



Institute for Energy Economics  
and Financial Analysis

# Private Equity in PJM: New Risks for Limited Partners, Private Capital

**Dennis Wamsted**, Energy Analyst

October 2023

# Contents

- Key Findings.....3
- Executive Summary.....4
- Investor Risks.....6
  - The Nuveen/TIAA Tale..... 10
- Conclusions..... 15
- Appendix A: PJM’s 5,000MW+ Capacity Club ..... 16
  - ArcLight ..... 16
  - LS Power ..... 17
  - Energy Capital Partners (ECP)..... 18
  - Avenue Capital ..... 20
- Appendix B: Limited Partner Fund Commitments..... 21
- About IEEFA..... 25
- About the Author ..... 25

# Tables

- Table 1: Private Equity Returns Versus Public Equity.....6
- Table 2: Performance Data for Select PJM-focused PE Funds .....9
- Table 3: Nuveen/TIAA’s Power Plant Ownership ..... 13
- Table 4: ArcLight Capital PJM Plant Ownership ..... 16
- Table 5: LS Power PJM Plant Ownership ..... 17
- Table 6: ECP PJM Plant Ownership ..... 19
- Table 7: Avenue Capital PJM Plant Ownership..... 20
- Table 8: ArcLight Energy Partners Funds..... 22
- Table 9: Energy Capital Partner Funds ..... 23
- Table 10: LS Power Funds..... 24

## Key Findings

**The changing regional power environment is likely to shift the outlook for outside investors, including limited partners (LPs), by lowering annual returns, raising investment risks, or both.**

Beyond financial risks, LPs face mounting reputational risks from their gas and coal investments as concerns increase about climate change and the negative impact of fossil fuel emissions.

The next few years could see additional performance problems at many of these infrastructure and PJM-focused funds, potentially lowering returns for LPs.

**It is a new, much riskier situation for private equity (PE) and private capital in PJM, and risks are now trickling down to outside pension fund investors.**



---

## Executive Summary

Private capital, particularly difficult-to-track private equity (PE) investment, has reshaped the PJM power market in the past decade. PJM data shows that 35,515 megawatts (MW) of combined cycle gas-fired capacity have been built in the 13-state regional system since 2011, reflecting the impact of the fracking revolution that brought plentiful, low-cost gas supplies to the market. PE and other private sources developed more than 80% of the total—28,815MW.

This gas-driven growth, coupled with significant PE investment in the region's coal-fired power plants, has transformed the ranks of PJM's largest generating companies. As recently as 2017, the five largest capacity owners were all regulated and/or publicly traded: American Electric Power, Dominion Energy (the parent of Virginia Power), Exelon (the parent of Commonwealth Edison), FirstEnergy and NRG Energy. Today, three of the largest generators are private firms—ArcLight with 14,230MW of operating capacity; LS Power, with 10,803MW; and Talen (now controlled by Nuveen/TIAA and Rubric Capital), with 10,370MW.<sup>1</sup> Beyond these three majors, there are a host of private and PE firms that own between 1,000MW and 5,000MW of capacity. Together, private capital now owns roughly 60% of the fossil fuel-fired generation capacity in PJM.

Ownership status is important. Utilities are overseen by state regulators who have a vested interest in keeping costs for ratepayers in check; merchant power companies owned by private capital are largely free from that oversight. Utilities, as well as publicly traded independent power producers, are also required to file regular financial reports with the Securities and Exchange Commission; private capital, by and large, is not. These differences largely shield private firms from regulatory and financial oversight and public pressure.

In a three-part report, IEEFA is examining the increasing risk environment in PJM, the nation's largest power market. This second report focuses on the limited partners (LPs)—the pension and retirement funds that have poured money into the PE sector in the past decade, and generally have been well rewarded for their investments. But the changing regional power environment is likely to shift the outlook for outside investors by lowering annual returns, raising investment risks, or both. This report pays particular attention to the fallout from bankruptcy filings, in which funds and other private entities end up owning assets they may not want. For example, Nuveen/TIAA now finds itself in that situation for the second time in three years, following the recent bankruptcy restructuring of Talen Energy, and the earlier bankruptcy restructuring of FirstEnergy Solutions, which became Energy Harbor.

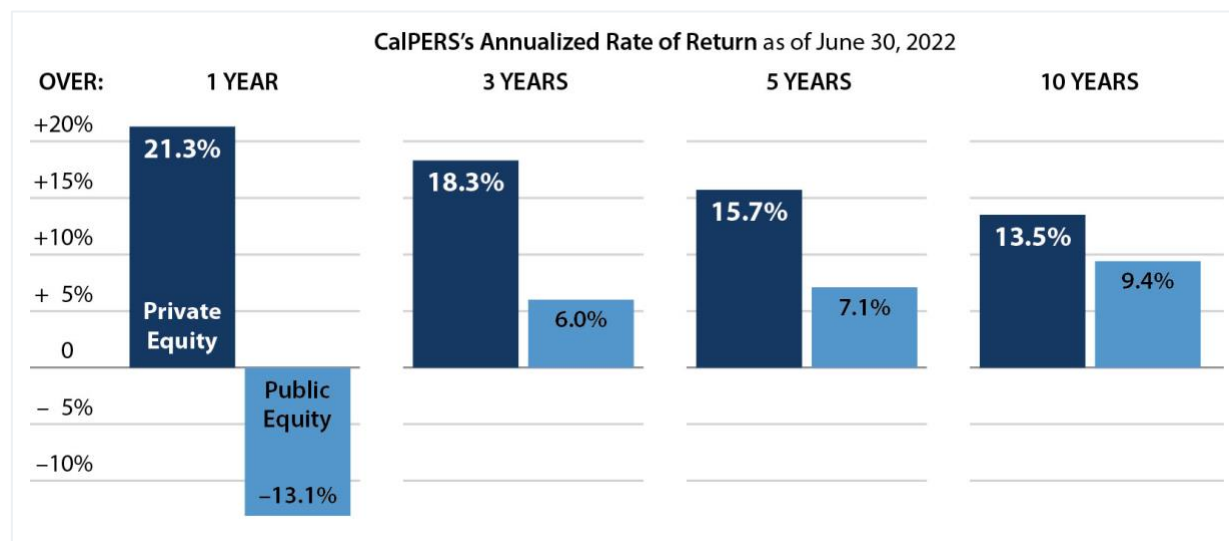
---

<sup>1</sup> The data is correct as of Dec. 31, 2022. See: Monitoring Analytics, LLC. [State of the Market Report for PJM-2022](#). March 9, 2023, p. 314.

In the first of our reports,<sup>2</sup> we examined the rising financial risks facing PE and other private firms. These risks include the recent substantial drop in capacity prices, the financial fallout from the 2022 winter storm and ongoing market reform efforts by the system operator.

In the third and final report, we will examine the risks posed by PE's relative immunity from oversight and public pressure. This is a particularly serious threat for the places where the plants operate, since PE generators can decide on short notice to close a facility if the economics no longer work, leaving unprepared communities facing significant economic dislocations from job and tax losses. Similarly, PE's lack of public accountability creates the very real possibility that efforts to curb regional carbon dioxide emissions will become more difficult in the years ahead. PE firms and other private capital now account for more than 50% of the PJM region's annual power-related carbon dioxide (CO<sub>2</sub>) releases, but the sector's lack of transparency shields it from the types of public pressure that have helped convince publicly traded electric utilities to move (however haltingly) toward decarbonization efforts.

### Private Equity Returns Have Been High, But Risks for Fossil-Fuel Funds Are Growing



Source: California Public Employees' Retirement System.

<sup>2</sup> IEEFA. [Private equity in PJM: Growing financial risks](#). Aug. 22, 2023.

## Investor Risks

Limited partners (LPs) such as state and corporate pension funds that have poured money into private capital and private equity investments have grown accustomed to outsized returns, which have generally far outpaced those available in the bond or stock markets. This can be seen in the graphic below, which shows performance numbers for four large state pension funds over the past 10 years. The reporting dates for the funds differ, but the takeaway is the same: In every case but one, the returns from the funds' private equity investments significantly outperformed their public equity investments, regardless of the time period.

