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STATE OF THE GRID

QUARTER 1, 2026

Connecting the dots for a smarter energy future.

Expert consulting services tailored to utilities and their vendors, focusing on Smart Grid and System Operations.

IN THIS ISSUE

Welcome to our newsletter!

Q1 2026 opened with the same intensity that closed out last year—rising demand, evolving regulatory expectations, and a grid that's being asked to do more than ever. This quarter's newsletter highlights the trends, conversations, and innovations shaping the industry's response. Amid the challenges, we see real opportunities to modernize, adapt, and lead. Join us as we navigate the road ahead.

INDUSTRY EVENTS AND INFORMATION

NORTHWEST ENERGY SYSTEMS SYMPOSIUM

April 1-2 in Seattle, WA

Dr. Mani Vadari spoke at the bi-annual IEEE NWESS gathering on April 2 at the University of Washington, delivering his talk, "Defining Delivery System Planning: Challenges of Meeting Load Increases, Affordability, and Renewable Energy Mandates." His insights resonated with both regional experts and emerging engineers, sparking thoughtful discussion about the future of the Northwest grid. More info here.

EEE PES T&D Conference

May 4-7 in Chicago, IL

The IEEE PES T&D Conference & Exposition will convene utility leaders, engineers, technology providers, and researchers to explore advancements in transmission, distribution, grid modernization, and system resilience. The event features technical sessions, demonstrations, and exhibits focused on emerging technologies shaping the future of power delivery. More info here.

EEI 2026 Conference and Expo

June 2-4 in Las Vegas, NV

The Edison Electric Institute (EEI) annual event is for electric company executives, policymakers, and industry stakeholders. to discuss sector trends and regulatory developments. Sessions typically focus on reliability, grid modernization, clean energy deployment, and customer-focused innovation. More info here.

IEEE General Meeting 2026

July 19-23 in Montreal, PQ

The IEEE PES General Meeting will bring together academics, utilities, manufacturers, and policymakers to discuss current research, power system planning, operations, and reliability. The program includes technical papers, panel sessions, and working group meetings covering a broad range of power and energy topics. More info here.

EARLY PRAISE FOR DR. VADARI'S LATEST BOOK!

Before finalizing *OMS Unlocked: Pathways to Successful Implementations*, Dr. Vadari asked a group of experienced practitioners to pressure-test the ideas and ensure the book reflects real OMS work. Here are some perspectives shared by them:

"If 'brevity is the soul of wit,' this book drives to the soul of an OMS and its implementation. Dr. Vadari brings deep industry and control software knowledge to this discussion, offering clarity, history, and practical guidance in equal measure."

Michael Atkinson, SVP, Grid Automation –Hitachi Energy (Retired)

"This book is a must-read for anyone contemplating implementing a new OMS, upgrading an existing one, or simply focusing on keeping the lights on."

Michael Pesin, Dy Asst Secretary, U.S. Department of Energy

"This book delivers what the industry needs now: a clear view of where these systems originated, where they are today, and where they must go to build the grid of the future."

Mahesh Sudhakaran, General Manager, Grid Software, GE Vernova

"*"Dr. Vadari's broad industry exposure gives this work credibility and practical relevance. It is a valuable guide for utilities seeking to realize the full potential of their OMS investments."*

Young Ngo, Chief Technology Officer, Survalent, President, Themis Intelligence

More updates coming soon as *OMS Unlocked* moves toward publication.

M&A

Constellation completes Calpine acquisition

Constellation has completed its acquisition of Calpine from Energy Capital Partners in a cash-and-stock transaction, creating the largest electricity producer in the United States. The combination brings together Constellation's nuclear fleet with Calpine's natural gas and geothermal assets, strengthening the company's ability to deliver reliable, low-emission power to meet growing demand from data centers, advanced manufacturing, and critical infrastructure. Read more.

ABB acquires Netcontrol

ABB announced that it has signed an agreement to acquire Netcontrol, a provider of electrical grid automation solutions for power utilities and critical infrastructure operators. The transaction is expected to close in Q1 2026, subject to regulatory approvals and customary closing conditions. Financial terms were not disclosed. Read more.

Generac agrees to acquire Enercon

Generac Holdings, a global designer, manufacturer and provider of energy technology solutions and other power products, announced the signing of a definitive agreement to acquire Enercon Engineering, Inc., adding specialized manufacturing expertise in generator enclosures and switchgear to meet the growing need for backup power as global demand for data center capacity could more than triple by 2030. Read more.

