

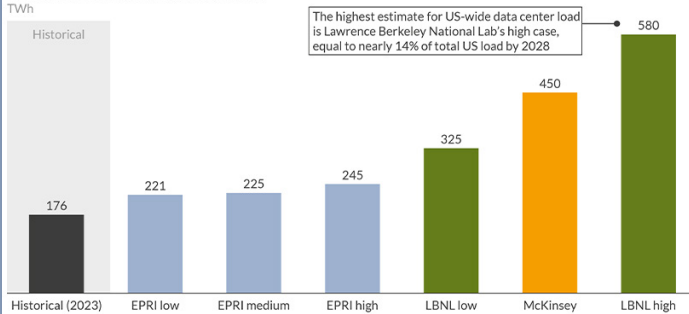
NODAL TRADER SPECIAL EDITION

Insights and Analysis from RTO Insider and Yes Energy

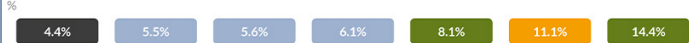
DEMAND FORECASTING

The Promise, Uncertainty and Unparalleled Risk of Data Center Load

Forecasted annual US data center load in 2028 TWh



Estimated percentage of US load attributed to data centers¹



¹ Forecasted values are relative to AER total demand forecast excluding AER data center load plus forecast specific data center load.

Aurora Energy Research

The data and utility industries are being thrust together to create what eventually will be a central nervous system that will affect the entire planet. They need to do a lot more work to better understand each other, optimize their approaches and de-risk the outcomes.

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Invenenergy

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FROM THE EDITOR

Actionable Intelligence on 6 Market Trends

Key Takeaways from the Pre-Conference Workshop from Yes Energy and *RTO Insider*



Ken Sands

The Nodal Trading Conference brings together a broad audience representing energy traders, independent power generators and utilities. Whatever your organization or role, the pre-conference workshop is intended to provide insights that will help you be better at your job.

This special workshop edition of *RTO Insider* touches on highlights of the presentations and provides deeper context by reproducing recent news articles related to the six trends presented in the workshop.

Quinn Gray, senior product manager for Yes Energy, describes one of the major market changes: ERCOT's Real-Time Co-Optimization plus Batteries (RTC+B) initiative, which goes live in December. The program will allow the market to optimize ancillary services and energy simultaneously in real time, with the goals of reducing overall costs and making it easier to dispatch energy resources more efficiently. Initial testing by ERCOT is promising.

RTO Insider reporter **James Downing** has decades of experience covering FERC, Congress, and the energy regulation and legislation emanating from Washington, D.C. He's watching every development in that rapidly evolving landscape, and understands the short-term and long-term implications for the markets. His presentation sets the stage for a candid discussion of what might happen.

Yes Energy Product Manager **Sam Lockshin** has identified the best practices in data and analytics for participation in the power markets. He walks through essential data and analytics strategies for optimal power market participation. To succeed in the markets, data is the most valuable asset.

Yes Energy Senior Product Manager **Ben Perry** explains how electrical load patterns are shifting sensitivity to heat in measurable ways and what this could mean for trading. Air conditioning used to be a rarity in homes in Western Oregon and Washington, for example. A relatively small increase in temperatures creates a tipping point in which many more people are adding air conditioning units to their homes, dramatically increasing load.

Speaking of load growth, Yes Energy Product Manager **Alex Bennitt** examines the dynamic relationship between supply and demand as the rapid expansion of artificial intelligence data centers in particular is driving load to levels of growth not seen in decades. This landscape creates challenges for market participants across all sectors to manage forward-looking market positioning.

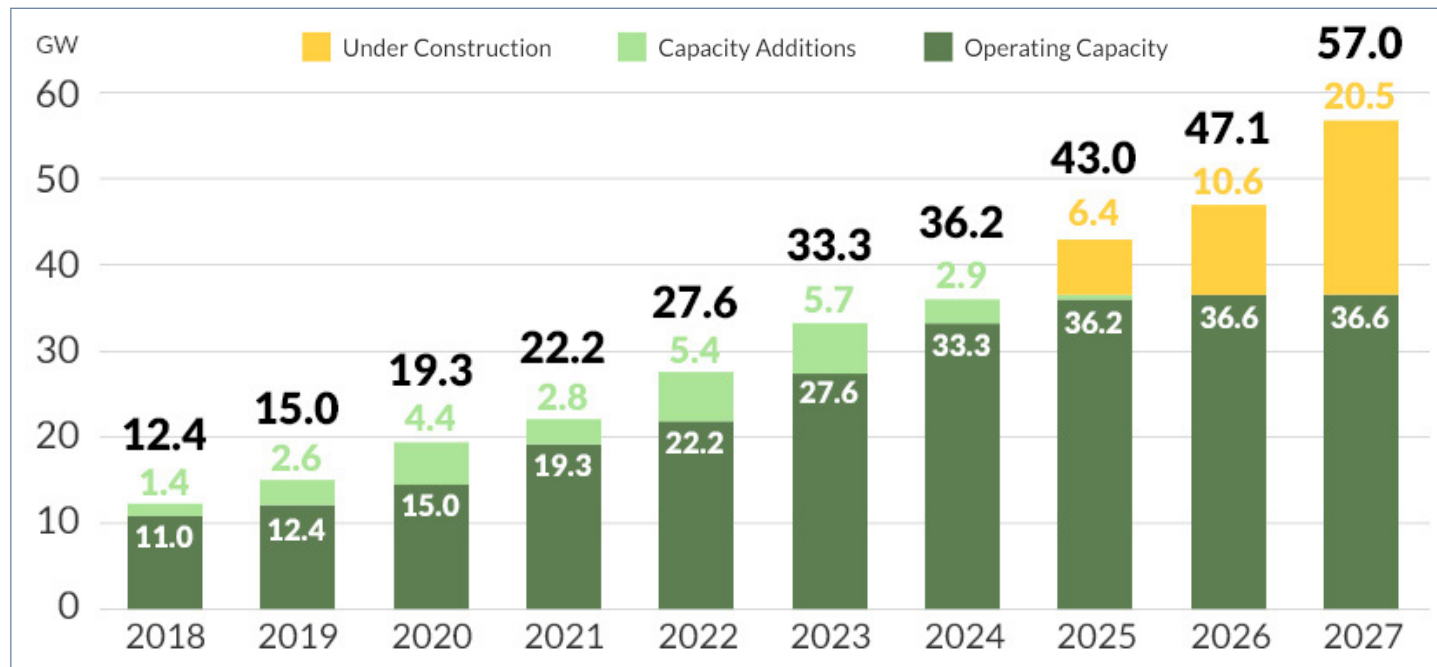
Laura Fletcher, associate product manager at Yes Energy, explains how to track all of the changes to the grid, with data compiled by the Infrastructure Insights team. Every week, new generation, transmission and load center projects are announced, and the team tracks their progress over time. It's particularly difficult to stay on top of all the load center proposals, and which lead to actual construction.

We hope you benefit from the Yes Energy workshop, and appreciate the added value from the abbreviated versions of *RTO Insider* articles contained in this special edition. Every month, *RTO Insider* produces more than 150 full-length articles. For information about a subscription, go to rtoinsider.com/subscribe. ■

– Ken Sands

The Load Growth Era is Here

Complex Load Growth Creating Uncertainty Around Demand Center Operations and Supply Stack



Data center growth and under construction projects | Yes Energy



Alex Bennitt

The load growth era is here, says Alex Bennitt, product manager at Yes Energy.

Weather-adjusted demand is climbing across the United

States outside of the Northeast, driven by data centers, which are sending load growth projections into hard-to-comprehend projections from the ISOs.

Yes Energy's **forward-looking demand forecasting and infrastructure tracking data** seem to indicate a more modest load growth profile over the next couple of years. Plus, Yes Energy's real-time Live Power data on demand centers shows that facilities are operating well below their theoretical max power draw and operating in a manner that shows ability to flex load.

To meet current and forecast load growth, supply build out has picked up, driven by solar capacity growth around the United States. Solar has effectively crushed on-peak market fundamentals in CAISO and ERCOT, showing a potential future for ISOs that have been slower to adopt solar. Solar has created interesting

market dynamics with increased cycling on an aging thermal fleet, and high ramp rates needed when the sun sets.

This is where batteries have entered the picture, providing unique generation characteristics that help soak up mid-day solar and flatten thermal ramp rates with a shift to discharging power onto the grid when the sun sets.

Here are some highlights regarding load:

- **Data center capacity has tripled** since 2018, sitting at 36.2 GW by the end of 2024. Data center capacity is projected to hit 57 GW by 2027, with ~21 GW of capacity under construction and online by 2027.
- **Cryptocurrency mining projects drove 30% of data center capacity growth.** Crypto capacity will hit 15 GW by 2027, with 7.7 GW under construction and online by 2027, a doubling of current capacity.
- **Data centers are not operating at their theoretical maximum power draw**, or contracted interconnect amount with ISO. Yes Energy's Live Power data and ERCOT 60-day state estimator data show show operational data center load at 30-50% of contracted load.

Here are some highlights regarding capacity growth:

- **Solar leads the way in growth** since 2020, with ~100 GW of capacity added across the United States. ERCOT has added ~51 GW of new capacity since 2020, with 23 GW of new solar, the largest capacity buildout compared to other regions.
- Forward-looking capacity projections show that it's the **tip of the iceberg for supply buildout**. Batteries are bursting on the scene across the U.S, with ERCOT and WECC seeing the largest share of projects. ERCOT has 77 GW of capacity projected to come online by 2030: including 39 GW of solar and 30 GW of batteries.
- ERCOT averaged 25 GW of daily peak hour solar generation in August, an incredible solar generation buildout for an ISO that saw only 3.5 GW of equivalent generation in August 2020.
- **Large solar generation increases has led to increased thermal cycling**, but batteries have stepped in, particularly in CAISO, soaking up midday solar and flattening sunset thermal ramp rates over the last 5 years. ▲

The Promise, Uncertainty and Unparalleled Risk of Data Center Load

By Peter Kelly-Detwiler

Headlines and projections related to emerging data center load are astonishing. This activity is part of a global race to expand artificial intelligence capabilities while growing the underlying data center infrastructure.



Peter Kelly-Detwiler

The investments clearly will be enormous, with profound implications for many utilities. After decades of relatively flat — or even negative — growth, many utilities understandably like what they see: enormous, high load factor demand from some of the most well-capitalized companies on the planet.

At first blush, data load looks like a perfect antidote to stagnating utility revenues. However, this value proposition brings with it significant risks, such as:

- The Interconnection Requests and “Phantom Load” — The data industry power imperative is simple: Get access to energy as quickly as possible to maintain competitiveness. To get that power, large players may deal with utilities directly, or they may buy existing projects put together by other develop-

ers. In either case, they are incentivized to develop multiple applications across numerous locations. In addition to the big hyperscalers, numerous other players are active, including speculative developers looking to grab land, access power and flip their projects to third parties. The result is an inflation of the interconnection numbers that may be *quite significant*.

