission grid in the Northeast and mid-Atlantic. Generation will now be located closer to load centers along the I-95 corridor; this area of the grid was originally served mainly by west-to-east power flow from large mine-mouth coal generating stations in western Pennsylvania and beyond and, later, shale natural gas-fired plants in central Pennsylvania."[13]

A necessary component of this renewable buildout, new transmission, particularly for offshore wind, moved forward this year with the filing of an agreement between PJM and New Jersey that outlined how to pay for the needed system upgrades (essentially keeping the costs within the state and not pushing costs on ratepayers elsewhere in PJM). "This joint New Jersey-PJM [State Agreement Approach] experience provides an effective planning blueprint going forward for states to pursue their own respective [renewable portfolio standards]."[14]

Given the lack of expected demand growth (see below), the economic pressure on the region's aging PE-owned coal plants will increase.

The Lack of Demand Growth

PJM has a history of over-projecting load growth. In its 2015 load growth outlook, PJM estimated that summer peak demand in the region would climb to 171,580MW by 2025.[15] The 2015 forecast and others like it in the early and mid-2010s were a key factor behind the wave of combined cycle gas turbine (CCGT) projects built in the region over the past decade. Installed CCGT capacity in PJM totaled 27,292MW at the end of 2013; by March 2022, it had jumped to 52,095MW.[16]

But the demand growth didn't show up. The region's actual summer peak demand in 2021 was 147,929MW.[17] Rather than increasing, PJM's summer peak demand total has declined since 2015, when the total was 151,632MW. The system's all-time peak was 165,563MW, reached during summer 2006.[18] And it's not just peak demand

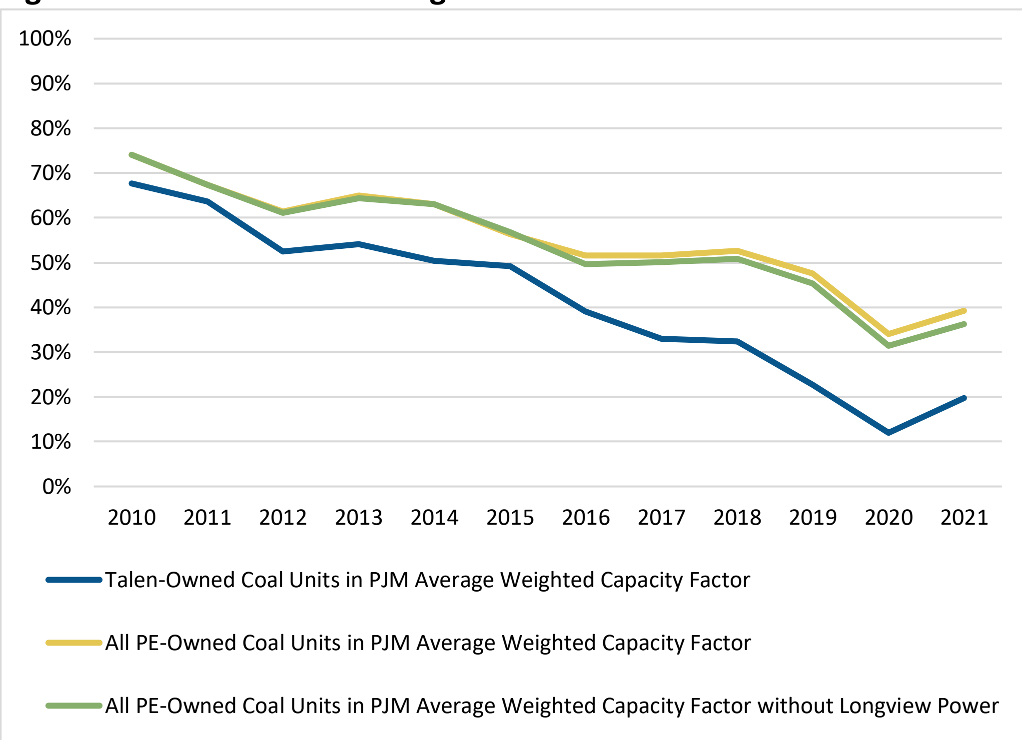
[13] *Ibid.*
[14] *Ibid.*
[15] PJM. PJM 2015 load forecast. January 2015.
[16] Monitoring Analytics LLC. PJM State of the Market 2013, p. 354. Also see: Monitoring Analytics LLC. State of the Market Report for PJM, Q1 2022, p. 645.
[17] PJM. PJM 2022 load forecast. January 2022.
[18] PJM. PJM Prepared To Meet Summer Electricity Demand. May 11, 2022.