Leidos to acquire power design firm ENTRUST

Leidos – an engineering firm in power infrastructure – has signed a definitive agreement to acquire ENTRUST Solutions Group from Kohlberg for approximately $2.4 billion. The acquisition adds complementary capabilities and customers, bringing Leidos into the utility gas and electric generation infrastructure markets. Read more.

Portland General Electric to acquire PacifiCorp's Washington utility operations

Portland General Electric Company announced an agreement to acquire select Washington state generation, transmission, and electric utility operations from PacifiCorp for $1.9 billion, representing a purchase price multiple of 1.4x estimated 2026 rate base. The acquisition will enable PGE to extend its long-standing commitments to reliability, affordability, economic

Mergers and Acquisitions by Nick Youngson CC BY-SA 3.0 Alpha Stock Images

development, and a customer-centric approach to approximately 140,000 Washington customers. PGE expects accretion in the first full year upon closing and overall enhancement of PGE's long-term EPS and dividend growth from the transaction. Read more.

Itron agrees to acquire Urbint, Inc

Itron announced a definitive agreement to acquire Urbint for $325 million, adding Urbint's AI-powered operational-resilience software to Itron's grid-edge and safety portfolio. Itron's acquisition of Urbint is a software- and AI-driven expansion, not a hardware or metering play. It strengthens Itron's position in grid resilience, worker safety, and predictive operations. Read more.

GE Vernova completes acquisition of Prolec GE

GE Vernova has completed its acquisition of Prolec GE, bringing the transformer manufacturer fully into its Grid Solutions business. The move expands GE Vernova's transformer production capacity and strengthens its ability to meet surging demand for grid-hardening, electrification, and reliability investments across North America. Read more.

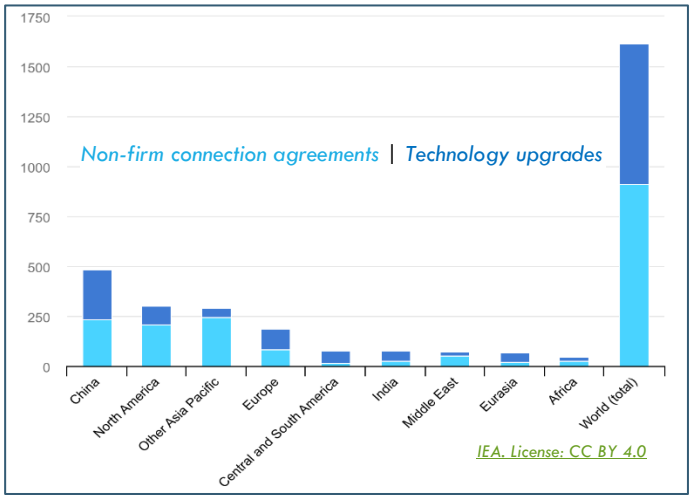
Consortium led by GIP and EQT moves to acquire AES

A consortium led by Global Infrastructure Partners (GIP) and EQT has reached an agreement to acquire AES, positioning the company for accelerated investment in clean energy, grid modernization, and large-scale infrastructure. The transaction would take AES private, giving the new owners greater flexibility to advance its renewables pipeline, storage portfolio, and utility-scale energy solutions amid rapidly rising electricity demand. Read more.

KEY HIGHLIGHTS

IEA: The age of electricity accelerates as global demand surges through 2030

The IEA's Electricity 2026 report shows the world entering a true "Age of Electricity," with global demand expected to grow 3.6% annually through 2030, driven by AI, data centers, EVs, heat pumps, and industrial electrification. For the first time in decades, electricity demand is outpacing economic growth, with emerging economies—especially China, India, and Southeast Asia—accounting for nearly 80% of new consumption. The report warns that more than 2,500 GW of projects remain stuck in interconnection queues and that meeting demand will require 50% more annual grid investment by 2030, alongside rapid deployment of grid-enhancing technologies and flexible connection agreements. *The IEA chart to the right shows how non-firm connections and grid-enhancing technologies could unlock more than a terawatt of hosting capacity—accelerating clean energy deployment without waiting for major transmission build-outs*. Read more.