- Contract Lengths and Temporal Mismatches — *Recent contractual structures* approved by utility commissions typically include a ramp period of four to five years, followed by a period of 12 to 15 years at full load. Contracts often are structured as take-or-pay agreements, meant to inoculate ratepayers during the length of the contract period, but only for the initial contract length. The problem is the contract durations align poorly with generation and transmission infrastructure with lifespans that often exceed 30 or 40 years. If data center loads were not so large, this risk would not be as considerable. Given their magnitude, if data center load shrinks or disappears, stranded asset risk could be quite considerable.
- Competition & Consolidation — In the U.S. alone, more than a dozen entities have developed over 40 *large language models* that consume huge amounts of data and electricity. If the past battle for

search engine supremacy or the lessons of general economic theory are anything to go by, we can expect many of these actors to fail or be consolidated in the future, creating attendant risk for both the utilities holding the supply contracts and their captive ratepayers.

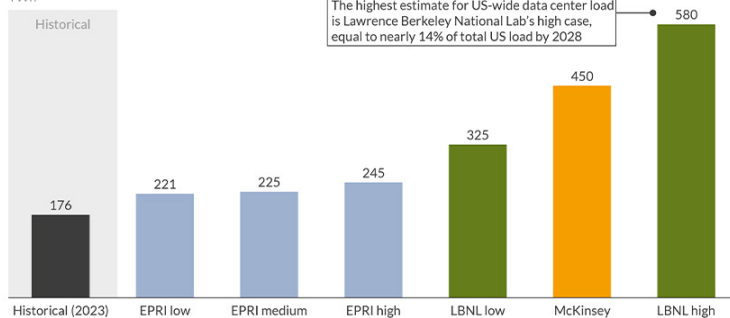
Why This Matters

Our new columnist, Peter Kelly-Detwiler, writes that the data and utility industries are being thrust together to create what eventually will be a central nervous system that will affect the entire planet. They need to do a lot more work to better understand each other, optimize their approaches and de-risk the outcomes.

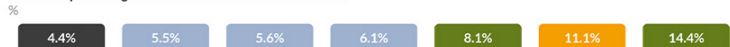
- Constantly Evolving Technologies — Data center technologies are highly dynamic and are becoming increasingly efficient. *In cooling*, which consumes roughly 35% of data center load, *liquid and two-phase cooling* promise to cut energy consumption dramatically, by as much as 90%. Meanwhile, performance of the cutting-edge chips from Nvidia demonstrates remarkable gains. The *next-generation chip* — to be delivered by 2027 — will yield performance gains of 900 times that of its chip introduced in 2022. Supported by AI itself, future chip efficiencies will improve.
- Approaches to Training the Large Language Models — The traditional “brute force” approach to *training AI models* has been to combine powerful chips with huge amounts of electricity to crunch data — in some cases as much as a trillion parameters in a single training model. However, news out of China suggests that in some instances there may be a better way that involves far fewer chips and significantly less energy.

All of these issues point to today’s indisputable reality: The industry is morphing so quickly that nobody knows what it will look like in a year or two. Given how rapidly the industry is growing, the hundreds of billions of dollars of investment, and the rapid evolution of the models and underlying technologies, projecting the future is impossible. ■

Forecasted annual US data center load in 2028 TWh



Estimated percentage of US load attributed to data centers¹



¹ Forecasted values are relative to AER total demand forecast excluding AER data center load plus forecast specific data center load.

Estimates vary widely for data center load growth, ranging between 5-14% of total U.S.-wide load by 2028 | Aurora Energy Research

Insufficient Data Center Load Forecasting Likely a Big Part of PJM's Problem

By Peter Kelly-Detwiler

Mid-Atlantic grid operator PJM had a rough summer. *It received an open letter* penned by nine bipartisan governors of the 13-state region it serves, citing a "crisis of confidence from market participants, consumers and the states." Admonishing PJM for its "multiyear inability to efficiently connect new resources to its grid and engage in long-term transmission planning," the governors called for fundamental changes and new leadership.



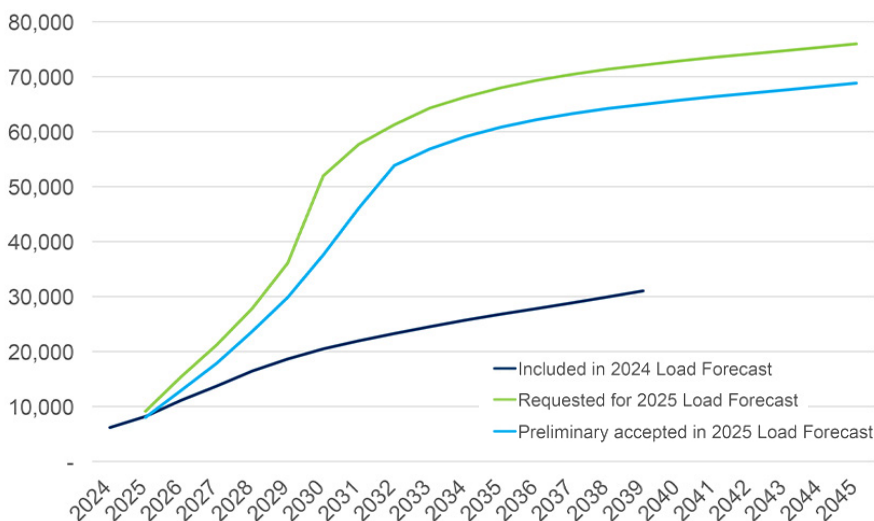
Peter Kelly-Detwiler

Then things got worse, with the release of record high results from the Base Residual Auction for capacity addressing the 2026/27 delivery year. Last year's auction results already had caused an uproar, as the *clearing price for most of PJM* was set at \$269.92/MW-day, up dramatically from \$28.92/MW-day the prior year. Baltimore Gas and Electric and Dominion fared even worse, at \$466.35/MW-day and \$444.26/MW-day. Total costs paid for capacity by all energy consumers soared from \$2.2 billion to \$14.7 billion in just one year.

In response and in an attempt to limit future costs to customers, Pennsylvania Gov. Josh Shapiro (D) negotiated a floor and cap with PJM — eventually blessed

Why This Matters

Given the magnitude of the costs related to potentially inaccurate demand forecasts, combined with the red-hot politics surrounding the global race to dominate artificial intelligence, it's not hard to imagine PJM's capacity auction results becoming intensely and increasingly politicized.



PJM MW demand | PJM

by FERC — that would create a price band between \$177.24/MW-day and \$329.17/MW-day for the following two delivery years.

How did we get here? It generally comes down to the balance between expected supply and forecast demand.

The perfect recipe for creating more pricing pressure when supply is limited is to add large amounts of potential new demand, and the addition of data center load does just that. These facilities are large (often well over 100 MW), disconnected from the general macroeconomic environment and extraordinarily difficult to forecast, especially when the majority of current *interconnection requests* to utilities may never actually be served with power. Existing and forecast data center load clearly had the potential for a significant impact on the past two auction results. The question is, how much?

In fact, it may have resulted in billions of dollars of unnecessary costs to consumers. PJM's Independent Market Monitor (IMM) *ran alternative scenarios* earlier this year to evaluate this issue and concluded, "data center load growth is the primary reason for recent and expected capacity market conditions, including total forecast load growth, the tight supply and demand balance, and high prices."

The IMM attributed \$9.3 billion of the \$14.7 billion from last year's auction to

data centers, noting, "the inclusion of forecasted data center load increased total revenues by \$7,742.157 or 115 percent." The IMM further commented, "the role of data center load does not mean that PJM would not have eventually reached a point where supply and demand were tight, but that trajectory was relatively slow and would have resulted in more time to permit market reactions to address the balance of supply and demand."

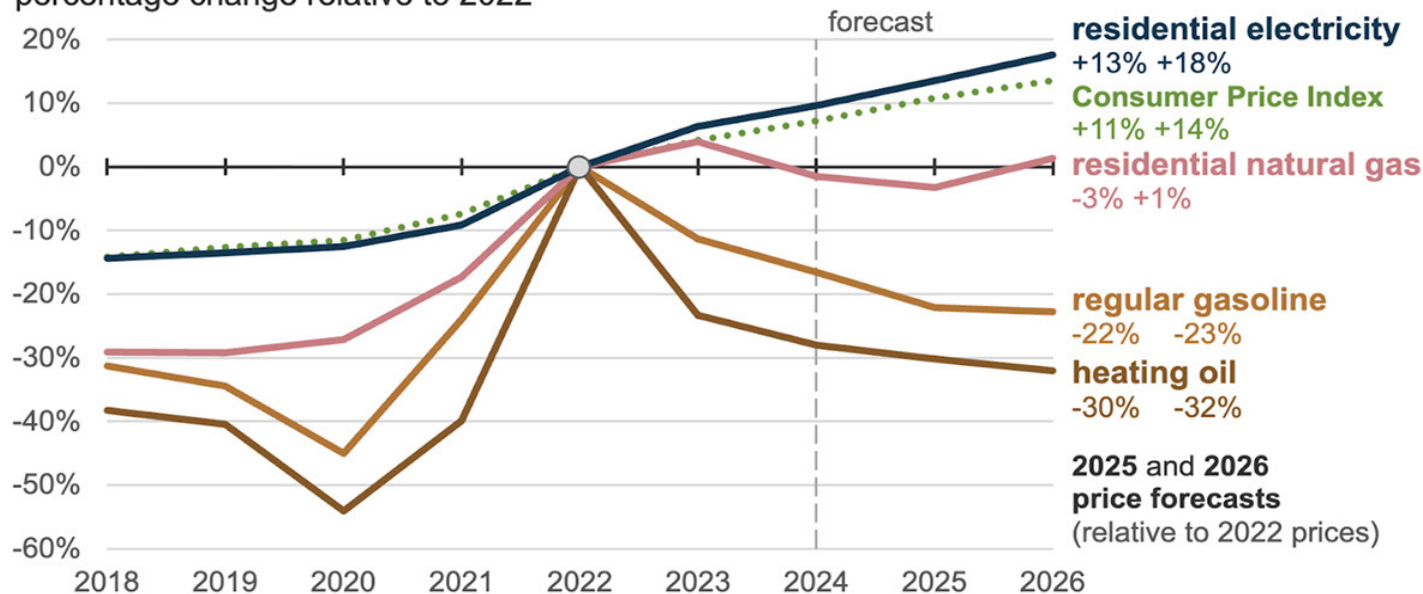
What's next? The latest auction signals tough sledding for consumers, with little end in sight. Given the magnitude of the costs related to potentially inaccurate demand forecasts, combined with the red-hot politics surrounding the global race to dominate artificial intelligence, it's not hard to imagine PJM's capacity auction results becoming intensely and increasingly politicized.

