



# Q1 2025: Energy Markets Insights for DER Owners

April 2025

## **Introduction & Executive Summary**

# Energy markets are undergoing major shifts, elevating the importance of – and creating new financial opportunities for – distributed energy resource (DER) owners and demand response participants.

These shifts include increasing renewable energy penetration, surging load growth from data centers and electrification, and changing seasonal supply and demand patterns. Winter peaks are also becoming more prominent and are leading markets to rethink how they plan for their capacity needs and pay DER owners for wholesale power market participation. These factors are driving up capacity prices and expanding the use of ancillary services programs.

While the value of demand response is rising, navigating these changes requires careful strategy to maximize revenue and minimize disruption. We created this report to guide customers and partners to do just that.

#### NYISO:

New York is facing significant power plant retirements and growing winter demand, leading to more winter dispatches in capacity programs. Customers can increase earnings by over 40% by switching to NYISO's new DER Participation Model. We predict that this model, which treats demand response resources more like traditional power plants, is the direction that other markets will take.

#### PJM:

Record-high capacity prices in PJM are the result of policy interventions, delayed retirements, and unexpected load growth. Demand response participation, particularly through capacity and peak demand charge avoidance programs, is crucial to managing these rising costs, but requires careful coordination to optimize revenue and savings.

#### MISO:

MISO's introduction of a sloped demand curve will stabilize capacity pricing, but at higher price points than historically seen. It's critical for energy users to partner with providers who can navigate rapidly shifting rules and open new geographies and revenue streams.

#### IESO:

Ontario's Market Renewal Program will shift IESO's market to a day-ahead structure, driving energy prices up and Global Adjustment charges down. Optimizing participation in the capacity program alongside Global Adjustment will be key to maintaining and maximizing overall value.

#### Continue reading for the full report.

## **Cross-Market Trends**

# Increasing renewable energy penetration puts upward pressure on capacity pricing

While traditional power plants are being retired, generation capacity growth is primarily coming from renewable energy sources that are available less than 50% of the time during peak hours. As such, these resources are not accredited to the same degree as traditional power plants by capacity markets. **This decrease in perceived supply puts upward pressure on capacity prices, increasing costs**, but ultimately creates an opportunity for demand-side resources to financially benefit from these rising prices.

# The increasing value of Operating Reserves and dispatch frequency

Renewable energy output is inherently intermittent. As a result, the grid experiences brief dips in renewable energy production, and that's when markets call on Operating Reserves (OR). The graph below shows just that. When wind production wanes, Voltus customers enrolled in our SPP OR program are dispatched to offset the decrease in supply. Over the four-day period shown below, three of the four demand response dispatches (circled in green) were attributable to dips in wind energy production.



#### U.S. expected to mostly build solar and batteries this year Share of planned new utility-scale capacity additions, 2025



OR pricing can fluctuate in the short term. **Still, we are confident that OR will become increasingly important in the long run as a counterbalance to intermittent renewables, and that this importance will be reflected in high pricing**. OR participation creates an opportunity for customers with high flexibility to increase their demand response earnings.

It's also interesting to note that demand-side resources are increasingly being used for routine grid balancing, just like traditional power plants. Historically, demand response was primarily used during extreme grid emergencies.

#### Load growth from data centers

# 

#### Forecasted load growth by 2029

(Source: Grid Strategies)

Increasing demand also puts upward pressure on pricing. Most notably, unprecedented load growth is coming from data centers. Based on the visual above, PJM and ERCOT are experiencing the highest increases from data center load growth.

## Electricity consumption isn't just growing, it's changing.

Devices that previously used gas and propane (e.g., water heaters, batteries, construction equipment, etc.) are increasingly using electricity. Many of these devices charge at night or use more electricity during the winter, so the *times* that electricity is being used are shifting.





This past January, as shown above, PJM reached 144 GW of demand, compared to its July 2024 peak of 152 GW. This represents a narrower gap between summer and winter than seen in the past. We've observed that some utilities are already experiencing or preparing for winter peaks.

Changes like these are causing markets to reassess how they plan for their capacity needs. This creates changes to how and when demand response programs are called, which can create more financial opportunity for Voltus customers.

Now, let's dive into how these trends and opportunities are playing out in specific markets.

# NYISO

In New York, 5 GW of power plant capacity is scheduled to come offline in the coming years, while continued electrification and the addition of large-scale industrial facilities are driving load growth.

Remember how we mentioned an increase in electricity consumption during the winter months?

As seen in the top graph below, in January 2025, NYISO's System Load (green line) exceeded the System Forecast (light blue line). In response, NYISO dispatched its demand response capacity program, Special Case Resources (SCR). The bottom graph shows the load of all Voltus's NY customers in aggregate across the same period, with the load reduction efforts associated with these SCR dispatches highlighted by the green bands.



Historically, SCR has rarely been dispatched, and almost exclusively in the summer. Voltus helped our customers earn nearly \$2M in dispatch payments during these events.

Now, how is NYISO rethinking its capacity needs and demand response programs more holistically?

## NYISO DER Participation Model: A model for the future

A key part of NYISO's strategy is to incentivize more DERs to better serve the needs of the grid. This is where the NYISO DER Participation Model comes in.