that is declining. In its recent bankruptcy filing (see below), Talen estimated that average demand has dropped 3% in the past decade.[19]

Looking forward, PJM has cut its growth forecasts. Its 2022 load forecast projects that peak demand growth will average 0.4% annually in the next 10 years, pushing the system's summer peak to just over 154,000 MW—still nowhere near the 171,000MW-plus forecast from 2015.[20]

The effect on PJM's PE-owned coal plants is easy to see. Low growth coupled with significant new competition from newer, more efficient gas-fired generators has resulted in declining sales during the last decade from every facility except Longview, the youngest of the region's PE coal plants. Even the 2021 "increase" isn't anything more than a reflection of the depressed sales stemming from the onset of the COVID-19 pandemic in 2020. As noted earlier, coal generation in the region is down for the first four months of the current year.

Figure 5: A Decade of Declining Sales From PJM's PE-Owned Coal Plants



There is little likelihood of a turnaround in sales for the region's PE-owned coal plants. One key factor is that PJM attributes more than half of the region's expected growth to rising data center demand, largely in Dominion Energy's service territory. Because of their significant electricity consumption, data centers have strong

[19] Talen bankruptcy filing. Declaration of Ryan Leland Omohundro in Support of Debtors' Chapter 11 Petitions and First Day Relief. May 2022.
[20] PJM. PJM preliminary 2022 load forecast. December 2021.

incentives to embrace efficiency measures that could cut into overall growth. Data center companies also have strongly favored contracts with renewable energy providers, which could effectively freeze coal out of expected growth. A second factor, the coming regional boom in new renewable energy generation discussed above, will also cap (and likely push out) sales from PE-owned coal plants.

Finding Financing a Growing Concern

In the short term, rising interest rates are going to have an impact on PJM PE coal plant owners. Acquisitions during the past decade have largely been funded with significant quantities of low-cost debt. That period appears to be coming to an end as the Federal Reserve moves to tighten credit availability by raising interest rates. Higher rates translate into higher financing costs, which ultimately will raise production costs when PE firms look for new or refinancing options for their debt. The rising costs will simply increase their competitive disadvantage.

Longer term, growing financial concerns associated with climate change are likely to change the firms' ability to access the capital markets, a point underscored by Moody's in an April summary on the latest report from the Intergovernmental Panel on Climate Change (IPCC). The report focused on the range of low-cost, currently available options that can be used to forestall the worst effects of global warming. None of the options include coal.

"These [options] include the deployment of wind and solar power, electric vehicles, energy efficiency in aviation and shipping, and energy efficiency in homes; they also include changes in consumer behavior including shifts to more sustainable means of land transportation and reduced household energy demand, among others," the IPCC report noted. "These demand-side changes will lead to a significant reduction in fossil fuel use – particularly coal."[21]

Talen also highlighted growing financing issues in its bankruptcy filing (see below). Ryan Leland Omohundro, the executive brought in to steer Talen through the restructuring process, wrote that "concerns about the environmental impacts of fossil fuel combustion, including impacts on global climate issues, are resulting in increased regulation of coal combustion and other sustainability mandates, which in turn result in unfavorable lending policies and difficulty raising capital toward financing for traditional fossil fuel-powered generation facilities."[22]

"Today's electricity consumers, businesses, and technologies," he added, "demand electricity that is not only low-cost, but also reliable and zero-carbon."[23]

It is clear that market risks facing PE-owned coal projects in PJM are increasing rapidly. Potential investors and lenders need to weigh those threats carefully—better returns and lower risk are available in the renewable energy sector.

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[21] Moody's Investors Service. IPCC Report's Call for Urgent Climate Action may Increase Credit Risks. April 2022.
[22] *Op cit.* Omohundro Declaration.
[23] *Ibid.*

Aging Out

The problem for the PE-owned coal-fired power plants is simple: They are old. As we noted above, fully three-quarters of the installed coal-fired capacity in PJM is already more than 40 years old. For the PE-owned plants, the numbers are even worse—15 of the 18 units tracked here are more than 40 years old. If you dig into the numbers a bit further, the picture gets even bleaker. Take out the Logan and Chambers cogeneration plants, which were scheduled to close May 31 (see below), and the Longview plant (the outlier in the analysis) and the average age of the remaining 15 units climbs to 49 years—old age for a coal plant.

