CEBA Report: Corporate Demand Drives Clean Energy

ANALYSIS, METHODOLOGY, AND FINDINGS

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Introduction

The United States is currently entering an era of rapid electricity demand growth, fueled by increased electrification, onshored manufacturing, and an influx of data centers powering the artificial intelligence (AI) boom.[1] This increased demand for electricity requires large amounts of new generation capacity — and renewable resources offer the fastest, most cost-effective path to adding new capacity.[2]

One of the key drivers of renewable energy growth over the last decade has been the voluntary renewable energy market, which encompasses energy procured outside of state clean energy mandates.[3] Corporate buyers, in particular, have contributed significantly to voluntary procurement, signing over 100 GW of clean energy deals between 2014 and 2024, which represents 41% of all clean energy capacity added to the U.S. grid in the last decade.[4] While corporate procurement represents a dominant portion of the voluntary market's sales volume, other forms of offtake are also available (e.g., utility PPAs and green tariffs), though their sales volume is generally smaller in comparison.[5]

Clean energy procurement enables corporations to meet their sustainability goals and offset their electricity usage with zero-carbon, clean energy. Traditionally, corporate clean energy procurement has focused on wind and solar projects (which are the focus of this paper), but companies are increasingly signing agreements to procure firm generation from storage, nuclear, and geothermal projects.[6] As more and more companies pledge to reduce their carbon footprints,[7] offtake agreements, such as virtual power purchase agreements (VPPAs), serve as an effective way for companies to meet their decarbonization targets without needing to significantly alter their operating models.[8] Offtake agreements can also serve as a hedge

1 Shehabi, Arman, et al. *2024 United States Data Center Energy Usage Report*. Lawrence Berkeley National Laboratory / eScholarship, 2024, https://escholarship.org/uc/item/32d6m0d1.

2 Fitzgerald, Maria. "Engie's Pulled Project Highlights the Worsening Economics of Gas." Latitude Media, 25 Feb. 2025, latitudemedia.com/news/engies-pulled-project-highlights-the-worsening-economics-of-gas/. Accessed 2 May 2025.

3 O'Shaughnessy, Eric. *Impacts of Voluntary Renewable Energy Demand on Deployment: A Market-Based Approach*. U.S. Environmental-Protection Agency, 2025, https://www.epa.gov/system/files/documents/2025-01/impacts_voluntary_renewable_energy_demand.pdf.

4 Basinger, Julianne. "CEBA Notes Landmark 100 Gigawatts of Clean Energy Procured by Corporate and Industrial Customers Since 2014." Clean Energy Buyers Association, 25 Mar. 2025, https://cebuyers.org/blog/ceba-notes-landmark-100-gigawatts-of-clean-energy-procured-by-corporate-and-industrial-customers-since-2014/.

5 O'Shaughnessy, Eric, et al. *Status and Trends in the U.S. Voluntary Green Power Market: 2022 Data*. National Renewable Energy Laboratory, 2024, NREL/TP-7A40-88219, www.nrel.gov/docs/fy24osti/88219.pdf.

6 Clancy, Heather. "Record Year for Corporate Clean Energy as Contracts Reach 100 Gigawatts." *GreenBiz*, 26 Mar. 2025, trellis.net/article/2024-record-year-for-corporate-renewable-energy/.

7 The Climate Group. *RE100*. The Climate Group, 26 Oct. 2023, www.there100.org/.

8 Enel North America. "VPPA 101: Everything You Need to Know." Enel North America, 30 Aug. 2023, www.enelnorthamerica.com/insights/blogs/vppa-101-everything-you-need-to-know.

against the buyer's electricity costs as a secondary benefit.[9,10] In return, these fixed-price offtake agreements offer renewable energy developers a steady revenue stream, which enables them to attract the capital required for construction of their projects.[11]

Despite the clear impact that voluntary corporate energy procurement has had on renewable energy growth, its contributions to the energy transition are being questioned. Several recent studies and articles challenge the impact of these corporate actions, arguing that wind and solar technologies are so inexpensive (or subsidized by government policies) that they will get built regardless of corporate offtake.[12,13] In reality, the primary role of corporate offtake agreements such as VPPAs is not to bolster clean energy technology, but to mitigate the financial risk associated with earning revenue from the variable wholesale electricity market.