TotalEnergies finalizes $1B deal to exit U.S. offshore wind, redirects capital to LNG and oil

The Trump administration and TotalEnergies have now finalized a nearly $1 billion settlement that cancels the company's offshore wind leases off New York and North Carolina and commits it to permanently halt U.S. offshore wind development. Under the agreement, TotalEnergies will redirect the refunded capital into LNG and oil projects, including the Rio Grande LNG facility in Texas and expanded Gulf Coast oil and shale gas production. Federal officials are framing the deal as a shift toward "dependable, affordable" energy, while environmental groups call it a "billion-dollar bribe" designed to kill clean-energy projects after courts blocked earlier attempts to stop offshore wind construction. Read more.

Sawes Energy Technology tests world's first 1.2MW inflatable wind turbine

On January 5, 2026, the S2000 Stratosphere Airborne Wind Energy System (SAWES), the world's first MW-class urban-use high-altitude wind turbine, successfully completed its maiden flight in Yibin, Sichuan Province, China. The 60-meter-long, helium-lifted turbine rose to 2,000 meters, operating for 30 minutes and delivering 385 kWh to the grid. Read more. See video.

NRC approves the first-ever construction permit for an advanced, commercial-scale nuclear power plant

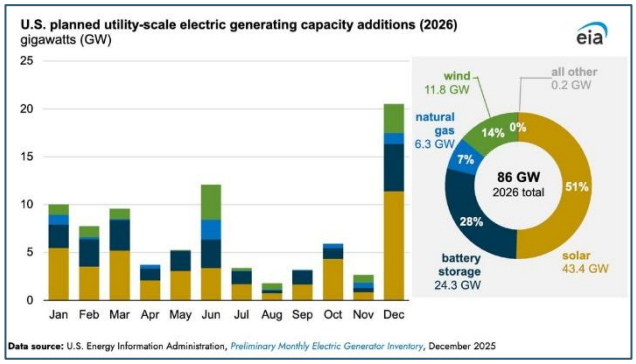
The Nuclear Regulatory Commission (NRC) authorized a construction permit for TerraPower's 345-MWe Natrium reactor in Kemmerer, Wyoming, marking the first U.S. approval for a non-light water reactor in over 40 years. This approval paves the way for advanced, sodium-cooled technology. Read more.

FERC approves license for 1200MW hydro project

The Federal Energy Regulatory Commission (FERC) approved a 40-year license for the 1,200-MW Goldendale Energy Storage Project in Klickitat County, near the Yakama Nation's sacred site of Pushpum. The $2B+ project, a closed-loop pumped storage system, aims to deliver 3.5M megawatt-hours annually to the Pacific Northwest. Construction may begin in 2027. The project is the first significant hydro project FERC has approved in over a decade, but it still requires additional permitting and faces potential legal challenges from tribal and environmental groups. Read more.

New U.S. electric generating capacity expected to reach a record high in 2026

According to the EIA, U.S. power plant developers and operators plan to add 86 gigawatts (GW) of new utility-scale electric generating capacity to the U.S. power grid in 2026, a record if realized. Solar power makes up 51% of the planned 2026 capacity additions, followed by battery storage at 28% and wind at 14%. Read more.



AI adoption accelerates across North American utilities

A new Information Services Group (ISG) report shows AI adoption moving from pilots to core operations across North American utilities, with companies deploying AI, generative AI, and machine learning to improve outage prediction, asset maintenance, DER integration, and field-workforce efficiency. Utilities are increasingly using predictive models to manage rising grid complexity and extreme-weather volatility, while AI-enabled customer platforms support more personalized service and time-based rates. Read more.

GridWise Alliance releases 2026 Grid Modernization Index

The 2026 Grid Modernization Index shows rapid momentum in grid transformation, with one-third of states aligned across all four readiness pillars and another third close behind. Grid optimization and system design lead nationally, with 82% of states meeting readiness criteria, while customer adoption remains the weakest area at 58%. The updated methodology replaces rankings with a standardized rubric, giving utilities and policymakers clearer, more actionable insight into where states are advancing—and where gaps in policy, customer programs, and data persist. Read more.