**Table 1: Private Equity Returns Versus Public Equity**

	Annualized Rate of Return (%)			
	1 Year	3 Years	5 Years	10 Years
New York State Common Retirement Fund (as of March 31, 2022)				
Private Equity	37.57	23.89	19.93	15.38
Public Equity	6.52	15.21	13.03	11.9
Total Fund	9.51	12.49	10.77	9.55
California Public Employees' Retirement System (as of June 30, 2022)				
Private Equity	21.3	18.3	15.7	13.5
Public Equity	-13.1	6	7.1	9.4
Total Fund	-6.1	6	6.7	7.7
Teacher Retirement System of Texas (as of March 31, 2023)				
Private Equity	-7.8	16.3	14	14.3
Public Equity	-6.9	15.2	5.3	6.9
Total Fund	-5.2	10.3	6.7	7.6
Ohio Public Employees Retirement System (as of December 31, 2022) Defined Benefit Portfolio (\$92.49 B)				
Private Equity	-4.79	17.08	15.39	NA
U.S. Equity	-18.99	6.96	8.71	NA
Total Fund	-12.03	4.36	5.27	NA

*Note: The Ohio Public Employees Retirement System does not provide 10-Year data.*

*Source: Annual state pension fund reports.*

These strong results may continue for private equity in general. But as we demonstrated in our first report, the financial risks to PE investors in gas- and coal-fired power plants in PJM have grown significantly in the past several years. The rising risks have largely been driven by lower capacity auction prices, hefty fines for non-performance during a 2022 winter storm and pending market

reforms. Such risks could easily lower returns for LPs in funds with significant exposure to the PJM generation market.

For example, ArcLight's Energy Partners Fund VII (ArcLight VII) is the investment vehicle for the gas-fired generation assets the PE firm bought from New Jersey utility PSEG in 2022, putting them in an entity called Parkway Generation. Its assets include the Keys Energy, Sewaren, Bergen and Linden combined cycle plants, which have a total capacity of more than 4,100MW. Keys and Sewaren are new facilities, having just entered commercial service in 2018, and Keys has been a particularly strong performer, posting an average capacity factor of more than 70% through 2022.

But the units did not perform well during a 2022 December freeze, prompting PJM to propose a \$100 million fine against the firm. Moody's then put Parkway Generation under review for a potential credit downgrade, warning that the fine and other financial issues could impair efforts to refinance the company's debt.<sup>3</sup>

PJM and 80 affected parties filed a settlement agreement with the Federal Energy Regulatory Commission (FERC) at the end of September regarding the non-performance fines from the December storm. Under the terms of the proposal, the fines due to PJM will be reduced by 31.7%, cutting the system-wide total by approximately \$570 million, to less than \$1.3 billion.<sup>4</sup>

Even at that reduced level, the fines will amount to roughly one-third of the total capacity payments paid out by PJM for the 2023-24 power delivery year, according to an affidavit submitted by Michael Borgatti in favor of the proposed settlement.<sup>5</sup> Borgatti, vice president at Gabel Associates, a consulting firm representing some of the affected generators, said the settlement was a reasonable compromise, even though it represented a substantial penalty for underperformance.

Michael Bryson, senior vice president for operations at PJM, seconded that view: "Notwithstanding that reduction, the non-performance charges unquestionably provide a powerful incentive for capacity resources to meet their obligations and for all resources to help the PJM region meet its resource adequacy needs."<sup>6</sup> All told, he said the fines would account for about 55% of the capacity revenues received by the poor performing units during the year, and that many of the resources will effectively receive no capacity revenues at all due to the fines.<sup>7</sup>

At the fund level, the settlement brings certainty, but also likely lower returns—for the LPs, the general partner(s), or both. ArcLight VII is a relatively new fund, but a fine of roughly \$70 million (the approximate amount due after the settlement-driven reduction) will have a major financial impact, either forcing the LPs to accept lower distributions in the near term or requiring ArcLight to up its contributions to keep annual LP payments at expected levels.

---

<sup>3</sup> Moody's Investors Service. [Parkway Generation LLC](#). Nov. 15, 2022.

<sup>4</sup> Affidavit of Michael Borgatti. Searchable at FERC's [elibrary](#), Docket ER23-2975-000. Sept. 29, 2023, p. 8.

<sup>5</sup> *Ibid.*

<sup>6</sup> Affidavit of Michael Bryson. Searchable at FERC's [elibrary](#), Docket ER23-2975-000. Sept. 29, 2023, p. 33.

<sup>7</sup> *Ibid.*

According to Pitchbook, there are eight limited partners currently invested in the fund: Allstate, American Airlines, Citigroup, the Mayo Clinic, the Michigan state retirement fund, Migdal Insurance and Financial Holdings, the Oklahoma police pension plan, and the Texas Permanent School Fund.

Similar financial risks face the LP investors in Carlyle Power Partners II (CPP II), an infrastructure fund run by The Carlyle Group.

The experience of one of those investors—the Maine Public Employees Retirement System (MainePERS)—is illustrative. The system committed \$50 million to CPP II in 2015.<sup>8</sup> The fund provided the equity capital for Carlyle’s purchase of 1,747 MW of capacity in the PJM and ISO-New England markets from IFM Investors, a New York-based private equity company.<sup>9</sup> The purchase included three plants in PJM—the 326MW Ocean Peaking Power facility in New Jersey, the 672MW Rock Springs plant in Maryland, and an 80% stake in the 248MW Lakewood unit in New Jersey (the other 20% is owned by Osaka Gas). Carlyle operates the three under the Nautilus Power moniker.

CPP II was also the vehicle used by The Carlyle Group to purchase two natural gas-fired power plants in Illinois in 2017. The two, the 533MW Elgin Energy Center and the 415MW Rocky Road facility, are operated as Lincoln Power.

Like ArcLight’s Parkway unit, both Lincoln and Nautilus had significant performance problems during the December 2022 freeze. The problems at Lincoln, and resulting non-performance fines totaling \$39 million, were so severe that Carlyle put the firm into Chapter 11 bankruptcy at the end of March.<sup>10,11</sup> Carlyle also was forced to inject \$58 million in equity and another \$30 million in working capital into Nautilus this spring to ease the company’s liquidity problems due to recent lower capacity auction prices and the fines from PJM.<sup>12</sup>

The issue for MainePERS, and likely for other investors in CPP II, is that its investment in the fund had already been underperforming for the last three years, even before the changing risk environment brought about by the December storm and the subsequent non-performance fines and PJM market restructuring proposals. According to data from MainePERS, CPP II has consistently lagged the results of its group-wide infrastructure investments since 2020.<sup>13</sup> The bankruptcy filing for Lincoln Power, which led to the sale of the firm’s two Illinois plants to Middle River Associates, a unit of PE firm Avenue Capital, for just \$26.2 million, and the performance problems at Nautilus Power, are likely to further undercut the fund’s performance this year and perhaps longer.

A MainePERS investment in ArcLight Energy Partners Fund VI (ArcLight VI) has also badly lagged the performance of its other private equity infrastructure investments. In its first quarter 2023 results,

<sup>8</sup> Maine Public Employment Retirement System. [MainePERS Private Market Investment Summary](#). March 31, 2023, p. 4.

<sup>9</sup> The Carlyle Group. [The Carlyle Group to acquire power generation portfolio from IFM Investors](#). Feb. 2, 2016.

<sup>10</sup> The settlement does affect this and two other bankruptcy filings and their associated non-performance fines. PJM Settlement Offer and Explanatory Statement. Searchable at FERC’s [elibrary](#), Docket ER23-2975-000. Sept. 29, 2023, p. 40.

<sup>11</sup> U.S. Bankruptcy Court for the District of Delaware. Case 23-10382. [Justin Pugh First Day Declaration](#). March 31, 2023, p. 19.

<sup>12</sup> Moody’s Investors Service. [Moody’s revises Nautilus Power LLC’s outlook to stable from negative](#). April 20, 2023.

<sup>13</sup> Performance data for MainePERS private equity investments can be found [here](#).



MainePERS said its internal rate of return for ArcLight VI was 4.2%, compared to 11.5% for its infrastructure investments as a whole. ArcLight VI is a \$5.5 billion, fossil fuel-heavy fund that closed to new investors in 2015. Among the fund's current investments is the Gavin coal-fired power plant in Ohio, one of the largest carbon dioxide emitters in the U.S. ArcLight bought the Gavin plant and three gas-fired generation facilities from American Electric Power in a 50-50, \$2.1 billion deal with Blackstone in 2017.<sup>14</sup>

MainePERS also invested \$75 million in another ArcLight fund, Energy Partners V, that owns stakes in the Keystone and Conemaugh coal-fired power plants in Pennsylvania. These two plants, both 1,711MW, emitted more than 11 million tons of CO<sub>2</sub> in 2022 even though they operated less than 50% of the time. ArcLight V has 52 limited partners, according to Pitchbook. In addition to MainePERS, some other large investors include John Hancock Financial Services (which invested \$147.9 million initially), the North Carolina Retirement Systems (\$100 million) and the Connecticut Retirement Plans and Trust Funds (\$65 million).<sup>15</sup>

LPs don't always disclose specific information on the performance of their individual fund investments, but we can get a sense of how particular funds are doing by comparing them to broader benchmark funds. Results from four funds with significant asset ownership in the PJM market are presented in the following table. None of the funds are top performers, and the ArcLight and Blackstone funds have fared particularly poorly relative to peers. Based on returns data analyzed by Pitchbook, ArcLight's energy funds V and VI, as well as Blackstone Capital Partners VII, have all performed worse than 75% of comparable private equity funds.