In contrast to fossil fuel generators, wind and solar projects have low operating costs but relatively high capital expenditures[14] that are financed through a combination of sponsor equity, tax equity, and back leverage debt. Once a project becomes operational, it must repay these upfront costs through term loans and dividends to investors. During periods of low wholesale power prices, projects may not earn enough merchant revenue to meet their debt service obligations or their investors' rates of return, which, absent additional revenue sources, could lead to financial distress and potential default. Offtake agreements like VPPAs significantly reduce the likelihood of projects entering these periods of financial distress by providing projects with a fixed price for the energy they produce. It is for this very reason that offtake agreements make it significantly easier for projects to get financed and built; debt interest rates and required debt service coverage ratios are typically lower for projects with offtake,[15] and the vast majority of projects built recently had some form of offtake agreement in place.[16]

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9 Kobus, James, Ali Ibrahim Nasrallah, and Jim Guidera. *The Role of Corporate Renewable Power Purchase Agreements in Supporting US Wind and Solar Deployment*. Center on Global Energy Policy, Columbia University SIPA, Mar. 2021, https://www.energypolicy.columbia.edu/sites/default/files/pictures/PPA%20report,%20designed%20v4,%203.17.21.pdf.

10 Dagoumas, Athanasios S., and Nikolaos E. Koltsaklis. "Price Signal of Tradable Guarantees of Origin for Hedging Risk of Renewable Energy Sources Investments." *International Journal of Energy Economics and Policy*, vol. 7, no. 4, 2017, https://www.econjournals.com/index.php/ijeep/article/view/5231.

11 American Council on Renewable Energy (ACORE). *Bridging Demand and Financing: Voluntary Offtake in Clean Energy*. ACORE, Dec. 2024, https://acore.org/wp-content/uploads/2024/12/Bridging-Demand-and-Financing-Voluntary-Offtake-in-Clean-Energy.pdf.

12 Xu, Qingyu, Wilson Ricks, Aneesha Manocha, Neha Patankar, and Jesse D. Jenkins. "System-Level Impacts of Voluntary Carbon-Free Electricity Procurement Strategies." *Joule*, vol. 8, no. 2, 374–400, 2024, https://doi.org/10.1016/j.joule.2023.12.007.

13 Langer, Lissy, Matthew Brander, Shannon M. Lloyd, Dogan Keles, H. Damon Matthews, and Anders Bjørn. "Does the Purchase of Voluntary Renewable Energy Certificates Lead to Emission Reductions? A Review of Studies Quantifying the Impact." *Journal of Cleaner Production*, vol. 478, 143791, 2024, https://doi.org/10.1016/j.jclepro.2024.143791.

14 Beiter, Philipp, et al. "The Enduring Role of Contracts for Difference in Risk Management and Market Creation for Renewables." *Nature Energy*, vol. 9, 20–26, 2023. https://doi.org/10.1038/s41560-023-01401-w.

15 "Cost of Capital: 2025 Outlook." Project Finance, Jan. 2025, www.projectfinance.law/publications/2025/january/cost-of-capital-2025-outlook/. Accessed 2 May 2025.

16 Barbose, Galen L. *U.S. State Renewables Portfolio & Clean Electricity Standards: 2024 Status Update*. Lawrence Berkeley National Laboratory, Aug. 2024, https://emp.lbl.gov/publications/us-state-renewables-portfolio-clean-0.

In this paper, we put numbers and data behind the important role that corporate procurement plays in reducing the financial volatility of wind and solar projects in the United States. Using empirical analysis, we show that even when the net revenue earned from a contracted VPPA is negligible, the revenue-stabilizing impact of the VPPA significantly reduces the likelihood that a project will face financial distress. We also examine the impact of unbundled Renewable Energy Certificate (REC) purchases on renewable energy projects, finding that while RECs are less effective in reducing financial distress in comparison to VPPAs, the stable contracted revenue from REC purchases can make a significant difference for many projects during periods of low wholesale power prices. Our findings support the critical role that corporate procurement plays in getting clean energy projects financed and built — and highlight the continued importance of corporate procurement in an era when the grid needs more cost-effective generation.

Methodology

To assess the impact of voluntary corporate procurement of VPPAs and RECs on securing the financial stability of renewable projects, we modeled the economic performance of 251 operational wind and solar projects across ERCOT, MISO, and PJM. These markets were selected due to their heavy concentration of corporate procurement; nearly 70% of future corporate procurement is forecast to take place in ERCOT, MISO, or PJM.[17] While not covered specifically in this analysis, the modeling methodology and key findings are broadly applicable to other ISOs and markets outside the United States as well.