The action to address this issue is to employ far more rigor in the forecasting process at the utility level (while ensuring that each utility uses similar processes) and employ a higher level of rigor within PJM's forecasting approach. The second is to do everything possible to accelerate deployment of new capacity in the system.

However, with the next auction coming soon, don't expect the cavalry to arrive anytime soon. They haven't even saddled up their horses. ■

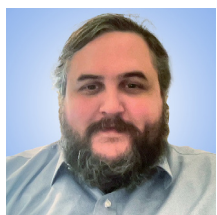
FERC's Role in Changing Times

Selected retail energy prices and Consumer Price Index (2018–2026) percentage change relative to 2022



| EIA

By James Downing



James Downing

FERC over the years has been called an unknown, “sleepy” agency with one former commissioner calling its work “the boring good,” but the return of demand growth

and resulting impact on power prices has changed that.

Rising power prices have state officials in the key RTO of PJM asking for more of a role in its governance and considering legislation to help take the burden off their consumers.

PJM's capacity market has been a focus of regular disputes over the years with earlier rounds of reforms leading to delayed auctions, which coincided with the return of demand growth due to a rush to build out data centers, reshoring manufacturing, the growth of EVs and other factors.

The auctions were meant to run three years ahead of time because that was the development timeline for new natural gas plants, but recent auctions have run so close to the capacity delivery year that new resources could not compete. The expansion of data centers with limited

options for new supply has pushed up prices by \$19 billion over the past two auctions.

In addition to capacity prices, FERC has dealt with controversy around another aspect of growing demand with the co-location of large loads at power plants. That kicked off after Amazon Web Services and Talen Energy wanted to expand an existing, co-located data center at the Susquehanna Nuclear Plant in northeastern Pennsylvania.

The commission rejected the request to expand the data center with a 2-1 vote. Commissioners Mark Christie and Lindsay See voted to reject based on fears there would be a rush of additional deals as other nuclear plant owners were interested in the concept, which would guarantee the plants long-term income and insulate them from the risk of cheap natural gas. Nuclear plants are the backbone of PJM's fleet so removing them would have had major price impacts.

The lone vote in support was Chair Willie Phillips, a Biden appointee, who endorsed the idea for its speed-to-market benefits in light of the race against China around artificial intelligence.

Cut to the victory of Donald Trump, which elevated Christie to chair. Phillips stuck around for several months before facing an ultimatum to leave from the White

House and he decided to return to private practice.

Christie's term ended earlier this year, and his “no” vote was among the factors that led to him not being nominated for a second term. After he left, President Trump picked David Rosner as chair even though See was the only Republican appointee available, with the co-location order again being a factor.

The president's appointment authority historically has been the main way to influence policy coming out of FERC, but looming court cases could change that.

Trump has fired members of other independent regulatory commissions who have challenged that in court. Lower courts have granted injunctions, which the administration appealed to the Supreme Court.

In an opinion overturning those injunctions, the majority of the Supreme Court has said the administration is likely to win because independent agencies exercise significant executive authority and constitutionally the president should have more authority over them. That argument comes from the “unitary executive theory,” and it would overturn a key legal precedent that made regulatory agencies independent for nearly a century and has major implications for FERC's future. ■

Will the Supreme Court End FERC's Independence?

By James Downing

President Donald Trump now has more than one of his own nominees on FERC for the first time in his second term, and, coupled with ongoing cases working their way through the courts, that has raised questions about the future of its independence.

When asked about FERC's independence during their confirmation hearing, both Laura Swett and David LaCerte gave the standard answer of following the law and FERC's internal rules and regulations. But depending on the results of several cases, the laws governing the commission and other federal agencies could go through some major, radical changes.

The argument against independent agencies comes from subscribers of the "unitary executive theory" which, as Project 2025 said, finds them "constitutionally problematic" because in their view, the opening line of Article II of the Constitution vests executive power solely in the president.

While they exercise executive authority, independent agencies are largely free from White House influence, in part because of laws limiting the president's ability to fire their members to certain circumstances. These laws were deemed constitutional in 1935 in *Humphrey's Executor v. United States*, a case that proponents of the unitary executive have made a target for the Supreme Court revisiting.

Beyond the legal issues are "norms-based arguments" about whether a presi-

Why This Matters

FERC has long been insulated from the winds of political change, but a key legal precedent underpinning that independence being under threat has the industry wondering what that could mean for how it is regulated by the agency.

dent should be able to control everything an agency does. "The president has shown that he's willing to basically use all the tools at his disposal to control agencies," Yale Law School associate professor Joshua Macey said. "With FERC, he's been a little bit more reluctant."

But the Department of Energy's use of Section 202(c) of the Federal Power Act to keep two old fossil-fired power plants running this summer (and extending both orders this fall) was unprecedented.

And while naming Democratic FERC Commissioner David Rosner as chair appeared bipartisan on its face, sources told *RTO Insider* they saw it as Trump exerting control over the agency.

Ari Peskoe, director of Harvard Law School's Electricity Law Initiative, pointed to the department's Notice of Proposed Rulemaking during Trump's first term as

the kind of policy that the administration might try to impose if the unitary executive theory prevails at the Supreme Court. The proposed rule, rejected unanimously by a FERC comprising a majority of Trump's nominees, would have paid power plants with on-site fuel their full operating costs.

"Congress designed agencies like FERC to operate somewhat independently from the White House," Peskoe said. "I think part of the reason for that is for the stability of these industries. And particularly for energy industries regulated by FERC, that are making such large investments ... unstable policies like we've seen at some politically controlled agencies would I think be disastrous for the development of energy infrastructure."

FERC's *ex parte* rules already distinguish between its adjudicatory function and its rulemaking function: Commissioners cannot discuss pending rates, but commission chairs often have discussed rulemakings with the White House in past administrations.

Whether the Trump administration would want to intervene in adjudications before the agency is an open question, but the anti-wind policies at other agencies show that the White House cares about certain electricity issues more than others.

"My own view is that probably the primary justification for agency independence is that some matters involve significant expertise, and there is a real benefit to having to not completely immunizing them from political trends but at least limiting the kind of whipsaw reaction that comes in with a policy change every four years," Macey said.

Presidents will always influence FERC policy, Macey noted, even if that remains solely through the power to nominate commissioners and appoint the chair. While drastic actions like freezing permits for clean energy resources might seem like they favor an administration's interest, they lead to unintended consequences, he said.

"I think they are pretty bad for capital markets and investment because investors like stability much more than they like a policy that slightly favors their own interests," Macey said. ■



The U.S. Supreme Court | Shutterstock

Governors Call for More State Authority in PJM

States Seeking Greater Role in Governance, Decision-making

By Devin Leith-Yessian

PHILADELPHIA — Virginia Gov. Glenn Youngkin requested that PJM reopen the nomination process for two open seats on its Board of Managers to consider two candidates recommended by the states.

Addressing a technical conference on the state of PJM, Youngkin said there needs to be real reform immediately at PJM, with granting states a greater voice in decision-making atop the list. Much of the full-day conference focused on the prospect of governance reforms and how the RTO can meet the challenge of rising data center load.

The request comes after Youngkin and Pennsylvania Gov. Josh Shapiro co-signed a letter to the Board of Managers urging the RTO to consider nominating former FERC Commissioners Mark Christie (R) and Allison Clements (D) to serve as board members and for a larger discussion to be launched on setting aside two seats for candidates nominated by member states.

The PJM Nominating Committee instead opted to nominate Robert Ethier, a former ISO-NE executive, and Le Xie, faculty co-director of the Power and AI Initiative at the Harvard School of Engineering and Applied Sciences. The Members Committee is to vote on appointing Xie and Ethier during its Sept. 25 meeting, which is the voting deadline FERC granted in response to PJM's request for a delay.

In response, seven state governors signed onto a [letter](#) expressing disappointment that Christie and Clements were not nominated, saying that would



Pennsylvania Gov. Josh Shapiro speaks at a multistate technical conference focused on governance and resource adequacy in PJM. | © RTO Insider LLC

have signaled that PJM is listening to the states. They wrote that the lack of board representation for consumers and state regulators is a core concern for the governors.

"Our recommendation was intended to provide a constructive solution that would have both strengthened PJM's governance and signaled that voices representing the public interest are afforded a meaningful place in decision-making at PJM," the governors wrote. "The Nominating Committee's decision to disregard our recommendation indicates that our concerns for our consumers are not being taken seriously and underscores how the states' role in PJM is being minimized."

Youngkin said PJM has failed to forecast rising load in its footprint in time to get ahead of it, introducing interconnection bottlenecks and causing a resource adequacy crisis.

"And that is why we are working on legislation that will allow Virginia to reassess whether our utilities will continue to be part of PJM. Virginia will need to decide

what is best for Virginia ratepayers. This doesn't mean that we are walking away, but it does mean that collectively we recognize we need to represent and protect our ratepayers. And that means sending a clear, unifying signal that PJM must modernize, must reform. PJM must improve its planning and, above all, PJM must work to restore confidence that recently has been so badly lost."