**Table 2: Performance Data for Select PJM-focused PE Funds**

Fund	Vintage Year	IRR (%)	Pitchbook Median Benchmark IRR (%) <sup>1</sup>	Pitchbook Quartile
Carlyle Power Partners II <sup>2</sup>	2014	11.7	10.82	2nd
ArcLight Energy Partners V	2011	8.00	14.16	4th
ArcLight Energy Partners VI	2015	4.11	11.35	4th
Blackstone Capital Partners VII <sup>3</sup>	2016	13.79	19.5	4th

<sup>1</sup> Pitchbook benchmarks are by vintage year compared to a peer group of funds that include infrastructure, energy, real estate etc.

<sup>2</sup> Carlyle's 2Q23 10-Q filing reported 11% net IRR for CPP II

<sup>3</sup> Blackstone's 2Q23 10-Q filing reported 4% net IRR for BCP VII

Source: Company reports, Pitchbook.

<sup>14</sup> IEEFA. [Pension funds investing indirectly in Ohio's Gavin coal plant are at risk as financial, environmental disadvantages mount.](#) Oct. 14, 2021.

<sup>15</sup> Full details on the LPs invested in the three ArcLight Energy Partners funds are in the appendix.

Beyond these financial risks, LPs face mounting reputational risks from their gas and coal investments as concerns increase about climate change and the negative impact of fossil fuel emissions.

The entities facing these financial and reputational risks have been obscured by a lack of transparency regarding ownership and investment links in the private equity sector. The firms are largely exempt from the financial filings of publicly held companies. LPs often refuse to disclose the precise amount of their investments and/or which firms and funds they are investing in; even when they do, there is rarely clear information on the performance of these individual investments. Instead, the performance is usually aggregated by broad categories, obscuring fund underperformance.

IEEFA believes full transparency is the proper approach for LPs with all future investments. If these are truly good opportunities, there should be no reason to shield information from retirees or anyone else. Owning portions of thousands of megawatts of fossil fuel generation capacity has a major climate impact. Without stated plans to exit these investments or ensure that their emissions are reduced, the pension funds are culpable for the unfolding global warming crisis.

## The Nuveen/TIAA Tale



**“Climate change is happening now and we face the challenge of stewarding our clients’ retirement investments through the transition towards a net zero greenhouse gas (GHG) emission economy.”<sup>16</sup>**

That statement is from TIAA’s 2022 climate report, which outlines the company’s approach to investing in this new environment.<sup>17</sup> One of the company’s key goals, it said, “is to advocate for enhanced disclosure of consistent, reliable climate-risk data from our portfolio companies.”<sup>18</sup>

On that score, it appears the company is failing its own test.

Twice in the past two years, Nuveen Asset Management and its parent, Teachers Insurance and Annuity Association of America (TIAA), have become the controlling partner of two companies that owned significant amounts of fossil fuel generation capacity in PJM. These bankruptcy-driven ownership changes mean Nuveen/TIAA is now responsible for a significant amount of regional fossil fuel generation—and the CO<sub>2</sub> emissions that go hand-in-hand with that generation. Nuveen/TIAA’s financial support for these plants was not publicly disclosed until after they assumed ownership when the companies emerged from bankruptcy.

<sup>16</sup> TIAA. [Ensuring Our Future](#). 2022.

<sup>17</sup> TIAA was established as a life insurance company in 1918 to serve the education market. It has expanded significantly since, particularly through its acquisition of Nuveen, an investment management company, in 2014. See: IEEFA. [TIAA Fails Clients on Climate](#). 2022, pp. 7-8.

<sup>18</sup> TIAA, *op. cit.*, p. 17.

## The Pleasants Problem

In 2020, Nuveen/TIAA became the controlling partner of Energy Harbor, the company that emerged from the bankruptcy of FirstEnergy Solutions, the former competitive power unit of FirstEnergy, a large Ohio-based utility. The generating assets in Energy Harbor included three nuclear power plants—the 1,808MW Beaver Valley station in Pennsylvania and two plants in Ohio, the 894MW Davis-Besse facility and the 1,240MW Perry plant—as well as the W.H. Sammis and Pleasants coal-fired power plants. Sammis, with a generating capacity of 1,490 MW at its three remaining units, is in eastern Ohio; the two-unit, 1,278MW Pleasants facility is in West Virginia.

After emerging as an independent company in 2020, Energy Harbor announced plans to become “one of the few 100% carbon free energy infrastructure and supply companies in the U.S.”<sup>19</sup> As part of its pledge the company said it would sell or close its two coal-fired power plants. The company has achieved half of its goal: According to PJM, the Sammis plant was deactivated as of May 3. However, Pleasants has now passed to a new owner that has restarted the plant. Nuveen/TIAA may no longer own the plant, but IEEFA believes it still shares responsibility for the plant’s CO<sub>2</sub> and other air emissions.

Last December, Energy Harbor negotiated a sale-leaseback of Pleasants with a PE-controlled cleanup/redevelopment company called Energy Transition and Environmental Management (ETEM). The plan was for Pleasants to operate the plant for the first six months of 2023 and then shut it down, with ETEM then assuming control. But the plant’s closure was challenged by state politicians, and West Virginia regulators pushed to get two state-regulated utilities to buy it. This opened a path for a small company, Omnis Fuel Technologies, to acquire it from ETEM. That transaction was approved by FERC on Aug. 1, meaning Energy Harbor is now officially out of the coal generation business. Omnis says its goal is to build a graphite production facility on the site and use waste hydrogen from the process to fuel the Pleasants boilers, but it restarted Pleasants using coal at the end of August.

Even though Energy Harbor has now washed its hands of the plant, IEEFA believes it is disingenuous at best for the company, and by extension Nuveen/TIAA, to claim it is carbon free unless Pleasants is closed. In the two years after Energy Harbor emerged from bankruptcy—that is, in the period when Pleasants was controlled by Nuveen/TIAA—it recorded an average capacity factor of 68.7%, and its 70.9% capacity factor in 2022 was the plant’s highest since 2014. That pushed the plant’s CO<sub>2</sub> emissions up to 8.4 million tons, the first time it exceeded 8 million tons since 2014 as well—hardly a carbon-free example.

Nuveen/TIAA’s role in the nuclear side of Energy Harbor remains uncertain at this point. Vistra, a large, Texas-based independent power producer, announced a deal in March to buy the company’s three nuclear plants for \$3.4 billion and roll them into a new subsidiary called Vistra Vision. At the time, Nuveen and Energy Harbor’s other principal owner, PE firm Avenue Capital, said they would be passive investors in the newly formed Vistra entity. But that has been challenged by FERC staff, who

<sup>19</sup> Energy Harbor. [Transition to 100% Carbon Free Energy](#). March 14, 2022.

asked the companies in an August deficiency letter to explain how Nuveen/TIAA and Avenue Capital could be considered passive investors if their consent was required before “[m]aking any material changes to the principal lines of business of Vistra Visions and its subsidiaries.”<sup>20</sup>

FERC has not yet acted on this issue, meaning that Nuveen/TIAA remains very much in the nuclear power business.

## Nuveen/TIAA’s Talen Takeover

In addition, Nuveen/TIAA has just become one of the controlling owners of a much larger fossil fuel generator. According to documents filed at FERC in conjunction with the Talen Energy bankruptcy, Nuveen/TIAA is now one of the restructured firm’s two principal owners. The other is Rubric Capital, a private equity firm based in New York. Through Talen, Nuveen/TIAA and Rubric Capital now own stakes in five large coal plants, 10 gas plants, a plant that runs on fuel oil, and the Susquehanna nuclear plant.

A full listing of the power plants in its portfolio appears in the table below.

Nuveen/TIAA and Rubric were two of Talen’s largest unsecured creditors and helped coordinate a successful effort by the company’s other unsecured lenders to buy the bankrupt firm, which was formerly owned by PE firm Riverstone Holdings. Talen filed for bankruptcy May 9, 2022, and completed the restructuring process just over a year later, having shed \$2.7 billion in debt and acquiring its new owners. In a May 22 FERC filing, Talen said that Nuveen/TIAA and Rubric were the only two companies with a greater than 10% ownership stake in the restructured firm.<sup>21</sup> FERC disclosure rules only require the publication of the names of companies/individuals that hold stakes of more than 10%. In Talen’s initial filing seeking FERC approval for the restructuring, submitted Dec. 15, 2022, it had indicated that Rubric would control between 22% and 25% of the new company while Nuveen/TIAA would control between 11% and 16%.<sup>22</sup> A third company, Citadel Advisors, had been listed as potentially owning as much as 15% of Talen, but its stake clearly dropped as the deal was finalized since it was not listed as one of the owners who held a 10% stake in the May 22 filing.

---

<sup>20</sup> FERC Office of Energy Market Regulation deficiency letter. Docket No. EC23-74-000. Aug. 17, 2023. Searchable at [FERC’s eLibrary](#).