Table 1: Age of PJM PE-Owned Coal Plants

Unit	Year Unit Entered Service	Age in 2022
Brunner Unit 3	1969	53
Herbert Wagner 3	1966	56
Montour 1	1972	50
Montour 2	1973	49
Conemaugh 1	1970	52
Conemaugh 2	1971	51
Keystone 1	1967	55
Keystone 2	1968	54
Brandon Shores 1	1984	38
Brandon Shores 2	1991	31
Gen Gavin 1	1974	48
Gen Gavin 2	1975	47
Homer City 1	1969	53
Homer City 2	1969	53
Homer City 3	1977	45
Longview	2011	11
Logan Gen	1994	28
Chambers Cogen	1994	28

Source: S&P data.

The problems for older plants have been delineated in analyses from the Department of Energy's Argonne National Laboratory and the National Energy Technology Laboratory.[24] They found older plants typically cost more to operate and maintain, and are less reliable. In particular, they found coal plant heat rates increase as the plants age and that their availability declines. Higher heat rates mean a plant requires more fuel to generate electricity, effectively raising the cost of production. This is a major problem in a competitive market such as PJM. Lower availability means a plant will be less able to generate electricity, missing sales and

[24] U.S. Department of Energy, *op. cit.*

effectively raising plant costs by forcing the operator to spread fixed operation and maintenance (O&M) costs over a smaller amount of production.

Finally, as plants get older, maintenance costs tend to increase as equipment and components age and must be repaired or replaced. These are certainly issues now affecting PJM's PE-owned coal plants, and they are certain to increase in severity in the years ahead. In other words: Investor beware, the costs of your potential purchase are only going to increase.

Talen Files for Bankruptcy

Riverstone Investment Undercut by Falling Sales

Talen Energy is the largest private-equity-backed coal plant operator in PJM. It is also in the most difficult financial position.

The company was created in 2015 from generation assets spun off by PPL and existing facilities owned by Riverstone Holdings, a large New York-based private equity firm. At the company's launch in June 2015, it controlled roughly 15,000MW of generation capacity and was 65% owned by PPL and 35% owned by Riverstone. Of that total, 40%, or 6,000MW, was coal-fired. Riverstone subsequently took the business private, paying $5.2 billion in December 2016 for PPL's share of the firm.

The timing could not have been much worse. The region's gas-plant buildout was in full swing and demand was flat (see longer discussion above). The impact on Talen's coal-fired power plants has been dramatic: Since the buyout, total generation has declined almost 60 percent (see table below).

Table 2: Generation Totals for Talen's Coal Plants

	Capacity (MW)	Talen Ownership (%)	2015 Generation (MWh)	2021 Generation (MWh)	Decline (MWh)	Decline (%)
Montour	1,528	100	6,644,098	1,260,335	5,383,763	81.03%
Brunner Island*	1,428	100	4,850,745	2,518,536	2,332,209	48.08%
Brandon Shores	1,274	100	4,962,679	2,470,805	2,491,874	50.21%
H.A. Wagner Unit 3	359	100	1,193,853	113,899	1,079,954	90.46%
Keystone	1,718	12	1,141,771	889,857	251,914	22.06%
Conemaugh	1,754	22	2,452,334	1,597,853	854,481	34.84%
C.P. Crane	402	100	402,573	-	402,573	
Totals			21,648,053	8,851,285	12,796,768	59.11%
C.P. Crane was sold in 2016 and closed in 2018.						
Keystone and Conemaugh generation totals reflect Talen's ownership share.						
*Brunner Island's three units were coal fired in 2015; two have since been converted to run on natural gas. The generation decline at Unit 3, the remaining coal-fired unit, has been even more dramatic; it has dropped 55% since 2015.						

Source: S&P Global, Talen.