For each project, we simulated economic performance by calculating operating income and debt obligations using historic generation, price, and operating cost data from 2015 to 2024, then identifying sustained periods of financial distress. We compared the results to rates of financial distress in purely merchant scenarios of the same projects to quantify the stabilizing effect of corporate offtake.

While actual VPPA and REC prices, VPPA terms, and finance structures are highly project-specific, we used generalized characteristics that were derived based on industry reports and standards in this analysis. This approach allowed us to compare projects across different regions and time periods at scale, focusing on standard hub-settled VPPAs, which aren't an effective hedge against price volatility for projects with high amounts of basis.[18] In practice, many projects that experience continued, large hub-to-node basis will either renegotiate their hub-settled VPPA, sign a nodal VPPA, or include basis-sharing provisions in their VPPA contract to limit financial impacts to both VPPAs.[19]

17 "New Report: Corporate Demand for Carbon Emissions-Free Electricity Grows to 275 GW Over Next Decade." Clean Energy Buyers Association, 30 Jan. 2025, https://cebuyers.org/blog/new-report-corporate-demand-for-carbon-emissions-free-electricity-grows-to-275-gw-over-next-decade/.

18 Projects that experienced an average hub-to-node price difference greater than $10/MWh during any 2-year rolling period were defined to have a large amount of basis.

19 "Five Common Risks in Virtual PPAs and How to Mitigate Them." World Kinect, 26 Apr. 2023, https://www.world-kinect.com/blog/five-common-risks-virtual-ppas-and-how-mitigate-them.

Generation and Power Prices

First, we created a time series of hourly generation for each wind and solar project. We exclusively used observed generation for ERCOT projects, as ERCOT provides extensive generation data for both wind and solar projects. For PJM and MISO, we used proprietary REsurety modeled generation, which is calculated from a mixture of modeled weather data and project-specific characteristics.

For modeled solar generation, we applied a standard solar degradation rate of 0.5%[20] for each year post-commercial operation date (COD). We simulated economic curtailment by using a nodal price threshold below which generation was reduced to zero. In reality, the breakeven price, below which production will be curtailed, for a renewable project will depend on the project-specific revenue streams it earns beyond merchant revenue (e.g., REC purchases). However, for the sake of simplicity and generalization across projects and markets, we used nodal price thresholds of $0/MWh for solar projects and –$27.50/MWh for wind projects, which assumes investment tax credit for solar projects and the full value of production tax credits for wind projects.

We calculated wholesale, or “merchant,” revenue by multiplying each project’s hourly generation time series by hourly averaged real-time nodal prices.[21] Some projects will, in reality, have settlements that depend on day-ahead prices, but we assumed purely real-time settlement to maintain a generalized merchant methodology. We removed all ERCOT prices and generation from February 2021 due to the extreme volatility of the period as a result of Winter Storm Uri.

VPPA and REC Prices

Projects with an offtake agreement in place have an additional revenue stream beyond merchant revenue. In the case of a VPPA, settlement to the project is a function of the difference between a fixed VPPA price and the floating hub price. For a project with relatively low hub-to-node basis, the floating hub price is strongly linked to merchant revenue.

To focus on the risk mitigation benefits of the VPPA, we set the VPPA price such that the settlement of the VPPA over the lifetime of the contract was $0. Using this approach ensures that the simulated VPPAs don’t serve as a subsidy or a driver of revenue loss for projects — but instead, provide value purely by mitigating project revenue volatility.

We calculated the net revenue earned by a project with a VPPA as:

PPA Revenue = Merchant Revenue + (Generation x (PPA Price - Real-time Hub Price))

20 Bolinger, Mark, and Ryan Wiser. “Quantifying the Value of Energy Storage in Ancillary Service Markets.” National Renewable Energy Laboratory, June 2012, docs.nrel.gov/docs/fy12osti/51664.pdf.

21 Locational marginal prices provided by Yes Energy, LLC.

We compared the assumed VPPA prices against the market cost of energy and PPA prices from multiple sources, including Berkeley Lab Market Reports,[22,23] Lazard LCOE+,[24] and CRC-IB MCOE[25] reports, to ensure that they aligned with and did not exceed industry benchmarks.