<sup>21</sup> Talen FERC filing under docket EC23-42-000. Searchable at [FERC’s eLibrary](#).

<sup>22</sup> *Ibid.*

**Table 3: Nuveen/TIAA's Power Plant Ownership**

Region	State	Plant Name	Fuel (2022)	First Year in Service	Planned Retirement	Plant Capacity (MW)	Talen Total (MW)	2022 Generation (MWh)	2022 CO <sub>2</sub> Emissions (tons)	Talen CO <sub>2</sub> Emissions Share (tons)
PJM	MD	Brandon Shores	Coal	1984	June 2025	1,273	1,273	2,421,014	2,426,033	2,426,033
	MD	Carroll County <sup>1</sup>	Gas	2017		715	286	5,330,523	2,327,899	931,159
	MD	Herbert A Wagner	RFO	1956		841	841	138,875	185,500	185,500
	NJ	Camden Cogeneration	Gas	1993		145	145	109,215	58,107	58,107
	PA	Brunner Island	Gas	1961		1,411	1,411	4,056,572	3,013,203	3,013,203
	PA	Martins Creek 3&4	Gas	1975		1,753	1,753	265,266	187,458	187,458
	PA	Montour <sup>2</sup>	Coal	1972		1,504	1,504	1,463,564	1,341,227	1,341,227
	PA	Lower Mount Bethel Energy	Gas	2004		602	602	4,414,764	1,800,469	1,800,469
	PA	Keystone <sup>3</sup>	Coal	1967		1,711	211	5,556,250	5,418,275	1,020,261
	PA	Conemaugh <sup>3</sup>	Coal	1970		1,711	380	6,196,135	5,963,853	1,631,114
	PA	Martins Creek Peakers <sup>4</sup>	Gas			250	250			
PA	Susquehanna	Nuclear	1983		2,494	2,245	20,065,031	-	-	
WECC	MT	Colstrip <sup>5</sup>	Coal	1975		1,480	222	10,865,555	11,743,395	1,761,509
ISO-NE	MA	Dartmouth Power <sup>6</sup>	Gas	1992		82	82	31,379	23,455	23,455
ERCOT	TX	Barney Davis	Gas	1974		947	947	105,359	82,970	82,970
	TX	Laredo <sup>7</sup>	Gas	2008		192	192		20,287	20,287
	TX	Nueces Bay	Gas	2010		655	655	1,472,089	704,889	704,889
<b>TOTALS</b>						<b>17,766</b>	<b>12,999</b>	<b>62,491,591</b>	<b>35,297,020</b>	<b>15,187,641</b>

<sup>1</sup> Carroll County was already 40% owned by Nuveen/TIAA

<sup>2</sup> Montour is being converted to run on gas

<sup>3</sup> This represents Talen's share of Keystone and Conemaugh; Riverstone, Talen's former parent, still separately owns portions of the two plants

<sup>4</sup> Martins Creek Peakers include 19 small CTs across Pennsylvania; no generation or emissions data has been reported

<sup>5</sup> Talen currently owns 30% of Colstrip Unit 3; it has a deal to buy Puget Sound's 25% stake in Units 3 & 4 in 2025

<sup>6</sup> Generation data is from 2021, emissions data is from 2022

<sup>7</sup> No 2022 generation data reported

Source: FERC filings, S&P, EPA.

There are two key takeaways from this table. First, Nuveen/TIAA is now an owner of an extensive fleet of fossil fuel power plants, particularly in PJM. Second, much of this capacity is old and runs at reduced levels. This poses significant financial, environmental and reputational risks for Nuveen/TIAA.

The problems with Talen's generation fleet became crystal clear during a 2022 winter storm that hit the eastern U.S. The company warned in its first quarter earnings report that it could be liable for \$46 million in penalties for poor performance during the December event.<sup>23</sup> Under the terms of the recently filed settlement between PJM and the generators that reduced the penalties, Talen will receive a credit from PJM—perhaps because it paid its fines early—but it's clear from earlier filings that the company's plants performed poorly during the storm.<sup>24</sup>

<sup>23</sup> Talen Energy. [Financials, Q1 2022](#), p. 46.

<sup>24</sup> PJM Settlement Offer. Searchable at FERC's [elibrary](#), Docket ER23-2975-000. Sept. 29, 2023, p. 9.

“The Talen generators fell well short in providing energy and reserves to help address the emergency conditions facing the PJM region during Winter Storm Elliott on December 23 and 24, 2022,” PJM wrote in response to Talen’s initial filing seeking to have the fines reduced.<sup>25</sup>

“The Talen generators, which received capacity payments for the seven months leading up to Winter Storm Elliot, did provide less value than other resources with shorter startup periods, as the Talen generators generally were offline and not available to be dispatched within a timeframe that PJM dispatchers determined would help alleviate the emergency conditions.<sup>26</sup>



**“Capacity resources are not paid to simply exist; they are paid to be available to perform and serve PJM’s loads.”<sup>27</sup>**

Nuveen/TIAA’s enlarged fossil fuel ownership stake may also be a problem for its investors, many of whom are looking for greener options.

Talen has recently filed with the SEC for a public stock offering. When the offering will take place and how it will affect Nuveen/TIAA’s ownership stake remains uncertain, but the company is a major player in the PJM power market for now.

<sup>25</sup> From FERC docket No. EL23-56-000. Answer of PJM Interconnection. P. 1. Searchable at [FERC’s eLibrary](#).

<sup>26</sup> *Ibid.*

<sup>27</sup> *Ibid.*

---

## Conclusions

The changes within PJM—lower capacity payments, significant fines for poor performing plants last December, and looming market reforms—that have boosted risks for private equity firms are also likely to squeeze financial returns for the LPs that have invested in infrastructure and other PE funds with significant levels of fossil fuel assets in the region. We have seen that the performance of several of these funds is already lagging peer benchmarks, even before the full impact of the pending changes has been felt across the market.

The next few years could see additional performance problems at many of these infrastructure and PJM-focused funds, potentially lowering returns for LPs. Pension funds and other investors may not be able to pull out of these existing commitments, but they certainly should be taking these new risks into account when considering future investments—assuming the solid returns from previous PJM infrastructure funds will continue is a risky bet indeed.

Pension fund investors also need to be aware of the risks and complications arising from the bankruptcy process. Nuveen/TIAA's investments have resulted in the firm controlling two major bankrupt power producers in the PJM region, Energy Harbor and Talen, which are far outside their core investment management expertise. Further, these companies may not fit in with pension funds' investment goals—Energy Harbor is a major nuclear generator and Talen owns a significant amount of fossil fuel-fired generation across the country.

It is a new, much riskier investment landscape for PE and private capital in PJM, and those risks are now beginning to affect outside pension fund investors.

## Appendix A: PJM's 5,000MW+ Capacity Club

Aside from Nuveen/TIAA, there are three other PE/private capital firms with more than 5,000 MW of owned generation in PJM. A fourth PE firm, Avenue Capital, is included in this appendix, as well. Its current and pending PJM capacity ownership just misses the 5,000MW threshold, but it has been actively accumulating new assets in recent years. Details on the four firms follow.

### ArcLight

In addition to its 6,072 MW of owned gas-fired capacity in PJM, ArcLight owns stakes in three large regional coal plants—Gavin, Keystone and Conemaugh. The 2,680MW Gavin plant in Ohio has consistently ranked as one of the largest power plant CO<sub>2</sub> emitters in the U.S. since ArcLight and Blackstone bought the facility from AEP in 2017.

ArcLight significantly expanded its ownership of gas-fired generation capacity in PJM in 2022 when it bought a portfolio of plants owned by New Jersey utility PSEG. The nine units have a combined capacity of 4,800 MW; the purchase price was announced as \$1.37 billion.<sup>28</sup>

The PE firm also owns generating assets in the New England and New York ISOs. The four units, with a total capacity of about 2,000 MW, were part of the purchase from PSEG.<sup>29</sup> Elsewhere, ArcLight owns generation capacity in Arizona, Puerto Rico and Spain.