Historically, most demand response capacity participation has been through distinct programs with defined terms (e.g., notification time, dispatch duration, dispatch frequency, etc.). Generators, on the other hand, have simply offered their energy into hourly markets and received capacity payments if those offers meet certain requirements. Generator offers can reflect any constraints they have, such as startup time or being out of fuel.

The DER Participation Model offers DERs access to all market programs, including energy, ancillary services, and capacity, under a single registration. This moves us past the concept of enrolling in distinct programs and allows these resources to participate in the market just as generators do. Each resource will be able to reflect its abilities and limitations, and its payments will scale accordingly.

## **DER Participation Model increases earnings**

<u>Voltus was the first provider to submit registrations</u> under the NYISO DER Participation Model. We're creating telemetry integrations with utilities across the state to provide the DER Participation Model to customers in a much larger geographic area than other providers. This technical work has been one of the largest projects Voltus has ever undertaken, and it's for good reason: DER participation can pay more than SCR participation alone.

## If one megawatt enrolled in New York's SCR program in NYC, for example, switches to the DER Participation Model, its earnings from demand response can increase by roughly 40%!

Voltus predicts that several more markets will make similar structural changes (that is, treat and pay demand response more like generators) in the coming years.

## Key Insight & Action Item

- 1. Markets are beginning to value demand response much like traditional generators. Resources that can do more – respond faster, more frequently, or longer can be paid more.
- 2. Every organization has to find the balance between maximizing revenue and limiting participation hours. Voltus works with customers to find the sweet spot.
- 3. If you have facilities in New York and you'd like to earn more, Voltus can work with you to figure out if the DER participation model is right for your organization simply reach out to <u>info@voltus.co</u> to get started.

## PJM

#### **PJM's Capacity Auction History**

2024 saw a historic capacity auction in PJM. Capacity prices hit an all-time high, increasing 9x on average across all zones.

Let's take a moment to look at how we got there:

- Between 2021 and 2023, PJM faced growing challenges as state-level policies began to influence which energy resources could retire or come online. For example, policymakers in West Virginia pushed to keep aging coal plants operational, even as PJM's market signals favored their retirement. This kind of political intervention disrupted the market's ability to accurately signal capacity needs, forced PJM to adjust how it conducted its capacity auctions, and resulted in a shortening of the forward period; auctions went from three years ahead for 2021/2022 to one year ahead for 2022/2023.
- In PJM's capacity auction for the 2023/2024 delivery year, clearing prices fell by roughly 32%, reaching some of the lowest levels ever seen in PJM. This was driven by a surge in accredited capacity (primarily from uprates and delayed retirements) combined with decades-long stagnation in demand growth.
- The price drop raised concerns across the industry, particularly among investors and generators that rely on capacity revenues. Clearing prices fell below the levels needed to sustain investment in both new and existing thermal resources. As a result, PJM began to see signs of reduced investment in firm generation *and* increased retirements, even as it started to revise its demand forecasts upward in response to the accelerating growth of electrification and data centers.
- At the same time, PJM's already backlogged interconnection queue grew worse, delaying the addition of new resources, particularly renewables, by years. Combined with unexpectedly high demand growth, these dynamics created a supply-demand imbalance. The result: Capacity prices, which had recently hit all-time lows, reversed course and surged to all-time highs.
- On April 22, 2025, FERC approved a PJM proposal to limit capacity prices with a floor and a cap. Over the next two years, this will result in pricing that's roughly \$64,000-\$119,000/MW-yr.

As seen in the graph below, even the \$64,000 floor exceeds capacity pricing in recent years, which means **higher prices are definitely here to stay**.

## RTO Clearing Price (\$/MW-year)



## Managing rising capacity prices

One of the most common ways of reducing effective capacity charges is by participating in the Emergency Load Response Program (ELRP), which pays customers to provide demand response at the price set in the capacity auction. The deadline for enrolling in that program (for the program year starting on June 1, 2025) has now passed, but energy users can sign up for future years.

Customers can also reduce their exposure to rising capacity prices by reducing the MW of capacity they must pay for. Capacity charges consist of two components: Generation capacity charges are priced at the PJM capacity auction clearing price as well. A customer's capacity charges are based on their average load across the five PJM system peak hours. Our generation capacity Peak Saver program alerts customers of potential peak load hours, allowing customers to reduce load and, in turn, their capacity costs.





Energy users are also facing transmission capacity (or NITS) charges. NITS charges continue to rise, or remain high, in nearly every zone - see examples below.



NITS charges are based on energy users' load during their local utility system's peak hour (or hours). Voltus's Peak Saver program excels relative to other providers, especially in its accuracy in forecasting local system peaks and sending clear signals to customers.

There is nuance to managing ELRP for revenue while avoiding generation and NITS capacity charges because they can cannibalize each other or lead to unreasonable dispatch frequency. Working with an experienced provider like Voltus that understands how the programs are interconnected is critical to maximizing value.

#### 🂡 Key Insight & Action Item

- 1. Demand response participation can offset record-high capacity prices.
- 2. Ensure you are working with a provider that understands how to maximize revenue and decrease costs across programs.