New AI-driven UPS could make hyperscale data centers better grid citizens

NLR and ON.energy have begun testing a new medium-voltage AI UPS on NLR's one-of-a-kind dual simulator—capable of emulating both a full data center and a live power grid. The technology is designed to smooth the extreme, millisecond-scale load swings typical of hyperscale data centers, helping operators present a steadier, more grid-friendly profile while riding through faults, storms, and other disturbances. By validating performance in a safe, high-fidelity environment, the partnership aims to accelerate deployment of grid-supportive data center technologies at a moment when AI-driven load growth is straining utility interconnection processes nationwide. Read more.

EPRI pushes flexibility framework for data center interconnections

At CERAWeek, EPRI and more than 30 major signatories—including Google, Meta, Nvidia, Southern Company, Exelon, and Constellation—called for a shift away from worst-case, inflexible load assumptions in planning and interconnection. The letter argues that modern data centers can provide meaningful load flexibility, and that recognizing this capability could unlock capacity, speed up interconnections, and reduce grid stress during large load surges. Read more.

New 20MW turbine sets global record

Major turbine manufacturer Goldwind has claimed a new global record with the launch of a 20 MW offshore wind turbine, marking the largest and most powerful model ever announced. The prototype's massive rotor and swept area are designed to boost annual energy production and cut project costs, signaling the next leap in turbine scaling as developers push for higher output per foundation. The milestone underscores how rapidly offshore wind technology continues to advance—even as U.S. market uncertainty grows—positioning ultra-large turbines as a key driver of future cost reductions and global deployment. Read more.

Ore Energy pilots 100-hour iron-air BESS

Dutch startup Ore Energy has successfully connected its 100-hour iron-air long-duration storage system to the grid in Europe's first pilot of its kind, proving it can charge and discharge for up to four days. The test validated the technology under real-world operating conditions, giving Ore Energy confidence that iron-air chemistry can offer a low-cost path to multi-day storage as grids face deeper renewable swings. Read more.

FEATURED ARTICLE

THE GREAT ELECTRICITY SQUEEZE: HOW UTILITIES CAN NAVIGATE LARGE LOAD INTERCONNECTION TRADE OFFS

By John (JD) Hammerly, CEO, The Glarus Group, and Dr. Mani Vadari, President, Modern Grid Solutions

For decades, U.S. electricity demand grew slowly and predictably. That era is over. AI Data Centers, electrified manufacturing, and reshored industrial supply chains are driving load requests in the hundreds of megawatts — often on 18–24-month timelines. Utilities now face a historic surge in Large Load Interconnections (LLIs) and could experience annual electrical load growth exceeding 10%, reshaping planning, investment, and regulatory expectations.

The central challenge is clear: ***How do utilities capture the economic benefits of LLIs without exposing existing customers to rate shock, stranded asset risk, or delays in the clean energy transition?***

Below is a concise guide to the core challenges and opportunities LLIs create—and how utilities can strategically manage both to benefit both the LLI and the ratepayer.

Challenges

Challenge #1: Rate Shock for Existing Customers

LLIs require rapid, large-scale investment in substations, transmission, and resource adequacy. Traditionally, these costs were included in the rate base, but when investment grows faster than customer count, existing customers face higher bills for no additional benefit. Public resistance often stems from this dynamic — not from the LLIs themselves, but from the cost shift they can trigger.

Challenge #2: The Capital Investment Treadmill

Serving LLIs demands immediate capital outlays: new substations, high-voltage lines, dual-supply resiliency, and accelerated engineering. AI/data center timelines — 250 M W in two years, scaling to 1 GW in five — compress planning cycles and strain utility budgets. Classically, these costs for rapid, non-discretionary upgrades are spread across the entire rate base. When utility investments rise faster than growth in customer count or existing load, its

customers suffer rate shock. Without careful cost allocation, utilities risk overextending capital and under-recovering costs.

Challenge #3: Clean Energy Transition Costs

LLIs are arriving just as utilities transition from dispatchable fossil generation to weather variable resources (WVRs). Even when renewables are cost-competitive, achieving 24/7 reliability requires overbuilding capacity or adding storage. These investments raise the system's average cost of power unless LLIs bear their fair share of the incremental cost – both for access to resources and for delivery.

Challenge #4: Stranded Asset Risk

If an LLI downsizes or relocates, utilities and customers can be left paying for infrastructure built solely for that load. Strong contractual protections — minimum billing demand, take-or-pay structures, early termination penalties, and upfront contributions — are essential to prevent long-term financial exposure.