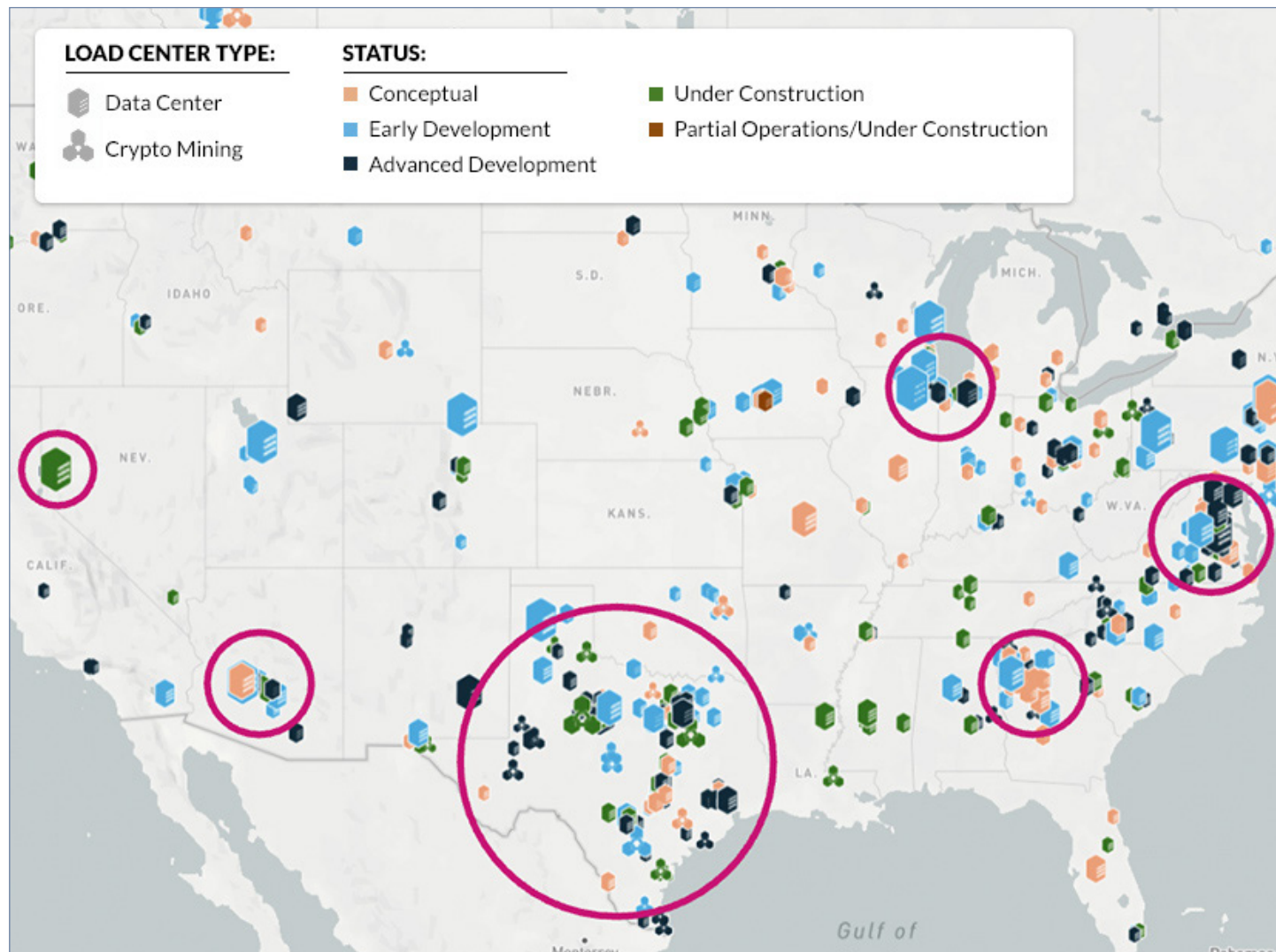
Opening the technical conference, Shapiro said PJM is at an inflection point where the states have empowered it with increasing authority to not only coordinate power flows but also ensure resource adequacy. Now it has responded too slowly to reform its interconnection process to facilitate the generation growth needed to meet rising demand.

He said the situation has been made more difficult by the Trump administration creating barriers and cutting funding for new generation. PJM was founded in Philadelphia nearly a century ago, and there is now an opportunity to reform its governance to provide more opportunity to work with its member states. ■

Why This Matters

Governors in the PJM area are pressuring the RTO to make immediate governance changes that give more power to the states — with the implicit threat that they could pull their states out absent quick action.

Tracking the Rapidly Transforming Power Grid



| Yes Energy



Laura Fletcher

Navigating the uncertainties of the ongoing and rapidly transforming power grid are imperative for longer-term trading strategies, says Laura Fletcher, associate product

manager for the Infrastructure Insights product at Yes Energy.

The tool **monitors upcoming grid changes** including new construction, upgrades, retirements and conversions of generation projects (renewable and non-renewable), transmission lines, substations and large power-consuming infrastructure like data centers and manufacturing facilities.

The utility of this data for traders, whether **FTR or long-term**, lies in its ability to in-

form models and provide an edge in the market for both macro and nodal-level analyses, says Fletcher. Upcoming data enhancements include projected online years, probability scores and point of interconnection for load centers.

Macro-level industry trends include significant load growth, particularly in PJM and ERCOT, driven by data centers and manufacturing facilities. The U.S. Department of Energy predicts a 25% rise in electricity demand by 2030, with data center demand potentially doubling or tripling by 2028.

Other planned load centers, such as manufacturing plants, oil and gas infrastructure, and EV charging networks, also **contribute to this growth**. Additionally, there's an increase in proposed high-voltage transmission projects and a rise in proposed baseload generation

capacity, such as natural gas and nuclear, fueled by shifting policy and the need for dispatchable power.

The Atlas Power crypto mine in Williston, N.D., demonstrated how a new load center could drastically increase congestion prices in an area, highlighting the importance of tracking such projects. Whether it's at the individual project level or more high level/policy related, these constant changes will have implications for longer horizon trading.

Infrastructure Insights is **tracking transmission projects**, as well, such as the Grain Belt Express line under advanced development across Kansas and Missouri. The controversial 500-mile, 600-kV HVDC line faces political and funding challenges, so Yes Energy analysts give it a 25% chance of successful completion at this point. ▲

DOE Pulls \$4.9B in Funding for Interregional Transmission Line

By Tom Kleckner

The Department of Energy says it has terminated its \$4.9 billion conditional loan commitment for the long-delayed Grain Belt Express project, saying it is "not critical" for the federal government to support the project.

"After a thorough review of the project's financials, DOE found that the conditions necessary to issue the guarantee are unlikely to be met," DOE said in a July 23 [press release](#).

Invenergy did not immediately respond to a request for comment.

DOE said the Loan Program Office's loan guarantee, issued by the Biden administration in November 2024, was one of many conditional commitments "rushed out the door" shortly after the 2024 election.

DOE said it is conducting a review of every applicant and borrower, including the nearly \$100 billion in closed loans and conditional commitments the LPO made

between Election Day 2024 and Inauguration Day 2025.

DOE's action is the latest hurdle facing the Grain Belt Express, an 800-mile HVDC project that has been under development since 2010. The project's developer, Invenergy, says the \$11 billion merchant transmission line would be capable of moving 5 GW of [mostly clean energy](#) from Kansas across Missouri and Indiana and into Illinois.

The news was [celebrated](#) by U.S. Sen. Josh Hawley (R-Mo.), who has called the project a "boondoggle" and twice sent letters to DOE urging it to cancel the loan guarantee. Hawley took credit for the cancellation, charging that the project "has taken the land of numerous Missouri farmers across eight counties while padding [Invenergy's] corporate profits." (See [Grain Belt Funding Appears on Shaky Ground with DOE, Invenergy Firm on Value](#).)

The project has been approved by regulators in all four states involved. The Missouri Public Service Commission found the project would save the state's cus-

tomers as much as \$18 billion, Invenergy has said. The company noted municipal utilities in 39 communities have contracts with it for power delivery and contractually guaranteed cost savings.

However, the project has faced push-back from Missouri landowners, who are opposed to a for-profit, private entity using eminent domain. Missouri Attorney General Andrew Bailey has criticized Grain Belt Express for filing nearly 50 eminent domain lawsuits against Missouri landowners. He opened a consumer protection investigation into the project in June. (See [Missouri AG Opens Inquiry into Grain Belt Express](#).)

Bailey issued a [statement](#) saying his office has "won a battle in the war for Missouri landowners" in what he termed an "unconstitutional land grab."

"If Invenergy still intends to force this project on unwilling landowners, we will continue to fight every step of the way," he threatened.

Invenergy says the \$11 billion project would save \$52 billion in energy costs over 15 years, create 5,500 jobs and power up to 50 data centers.

A 2022 [economic analysis](#) conducted for Invenergy found that the project would result in \$20 billion in total investment and create more than 20,000 temporary jobs and more than 400 permanent jobs in Illinois, Kansas and Missouri.

Invenergy says the Grain Belt, Express would move a "diverse mix of energy" from Kansas to Indiana. The project would save money and strengthen reliability for 29 states and D.C., and more than 40% of Americans, it said.

The project would create links among the [SPP](#), [MISO](#), Associated Electric Cooperative Inc. and [PJM](#) grids.

Grain Belt has been under development since 2010, when the now-defunct Clean Line Energy first proposed the transmission line. After years of regulatory, legal and political hurdles, Clean Line sold the project to Invenergy. (See [Invenergy Renewing Push for Grain Belt Express](#).) ■



Grain Belt Express
An INVENERGY TRANSMISSION Project

Routes as proposed:

Phase 1 Phase 2

DOE has pulled a \$4.9 billion loan commitment from Invenergy's Grain Belt Express. | [Invenergy](#)

MISO Petitions 8th Circuit in Dispute with SPP over Data Center-strained Flowgate

Proceeding Centers on Congestion Stemming from North Dakota Crypto-mining Facility

By Amanda Durish Cook

MISO is seeking judicial review of two related FERC decisions preventing the RTO from recouping costs or revising a joint procedure with SPP over a shared North Dakota transmission line that has become congested by a new cryptocurrency mining facility.

The RTO filed a petition for review with the U.S. 8th Circuit Court of Appeals over the commission's previous orders declining a request that SPP refund MISO members or change procedures around the overworked 230-kV Charlie Creek flowgate ([ER24-1586, et al.](#)).

The flowgate ran up tens of millions of dollars in congestion after the Atlas Power Data Center in Williston, N.D., activated on the SPP side of the line in 2023. MISO and its member Montana-Dakota Utilities maintain that associated market-to-market (M2M) settlements unfairly involved MISO in SPP's localized issue brought on by 200 MW of poorly planned

Why This Matters

The 8th Circuit's decision could alter the process by which MISO and SPP designate M2M status of flowgates on the seam between the two RTOs.

data center growth.

FERC in March denied requests by both MISO and Montana-Dakota Utilities for rehearing to obtain refunds from SPP or cancel eligibility for the flowgate's ongoing M2M coordination. The commission said the Charlie Creek Flowgate passed the RTOs' flowgate eligibility studies for such coordination. (See [FERC Again Declines Changes, Refunds on Crypto-burdened MISO-SPP Flowgate.](#))

According to the agreement between the RTOs, MISO must secure SPP's permis-

sion to remove M2M coordination from the flowgate.

MISO also unsuccessfully sought for FERC to alter the MISO-SPP interregional coordination process — which manages flowgates — to make it easier for one RTO to revoke M2M status on a line if it doesn't think the designation can assist with relieving a constraint. FERC decided that while a section of the two RTOs' interregional coordination process says M2M coordination should be reserved for issues that are regional — rather than local — that requirement is not an explicit prerequisite for a flowgate to hold an M2M designation.