While RECs are typically bundled with VPPA contracts, clean energy buyers can also purchase unbundled RECs without a contract for power (e.g., a PPA or VPPA) in place. Corporate energy buyers may be interested in purchasing unbundled RECs as they are highly liquid instruments, allowing a corporate entity to purchase RECs flexibly as needed.[26] For some companies that have sustainability goals but do not meet credit or contracting standards, REC purchases offer a more accessible alternative because of their lower requirements compared to a long-term VPPA. REC payments are made to the project on a per megawatt-hour basis and serve as a supplement to merchant revenue.

We used a REC price based on the historic price of the National Green-e® Certified REC Any Technology. Green-e® is the leading certification program in North America and represents a national and fuel-agnostic REC. We used a REC price of $2.74, representing the average REC price in 2023.[27]

Debt Sizing

Debt sizing is typically calculated based on numerous project-specific factors. To estimate a standard set of project debt obligations in this analysis, we calculated debt based on the project's net operating income, sized to a debt service coverage ratio (DSCR). DSCR is defined as the ratio of net operating income to debt service payment, such that a project with a DSCR below 1.0 has negative cash flow and is in financial distress. Therefore, all debt providers require a DSCR above 1.0 at P50 revenue, but the range of specific values is wide and depends on individual project factors. Norton Rose Fulbright[28] lists DSCR ratios ranging from 1.25 to 1.8, depending on technology and contracted status. We used a DSCR ratio of 1.5 as it is representative of an average project, so it can be applied broadly to the many projects evaluated.

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22 Wiser et al. "Land-Based Wind Market Report: 2024 Edition." Energy Markets & Policy Berkeley Lab, 2024, https://emp.lbl.gov/wind-technologies-market-report.

23 Seel et al. "Utility-Scale Solar, 2024 Edition: Empirical Trends in Deployment, Technology, Cost, Performance, PPA Pricing, and Value in the United States." Energy Markets & Policy Berkeley Lab, 2024, https://emp.lbl.gov/utility-scale-solar.

24 Lazard. "Levelized Cost of Energy+ (LCOE+)." Lazard, https://www.lazard.com/research-insights/levelized-cost-of-energyplus-lcoeplus/.

25 CRC-IB. "Analysis – Solar & Wind Market Cost of Energy (MCOE)." CRC-IB, 1 Aug. 2024, https://crc-ib.com/analysis-solar-wind-market-cost-of-energy-mcoe-2/.

26 "Unbundle Electricity and Renewable Energy Certificates." U.S. Environmental Protection Agency, https://www.epa.gov/lmop/unbundle-electricity-and-renewable-energy-certificates.

27 Historic REC prices were obtained from S&P Global via the Platts Connect platform. "S&P Global Commodity Insights. "Platts Connect." S&P Global Commodity Insights, https://www.spglobal.com/commodity-insights/en/products-solutions/delivery/platts-connect.

28 "Cost of Capital 2024 Outlook." Project Finance, Feb. 2024, https://www.projectfinance.law/publications/2024/february/cost-of-capital-2024-outlook/.

To calculate debt obligations, we first estimated monthly net operating income for each project as revenue minus operational expenditure. We calculated operational expenditure as the mid-range value presented in Lazard's 2023 LCOE+ report:[29] $10.50/kW-year for utility-scale solar and $27.50/kW-year for onshore wind. We added a 2.25% annual escalation rate from the project's COD.

To calculate a project's debt obligation, we determined the average annual revenue for each project and sized the debt such that the average DSCR was 1.5. To ensure our derived debt estimates were aligned to market conditions, we also calculated the total loan amount by assuming a 20-year amortized loan with a 5.86% interest rate. The assumed interest rate was based on the 90-day average of SOFR[30] rates + 150 basis points as of May 2025, which follows ranges provided by Norton Rose Fulbright for construction-derived term loans. We then compared this total loan amount against the calculated project capital expenditure[31] to ensure that loan amounts fell within reasonable coverage ranges.[32] These ranges were taken to be 10%–40% of total capital expenditure for wind and 10%–50% for solar. If a project's derived loan coverage fell outside these ranges, we adjusted the loan amount, and therefore monthly payments, to bring the project into range.