Benefits

Benefit #1: Accelerating the Clean Energy Transition

While the costs are real, they must be balanced against the equally substantial—and often transformative—

benefits that large-scale new demand brings to both utilities and their communities. When managed strategically, this growth becomes a powerful engine for accelerating grid and supply modernization, ultimately benefiting ratepayers.

Benefit #2: Quicker Infrastructure Modernization

Instead of patching an aging grid, LLIs force utilities to build brand-new, high-capacity infrastructure sooner. Instead of incremental upgrades, utilities can align LLI-driven capital with long-term utility and community growth management plans to deploy modern substations, advanced transmission, automation, and digital infrastructure far sooner than traditional budgets would allow. This accelerates the necessary transition to a more resilient, digitalized, decarbonized, and modern grid structure.

Benefit #3: De Risking Renewable Investment

Large, predictable loads reduce financing risk for WVR projects. Hybrid designs — renewables plus storage — become more viable, improving dispatchability and system flexibility. LLIs with on-site generation or storage can also support reliability during scarcity events.

Gigawatt-scale demand from LLIs changes the economics of renewable energy projects.

- **Anchor Load for WVRs**: Large loads provide an ideal guaranteed anchor buyer for new, large-scale solar or wind farms, de-risking the project, allowing the securing of financing to build them faster and at better borrowing rates.
- **Decarbonization at Scale**: By requiring the new load to be served by newly built renewable capacity, the utility can accelerate the displacement of older, fossil-fired power plants from its generation mix.
- **Hybrid WVRs by Default**: When spread across the utility's electricity supply portfolio, storage as a basic component in all new WVR investments increases the utility's operational flexibility and delivery reliability.
- **Resiliency and Flexible Load, a Shared Responsibility**: Most large loads will have significant on-site auxiliary generation. Through well-designed considerations, the LLI can reduce its electricity consumption (from the grid) during periods of scarcity, benefiting all utility customers.

Benefit #4: Boosting Local Tax Base and Employment

LLIs often invest $5–10 billion in local facilities, expanding the tax base and enabling communities to fund infrastructure without raising taxes, a critical benefit for economically distressed or poor counties. Construction jobs surge, and long-term operations bring highly competitive, technical, and maintenance jobs to the area.

Super Benefit: Smart Management, Flexibility & Aligned Ambitions

The greatest opportunity lies in the potential for strategic alignment between the LLI and the utility. LLIs can provide demand flexibility, reduce load during peak periods, and support grid services, turning the large load into a valuable, responsive grid resource. Utilities can protect customers by ensuring LLIs pay the full incremental cost of service and by incorporating land, water, and environmental considerations into planning.

Conclusion: A Strategic Imperative

LLIs are not simply new customers. They are catalysts for a once-in-a-century grid transformation. But utilities must approach them strategically, not transactionally. That means developing a formal LLI Strategic Engagement Plan that aligns:

- Utility growth and growth management goals
- LLI timelines and decision drivers
- Realistic assessment of utility constraints, capital cycles, and regulatory obligations
- Transparent cost allocation, risk mitigation, and a stranded asset protection framework

The most persistent tension is time. LLIs expect solutions in 12–24 months; utilities plan in 5-, 10-, and 20-year increments. This gap can be narrowed through pre-engineered designs, standardized contractual structures, dedicated LLI teams, regulatory pre-approval of investment categories, early signal monitoring of development activity, and bringing other stakeholders, such as city governments, into the process.

Utilities that adapt will capture economic development opportunities and accelerate modernization. Those that don't will lose projects — and the associated tax base, jobs, and grid investment — to regions that can move faster.

Key Takeaways:

- LLIs are not the problem; they are the catalyst
- Utilities that embrace this moment will position their customers, their communities, and their organizations to thrive.
- The electricity sector is entering a once-in-a-century transformation. The question is whether utilities will lead that transformation or be dragged along by it.

The LLIs can bring capital to invest at levels the utility could only dream of. Handled well, they can help build the resilient, clean, future-ready grid the nation needs. The opportunity is real, and utilities that seize it will lead the next era of electric system transformation.