MISO has claimed that unwarranted M2M coordination has cost its members \$38 million in charges to manage congestion on the flowgate, even as its members can only offer less than 1 MW of relief. However, FERC said SPP's evidence shows that revoking Charlie Creek's M2M flowgate status might risk the RTO needing to resort to transmission loading relief or load shedding. ■

BREAKING NEWS



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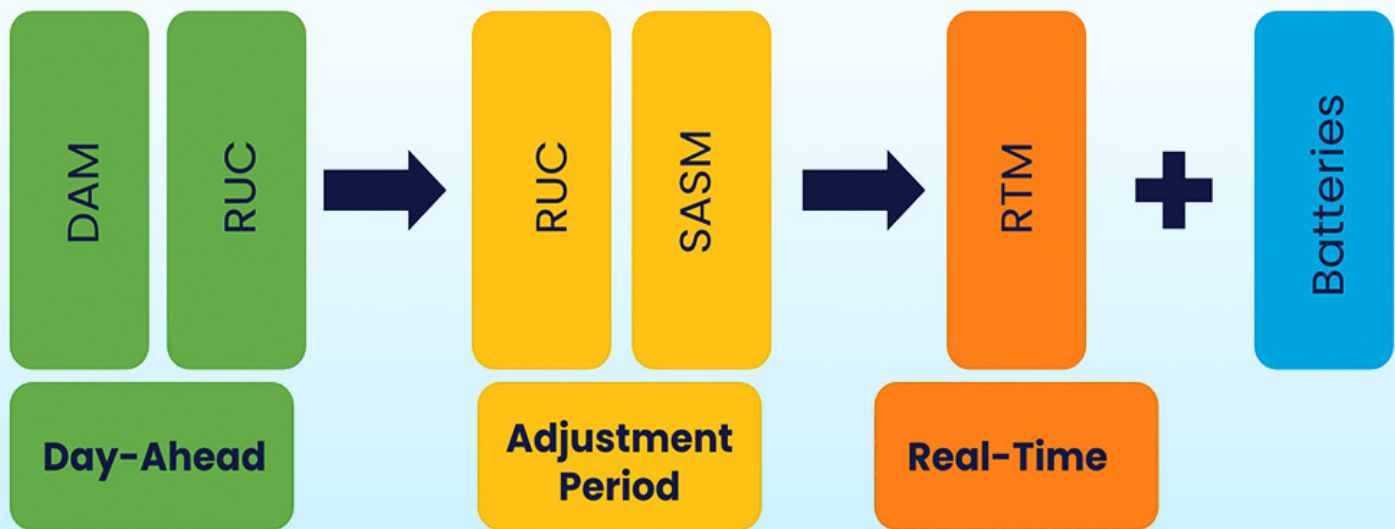
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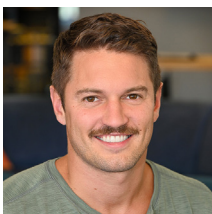
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ERCOT's RTC+B: The Largest Market Overhaul in Decades Nears Implementation

What is Changing?!



| Yes Energy



Quinn Gray

ERCOT is preparing for its most significant market redesign in recent memory with the upcoming launch of **Real-Time Co-Optimization plus Batteries (RTC+B)**.

says Quinn Gray, product manager at Yes Energy.

The sweeping reform represents a comprehensive overhaul of ERCOT's market operations — from **how ancillary services are procured to how real-time prices are formed** — with broad implications for market participants and data providers alike.

At the core of RTC+B is real-time co-optimization, which integrates energy and ancillary service markets into a single optimization engine. This shift is designed to **enhance efficiency, increase liquidity**

and reduce manual operator interventions. ERCOT's 2025 market study estimates that improved congestion management under RTC could save between \$2.5 billion and \$6.4 billion annually.

One of the most visible changes will be the replacement of the Operating Reserve Demand Curve (ORDC) with Ancillary Service Demand Curves (ASDCs). These new inputs allow ERCOT to more precisely value and prioritize individual ancillary service products — Regulation Up/Down, Responsive Reserve and ECRS — within the real-time market. The result: **ancillary service prices and awards will now be co-optimized alongside energy**, improving price convergence and overall market transparency.

Other major shifts include the retirement of the Supplemental Ancillary Service Market (SASM), updates to the Reliability

Unit Commitment (RUC) and Day-Ahead Market (DAM) processes, and the introduction of "virtual" ancillary service offers in the DAM — allowing participants to trade out of positions more flexibly and increasing overall market liquidity.

The "+B" in RTC+B underscores ERCOT's concurrent redesign of how battery storage resources participate in the market. Batteries will transition to a unified Energy Storage Resource (ESR) model with streamlined data reporting and a single bid/offer curve, accommodating the 29 GW of storage capacity expected on the system by the end of 2026.

While ERCOT continues to release updated trial data sets, Yes Energy reports that it is **actively monitoring these changes, maintaining existing data pipelines and integrating new reports** to ensure clients can seamlessly adapt to the post-RTC+B landscape. ▲

RTC+B Completes Major Test

ERCOT Board Gets Report from Staff on Latest Results

By Tom Kleckner

ERCOT's Board of Directors heard a report about the latest test in the Real-Time Optimization Plus Batteries project that's due to be deployed Dec. 5.

"It feels like if it's a football game, we're first down and goal from the 8-yard line," ERCOT's Matt Mereness said in briefing the board Sept. 23 on the *RTC+B project*.

"There's still a way to go, but things have been going pretty well."

Mereness, senior director of market operations and implementation and the RTC+B project manager, said the initiative is five months into market trials and testing and stabilizing systems. The first of two planned production tests was conducted Sept. 11.

ERCOT operators controlled the real-time market and frequency for two hours,

and market participants were able to submit accurate telemetry, bids, offers and follow RTC+B dispatch, he said. The RTC+B systems were able to award and dispatch energy and ancillary services in real time every five minutes.

A second production test is scheduled for Oct. 30. RTC+B is ERCOT's most significant market redesign since the switch from zonal to nodal in 2010.

"We don't normally take six months to implement something, but when you implement a major redesign of your real-time market and your four-second control of the system, you need to test it," Mereness said. "It's not just about ERCOT being successful. It's about 95 other companies that are batteries, resources and generators that have to move their machines."

During the first production test, solar and wind energy dropped by 3,000 MW and two units tripped offline, but "other

things" picked up.

"It wasn't necessarily an easy-peasy test like some of us thought it would be," Mereness said. "The good news is that the operators and engineers are now looking at how [our system reacted]. The nice part of actually doing a dress rehearsal is people look at the money; they look at the megawatts; and they see if they can follow."

ERCOT plans to publish a market notice Nov. 5 to alert market participants that RTC+B is live and the transition has begun.

The RTC+B initiative began last decade but was delayed by 2021's Winter Storm Uri. The program will allow the market to optimize ancillary services and energy simultaneously in real time, with the goals of reducing overall costs and making it easier to dispatch energy resources more efficiently. ■



I've probably read every issue

– FERC CHAIR
MARK CHRISTIE, JULY 2025

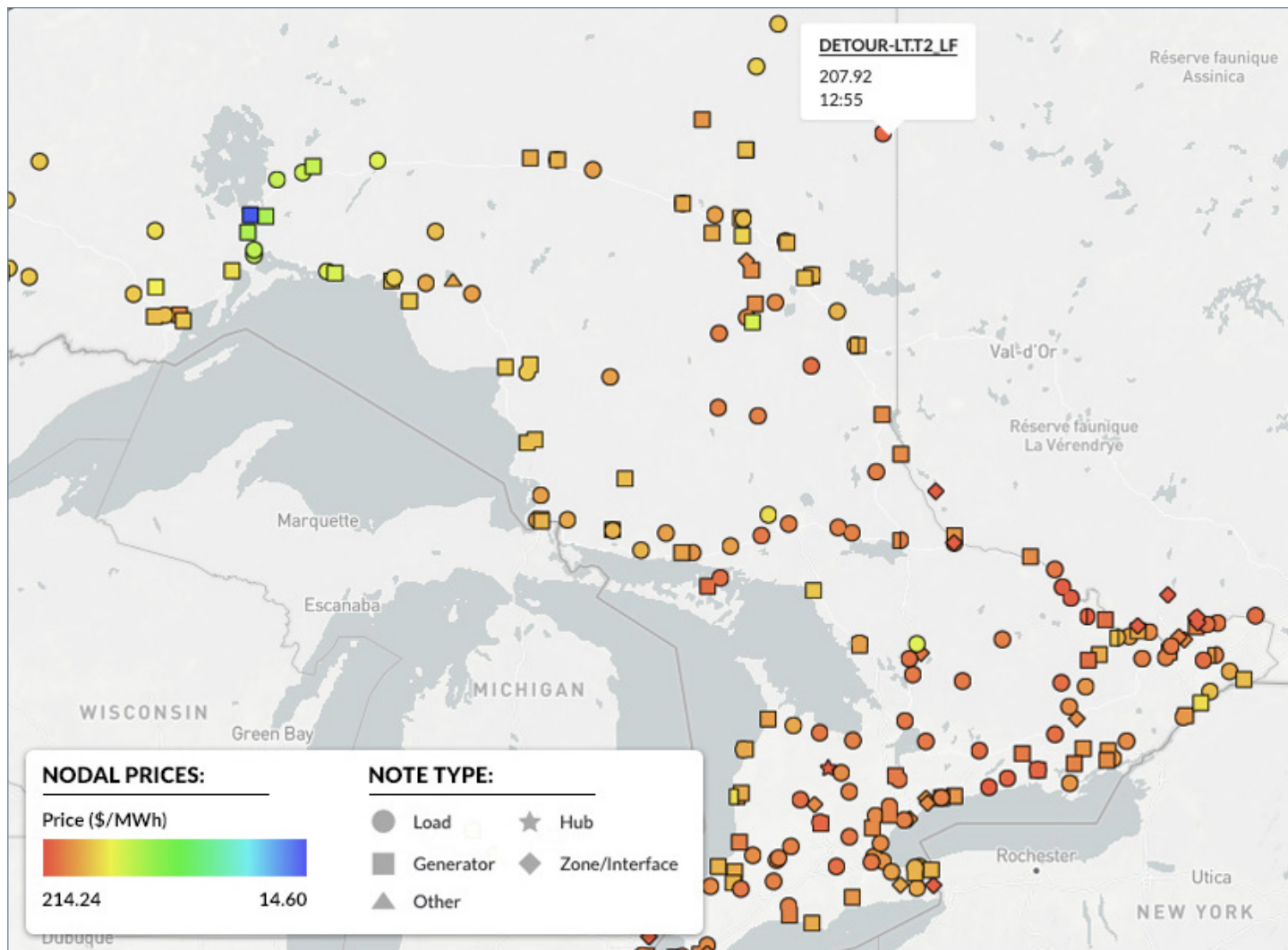
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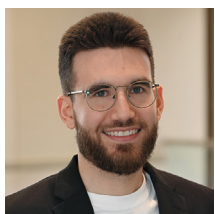
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Data and Analytics Best Practices for Power Markets



| Yes Energy



Sam Lockshin

If you're planning to participate for the first time or enter a new market, it's imperative to optimize your data and analytics strategy, says Sam Lockshin, technical product

manager for data delivery products at Yes Energy.