## MISO

#### MISO's evolving demand response landscape

Market rules and requirements are quickly changing in MISO, which makes it even more important to work with an experienced provider. Failure to do so can result in not receiving energy payments and/or not being able to enroll. Voltus is engaged in constant regulatory advocacy and building tools and processes to ensure that demand response participation remains simple and profitable for end customers in MISO.

Next, while the sloped demand curve (which we will explain shortly) will reduce pricing volatility, we anticipate that capacity prices will remain high in the future.

Third, states are slowly opting into allowing aggregators to offer demand programs in their markets, which gives energy users more competitive and better options in how they participate. Voltus worked to open four different states - Wisconsin, Michigan, Kansas, and Missouri, and we continue to petition in others.

Now, let's double-click into pricing and the new sloped demand curve.

## Sloped demand curve = Reduced volatility and high capacity prices

The MISO capacity auction in the past has used a vertical demand curve, so that MISO would procure an exact set amount of megawatts regardless of price. This has led to the annual price swinging wildly between near-zero pricing and pricing up near the auction's cap. The auction results released on April 28, 2025, are the first that are using this sloped demand curve.

There are many signs that the new, more stable pricing norm will be higher compared to most of the historical years in MISO. <u>A study from ICF</u> predicted that the auction would set prices between \$55,000 and up to the seasonal price cap of around \$119,000 per megawatt just for the summer season starting on June 1.

MISO's Planning Resource Action cleared at roughly \$79,000/MW-yr in North/Central and \$77,000/MW-yr in the South. Overall, while MISO expects to have sufficient supply to meet system needs this year, decreased accreditation and retirement for coal and natural gas units drove the supply stack to be tighter than in previous years.





#### MISO North/Central PRA Clearing Price vs. Planning Year

\*Zone 7 clearing price in 2021/2022 \$94k; Zone 5 clearing price in 2024/2025 \$135k

Going forward, Voltus believes that the value of MISO capacity will be high relative to other geographies, which is the opposite of what we've seen in prior years.

## Key Insight & Action Item

- 1. Capacity prices are expected to rise while volatility reduces.
- 2. Ensure you are enrolled with a provider that's monitoring changing market mechanics, rules, and compliance requirements.
- 3. Get involved in regulatory efforts to open access to new revenue opportunities.

# IESO

Like the other markets we discussed, we are seeing changes on both the supply side and the demand side in IESO, the grid operator that oversees Ontario.

First, the Pickering Nuclear Generating Station, which used to meet 13% of Ontario's peak demand, is being shut down, while demand is expected to grow 2% by 2026. IESO is also soliciting proposals from energy sources (e.g., wind, solar, hydro, etc.), so as new supply becomes available, it will be more heavily tilted toward renewables than the previous energy resource mix. That brings us to IESO's Market Renewal Program.

#### **IESO Market Renewal Program**

The Market Renewal Program (MRP) is taking effect on May 1, 2025. The most significant change from the MRP is that IESO is transitioning from a real-time market to a day-ahead market, aiming to stabilize energy costs and make it easier to schedule loads and generators. This is largely how U.S. energy markets are structured.

The intent of the MRP is to improve efficiency in energy supply, improve the reliability of the system, and reduce the cost to consumers ... although Voltus does not believe that costs to consumers will actually reduce. Voltus predicts that the introduction of a day-ahead market will exacerbate an existing trend where energy costs are increasing.



#### Energy and capacity costs are inversely correlated

As seen in the above graph, energy costs and capacity costs are inversely correlated, so when energy costs go up, capacity costs go down.

The downside is that while capacity costs are avoidable, energy costs are less so. Most large energy users in Ontario avoid capacity costs, or Global Adjustment, by reducing load during peak hours. As bills shift toward energy and away from capacity, the share of energy users' bills that they can reduce with this strategy will go down.

On the upside, the relative value of the Hourly Demand Response program (or HDR), which pays for curtailment, is looking better and better. HDR pricing is slowly increasing, both in absolute terms and compared with the value of peak avoidance.

#### What does this mean to energy users?

This trend means three things:

First, energy users should make sure they are enrolled in HDR, or they risk leaving almost \$60,000/MW-yr on the table. HDR is going to be the best value in terms of dollars-per-hour of curtailment, so it's an especially attractive option if they are limited in how frequently they can curtail.

Second, peak demand charge avoidance will continue to be meaningful – but energy users need to make sure they are not managing these two programs in silos. If not managed correctly, the two programs can cannibalize one another.

Optimizing program participation across both can earn customers an additional \$10,000/MW-yr.

## Key insight & Action item

- 1. The MRP will drive energy prices up and capacity prices down.
- 2. Leverage a blended HDR and Global Adjustment strategy to not miss out on earnings and savings amidst rising energy costs.

## Financially benefit from these trends

Changing market conditions are increasing the value of demand response participation. It's important to work with a provider that has deep energy markets expertise and a <u>proven track record</u> of helping maximize this value.

To learn more, visit <u>www.voltus.co</u> or reach out to <u>info@voltus.co</u>.