FEATURED ARTICLE

CETA: CLEAN ENERGY, COSTLY CONSEQUENCES

By Dr. Mani Vadari, President, Modern Grid Solutions

What CETA Actually Requires

Washington's Clean Energy Transformation Act (CETA)[1] sets some of the most aggressive clean-energy deadlines in the country. Before diving into the affordability impacts, it's important to understand what the law mandates:

- Elimination of coal-fired electricity by 2025
- Greenhouse gas neutrality by 2030, requiring utilities to offset any remaining emissions
- 100% carbon-free electricity by 2045, regardless of cost or technology maturity
- Strict limits on cost recovery, including a prohibition on passing compliance penalties to customers
- Expanded low-income assistance programs, acknowledging affordability pressures even as mandates increase costs
- Detailed compliance reporting and planning, adding administrative and regulatory burdens that ultimately flow into rates

These requirements set the tone for Washington's energy future — but they also lock utilities into timelines that may not align with technology readiness, grid reliability needs, or affordability for households.

Washington's Vision, Ratepayers' Reality

Washington's CETA was heralded as a bold step toward a carbon-free future, and it still is. Lawmakers framed it as visionary climate policy, a chance to lead the nation in decarbonizing the grid, which is still an excellent way to go. However, for households across the state, the promise of clean energy is colliding with a harsher reality: mounting costs. What was sold as a climate triumph increasingly looks like an unfunded experiment, with ratepayers footing the bill.

And here's the tension policymakers rarely acknowledge:

Climate action must remain a priority — for utilities, for regulators, and for citizens. But climate progress is not served by arbitrary timelines that outpace technological maturity or impose unaffordable burdens on households. A sustainable transition requires aligning goals with what the grid can reliably support, what technologies are commercially ready, and what families can reasonably afford. That means adopting an all-of-the-above energy strategy, continuously balancing the mix of renewable, non-emitting, and dispatchable resources in line with customer rates and system reliability. Ambition matters, but so does pacing and affordability.

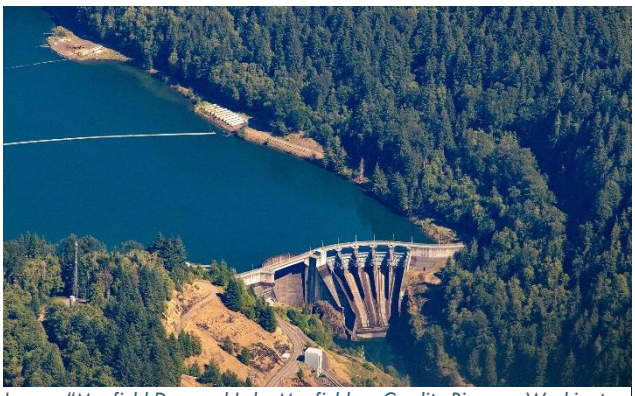


Image: "Mayfield Dam and Lake Mayfield — Cowlitz River — Washington State 03," by Bobjgalindo. Licensed under CC BY-SA 4.0.

Rising Costs Across the Grid

Washington State

The numbers tell the story. Rate hikes tied to clean energy mandates are already hitting households across Washington, and the trend is accelerating. The following three utilities illustrate the scope of the problem: different ownership models, different service territories, yet the same outcome: higher bills for customers.

- **Puget Sound Energy (PSE)**: Washington's largest investor-owned utility, serving more than 1.2 million electric customers and 900,000 natural gas customers across western Washington. It secured approval for a $326.6 million electric revenue increase in 2025 (11.5%), followed by another $203.3 million in 2026 (6.4%).[2] For the average household, that means about $13 more per month in 2025.
- **Avista**: A Spokane-based investor-owned utility serving about 400,000 electric customers in

eastern Washington, northern Idaho, and parts of Oregon. It has filed multiple rate increase requests tied directly to clean energy compliance.[3]

- **Tacoma Public Utilities (TPU)**: A municipally owned utility serving Tacoma and surrounding Pierce County communities. TPU announced hikes over two years, citing CETA mandates.[4]

Beyond Washington

And Washington is hardly unique. Across the country, utilities are raising rates to finance renewable projects, transmission lines, and compliance reporting. The examples below show how widespread the trend has become:

- **California**: San Diego Gas & Electric customers face new hikes in 2025, adding several dollars a month to already sky-high bills.[5]
- **Michigan**: Consumers Energy requested another 8% residential rate increase in late 2025, just months after a prior hike.[6]
- **New Jersey**: PJM Interconnection's auction results are expected to raise electricity rates statewide, sparking affordability concerns.[7]
- **North Carolina**: Duke Energy proposed increases of nearly 12–14%, tied to coal retirements and gas turbine replacements.[8]

Analysts estimate over 100 million utility customers nationwide face increased or proposed costs totaling more than $85 billion since early 2025.[9]

The paradox is glaring: CETA requires utilities to expand low-income assistance programs, acknowledging affordability challenges, while simultaneously driving costs higher. Investor-owned utilities (IOUs) profit from infrastructure spending, since every new transmission line or renewable project is financed through customer rates. The result is an equity tension: policy gestures toward affordability, but the IOU model guarantees rising bills.