IESO Ontario provides a great example. IESO went nodal May 1, 2025, with a financially binding day-ahead physical market that went from one ISO-wide price to nearly 1,000 price nodes. Having the right trading strategy is great, but it's only possible with the right data, Lockshin says.

First up on the checklist of data and analytics best practices is **data sourcing**.

Data timeliness and freshness is essential, with 15+ new reports and 12+ updated reports from IESO, some of which are now reported every 5 minutes, such as their nodal real-time LMPs.

Next up is **data quality monitoring**. Bad data can be disastrous. Watch for things like missing or invalid data, data source changes and broken feeds.

Even after correct data is collected, it might still be revised by the ISO. **Storing the full change history** by capturing all row-level data changes is a best practice.

Another key to working efficiently with complex data is **data normalization**. Since you probably already trade in and have data for other markets, standardized data helps with scaling your strategies in new markets, such as IESO.

Well-established **data access and governance** protocols are critical to main-

tain trust and accountability in data and analytics processes. Role-based access to critical data that reflects downstream use cases — from real-time traders to quants to risk, compliance and legal — is a foundational component of an effective governance model.

Ongoing platform reliability is essential. Your data and analytics platform needs to be available, redundant and resilient — especially in real-time power markets, where even a short outage can have major financial consequences.

Given the current pace of innovation in technology, data, and power markets, the status quo will only last you so long. To maintain their edge, the most effective organizations are regularly preparing for **future enhancements and upskilling** relevant to all of these data and analytics best practices. ▲

Ontario Market Monitor Revamps Techniques for IESO Nodal Market

By Rich Heidorn Jr.

Ontario's energy regulator is learning new ways to identify inefficiencies and malign behavior under IESO's Market Renewal Program, which introduced LMPs and a financially binding day-ahead market.

The Ontario Energy Board [said](#) its Market Surveillance Panel (MSP) has developed "new tools and indicia" in response to IESO's nodal market, which launched May 1. (See [Ontario Nodal Market Nearing 'Steady State' After Nearly 4 Months.](#))

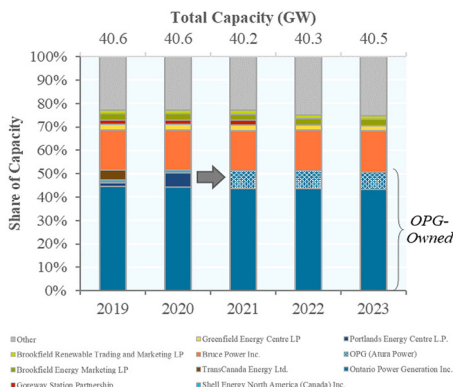
OEB said the MSP will continue to track "market participant conduct and the efficiency and competitiveness" under the new market. "However, the complexities of the renewed markets have increased relative to the legacy markets," it said.

The MSP's previous recommendations have been adopted by both the OEB and IESO — including some of the changes implemented under Market Renewal. MSP reports also have led to action by the IESO's Market Assessment and Compliance Division, resulting in settlement repayments and financial penalties.

New Market: Locational Marginal Prices and Single Clearing

Under Market Renewal, day-ahead market (DAM), pre-dispatch and real-time prices are calculated at about 1,000 LMP nodes, instead of Ontario-wide. With a financially binding DAM, there now is a single dispatch schedule.

Here are some of the other changes



Registered capacity by market participant, 2019-2023 | Ontario Energy Board Market Surveillance Panel State of the Market Report 2023

under the new market, and how the MSP plans to respond:

- Congestion Management Settlement Credit (CMSC) payments: CMSC payments encouraged participants to follow dispatch during transmission constraints under the former two-schedule system. They were replaced by LMPs — which embed the cost of congestion — and make-whole payments (MWPs), which compensate for lost opportunity costs when IESO dispatches resources out-of-merit.
- While continuing to use the highest-cost peaking natural gas generators as an initial screen, the MSP also will use statistical models to identify anomalous LMP differences not explained by losses or congestion. "This type of monitoring analysis will replace the monitoring of legacy CMSCs to assess potential market flaws or inappropriate conduct not explained by grid conditions," OEB said.
- The MSP will monitor large MWPs, as well as MWPs to individual market participants or for specific facilities, to identify anomalous results or market manipulation.
- Reserve Shortage Penalties: IESO now is using reserve shortage penalty prices (a maximum operating reserve area penalty price, a penalty price for 30-minute operating reserve and an area minimum operating reserve penalty price) to ensure that day-ahead, pre-dispatch and real-time calculation engines respect mandatory reserve requirements and that prices reflect those requirements, and to encourage market participants to meet their reliability obligations.
- Operating Parameters: The renewed market requires non-quick-start gas generators, hydro and variable generation to submit additional data on their operating parameters.
- The MSP will monitor changes to individual facility data for their effects on dispatch and economic efficiency.

Why This Matters

Previous recommendations by the Market Surveillance Panel have led to action by IESO's Market Assessment and Compliance Division, resulting in settlement repayments and financial penalties.

IESO Market Power Mitigation

IESO introduced a three-pronged market power mitigation (MPM) scheme to prevent suppliers from market power due to their location on the transmission grid:

- An ex-ante (before-the-fact) approach applied in the day-ahead, pre-dispatch and real-time scheduling processes to police the energy and operating reserve markets.
- An ex-ante mitigation process to prevent market power in the settlement of make-whole payments.
- An ex-post (after-the-fact) mitigation of market power to address physical withholding and economic withholding on uncompetitive interties.

Market Control Entities

IESO will use data from market control entities — companies that control generators and other market participants (dispatchable and price responsive loads, electricity storage resources, energy traders or virtual traders) — to assess physical withholding by examining in aggregate the offer quantities of resources that share a common MCE.

The MSP will incorporate the data in calculating structural measures of competition such as the Herfindahl-Hirschman Index and Residual Supplier Index.

OEB said the MSP will monitor persistent price differences between DAM and RT to ensure they are not a result of illiquid markets or gaming. ■

Ontario Nodal Market Nearing 'Steady State' After Nearly 4 Months

IESO to Look for Structural Improvements After Correcting Implementation Problems

By Rich Heidorn Jr.

Nearly four months after the launch of Ontario's nodal market, IESO officials say they are shifting from correcting implementation problems to seeking improvements to ensure the new model meets the goals of increasing market efficiency, transparency and competition.



Candice Trickey, director of Market Renewal Plan readiness | IESO

"We're getting ... pretty close to what I would call more of a steady state ... where we'll be able to start to move from ... addressing the day-to-day issues that come up for things that

didn't quite get implemented exactly as planned, to [looking at] the longer term," said Candice Trickey, director of Market Renewal Plan readiness.

The Renewed Market, which launched May 1, created a financially binding day-ahead market (DAM) and about 1,000 LMP nodes. (See [Ontario Nodal Market Operating as Expected at 1-month Mark.](#)) Despite some implementation problems, IESO said the market has been working well, with prices strongly correlated to demand.

Data Points

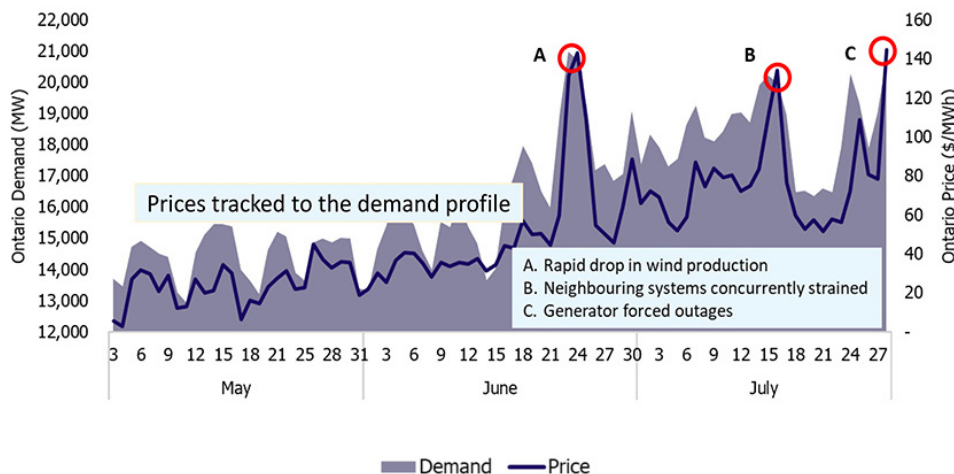
Some data points as the market nears the four-month mark:

- Nearly 30 traders have registered to

Why This Matters

Ontario's nodal market, which created a financially binding day-ahead market and about 1,000 pricing nodes, is intended to increase market efficiency, transparency and competition.

As the resource fleet was scheduled at or close to capacity, prices became more sensitive to smaller changes in demand



IESO said market prices had a very strong correlation to demand. | IESO

transact in the virtual market, which allows them to submit hourly bids and offers in nine zones. Problems completing traders' authorizations delayed the launch of the virtual market from May 8 to May 13. One large consumer has registered as a price-responsive load. Other organizations have begun the process of registering for the two new participation types.

- All required participants have registered reference levels under market power mitigation rules, with some refining their values based on their experience in the market. Reference levels include energy and operating reserve prices and resources' energy ramp rates and lead times.
- IESO said it has been issuing settlement statements and invoices within the required timelines, although increased processing times have resulted in invoices being issued later in the day than preferred by participants, an issue the ISO is working to address. The ISO created a [Settlements Notifications](#) webpage to advise participants of updates.
- Participant inquiries have increased under the new market. IESO said its Customer Relations unit has answered

80% of inquiries within two business days, although more complex questions have taken "much longer."