Management has attempted to respond, outlining a plan in late 2020 to stop burning coal and switch to gas at three of its PJM power plants—Montour, Brandon Shores and H.A. Wagner—by the end of 2025.[25] The company had previously reached a settlement with the Sierra Club to stop burning coal at its Brunner Island plant by 2028.[26] The company also said it would replace at least some of this capacity with new solar and battery storage, beginning with a 100MW solar project at the Montour facility. Little progress was made in the following months, and then the company announced another plan in May 2021 that targeted crypto-mining and data center construction. One analyst labelled it "Talen's Hail Mary plan."[27]

The plan never got off the ground, slowed by the company's $4 billion-plus in debt and deflected by the rapid rise in gas prices in 2021. The rising prices generated a serious liquidity problem for the company and forced it to seek an emergency $848 million capital infusion in December to pay its bills.[28] Even this failed to stem the red ink, and on May 9 the company filed for bankruptcy.[29]

In the bankruptcy filing, Omohundro, the executive brought in to oversee the company's restructuring, noted the real problem facing Talen and other coal generators in PJM: "Moreover, the low price of natural gas and the addition of new renewable energy capacity has meant that, in most scenarios, the Debtors' coal-fueled assets were no longer economical to run."[30]

The Gavin Plant

Lightstone Asks Lenders for a Reprieve

The Gen. J.M. Gavin plant, a two-unit, 2,680MW facility in Ohio, is the largest private equity-owned coal plant in the U.S. ArcLight Capital Holdings LLC and The Blackstone Group, two major private equity firms that currently have some $890 billion in assets, bought the plant and three gas-fired units from American Electric Power in 2017 for $2.17 billion. The company created to own Gavin, Lightstone Generation LLC, is equally owned by the two PE firms.

In an October 2021 report, IEEFA raised several serious issues regarding the long-term viability of the investment. At the time, we raised three concerns:

- It would be difficult for Lightstone to refinance the roughly $1.7 billion outstanding balance on the loan taken out to buy the project in 2017;

[25] Talen. Talen Energy Announces Transformational Move Toward a Sustainable, ESG-Focused Future. November 10, 2020.
[26] Power Magazine. Pennsylvania Plant Agrees to Phase Out Coal. February 15, 2018.
[27] Bloomberg. Talen Energy Investors Await Update from the Top After Pivot to Crypto. August 4, 2021.
[28] Talen. Talen Energy Supply Upsizes and Closes $848 Million First-Lien Financing; Transaction Provides Incremental Liquidity and Advances Energy Transition Strategy. December 15, 2021.
[29] S&P Global Market Intelligence. Talen Energy subsidiaries file for Chapter 11 bankruptcy. May 10, 2022.
[30] *Op. cit.* Omohundro Declaration.

- Debt ratings agencies were increasingly concerned about the risks associated with coal-fired power plants, leading to long-term increases in the cost of borrowing for such facilities; and

- The project was likely underperforming in light of falling regional capacity prices, generally low energy prices, flat demand, and rising competition from renewable and demand side energy resources.

Six months later, it is clear all three concerns have been validated.

Lightstone is now in the process of asking its lenders to extend the loan due date by three years, to 2027. To secure support for the deal, the company is apparently offering an immediate $100 million payout to the lender group and a 2% increase in the interest rate, among other incentives.[31,32]

The initial lead lender for the Gavin buyout was Deutsche Bank. It adopted a new policy in 2020 that restricts its ability to finance new and existing coal projects. In particular, the company is only supposed to offer financing to coal-dependent energy companies "if they present credible diversification plans."[33] No diversification plan has been announced by Lightstone, which would appear to make it untenable for the bank to continue doing business with Lightstone.

Whether the bank can finesse this restriction, perhaps by saying it is not new financing but simply an extension, is unclear. What is clear is that any participating lender, whether Deutsche Bank or a new group, will face serious reputational risks for their participation.

Gavin is the fourth-largest power plant emitter of carbon dioxide in the U.S. Underwriting those emissions will have a cost for any lender.

Assuming some lender is willing to take the reputational risk, particularly in light of the bonus interest Lightstone is reportedly offering, the action will simply push off the inevitable. The extra interest will raise the cost of producing power at Gavin, making the unit less competitive in the PJM market and likely cutting into future sales. In turn, this will undercut Lightstone's ability to repay the new extended loan, putting the project and its lenders in the same (or a worse) hole down the road.

On top of these issues, lenders need to understand that Lightstone is moving forward with an U.S. Environmental Protection Agency (EPA)-required retrofit to the coal ash handling systems at both units at the plant. The retrofits will convert the units' current wet bottom ash handling systems to dry ash units.