California as a Warning Sign

California offers a cautionary tale. Residential electricity rates there now hover around 31–32¢ per kilowatt-hour, nearly double the national average of ~17¢.[10]. Clean energy mandates, wildfire mitigation, and grid modernization have all contributed to the surge.[11] The consequences are stark: families squeezed financially, businesses relocating, and an affordability crisis deepening.

Washington risks following the same trajectory. If costs continue to climb unchecked, the state's climate ambitions could unravel under the weight of public backlash.

Loopholes, Workarounds, and Reliability Risks

Behind the scenes, utilities are exploring "creative compliance." Some buy out-of-state market power or purchase renewable energy credits, others stretch definitions of "non-emitting resources," and many delay investments until regulators force their hand.[12] Some are even toying with the idea of paying penalties for non-compliance in favor of keeping rates low for their customers.

Critics warn of reliability risks if renewable buildout does not meet demand curve requirements, requiring the need for additional supply resources, such as storage, resulting in further increases in costs. They highlight regressive impacts: rate hikes hit low-income households hardest, despite assistance programs. And they point to compliance gamesmanship—meeting the letter of the law but not its spirit.

If utilities fail to comply, penalties fall on shareholders, not customers. However, for ratepayers, the dilemma is stark: they fully finance clean energy compliance through ever-rising bills. Under CETA, while utilities cannot recover penalty costs through their rate base,[13] it creates a perverse incentive of forcing compliance costs onto households while treating penalties as a last-resort shareholder expense. The law ensures ratepayers always pay for the transition, but never for the consequences of failure.

The Bottom Line

CETA and other similar policies are bold, and such efforts must be supported, but in practice, they function as massive unfunded mandates on households. Rate hikes are already here, and more are on the way. California's lesson is clear: affordability collapses when electricity costs spiral, undermining equity goals. Clean energy isn't free, and someone must always pay. Right now, that someone is the ratepayer.

Call to Action

- **Policymakers**: confront the affordability crisis, revisit CETA, and balance sustainability with fairness.
- **Consumers**: demand accountability—affordability is as essential as sustainability.
- **Utilities**: compliance shouldn't be an excuse; transformation requires reliability, fairness, and affordability.

A sustainable clean-energy future demands ambition, but it also demands realism. Washington can lead on climate without repeating California's affordability crisis if policymakers ground their goals in technological readiness, economic feasibility, and a balanced, all-of-the-above resource mix. The path forward isn't abandoning climate commitments; it's aligning them with what utilities can reliably deliver and what households can reasonably afford. A transition built on pragmatic timelines and honest cost assessments will earn public trust, protect vulnerable customers, and ultimately make Washington's clean-energy vision durable.

End Notes

[1] Clean Energy Transformation Act (RCW 19.405): https://app.leg.wa.gov/rcw/default.aspx?cite=19.405

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[12] Washington State Department of Commerce. Clean Energy Transformation Act (CETA). Accessed December 18, 2025. https://www.commerce.wa.gov/energy-policy/electricity-policy/ceta/

[13] Washington State Legislature. "RCW 19.405.090: Enforcement – Penalities." Accessed December 18, 2025. https://app.leg.wa.gov/rcw/default.aspx?cite=19.405.090

FEATURED ARTICLE

AI, GRID EDGE AND THE RACE FOR POWER: KEY TAKEAWAYS FROM DTECH 2025

By Dr. Mani Vadari, President, Modern Grid Solutions

The 2026 Distributech (DTech) conference returned to San Diego from February 1-5, drawing more than 18,000 industry professionals and 684 exhibitors. With over 42% of attendees representing utilities, the event reaffirmed its role as a must-attend gathering for decision-makers driving the future of our industry. Booths ranged widely in scale, with OATI once again hosting the largest, and a dedicated area showcasing promising startups.