**Table 4: ArcLight Capital PJM Plant Ownership**

Plant Name	State	Fuel (2022)	First Year in Service	Planned Retirement	ArcLight Fund Owner	Plant Capacity (MW)	ArcLight Total (MW)	2022 Generation (MWh)	2022 CO <sub>2</sub> Emissions (tons)	ArcLight CO <sub>2</sub> Emissions Share (tons)
Lawrenceburg	IN	Gas	2004		Energy Partners Fund VI	1,190	595	8,743,819	3,740,899	1,870,449
Keys Energy Center	MD	Gas	2018		Energy Partners Fund VII	761	761	4,641,291	1,984,574	1,984,574
Bergen <sup>1</sup>	NJ	Gas	1959		Energy Partners Fund VII	1,245	1,245	1,437,589	974,487	974,487
Burlington	NJ	Gas	1967		Energy Partners Fund VII	168	168	57,883	34,476	34,476
Keamy	NJ	Gas	1967		Energy Partners Fund VII	456	456	252,278	160,743	160,743
Linden	NJ	Gas	2006		Energy Partners Fund VII	1,636	1,636	5,148,088	2,215,415	2,215,415
Sewaren	NJ	Gas	2018		Energy Partners Fund VII	538	538	2,792,525	1,097,216	1,097,216
Gen J M Gavin	OH	Coal	1974		Energy Partners Fund VI	2,680	1,340	12,982,089	12,337,612	6,168,806
Darby	OH	Gas	2001		Energy Partners Fund VI	480	240	349,857	249,374	124,687
Waterford	OH	Gas	2003		Energy Partners Fund VI	866	433	6,790,198	2,780,761	1,390,380
Bay Shore	OH	Pet Coke	1955			136	136		1,285,518	1,285,518
Conemaugh	PA	Coal	1970		Energy Partners Fund V	1,711	385	6,196,135	5,963,853	1,341,867
Keystone	PA	Coal	1967		Energy Partners Fund V	1,711	391	5,556,250	5,418,275	1,237,534
Rausch Creek	PA	Coal				30	8	197,531	423,706	105,926
<b>TOTALS</b>						<b>13,608</b>	<b>8,331</b>	<b>55,145,532</b>	<b>38,666,908</b>	<b>19,992,079</b>

<sup>1</sup> The first unit at Bergen came online in 1959, later units entered service in 1995 and 2002

Source: FERC filings, S&P, EPA.

<sup>28</sup> PR Newswire. ArcLight closes acquisition of 4.8 GW power generation portfolio from PSEG. Feb. 18, 2022.

<sup>29</sup> PSEG. [PSEG closes on sale of New York and Connecticut generating assets to complete sale of PSEG fossil portfolio to affiliates of ArcLight Capital Partners](#). Feb. 23, 2022.



## LS Power

New York-based LS Power was established in 1990.

The firm owns 16,600 MW of operating capacity nationwide, the bulk of which is in the PJM region. In addition to the 9,207 MW of gas-fired capacity detailed in the table below, LS Power owns 155 MW of solar capacity and 1,615 MW of pumped hydro storage capacity in PJM.

**Table 5: LS Power PJM Plant Ownership**

Plant Name	State	Fuel (2022)	First Year in Service	Planned Retirement	LS Power Fund Owner	Plant Capacity (MW)	LS Power Total (MW)	2022 Generation (MWh)	2022 CO2 Emissions (tons)	LS Power CO2 Emissions Share (tons)
Rockford Energy Center <sup>1</sup>	IL	Gas	2000		LS Power Equity Partners III	361	361	264,296	170,423	170,423
University Park Energy <sup>1</sup>	IL	Gas	2001		LS Power Equity Partners II	300	300	226,634	147,989	147,989
Aurora	IL	Gas	2001		LS Power Equity Partners III	967	967	339,135	209,763	209,763
LSP University Park	IL	Gas	2002		LS Power Equity Partners II	540	540	214,368	122,652	122,652
Rockford II Energy Center	IL	Gas	2002		LS Power Equity Partners III	182	182	62,372	36,780	36,780
Riverside Generating Project	KY	Gas	2001			825	825	658,299	432,339	432,339
West Deptford Energy Station	NJ	Gas	2014		LS Power Equity Partners	735	131	1,961,794	843,192	150,088
Troy Energy	OH	Gas	2002		LS Power Equity Partners III	689	689	1,039,064	650,714	650,714
Rolling Hills Generating	OH	Gas	2003		LSP Development*	853	853	1,412,995	920,133	920,133
Springdale (1-2)	PA	Gas	1999			88	88	162,319	95,747	95,747
Springdale (3-5)	PA	Gas	2003			509	509	4,405,161	1,679,259	1,679,259
Armstrong County	PA	Gas	2002		LS Power Equity Partners III	671	671	1,329,138	812,920	812,920
Helix Ironwood	PA	Gas	2001			712	712	5,136,582	2,254,756	2,254,756
Gans Generating Facility	PA	Gas	2000			88	88	140,321	84,793	84,793
Hummel Station	PA	Gas	2018		LS Power Equity Partners IV	1,086	1,086	7,881,828	3,207,976	3,207,976
Doswell Limited Partnership	VA	Gas	1991			665	665	3,647,726	1,844,389	1,844,389
Doswell Peakers	VA	Gas	2001			500	500	935,690	649,330	649,330
Buchanan Units 1 & 2	VA	Gas	2002			80	40	330,361	187,385	93,692
<b>TOTALS</b>						<b>9,851</b>	<b>9,207</b>	<b>30,148,081</b>	<b>14,350,541</b>	<b>13,563,744</b>

<sup>1</sup> Generation and emissions data is from 2021

\* LSP Development is controlled by Mikhail Segal, the founder of LS Power. His sons Paul and Theodore Segal also own at least 10% of LSP Development.

LS Power owns over 16,600 MW of power generation, including a nearly 14,000-MW gas generation fleet across 10 states.

Source: FERC filings, S&P, EPA.

## Energy Capital Partners (ECP)

Calpine, which was founded in 1984, bills itself as the largest generator of gas-fired electricity in the U.S. It was taken private by PE firm Energy Capital Partners (ECP) in a 2018 deal valued at more than \$17 billion, including debt and equity.<sup>30</sup>

In 2022, ECP created a continuation fund to allow investors in ECP Capital Partners III and IV, the initial holders of Calpine, to sell if they desired and for new investors to buy into the power producer. According to ECP, the main investors in the \$1.6 billion continuation fund are Pantheon and Phoenix Insurance (an existing investor).<sup>31</sup> Other investors in the continuation fund are South Korea's National Pension Service (NPS) and the Korean Teachers' Credit Union (KTCU), which have put \$300 million and \$90 million respectively into the new ECP fund.<sup>32</sup>

Calpine says it operates 76 power plants with a total of almost 26,000 MW of capacity. Twenty-nine of its power plants are in the Eastern U.S., where it controls 9,355 MW of capacity, almost two-thirds in the PJM region.<sup>33</sup> In addition to its U.S. assets, ECP controls Canada's Heartland Generation, which owns 2,660 MW of natural gas-fired capacity in Alberta and British Columbia.<sup>34</sup>

Bridgepoint Group, a UK-based private equity firm with \$40 billion in assets under management, announced in September that it was buying ECP. The deal, to be financed with 235 million newly issued Bridgepoint shares, £233 million in cash and the assumption of £179 million of ECP debt,<sup>35</sup> will create a firm with a significant presence in both the U.S. and European markets. As announced, ECP will continue to operate under the same name in the U.S.

The following table lists the investors in ECP funds III and IV, which were the former owners of Calpine. Data on the current investors in the ECP continuation fund has not been publicly released.

<sup>30</sup> [ECP set to close on \\$1.6 billion for Calpine continuation fund](#). June 27, 2022.

<sup>31</sup> [ECP announces closing of \\$1.6 billion continuation fund for Calpine Corporation](#). June 23, 2022.

<sup>32</sup> [NPS, KTCU to invest \\$390 mn in US major power generator](#). The Korea Economic Daily. May 19, 2022.

<sup>33</sup> Calpine [website](#), accessed Aug. 7, 2023.

<sup>34</sup> Heartland Generation [website](#), accessed Aug. 14, 2023.

<sup>35</sup> Bridgepoint. [Bridgepoint adds \\$20bn infrastructure strategy, as ECP joins platform to build €57bn global alternatives asset manager](#). Sept. 6, 2023.