Calculation of Financial Distress

Financial distress was defined as net operating income falling below debt servicing obligations (DSCR < 1.0). Due to the inherent variability of renewable energy generation and the volatility in market prices, most projects will experience at least one month where net income is below debt servicing; however, projects maintain cash reserves to manage short-term volatility that can address these brief debt service shortfalls. To account for these cash reserves, we used 24-month rolling sums of net operating income and debt service to calculate the DSCR over rolling two-year periods. By removing the variability of any one given month, we found cumulative two-year intervals where a project was unable to meet debt obligations and highlighted periods of sustained financial distress.

29 Lazard. "2023 Levelized Cost of Energy+." Lazard, 12 April 2023, https://www.lazard.com/research-insights/2023-levelized-cost-of-energyplus/.

30 The Secured Overnight Financing Rate is a broad benchmark on daily secured borrowing interest rates published by the Federal Reserve Bank of New York. "SOFR." Federal Reserve Bank of New York, https://www.newyorkfed.org/markets/reference-rates/sofr.

31 Capital expenditure rates are sourced from Berkeley Lab Market Reports.

32 Ranges in debt coverage are meant to remove extreme values and are based on sources such as CRC-IB MCOE reports: CRC-IB. "Analysis – Solar & Wind Market Cost of Energy (MCOE) H2 2023." CRC-IB, 9 Jan. 2024, https://crc-ib.com/wp-content/uploads/2024/01/CRC-IB_MCOE_H2-2023_vF.pdf.

Analysis

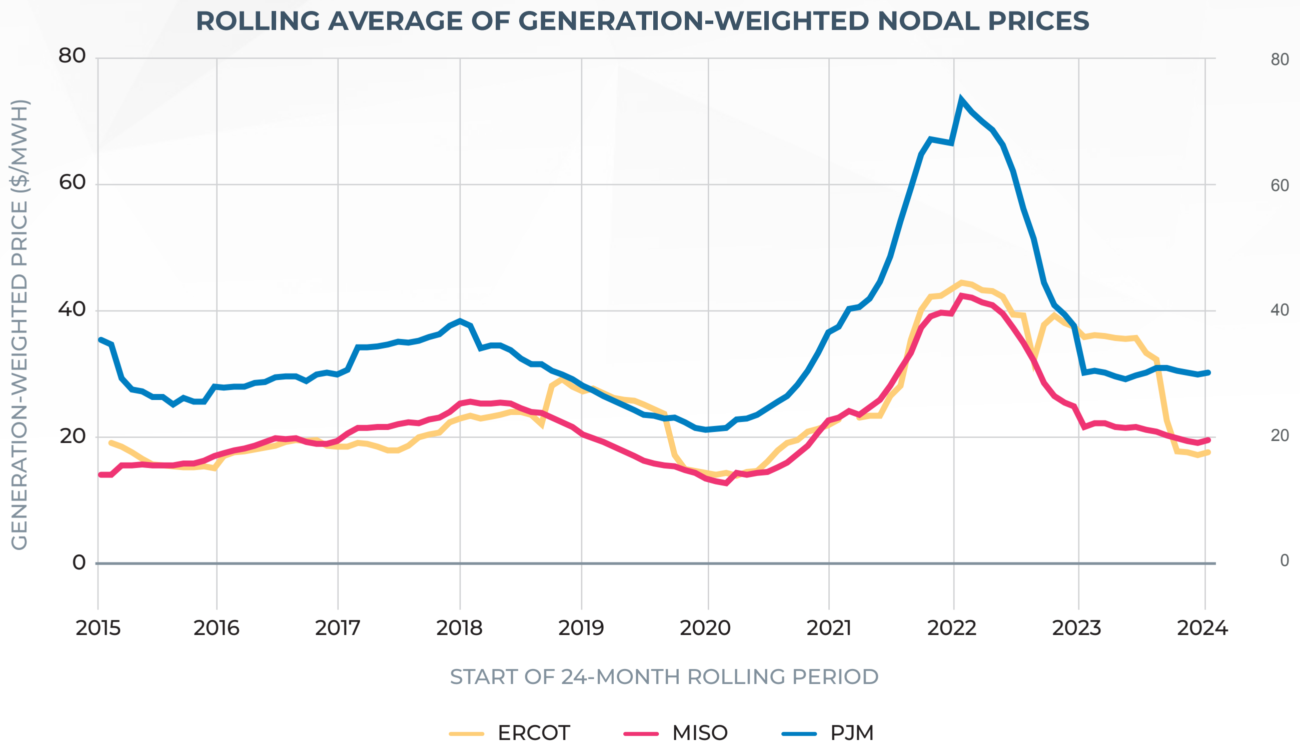
After establishing the generation, VPPA and REC prices, and debt sizing for each project, we calculated the merchant revenue volatility experienced by the wind and solar projects in ERCOT, MISO, and PJM. We then quantified the impact of VPPAs and unbundled REC contracts on reducing that volatility and decreasing the likelihood of financial distress.