Lightstone is planning to complete both retrofits this year, which will significantly cut into the plant's energy sales and revenue, and add to its future production costs.

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[31] Wall Street Journal. Coal-Plant Owner Lightstone Seeks $1.7 Billion Loan Extension, Sources Say. April 20, 2022.
[32] Op Cit. Moody's Lightstone Rating.
[33] Deutsche Bank. Deutsche Bank to end global business activities in coal mining by 2025. July 27, 2020. Also see: IEEFA. Coal divestment.

Moody's says the retrofit for Unit 1 is currently under way, with the work on Unit 2 scheduled for the fall.[34] The Unit 2 outage is expected to last for 10 weeks. IEEFA used this projected timing for both units to estimate the amount of revenue that will be lost this year due to the outages—and it is significant.

We assumed that Unit 1 would be offline from April 1 until June 15 and that Unit 2 would be out of service from Oct. 1 until Dec. 15. Using generation data from S&P from the past five years (the time since AEP sold the plant to Blackstone and ArcLight), we calculate sales from the two units are likely to fall by more than 2.8 million MWh this year—about 20 percent of the facility's average annual generation since 2017. Taking the average realized power price since 2018 (per Moody's data) of $32.48/MWh, the plant stands to lose roughly $92 million in revenue this year.

Further, Moody's reports that Unit 2 is offline now due to an unexpected outage and that it is not due back online until June, which will further reduce the unit's sales for the year and cut into revenue.

On top of this, the plant's capacity revenue will drop sharply in the coming year; PJM's base capacity price falls to $50/MW-day in June from $140/MW-day previously.

Moody's sees some potential benefits in the refinancing proposal, particularly one provision that would limit distributions to ArcLight and Blackstone until a portion of the debt is repaid. Still, it assigned a B2 rating to the plan and said the outlook was negative. According to Moody's ratings scale, B ratings "are considered speculative and are subject to high credit risk."[35] It added that "the project's rating is unlikely to be upgraded in the near term."

Moody's also warned that there are issues that could lead to another downgrade. (Moody's downgraded Lightstone's debt twice in 2021.) In particular, the ratings agency said it was vital for Lightstone "to resolve the operating and environmentally driven issues at Gavin" and to "materially reduce debt."[36] The last issue could be especially troublesome. The project's target debt level for year-end 2021 was $1.475 billion, but it ended the year well above $1.6 billion and had declined only marginally since 2018. The new target debt level is just $850 million, which will require significant belt-tightening and consistently strong operating performance to reach.

[34] Moody's Investors Service, *op. cit.*
[35] Moody's. Moody's credit rating scale. Accessed May 26, 2022.
[36] *Op cit.* Moody's Lightstone Rating.

Keystone and Conemaugh

The Rise (and Fall) of PE-owned Coal in PJM

The Keystone and Conemaugh plants were built in the late 1960s and early 1970s by a consortium of 11 investor-owned utilities in the PJM service territory.[37] Located about 35 miles apart just east of Pittsburgh, the two two-unit plants each have a net summer-rated generating capacity of 1,700MW.

In 2014, in connection with its planned takeover of Pepco, Exelon sold its ownership shares in the two plants—42% of Keystone and 31% of Conemaugh—to ArcLight Capital Partners. That was the beginning of a series of transactions that ended in 2019 when full ownership of both plants ended up in private equity hands, led by ArcLight whose purchase of PSEG's shares that year pushed its stake of Keystone to 67% and Conemaugh to 57.6%.

ArcLight has since sold its ownership stakes, with a group led by Bardin Hill (a PE firm with no energy experience) and Riverstone (see Gavin) owning the largest shares of the two units. The rationale for ArcLight's 2020 sale is uncertain given the lack of transparency among PE firms. But it certainly looks serendipitous 18 months out: Not surprisingly, generation at the two plants fell sharply in 2020 as the pandemic largely shut down the economy. But the 2021 reopening did not improve the plants' results, with generation at both facilities essentially flat from year to year.

Now, the current owners are facing the looming 2028 deadline to shut both plants, which do not comply with the new EPA rules on effluent releases.

Homer City

The three-unit, 1,888MW coal plant at Homer City has been in and out of financial difficulty for the past 10 years.