Table 6: ECP PJM Plant Ownership

Plant Name	State	Fuel (2022)	First Year in Service	Planned Retirement	ECP Fund Owner	Plant Capacity (MW)	ECP Total (MW)	2022 Generation (MWh)	ECP CO <sub>2</sub> Emissions (tons)
Christiana Substation	DE	DFO	1973		Energy Capital Partners III & IV	50	50	160	354
Delaware City 10 <sup>1</sup>	DE	DFO	1968		Energy Capital Partners III & IV	18	18	-	
Hay Road	DE	Gas	1989		Energy Capital Partners III & IV	1,136	1,136	1,998,514	988,695
West Energy Center <sup>1</sup>	DE	DFO	1964		Energy Capital Partners III & IV	15	15	-	
Zion Energy Center <sup>2</sup>	IL	Gas	2002		Energy Capital Partners III & IV	456	456	638,453	422,266
Crisfield <sup>3</sup>	MD	DFO	1968		Energy Capital Partners III & IV	10	10	1,400	
Carl's Comer Energy Center <sup>2</sup>	NJ	Gas	1973	June 2024	Energy Capital Partners III & IV	77	77	5,015	8,321
Cumberland Energy Center <sup>2</sup>	NJ	Gas	1990		Energy Capital Partners III & IV	183	183	60,254	34,875
Sherman Avenue <sup>2</sup>	NJ	Gas	1991		Energy Capital Partners III & IV	87	87	12,521	10,107
Mickleton Energy Center <sup>2</sup>	NJ	Gas	1974	June 2024	Energy Capital Partners III & IV	64	64	3,150	5,906
York Energy Center (Delta)	PA	Gas	2011		Energy Capital Partners III & IV	545	545	1,996,172	959,430
Bethlehem Power Plant	PA	Gas	2003		Energy Capital Partners III & IV	1,134	1,134	4,361,800	2,086,538
York 2 Energy Center	PA	Gas	2019		Energy Capital Partners III & IV	828	828	5,129,078	2,238,946
Tasley Energy Center <sup>2</sup>	VA	DFO	1972		Energy Capital Partners III & IV	30	30	292	770
Bayview 3	VA	DFO	1963		Energy Capital Partners III & IV	13	13	1,219	
Edge Moor (3-5 and a CT) <sup>2</sup>	DE	Gas	1952		Energy Capital Partners III & IV	725	725	292,456	265,591
Deepwater Repowering	NJ	Gas	Planned			550		-	-
<b>TOTALS</b>						<b>5,920</b>	<b>5,371</b>	<b>14,500,484</b>	<b>7,021,799</b>

<sup>1</sup> No generation or CO<sub>2</sub> emissions data was reported for 2022

<sup>2</sup> Generation and emissions data are from 2021

<sup>3</sup> Generation data is from 2021, no emissions data has been reported

Source: FERC filings, S&P, EPA.

## Avenue Capital

Founded in 1995, New York-based Avenue Capital says it focuses on “specialty lending, distressed debt and other special situation investments.”<sup>36</sup> That focus has led to a significant recent expansion of the firm’s holdings in PJM.

The firm and Nuveen/TIAA are major investors in Energy Harbor, which owns 3,942 MW of nuclear generation capacity. A planned sale to Vistra is being challenged by FERC staff; see earlier section for additional details. The company also is now in the process of taking control of two bankrupt generation entities in PJM, The Carlyle Group’s two-unit Lincoln Power unit and GenOn’s Heritage unit. If these deals are concluded, Avenue Capital will have an ownership stake in more than 12,500 MW of generating capacity in the region.

**Table 7: Avenue Capital PJM Plant Ownership**

Plant Name	State	Fuel (2022)	First Year in Service	Planned Retirement	Avenue Fund Owner	Plant Capacity (MW)	Avenue Total (MW)	2022 Generation (MWh)	2022 CO2 Emissions (tons)	Avenue CO2 Emissions Share (tons)
Elgin	IL	Gas	2002		Middle River Power VI	490	490	129,243	90,344	90,344
Rocky Road	IL	Gas	1999		Middle River Power VII	336	336	18,174	12,917	12,917
Big Sandy	WV	Gas	2001		Middle River Power II	300	300	257,205	165,579	165,579
Wolf Hills	VA	Gas	2001		Middle River Power II	250	250	37,161	25,210	25,210
Beaver Valley	PA	Nuclear	1976			1,808	289	14,750,027	-	-
Davis-Besse	OH	Nuclear	1978			894	143	6,492,333	-	-
Perry	OH	Nuclear	1957			1,240	198	10,334,454	-	-
Clifty Creek	IN	Coal	1955			1,173	57	5,813,741	6,494,396	314,978
Kyger Creek	OH	Coal	1955			963	47	5,229,446	6,079,037	294,833
W.H. Sammis 1	OH	Coal	1959	Retired 1/2023		1,490	238	5,256,114	6,607,934	1,057,269
Pleasants 2	WV	Coal	1979	Sold		1,278	204	8,080,662	8,446,479	1,351,437
Blossburg	PA	Gas	1971			21	21	44,626	37,501	37,501
Brunot Island	PA	Gas/Oil	1972			262	262	294,790	211,718	211,718
Gilbert	NJ	Gas/Oil	1970			455	455	86,471	65,777	65,777
Hamilton	PA	Oil	1971			20	20	NA	NA	NA
Hunterstown 3	PA	Gas/Oil	1971			64	64	30,950	NA	NA
Mountain	PA	Oil	1972			40	40	7,061	6,446	6,446
New Castle	PA	Gas/Oil	1952			331	331	533,363	348,465	348,465
Niles 3	OH	Oil	1972			26	26	-213	NA	NA
Orrtanna 3	PA	Oil	1971			20	20	36	NA	NA
Portland	PA	Gas/Oil	1967			178	178	7,162	6,621	6,621
Sayreville	NJ	Gas/Oil	1972			218	218	4,628	6,014	6,014
Shawnee 3	PA	Oil	1972			21	21	132	NA	NA
Shawville	PA	Gas/Oil	1954			602	602	1,172,135	716,515	716,515
Titus	PA	Oil	1967			31	31	-335	NA	NA
Tolna	PA	Oil	1972			41	41	4,596	3,834	3,834
Warren	PA	Gas/Oil	1972			62	62	11,689	7,608	7,608
<b>Totals</b>						<b>12,614</b>	<b>4,946</b>	<b>58,595,651</b>	<b>29,332,396</b>	<b>4,723,067</b>

Avenue Capital and its affiliates also own 1,828MW of capacity in the California ISO

1 The last three units at Sammis were closed in June 2023; four other units (720MW) were closed in 2020

2 Energy Harbor sold Pleasants to Omnis Fuels Technologies in August 2023

3 Generation data is from 2021 per S&P

NA = not available or not reported

Source: FERC filings, S&P, EPA.

<sup>36</sup> [Avenue Capital website](#), accessed Sept. 12, 2023.

## Appendix B: Limited Partner Fund Commitments

In the following pages we present the limited partners—public and private pension funds, foundations, insurance companies and other private equity firms—that have invested in funds managed by three general partners. These funds, managed by ArcLight Capital, Energy Capital Partners, and LS Power, control a significant portion of the gas- and coal-fired generation capacity in PJM.

Details on the generation facilities owned by the three firms were presented earlier. Using data gathered from Pitchbook, we have been able to link those funds to their limited partner investors. This data was current as of August 15.