Volatility of Merchant Revenue

Merchant renewable energy projects in the U.S. have historically experienced significant revenue volatility. Offtake agreements mitigate this volatility by providing a steadier revenue stream, reducing financial distress during periods of low wholesale power prices.

Merchant revenue volatility is exemplified in Fig. 1, which shows the 12-month rolling average of generation-weighted nodal prices across ERCOT, MISO, and PJM for the selected projects. All three markets demonstrate similar macro trends: low prices in 2020 due to decreased demand during the COVID pandemic, high prices in 2022 due to elevated natural gas prices, and lower prices in 2024 due to falling gas prices and mild weather. These swings in prices lead to a high amount of merchant revenue volatility — in the last two years alone, the average value of renewable projects in PJM has ranged from \$30/MWh to over \$70/MWh. For a 100 MW project with a 40% capacity factor, this translates to a swing in annual merchant revenue from \$10.5 million to over \$24 million.

Figure 1: 12-month rolling average of generation-weighted nodal price for renewable projects in ERCOT, MISO, and PJM

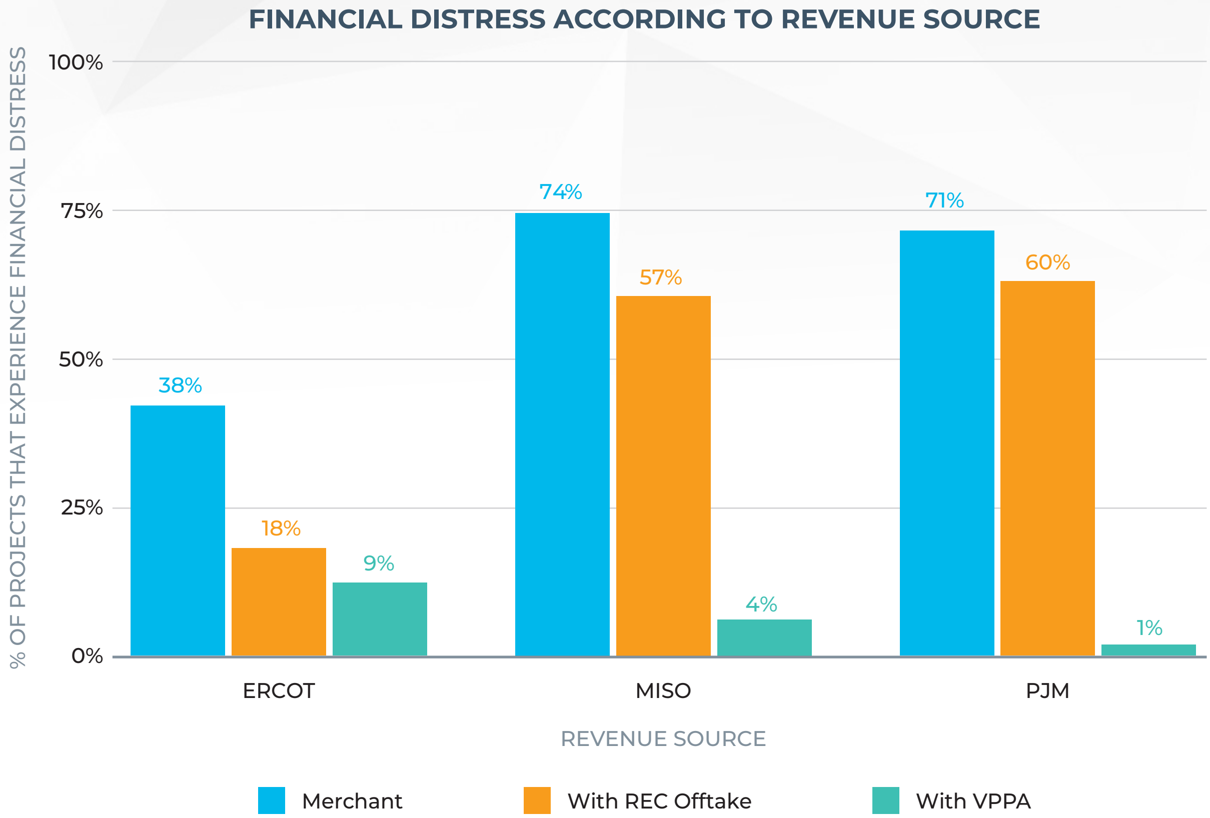


Impact of VPPAs and RECs in Reducing Financial Risk

As shown in the previous section, the volatility of merchant power prices can cause large swings in renewable merchant revenue, highlighting the importance of having a steady revenue stream. While VPPAs reduce this volatility by hedging against low wholesale power prices, unbundled REC purchases provide a consistent revenue boost to projects that may otherwise experience financial distress.

The frequency of simulated renewable project financial distress is shown in Fig. 2 for a purely merchant scenario, a scenario where projects sell 100% of their energy through unbundled REC purchases, and a scenario where a fully contracted VPPA is in place. Even with a relatively low REC value of $2.74, REC offtake agreements reduce the amount of projects that would