In 2012, Edison Mission Energy, the independent power unit of California's Edison International, gave up its lease on the plant, citing low power prices and the cost of required environmental upgrades.[38] General Electric Capital, the owner, took control of the plant and completed the required upgrades, at an estimated cost of $750 million.[39] By 2017, the plant was back in bankruptcy court, pushed there largely by the fracking-induced surge in cheap gas-fired generation. After this second bankruptcy, ownership of Homer City was taken over by a group of private equity firms, among them Knighthead Capital Management, a firm that Pitchbook describes as a specialist "in distressed credit and special situation opportunities."[40]

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[37] Department of Justice. Justice Department Allows Electric Power Joint Venture to Change Method of Bidding in Newly-Deregulated Market Environment. January 30, 1998.
[38] Transmission Hub. General Electric affiliate to take over Homer City coal plant. October 2012.
[39] Utility Dive. Homer City plant struggles demonstrate coal's uncertain future in Trump era. March 2017.
[40] Pitchbook. Investor profile. Accessed May 2, 2022.

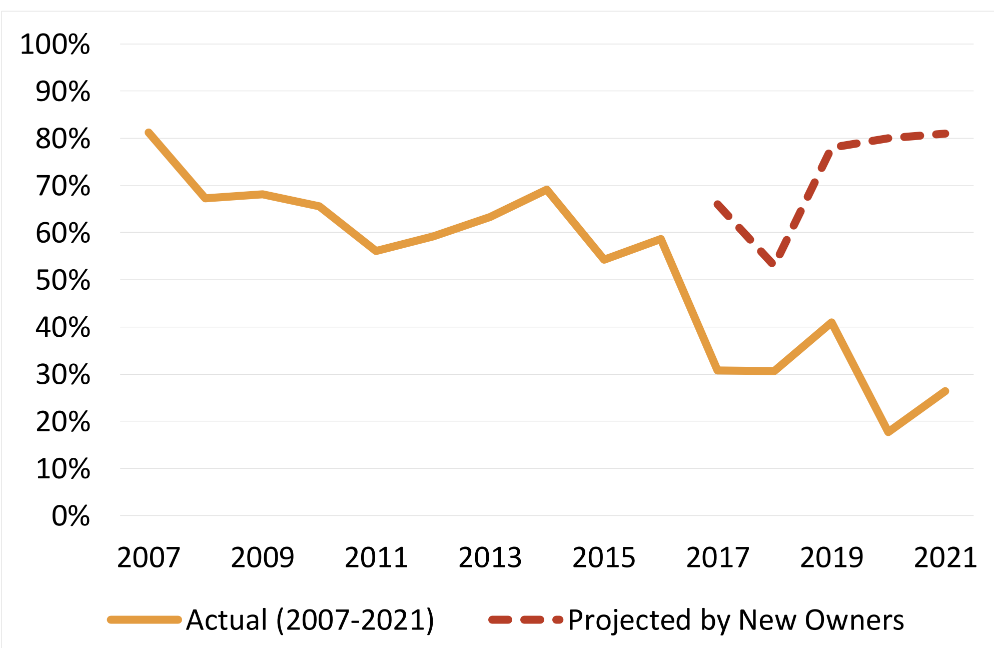
In a subsequent transaction in 2021, Knighthead Capital solidified its control of the plant, boosting its ownership share to just over 39%. TCW Inc., which is indirectly controlled by the Carlyle Group, owns 19.96%. Three other private firms (PSF Securities, Aegon USA Investment Management, and Golden Tree Asset Management), each own roughly 11% of the coal facility.[41]

The new ownership has done nothing to improve the plant's economics. In February, the plant operator said it was considering closing two of the three boilers at the facility, citing concerns about the state's looming entry into the Regional Greenhouse Gas Initiative (RGGI), an effort of 11 states along the Atlantic Coast to cut power plant-related carbon dioxide emissions.

Pennsylvania's entry into RGGI, hotly contested within the state, may ultimately raise the cost of power from Homer City, but it clearly is not the reason for the plant's struggles. As the graphic below clearly shows, generation at the plant has been falling more or less steadily for the past decade. The facility's capacity factor hovered around 60% from 2010-14, then dropped to the 40% level from 2016-19. Since 2020, 20% has been the rough new normal. As the graphic below shows, the ownership group that took over following the 2017 bankruptcy was unduly optimistic in projecting future sales for the plant.