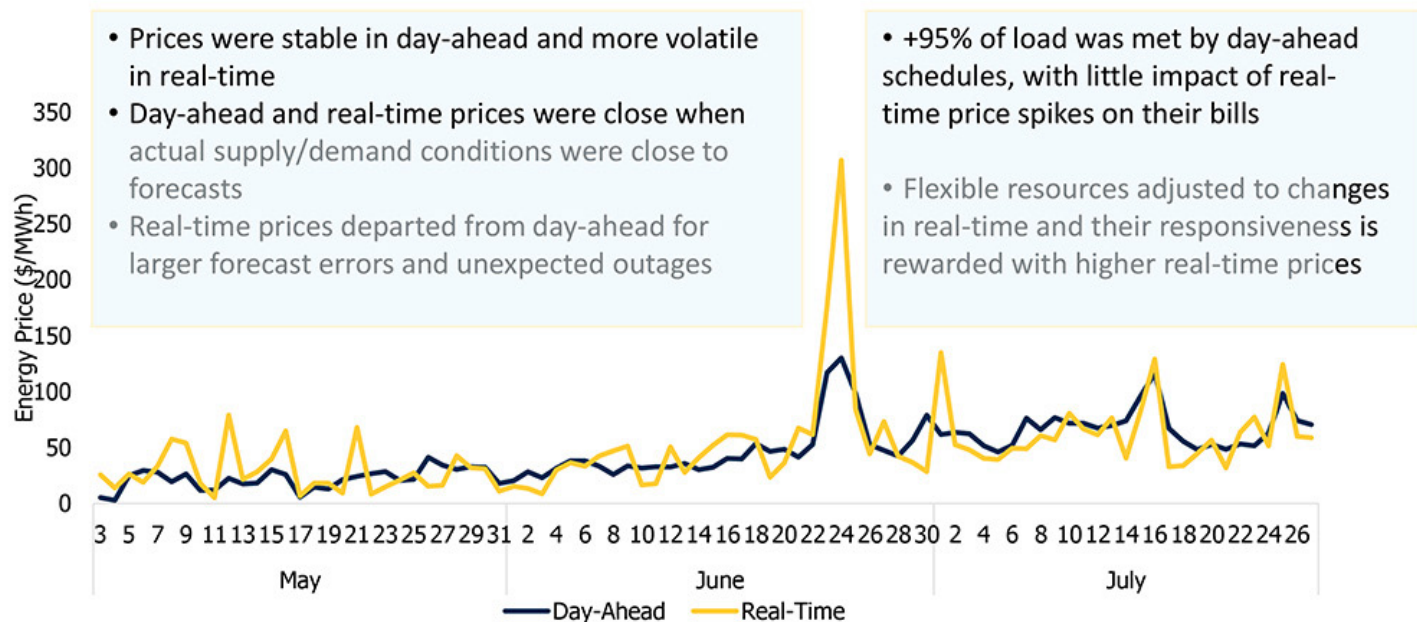
Market Results

IESO officials said market results generally have been in line with expectations.

The market began during the "freshtet," the annual influx of water from spring rainfall and melting snow. Many hydro-power projects must exit the operating reserve market and operate as "must-run" generators in spring because they have to flow the excess water through their turbines. (See [Operating Reserve Prices Surge in Ontario.](#))

Summer brought its own challenges. Joseph Ricasio, a member of IESO's control room team, said during the webinar. Hot weather sent the province's demand soaring above its 2024 peak of 23,852 MW on seven occasions, with peaks as high as 24,862 MW. "I don't remember the last time we received a lot of successive heat waves," he said.

Between June 23 and 24, Ontario shifted from a net exporter during peak hours — as strong wind generation allowed it to ship energy to New York and Michigan — to a net importer as wind diminished.



Real-time prices have been more volatile than the day-ahead market, with prices converging when actual conditions matched forecasts, and diverging when there were large load forecast errors or unexpected outages. | IESO

It was a net importer on July 14-16 due to economic conditions and on July 27-29 as two large generators were "forced offline."

Despite the challenges, Ricasio said, the financially binding DAM has improved IESO's ability to commit adequate generation for the next day. Some Level 1 Emergency Energy Alerts — a notice that all available generation resources are committed — have been identified based on day-ahead results, IESO said. "This gives advance notice to your neighbors that we may need their help," Ricasio said.

'Non-intuitive' Results

Trickey said numerous participants have questioned "non-intuitive or unusual" market results. Some identified defects, while others were a result of the challenging summer temperatures and the new market's multi-interval optimization.

"In an LMP market, the [offer] price is certainly an important determinant. But because we're looking at optimizing over many, many intervals, [there can be] a difference in what the scheduling algorithm and the pricing algorithm are looking at," she said. "So, you might see an offer close to the margin that appears uneconomic that gets scheduled."

Director of Markets Darren Matsugu said the market had produced prices "reflective of system conditions and efficient

resource schedules" with real-time and day-ahead prices converging when actual conditions matched forecasts, and diverging when there were deviations in real time due to large load forecast errors or unexpected outages. Although real-time prices were more volatile than day-ahead, more than 95% of load was met by day-ahead schedules, minimizing the price effect on consumers, the ISO said.

Prices have consistently separated between the north, where bottled hydro supply can suppress prices, and the transmission-constrained south.

"This past May when demand was relatively low and we had substantial baseload generation available, we had very few intermediary peaking resources that were already online and available to increase output immediately," he added. "But what we have seen is demand has increased over the summer, and more and more of those resources are being committed ahead of real time, either in day-ahead or in pre-dispatch. This increases the amount of incremental flexibility that can be dispatched on the system, if required."

An average of 80 to 90% percent of non-quick start gas generators dispatched in real time — units that need one to six hours to start up and synchronize with the grid — were scheduled in the DAM over the first three months, providing

grid operators and market participants "a clearer view and financial certainty for the next day's operations while also leaving room to adjust to forecast uncertainty and outages in real time," the ISO said.

No Major Changes Expected

Matsugu said the market thus far has worked as designed to reduce out-of-market payments and increase efficiency.

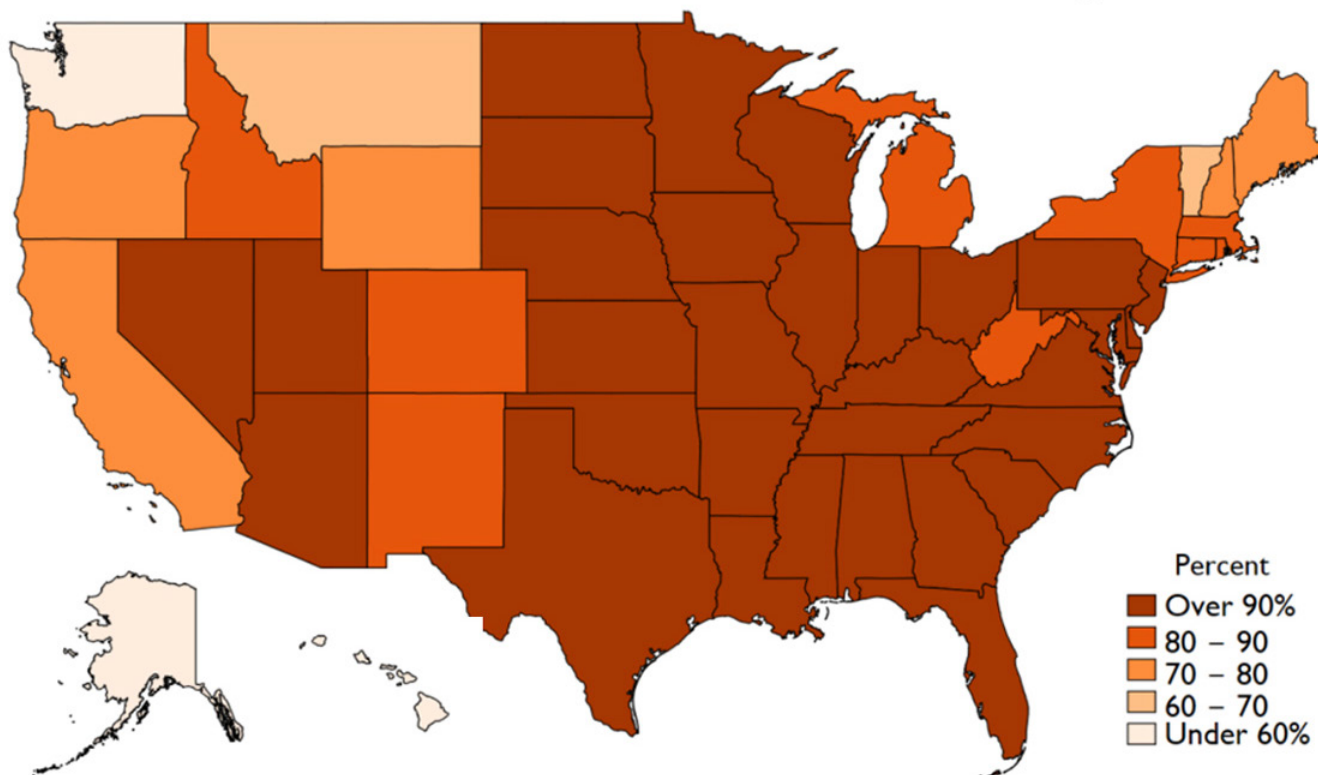
"I do expect that over time, there'll be some fine tuning that may be eventually required on these things, as is to be expected with any market — and particularly given the significance of the change that we've introduced with Market Renewal," he said. "But at this point, there are no major design issues that require immediate fixes, just something that we'll continue to pay close attention to."

Matsugu cautioned that IESO had only two seasons of experience with the new market rules, saying it will gain valuable knowledge in the coming fall and winter.

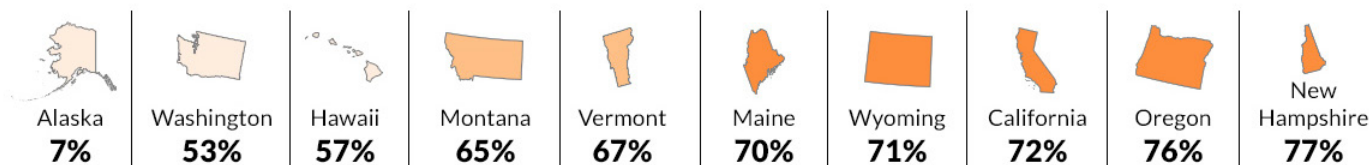
"It is premature, I think, to draw too much based upon the still very short time frame that we've been operating," he said. "We are still working toward ... a steady state, where we can see the market performance under a diverse set of outcomes and conditions. [And] the participants themselves are still establishing their own competitive bid and offer strategies." ■

Demand Sensitivity to Temperature Changing Around the U.S., Particularly the Pacific Northwest

Percent of Households With Air Conditioning



The Ten Least Air Conditioned States:



Energy Institute Blog



Ben Perry

Understanding how temperature affects demand is **critical for accurate load forecasting**, says

Ben Perry, senior product manager at Yes Energy. The

relationship between temperature and demand is starting to see a shift in particular regions of the United States.

Notably, the Pacific Northwest has started to see a large change in temperature **driven demand sensitivity**; Washington state in particular, historically has the second lowest air conditioning rate in the country.

Changes to Washington state's air condi-

tioning rates, combined with its air conditioning profile, place it as one of the most temperature sensitive demand regions in the United States.

Combine that with Seattle seeing some of the highest average and peak temperature increases, and it makes for an interesting demand dynamic in a region that will see two markets come online in the next couple of years.

Yes Energy tracks the relationship between demand and temperature for all its models, creating **weather-adjusted base load models** and providing customers with **normal temperature deviation load estimates**.

Using this weather-adjusted demand

data enables **better understanding of demand forecasting** going forward, with historical model data at different temperature normals.