face financial distress from 38% to 18% in ERCOT (a 52% reduction), with reductions of 23% and 17% in MISO and PJM, respectively. VPPA agreements have an even greater impact on reducing the frequency of financial distress due to their hedging behavior. VPPAs reduce the amount of projects that would face financial distress in ERCOT from 38% to 9% (an ~76% reduction), with reductions exceeding 90% in MISO and PJM.

Figure 2: Percentage of projects (including wind and solar) that face simulated financial distress across ERCOT, MISO, and PJM. Distress rates are separated by revenue source, and high basis projects have been removed from all revenue source aggregations.



We attribute the difference in impact between VPPAs and REC purchases to the difference in risk that each structure mitigates from the project. In essence, a REC purchase provides a low-risk revenue stream to the project that can blunt the effect of wholesale price volatility but does not address the underlying volatility itself. In some cases, the additional stable revenues earned by REC sales are sufficient to improve total cash flows above levels of financial distress. However, as shown in Fig. 1, wholesale power prices can be dynamic, and for many projects, the value of solely an unbundled REC is insufficient to mitigate financial distress.

Although we chose a specific REC value, that of National Green-e® Certified RECs, due to its wide adoption, availability, and common usage, more expensive RECs certainly exist. For example, PJM Tri-Qualified RECs have historically sold for up to $39, but are less commonly sold as unbundled, voluntary RECs compared to Green-e®. Not surprisingly, higher valued RECs provide larger contracted revenue relative to market power prices and fluctuations, resulting in significantly greater reduction of distress. We found that increasing the REC price to $7.50 resulted in a >75% reduction in distressed projects in ERCOT compared to the fully merchant scenario, with reductions of 70% and 50% in MISO and PJM, respectively.