The plant is also expensive, with S&P reporting its average operating and maintenance costs at about $35/MWh, putting the facility well out of the region's generation stack in normal circumstances.

Figure 6: Homer City Capacity Factor (plantwide)



41 FERC filings (EC21-80).

In the short term, the next move for Homer City almost certainly will depend on the coming capacity auction. Clearing the auction could give the plant another year's lease on life. But the long-term trend is clear: The plant is old—two of the three units are already 53 years old, while the third is 45—and the cost of its electricity is moving further to the edge of dispatchability. These factors will worsen, particularly as new renewable generation comes online.

Longview Power

The Longview Power plant in West Virginia is the youngest coal-fired facility in PJM and has been touted repeatedly as a state-of-the-art power plant, but the 710MW supercritical unit has faced the same problems as the region's other coal plants. Low regional power prices, weak demand growth and significant competition from gas already have forced the facility into bankruptcy twice, even though the unit only entered commercial service in 2011.

Table 3: Longview Power Ownership

Post 2013 Bankruptcy			Post 2020 Bankruptcy	
KKR Credit Advisors LLC	31.14		**Company**	**Percent**
Centerbridge Partners LP	11.15		Trilogy Portfolio Company LLC	22.21
Ascribe Capital	10.27		R&F Market LLC	13.27
Other owners	48.1*		Cetus Capital LLC	13.14
			Eaton Vance Management	10.91
			Other Owners	40.47*
* Companies are undisclosed but ownership of each is no more than 9.9%				

Source: FERC filings.

The first bankruptcy, filed in August 2013, resulted in the cancellation of about $1 billion in debt stemming from the plant's construction.[42] In tandem with that initial financial failure, Longview and its private equity backers were forced to make a number of early repairs at the plant. As described by Longview CEO Jeffery Keffer, "we got a plant that really wasn't ready for prime time."[43]

The company ultimately fixed the plant's operational problems, with Keffer telling S&P in early 2016 that Longview "has been running beautifully."[44]

There is no doubt the plant has run well. Since 2016, the plant's capacity factor has consistently been more than 75%, and climbing to 89% in 2021. But it apparently hasn't been making any money, despite the strong operating performance.

[42] S&P Global Market Intelligence. Longview Power files for Chapter 11, seeks ownership change. April 14, 2020.
[43] S&P Global Market Intelligence. 'Not your dad's coal plant': Longview aims to be a new breed of coal burner. September 17, 2015.
[44] S&P Global Market Intelligence. Sen. Manchin encourages Longview as it aims to set example for future of coal. February 5, 2016.

As early as June 2016, S&P Global Ratings downgraded Longview Power's $300 million senior secured term loan due in 2021 and its $25 million revolving credit facility due in 2020. The ratings agency said the downgrade was due "largely to lower power prices in PJM Interconnection LLC resulting from low natural gas prices and weak demand growth expectations."[45]

The news hasn't improved since:

- The company closed its onsite coal mine in 2018, saying it was no longer competitive with longwall miners in the area even though it had initially touted its access to the onsite facility as a key cost-saving measure.

- Later in 2018, Longview retained global investment bank Houlihan Lokey and was "exploring 'strategic alternatives' including a potential refinancing of its existing senior secured debt."[46]

- In September 2019, S&P downgraded the company's senior secured term loan to CCC, below investment grade, and warned that Longview's "liquidity has weakened to the point that without an improvement in business and financial conditions, the coal-fired plant could default when its revolving credit facility matures in April 2020."[47]

- Moody's raised similar concerns in an October 2019 report: "ESG concerns have reduced the number of potential investors in merchant coal projects, leading to higher capital costs and greater credit protections for potential lenders. Future financings are likely to be materially more expensive and difficult, especially compared to recent natural gas-fired project financings."[48]

The outbreak of the Covid-19 pandemic in March 2020 certainly undercut any chance that Longview could escape these financial clouds, and the company filed for bankruptcy a second time on April 14, 2020. Longview attributed the filing to low power prices, but it is noteworthy that in the six months immediately preceding the filing, the plant's capacity factor was almost 95%. In other words, it was running all the time and still not making any money despite its touted low-cost production.