**Table 8: ArcLight Energy Partners Funds**

Limited Partner	Type	Fund	Original Commitment (\$M)	Fund	Original Commitment (\$M)	Fund	Original Commitment (\$M)
Allstate Insurance Company	Insurance Company	Energy Partners V	75	Energy Partners VI	19.9		
Allstate Life Insurance Company of New York	Insurance Company			Energy Partners VI	4.4		
Allstate Retirement Plan	Corporate Pension			Energy Partners VI		Energy Partners VII	
American Airlines Master Fixed Benefit Pension Trust	Corporate Pension	Energy Partners V	58	Energy Partners VI	74	Energy Partners VII	
American Airlines, Inc. Pilot Retirement Benefit Program Fixed Income Plan	Corporate Pension	Energy Partners V	40	Energy Partners VI			
Anthem Health Plans	Insurance Company			Energy Partners VI	75		
Ball Corporation Master Pension Trust	Corporate Pension	Energy Partners V					
Bert Bell/Pete Rozelle NFL Player Retirement Plan	Union Pension Fund			Energy Partners VI			
Boston Retirement System	Public Pension Fund			Energy Partners VI	15		
British Columbia Investment Management	Money Management Firm	Energy Partners V		Energy Partners VI			
Caisse de dépôt et placement du Québec	Public Pension Fund	Energy Partners V					
Citigroup Pension Plan	Corporate Pension					Energy Partners VII	
Colorado Public Employees' Retirement Association	Public Pension Fund	Energy Partners V	50	Energy Partners VI	50		
Colorado School Division Pension	Public Pension Fund	Energy Partners V	50	Energy Partners VI	50		
Community Insurance Company	Insurance Company	Energy Partners V	25				
ConAgra Foods Master Pension Trust	Corporate Pension	Energy Partners V	19	Energy Partners VI			
Connecticut Retirement Plans and Trust Funds	Public Pension Fund	Energy Partners V	65	Energy Partners VI	85		
Dominion Energy Retiree Health and Welfare Plan	Corporate Pension	Energy Partners V		Energy Partners VI			
Dominion Resources Defined Benefit Master Trust	Corporate Pension	Energy Partners V	15	Energy Partners VI			
Eastman Chemical Company Master Retirement Trust	Corporate Pension	Energy Partners V		Energy Partners VI			
Eastman Retirement Assistance Plan	Corporate Pension	Energy Partners V	4				
Everlake	Insurance Company	Energy Partners V	75	Energy Partners VI	19.9		
Eversource Retirement Plan Master Trust	Corporate Pension	Energy Partners V	8	Energy Partners VI			
Fire & Police Pension Association of Colorado	Public Pension Fund	Energy Partners V					
George Kaiser Family Foundation	Foundation			Energy Partners VI			
Great American Insurance Company	Insurance Company			Energy Partners VI	6		
Great American Life Insurance	Insurance Company			Energy Partners VI	14		
Greater Manchester Pension Fund	Public Pension Fund			Energy Partners VI	46.84		
Harbourvest Real Assets - Energy Fund II	Corporate Pension			Energy Partners VI			
Harel Insurance Investments & Financial Services	Insurance Company	Energy Partners V		Energy Partners VI			
Hatteras Funds	Fund of Funds	Energy Partners V	5				
J. Paul Getty Trust	Foundation	Energy Partners V	15				
Jane and Daniel Och Family Foundation	Foundation			Energy Partners VI			
John Hancock Financial Services	Insurance Company	Energy Partners V	147.9	Energy Partners VI	70		
John Hancock Life & Health Insurance Company	Insurance Company			Energy Partners VI	15		
John Hancock Life Insurance Company of New York	Insurance Company			Energy Partners VI	15		
Josiah Macy Jr. Foundation	Foundation			Energy Partners VI			
Kaleida Health Pension Growth Plan	Corporate Pension	Energy Partners V	6				
Kettering Family Foundation	Foundation	Energy Partners V					
Kettering University Endowment	Endowment			Energy Partners VI			
Lancashire County Council Pension Fund	Public Pension Fund	Energy Partners V	78.96	Energy Partners VI	100.23		
Louisiana Municipal Police Employees Retirement System	Public Pension Fund			Energy Partners VI			
Louisiana State Employees' Retirement System	Public Pension Fund			Energy Partners VI	75		
Maine Public Employees Retirement System	Public Pension Fund	Energy Partners V	75	Energy Partners VI	150		
Mayo Pension Plan	Corporate Pension	Energy Partners V	9	Energy Partners VI		Energy Partners VII	
Michigan Department of Treasury	Government Agency			Energy Partners VI	50	Energy Partners VII	
Migdal Insurance and Financial Holdings	Insurance Company					Energy Partners VII	
Minnesota Life Insurance Company	Insurance Company	Energy Partners V	9.8				
Montana Board of Investments	Public Pension Fund	Energy Partners V	20	Energy Partners VI	20		
Montana Public Employees Retirement Board	Public Pension Fund	Energy Partners V		Energy Partners VI			
National Life Insurance Company	Insurance Company	Energy Partners V	10	Energy Partners VI	20		
Nationwide Mutual Insurance Company	Insurance Company			Energy Partners VI	16		
Nationwide Retirement Plan	Corporate Pension	Energy Partners V	4	Energy Partners VI			
NG DB MT Alternative Investments Fund	Corporate Pension	Energy Partners V					
NG DB MT Equity Fund	Corporate Pension	Energy Partners V					
North Carolina Retirement Systems	Public Pension Fund	Energy Partners V	100				
Northwestern Mutual	Insurance Company	Energy Partners V	15	Energy Partners VI	24		
Oklahoma Police Pension & Retirement System	Public Pension Fund			Energy Partners VI	7.5	Energy Partners VII	15
Pentegra Defined Benefit Plan for Financial Institutions	Corporate Pension			Energy Partners VI			
Proassurance Casualty Company	Insurance Company	Energy Partners V	25				
Proassurance Indemnity Company	Insurance Company	Energy Partners V	25				
Pruco Life Insurance Company	Insurance Company	Energy Partners V	1.5				
Pruco Life Insurance Company of New Jersey	Insurance Company	Energy Partners V					
Prudential Annuities Life Assurance Corporation	Insurance Company	Energy Partners V	0.8				
Reliastar Life Insurance Company	Insurance Company			Energy Partners VI	8.8		
Rockefeller Foundation	Foundation	Energy Partners V	11				
Sacramento County Employees' Retirement System	Public Pension Fund			Energy Partners VI	40		
SBC Master Pension Trust	Corporate Pension	Energy Partners V	55				
Selective Insurance Company of America	Insurance Company			Energy Partners VI	15		
Southern Farm Bureau Life Insurance Company	Insurance Company	Energy Partners V	0.7	Energy Partners VI	9.8		
St. Paul Fire and Marine Insurance Company	Insurance Company	Energy Partners V	15				
State of Michigan Retirement Systems	Public Pension Fund			Energy Partners VI		Energy Partners VII	
State Teachers Retirement System of Ohio	Public Pension Fund			Energy Partners VI	200		
Texas A&M University System Endowment	Endowment			Energy Partners VI	10		
Texas Permanent School Fund	Endowment	Energy Partners V		Energy Partners VI		Energy Partners VII	
Texas Tech University System Endowment	Endowment	Energy Partners V	15				
The Boeing Company Employee Retirement Plans Master Trust	Corporate Pension	Energy Partners V	35	Energy Partners VI			
The Nemours Foundation Pension Plan	Corporate Pension	Energy Partners V					
The Prudential Insurance Company of America	Insurance Company	Energy Partners V	37.1				
The Robert Lehman Foundation	Foundation	Energy Partners V	2				
Tiffany and Company Pension Plan	Corporate Pension	Energy Partners V					
Travelers Casualty and Surety Company	Insurance Company			Energy Partners VI	20		
University of Central Florida Foundation	Endowment			Energy Partners VI	2		
UPMC Master Trust	Corporate Pension	Energy Partners V	4				
Voya Financial	Insurance Company			Energy Partners VI	6.3		
Voya Retirement Insurance and Annuity Company	Insurance Company			Energy Partners VI	10		
Wellspan Health Pension Trust	Corporate Pension			Energy Partners VI			

Energy Partners Fund V closed in November 2011; Energy Partners Fund VI closed in July 2015; Energy Partners Fund VII closed in February 2020

Source: Pitchbook.

**Table 9: Energy Capital Partner Funds**

Limited Partner	Type	Fund	Original Commitment (\$M)	Fund	Original Commitment (\$M)
1199SEIU Health Care Employees Pension Fund	Union Pension Fund	ECP III			
Alternative Investments Fund	Corporate Pension	ECP III			
American Federation of Musicians and Employers' Pension Fund And Subsidiary	Union Pension Fund	ECP III			
Amitim Pension Funds	Corporate Pension	ECP III			
California State Teachers' Retirement System	Public Pension Fund	ECP III	200		
Carnegie Corporation Of New York	Foundation	ECP III		ECP IV	
Children's Hospital Corporation Pension Plan	Corporate Pension	ECP III	4		
Colorado Health Foundation	Foundation	ECP III			
Essex County Council Pension Fund	Public Pension Fund	ECP III	9.84		
Fire & Police Pension Association of Colorado	Public Pension Fund	ECP III			
Florida Retirement System Pension Plan	Public Pension Fund	ECP III			
Florida State Board of Administration	Public Pension Fund	ECP III	150		
I.A.M. National Pension Fund	Union Pension Fund	ECP III		ECP IV	
Jerry A And Kathleen A Grundhofer Family Foundation	Foundation	ECP III			
John Hancock Financial Services	Insurance Company	ECP III	46		
John Hancock Life & Health Insurance Company	Insurance Company	ECP III	2.3		
John Hancock Life Insurance Company of New York	Insurance Company	ECP III	1.7		
Keva	Public Pension Fund	ECP III		ECP IV	
Laborers District Council & Contractors Pension Fund of Ohio	Union Pension Fund	ECP III		ECP IV	
Laborers Pension Trust Fund for Northern California	Union Pension Fund	ECP III			
Lincoln National Life Insurance Company	Insurance Company	ECP III	15		
Los Angeles City Employees' Retirement System	Public Pension Fund	ECP III	40		
Los Angeles Fire and Police Pension System	Public Pension Fund	ECP III	25		
Lucent Technologies Master Pension Trust	Corporate Pension	ECP III			
Massachusetts Laborers' Annuity Fund	Union Pension Fund	ECP III		ECP IV	
Massachusetts Laborers' Pension Fund	Union Pension Fund	ECP III		ECP IV	
Mayo Pension Plan	Corporate Pension	ECP III		ECP IV	
Michigan Laborers' Pension Plan	Union Pension Fund	ECP III			
Minnesota State Board of Investment	Public Pension Fund	ECP III	200	ECP IV	150
New York State Teachers' Retirement System	Public Pension Fund	ECP III	125		
New York State Teamsters Conference Pension & Retirement Fund	Union Pension Fund	ECP III	4	ECP IV	
North Carolina Retirement Systems	Public Pension Fund	ECP III	100		
Ohio Carpenters' Pension Plan	Union Pension Fund	ECP III			
Physicians' Organization at Children's Hospital Retirement Plan Group Trust	Corporate Pension	ECP III	2		
Pritzker Traubert Family Foundation	Foundation	ECP III			
Producer-Writers Guild of America Pension Plan	Union Pension Fund	ECP III		ECP IV	
Retirement Income Credit Plan for Employees of Group Health Cooperative	Corporate Pension	ECP III			
Richard King Mellon Foundation	Foundation	ECP III		ECP IV	
San Francisco Employees' Retirement System	Public Pension Fund	ECP III	50		
Santa Barbara County Employees Retirement System	Public Pension Fund	ECP III	7.5		
SBC Master Pension Trust	Corporate Pension	ECP III		ECP IV	
Sentry Insurance	Insurance Company	ECP III	20		
Sound Retirement Trust	Union Pension Fund	ECP III			
Teacher Retirement System of Texas	Public Pension Fund	ECP III	150	ECP IV	150
Teachers' Retirement System of Louisiana	Public Pension Fund	ECP III	100		
Textron Master Trust	Corporate Pension	ECP III			
The Ford Family Foundation	Foundation	ECP III			
The Prudential Insurance Company of America	Insurance Company	ECP III	35		
U.S. Bank Corporate Pension Fund	Corporate Pension	ECP III			
United Food & Commercial Workers International Union - Industry Pension Fund	Union Pension Fund	ECP III			
Weston Havens Foundation	Foundation	ECP III			
William J. & Lia G. Poorvu Family Foundation	Foundation	ECP III			
William Penn Foundation	Foundation	ECP III			
Willis Towers Watson Pension Plan For U.S. Employees	Corporate Pension	ECP III			
Wyncote Foundation	Foundation	ECP III			