For Seattle City and Light, in 2023, a 7-degree above-normal temperature day would affect load by 110 MW in the peak load hour. In 2025, that same temperature deviation will affect load 150 MW in the same hour, a 40 MW (36%) increase.

On a percentage basis, this places Seattle City and Light among the highest temperature sensitive regions in the United States. Understanding changing temperature effects around the United States will help you spot new edge opportunities to trade on in the United States. ▲

Extreme Heat Will Test Grid Reliability, Human Resiliency

By Dej Knuckey

Extreme weather has earned its way onto the short list of life's certainties. Whether it's heat waves, excessive precipitation, storms or freezes, there's a greater chance than ever that where you live or where your company does business will be affected by extreme weather.



Dej Knuckey

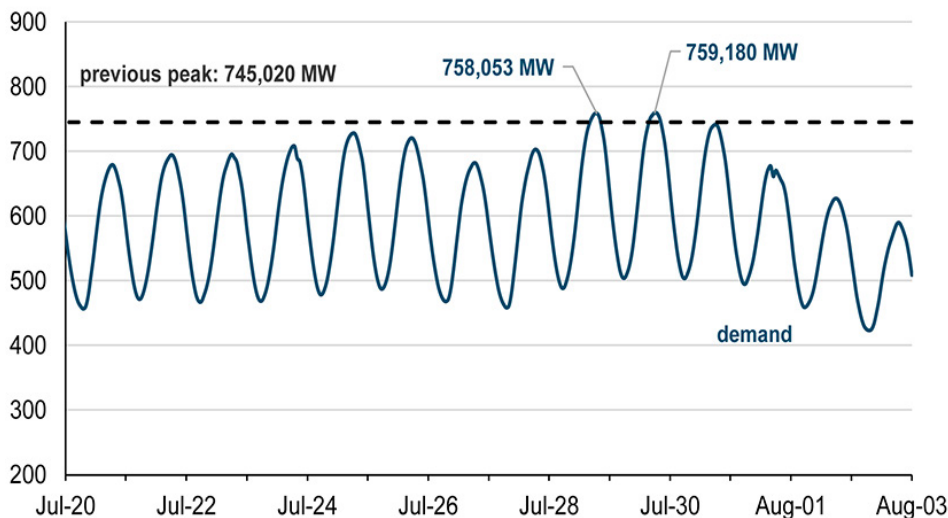
Heat affects the full length of the electric supply chain, from generation, through the grid, to utilities' customers. On July 28, 2025, [peak demand in the lower 48 states broke the record](#) set in July 2024, only to surpass it the next day. The peak demand of 759,180 MW between 6 and 7 p.m. July 29, adjusted for time zones, was nearly 2% higher than the July 2024 record.

The demand is driven largely by an increase in the cooling load, though there probably were some AI servers churning out answers to heat-related questions: How can I cool my home? Will a blended margarita cool me down more than one on the rocks?

If the only challenge were meeting those demand spikes, the electric system probably would be in good shape. But generation and the grid itself are less efficient during extreme heat, sometimes dramatically so.

The first challenge comes from hot air being less dense: Combined cycle and gas combustion plants are less efficient when the air mixed with the gas to com-

Hourly electricity demand for the Lower 48 states from July 20 to August 3, 2025 thousand megawatts (MW)



EIA

bust in the turbines is less dense.

The bigger challenge comes from hot water: All generation plants that involve combustion require cooling, regardless of whether they burn fossil fuels or split atoms. Most use water for cooling, which means drawing from seas and the like. If that water is hotter than usual before the cooling process, it will be less efficient at cooling, and there usually are limits on discharging hot water.

Certain types of [heat can make wind farms less efficient](#) too. Heat lowers air density, and wind turbines produce less power when the air's easier for the blades to pass through, so any hot day will cut production.

Hydroelectric output's not immune either.

Early heat waves in 2023 melted snow-pack in the Pacific Northwest, leaving less water flow for the summer.

What about solar? More sun is good, right? Not if it comes with heat.

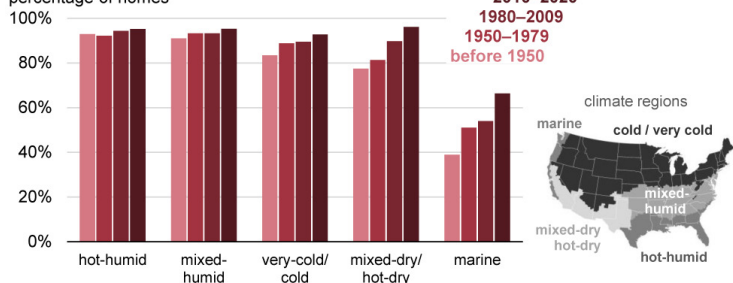
There's a reason Chile's Atacama Desert is a prime location for utility-scale solar: It's cool and sunny. Electronics are more efficient as temperatures drop, and every degree of extra heat lowers the output of a solar module.

Like all of us, the grid is saggy and inefficient during heat waves. The power lines not only stretch, but also are less efficient conductors as the heat vibrates the conductive material and slows the flow of electrons. So, line losses, which typically consume 5% of electricity across the grid, increase during heat waves, meaning more generation is required to deliver the same amount of electricity where it's needed.

While we've looked from generation to end user, extreme heat has effects all the way upstream in the fossil industry.

In the ultimate irony, melting permafrost puts pipeline foundations at risk of sinking and causing a [rupture in the pipeline](#). It's a problem in Alaska and other arctic regions, and often is managed using passive thermosyphons (think of vertical radiators around pilings). However, hotter ambient air renders them less effective, and refreezing the permafrost under pipeline footings may require running [fossil fuel-powered chillers](#). ■

Air-conditioning equipment usage in U.S. homes by climate region and year of initial construction percentage of homes



EIA

Northwest Summers Now Include ‘Huge’ Energy Flows from California

By Elaine Goodman

For decades, Portland General Electric watched electricity move from north to south through its system during the summer, as relatively cheap hydroelectric power from the Pacific Northwest flowed to California.

But now, the flow on a typical summer day has reversed, with electricity moving from south to north, PGE officials told the Oregon Public Utility Commission.

“With the 10,000 MW of batteries and 20,000 MW of solar that California has, we see a reversal of paths, where there is a huge northbound flow from California — cheap energy — up into the Northwest,” said Lee Recchia, PGE’s senior manager of the grid control center.

The flow reversal has created issues that PGE “didn’t really see coming,” Recchia said, particularly on the North of Pearl transmission path. The Bonneville Power Administration owns the Pearl flowgate, and PGE partly owns some 230-kV lines out of Pearl.

“We’ve seen some overloads that we hadn’t seen in the past years, and it’s one of our big congestion points,” Recchia said. PGE has developed a North of Pearl action flow chart for operators and a forecasting tool. The utility also is in regular discussions with BPA.

Weather forecasters predict higher-than-average temperatures for most of the West this summer.

But PacifiCorp’s predicted summer peak of 11,163 MW is not a significant jump from its 2024 summer peak, according

to Ben Faulkinberry, senior originator in the company’s energy supply business unit.

Since summer 2024, PacifiCorp has added 1,000 MW of wind resources and 320 MW of solar while also completing a 75-MW natural gas plant expansion. Another 400 MW of wind and 500 MW of solar are expected by the end of this summer.

PacifiCorp also energized the Gateway South transmission line, a 500-kV line that will carry electricity from the company’s wind power projects in Wyoming to the load center in Utah.

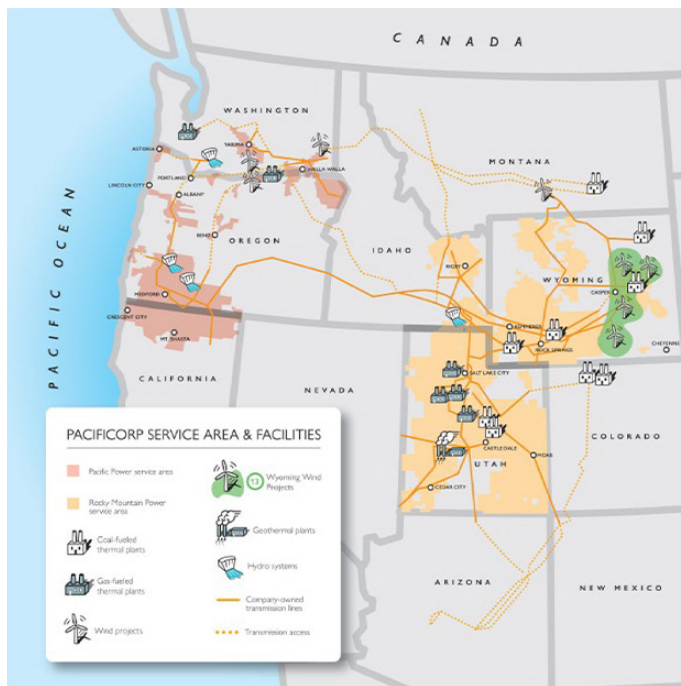
With the new line in service, curtailments of Wyoming wind are down by about 70%, Faulkinberry told the commission. And during the summer, when there’s less wind in eastern Wyoming, Gateway South gives PacifiCorp greater capacity to transact with market participants on the east side of the Rockies, he said.

“Our load requirement has not jumped substantially. We’ve added new resources. We’ve added new connectivity,” Faulkinberry said. “So we’re feeling, on the whole, pretty well-situated going into summer 2025.”

Still, PacifiCorp faces potential summer threats. One concern is the possibility of extreme heat simultaneously hitting the Pacific Northwest, Desert Southwest and California regions.

“That really puts a stress on our system as well as for the region as a whole,” he said.

Another worry is wildfire, which could impact transmission across the grid. Southern Oregon and southern Idaho, areas where PacifiCorp has “some pretty



PacifiCorp’s summer readiness has been boosted by the addition of 1,000 MW of wind resources, 320 MW of solar and a 75-MW natural gas plant expansion since summer 2024. | PacifiCorp

key connectivity,” are particular concerns, Faulkinberry said.

PacifiCorp also is expanding its demand response programs, including Cool Keeper, which has been a longstanding program in Utah.

Through the program, which PacifiCorp is now rolling out in Oregon, a technician installs a device that curbs power to the air conditioner compressor of a residence or small business. The company controls the device, and the customer can’t bypass it.

A typical Cool Keeper event lasts 5 to 15 minutes — enough time to stabilize the grid when it gets out of balance.

Because the fan and air handling components of the air conditioner keep running, customers generally don’t feel uncomfortable. Customers receive a bill credit for participating.

PacifiCorp forecasts that participation in Cool Keeper, along with a battery incentive program called Wattsmart, will offset the need to build three natural gas peaker plants within four to five years. ■

Why This Matters

The reversal of summer transmission flows on the West Coast shows how significantly California solar and battery resources are altering the dynamic of the region’s grid.