The second bankruptcy filing wiped out another $350 million in secured and subordinate debt,[49] but that still hasn't put the power plant on a firm financial footing.

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[45] S&P Global Market Intelligence. S&P downgrades Longview Power, warns of potential for covenant breach. June 29, 2016.
[46] S&P Global Market Intelligence. Longview coal plant operator considers refinancing existing senior debt. March 19, 2018.
[47] S&P Global Market Intelligence. Coal plant operator Longview seeks approval for W.Va. gas, solar project. September 13, 2019.
[48] S&P Global Market Intelligence. S&P warns ESG could increase infrastructure project finance risk. January 30, 2020.
[49] S&P Global Market Intelligence. Longview Power seeks FERC approval of reorganization plan June 4, 2020.

In its latest analysis of Longview, released in November 2021, Moody's wrote: "Longview Power, LLC's (Longview or Project) Caa1 rating reflects the weak credit quality following the bankruptcy of Mountain State Energy Holdings LLC and the issuer's position as a single-asset coal-fired power plant. Current market conditions are favorable as rising power prices are driving higher energy margins, though EBITDA remains highly variable quarter-over-quarter. Moody's outlook for PJM forward capacity prices is weak, especially in the RTO region where the plant competes. Longview's credit profile is challenged by elevated refinancing risk; the exit facility matures in July 2025, ...[at a time when] merchant coal-fired generation power plants face growing investor concern over environmental issues."[50]

New Jersey's Last Two Coal Plants

Chambers and Logan Cogen Units Set to Close

The two cogeneration units began commercial operation in 1994; Logan Generating Co. is a 219MW facility while Chambers Cogeneration is a 244MW unit.

The two plants have been owned by a series of private equity owners during the past 15 years. Currently, Starwood Energy Group Global owns all of Logan and 60% of Chambers. The remaining 40% of the Chambers facility is owned by Atlantic Power Holdings, a unit of I Squared Capital Advisors.

Atlantic City Electric, a subsidiary of Exelon, buys electricity from the two plants under a long-term contract that was set to expire in 2024. According to S&P estimates, operations and maintenance costs at Logan averaged more than $55 per megawatt-hour over the past five years, while the average cost at Chambers was $49.70/MWh.

Atlantic City Electric has been trying to buy out the two supply contracts for years, arguing that its ratepayers would save significantly via a buyout and closure. The company's December 2021 filing with the New Jersey Board of Public Utilities seeking approval for the buyout/closure plan estimated that its average residential customer (using 680 kilowatt-hours per month) was paying almost $120 annually for the two power purchase agreements.[51]

"Alternative, cleaner, and less expensive sources of energy and capacity are available to ACE customers through the PJM wholesale markets," the company said.[52]

State regulators approved the ACE proposal in March, and the two plants were scheduled to close for good at the end of May. Under the terms of the agreement,

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[50] Moody's Investors Service. Moody's announces completion of a periodic review of ratings of Longview Power, LLC. November 11, 2021.
[51] Atlantic City Electric. Re: In the Matter of the Petition of Atlantic City Electric Company for Approval of the Modification of Power Purchase Agreements with Chambers Cogeneration Limited Partnership and Logan Generating Company, L.P. to the New Jersey Board of Public Utilities. December 22, 2021, p. 701.
[52] *Ibid.*, p. 702.

ACE will pay Starwood a reduced monthly amount through the end of the contract term in 2024, savings its ratepayers more than $30 million.

Conclusion

The outlook for PJM's PE-owned coal-fired power plants is poor. Continued competition from new, efficient gas-fired facilities, significant planned additions of renewable energy capacity, and expectations of low to flat demand growth all serve to undercut the economics for the region's coal generators.

The real future lesson is for the banks and other private lenders. Continuing to lend to the PJM's coal plants is a risky business—the five-plus bankruptcies of the past 10 years are proof. The PE firms, which are often able to recover their investments through special dividends and other measures, are not the ones left holding the bag when a company files for bankruptcy. Rather, it is the lending community, which is forced to write off part or all of its investment, that is left owning an asset it doesn't really want.

The 105,000MW of renewable energy that PJM is planning to bring online in the coming years is proof that there are other, less risky options. Bankers and lenders need to pay attention: Gimmicks such as the bonus interest that Gavin's owners are offering simply are not worth the financial risk of non-payment and the growing reputational risk of coal plant lending.

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

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