ECP III closed in March 2014; ECP IV closed in January 2020

Source: Pitchbook.

**Table 10: LS Power Funds**

Limited Partner	Type	Fund	Original Commitment (\$M)	Fund	Original Commitment (\$M)	Fund	Original Commitment (\$M)
Alaska Permanent Fund	Sovereign Wealth Fund			Equity Partners III	200	Equity Partners IV	
Allstate Retirement Plan	Corporate Pension					Equity Partners IV	
American Home Assurance Company	Insurance Company			Equity Partners III	16.5		
Andrew W. Mellon Foundation	Foundation	Equity Partners II	49.46				
ATP Private Equity	Fund of Funds	Equity Partners II					
ATP Private Equity Partners III	Fund of Funds	Equity Partners II	100				
Atwood Foundation	Foundation	Equity Partners II		Equity Partners III		Equity Partners IV	
Brighthouse Financial	Insurance Company	Equity Partners II	3				
Centurylink Defined Benefit Master Trust	Corporate Pension	Equity Partners II					
CNA Retirement Plan	Corporate Pension	Equity Partners II	26	Equity Partners III	28		
Continental Casualty Company	Insurance Company	Equity Partners II	9.7				
Employees' Retirement Plan of Duke University	Corporate Pension	Equity Partners II					
Equitable Financial Life Insurance Company	Insurance Company	Equity Partners II	15				
Fall River Contributory Retirement System	Public Pension Fund	Equity Partners II					
Federal Insurance Company	Insurance Company	Equity Partners II	40	Equity Partners III	50		
Ford Foundation	Foundation	Equity Partners II					
Goldman Sachs Private Equity Partners IX	Money Management Firm	Equity Partners II	27				
Houston Police Officers' Pension System	Public Pension Fund			Equity Partners III	25		
Industriens Pensjonsforsikring	Union Pension Fund			Equity Partners III		Equity Partners IV	
Institutional Investment Partners Denmark	Fund of Funds	Equity Partners II	45				
ITT Salaried Retirement Plan	Corporate Pension	Equity Partners II	14				
John Hancock Financial Services	Insurance Company	Equity Partners II	29	Equity Partners III	53.3		
John Hancock Life & Health Insurance Company	Insurance Company			Equity Partners III	3.8		
John Hancock Life Insurance Company of New York	Insurance Company			Equity Partners III	2.9		
Kodak Retirement Income Plan	Corporate Pension	Equity Partners II	25				
L3Harris Pension Master Trust	Corporate Pension	Equity Partners II	17				
Lexington Insurance	Insurance Company			Equity Partners III	17		
Lincoln National Life Insurance Company	Insurance Company	Equity Partners II	20				
Loews and Subsidiaries Master Retirement Trust	Corporate Pension	Equity Partners II	3	Equity Partners III	2		
Lorillard Tobacco Company Retirement Master Trust	Corporate Pension	Equity Partners II	14				
Mayo Pension Plan	Corporate Pension	Equity Partners II	13	Equity Partners III	20		
Metlife Investors USA Insurance Company	Insurance Company	Equity Partners II	21				
Metropolitan Life Insurance Company	Insurance Company	Equity Partners II	6				
Migdal Insurance and Financial Holdings	Insurance Company					Equity Partners IV	
Minnesota Life Insurance Company	Insurance Company			Equity Partners III	5.5		
National Life Insurance Company	Insurance Company	Equity Partners II	9.8	Equity Partners III	2.5		
National Union Fire Insurance Company of Pittsburgh	Insurance Company			Equity Partners III	16.5		
New York State Teachers' Retirement System	Public Pension Fund					Equity Partners IV	100
Operating Engineers Trust Fund of Washington D.C. and Vicinity	Union Pension Fund	Equity Partners II					
Oregon Investment Council	Public Pension Fund			Equity Partners III			
Oregon Public Employees Retirement System	Public Pension Fund			Equity Partners III	100	Equity Partners IV	200
Pacific Indemnity Company	Insurance Company	Equity Partners II	10				
Pacific Life Insurance	Insurance Company	Equity Partners II	9.8				
Paul Hastings Defined Benefit Retirement Plan For Partners	Corporate Pension	Equity Partners II					
Producer-Writers Guild of America Pension Plan	Union Pension Fund	Equity Partners II					
Qwest Pension Plan	Corporate Pension	Equity Partners II	21				
Rasmuson Foundation	Foundation	Equity Partners II	4	Equity Partners III		Equity Partners IV	
Retirement Plan for Employees of Lorillard Tobacco Company	Corporate Pension	Equity Partners II	15				
Retirement Plan for Employees of UJA-Federation of NY and Affiliated Agencies and Institutions	Corporate Pension	Equity Partners II					
Reynolds American Defined Benefit Master Trust	Corporate Pension	Equity Partners II					
San Diego City Employees' Retirement System	Public Pension Fund	Equity Partners II	9.07				
San Mateo County Employees' Retirement Association	Public Pension Fund					Equity Partners IV	20
Securian Financial Group Retirement Plan and Trust Agreement	Corporate Pension			Equity Partners III	1		
Sehgal Foundation	Foundation	Equity Partners II					
Teachers Insurance and Annuity Association of America	Insurance Company	Equity Partners II	55				
Teachers' Retirement System of Louisiana	Public Pension Fund			Equity Partners III	50	Equity Partners IV	50
The ATP Group	Public Pension Fund	Equity Partners II					
The CNA Corporation Retirement Plan	Corporate Pension	Equity Partners II					
The Guardian Life Insurance Company of America	Insurance Company	Equity Partners II	18.51				
The Kohlberg Foundation	Foundation	Equity Partners II					
The Nemours Foundation Pension Plan	Corporate Pension			Equity Partners III	2		
The Skoll Foundation	Foundation	Equity Partners II	1.5				
United Guaranty Residential Insurance Company	Insurance Company			Equity Partners III	2.9		
Variable Annuity Life Insurance Company	Insurance Company	Equity Partners II	25				
Virginia G. Piper Charitable Trust	Foundation			Equity Partners III			
Virginia Retirement System	Public Pension Fund					Equity Partners IV	75
West Virginia Investment Management Board	Public Pension Fund			Equity Partners III	40	Equity Partners IV	40
West Yorkshire Pension Fund	Public Pension Fund					Equity Partners IV	40
Western National Life Insurance Company	Insurance Company	Equity Partners II	25				

Equity Partners II was launched in 2007; Equity Partners III was launched in 2013; Equity Partners IV was launched in 2018

Source: Pitchbook.



## 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

### Dennis Wamsted

At IEEFA, Dennis Wamsted focuses on the transition from fossil fuels to green generation resources, focusing particularly on the electric power sector.

**This report is for information and educational purposes only. The Institute for Energy Economics and Financial Analysis ("IEEFA") does not provide tax, legal, investment, financial product or accounting advice. This report is not intended to provide, and should not be relied on for, tax, legal, investment, financial product or accounting advice. Nothing in this report is intended as investment or financial product advice, as an offer or solicitation of an offer to buy or sell, or as a recommendation, opinion, endorsement, or sponsorship of any financial product, class of financial products, security, company, or fund. IEEFA is not responsible for any investment or other decision made by you. You are responsible for your own investment research and investment decisions. This report is not meant as a general guide to investing, nor as a source of any specific or general recommendation or opinion in relation to any financial products. Unless attributed to others, any opinions expressed are our current opinions only. Certain information presented may have been provided by third parties. IEEFA believes that such third-party information is reliable, and has checked public records to verify it where possible, but does not guarantee its accuracy, timeliness or completeness; and it is subject to change without notice.**