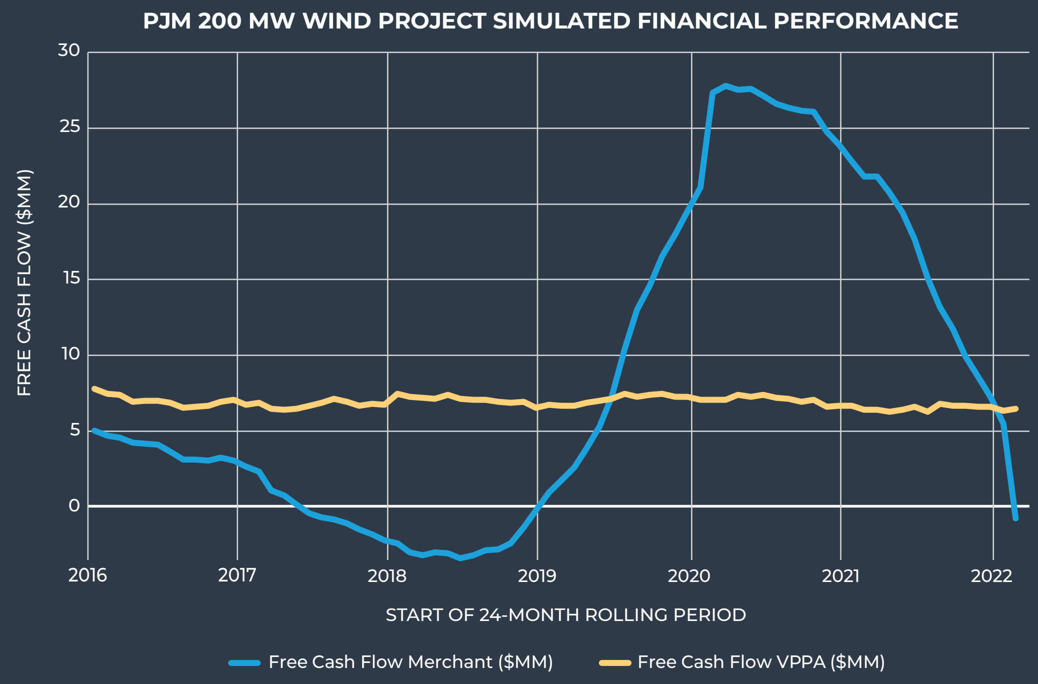
Case Study

To demonstrate the impact of an offtake agreement on a more granular level, we highlight the impact that a VPPA has on revenue stability for a single wind project in PJM. We have selected an approximately 200 MW wind farm in Illinois due to its large capacity and long operational history. It is representative of the general revenue trends we see across markets — namely, merchant revenue that tracks overall market prices and VPPA net revenue that remains relatively level throughout the operational life of the project (Fig. 3).

Over the two-year period from 2018 to 2020, the project's merchant operating income dropped below its debt service obligations, which would have caused financial distress (Fig. 3). However, the fixed price of the VPPA was higher than the market prices during this period, providing valuable revenue to support cash flows and help the project meet its debt service obligations, despite 12+ months of negative merchant cashflow. The same scenario has occurred again in recent months due to lower prices in 2024.

Due to the inherent risk mitigation of a VPPA, the project misses both the ups (2021–2022) and downs (2019–2020) of the market. Although an uncontracted project would capture merchant revenue upsides, which can be enough to avoid financial distress for 29% of projects in PJM (Fig. 2), the revenue stability gained from avoiding volatility risk makes it significantly easier for projects to get financed and built.

Figure 3: Simulated free cash flow (Net Operating Revenue - Debt Service) performance of a 200 MW wind project located in Illinois (PJM)



Summary and Conclusions

The United States is consuming more electricity than at any other period in history, and its need for energy output is only growing. Driven by a booming data and AI industry, manufacturing, and grid electrification, nationwide electricity demand is expected to increase by nearly 16% in the next five years after remaining relatively flat for several years.[33] Due to their relatively low cost, ability to deploy rapidly, and environmental benefits, wind and solar energy are critical to meeting this demand growth.

In this paper, we demonstrate the crucial role that VPPAs play in providing financial resiliency to projects. Rates of financial distress for renewable projects would be significantly higher were it not for the revenue-stabilizing impact of VPPAs, making offtake agreements a crucial part of project financing. Projects that rely on purely merchant revenue are beholden to shifting market power prices and sustained periods of low prices, which can result in the fundamental inability of merchant projects to cover their debt obligations, limiting their access to capital. Purchases of unbundled RECs from renewable generators also increase the stability of their cash flows and, depending on the credit price, can produce a significant reduction in the frequency of financial distress.

In contrast to recent assertions, our results indicate that offtake agreements are critical to ensuring the revenue stability required to secure financing. Without extensive voluntary purchase of clean energy by corporate buyers, fewer projects will be financed and built, and the U.S. will struggle as a result to meet growing energy demand.

As we enter a period of rapidly declining federal support for climate goals and clean energy build-out, renewable projects will require the financial support of predictable revenues more than ever. Projects that no longer qualify for federal tax credits are expected to experience levelized cost of energy increases exceeding 30%,[34] making it significantly more expensive to construct new projects. Corporate procurement is already a key component of financing renewable energy projects, but with the accelerated decline of federal tax credits, corporate offtake has become even more crucial for ensuring new projects can get built and remain financially viable.

33 Wilson, John D., Zach Zimmerman, and Rob Gramlich. "Strategic Industries Surging: Driving US Power Demand." Grid Strategies, Dec. 2024, https://gridstrategiesllc.com/wp-content/uploads/National-Load-Growth-Report-2024.pdf.

34 "Lazard's LCOE+." Lazard, June 2025, https://www.lazard.com/media/uounhon4/lazards-lcoeplus-june-2025.pdf.

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