Modern Grid Solutions maintained a strong presence with John (JD) Hammerly and me continuing a streak of attendance that now spans more than twenty years. Our days were packed – 7am breakfast meetings, booth visits, technology deep dives, and evening networking events. We joined notable gatherings hosted by Slalom, Accenture, and for the first time, DTech itself added an Opening Night Keynote and Concert featuring Recycled Percussion. It was a high-energy addition and a great place to reconnect with old friends like John Barnick (recently retired from ABB/Hitachi) and new friends from Reactive Technologies and PA Consulting.

AI/ML Everywhere

One theme dominated the show floor: AI is everywhere. From drones and robots to fully autonomous workflows, the pace of innovation has clearly accelerated. The AI/ML/Generative AI wave (and now Anthropic's Claude) has firmly entered the utility industry, sparking active conversations across vendors, utilities, and consulting firms.

Continuing the discussion from DTech'25, utilities are STILL trying to figure out how best to apply these new tools to real problems, vendors are STILL trying to determine how to incorporate these newer techniques into their toolsets, and consulting firms are STILL navigating how to stay relevant by helping clients understand the benefits and limitations of these new technologies.

Key observations:

- The hype cycle appears to have died down, but extreme viewpoints persist — from "ADMS applications will be fully AI driven" to "AI won't matter in utilities anytime soon."
- Vendors are moving forward cautiously, embedding AI/ML to augment existing toolsets in innovative ways and using the early gains to educate customers.
- The most tangible progress (not necessarily from DTech'26) is in customer experience, where utilities are adopting and leveraging AI/ML techniques already common in other industries.

The bottom line:

AI/ML adoption in utilities is inevitable but will evolve gradually. Expect early use cases to provide directional insights rather than precise solutions, with adoption accelerating as comfort and trust grow.

DERMS Did Not Disappear

Despite taking a step back from center stage, DERMS was far from absent. In fact, the term is being used – and misused – almost as broadly as "Smart Grid" in the early 2000s. As JD and I walked the floor, a few themes emerged:

- As I wrote in my 2009 book (and again in the 2020 edition), neither the vendors nor the utilities have

fully aligned on what they want from a DERMS — but now everyone wants one.
- There are many flavors: Grid-DERMS, Edge-DERMS, Microgrid-DERMS, and everything in-between.
- Functionality varies widely across both vendor offerings and utility expectations:
    - Some utilities want a pilot to understand what DERMS is and isn't.
    - Some want simple DER monitoring.
    - Some want monitoring and control.
    - Some want DERMS integrated into their balancing authority for optimized dispatch.
- Vendors, meanwhile, are trying to sell the next customer an improved version of what they delivered to the last.

This isn't criticism — it's a natural stage in the evolution of renewable and DER integration. Utility needs differ, and vendors are trying to respond. The more established players are working to standardize their products and bring them to market at scale.

A Missing Conversation – and a Coming Shockwave

One topic felt conspicuously absent from DTech discussions: the massive shift underway in enterprise-grade software development driven by advances in AI.

Recent breakthroughs - including Anthropic's Claude and platforms like AppFaktors (AppFaktors: Secure Architecture Solutions for Enterprises) are enabling enterprise applications to be generated from plain-English requirements, producing production-ready systems in hours or days rather than months or years. Solutions like these are driving the utilization of enterprise context and the building of compliant applications, which are key to driving innovation and modernization with AI. This has profound implications:

- Vendors will be able to build products and customizations dramatically faster.
- Utility IT teams can accelerate in-house development with smaller teams.
- University and DOE research labs can prototype applications quickly and focus more on pure research.

This shift also explains why major tech companies are reducing traditional developer roles – the required skillsets are changing rapidly. While utilities are still exploring how AI/ML can play a role in their environment, a parallel revolution is already reshaping how software itself is built.

Recent industry moves show how quickly this shift is accelerating. Salesforce CEO Marc Benioff said in an interview with TBPN that the company didn't hire additional engineers in FY26 because AI coding agents provided the needed capacity — a trend echoed by leaders like Dario Amodei, who note that fewer software engineers may be required as AI handles more end-to-end development. Salesforce has also reduced hiring in customer support while increasing sales roles by nearly 20%, pairing AI-driven lead generation with human relationship-building. These changes are early signals of a broader workforce realignment that utilities, vendors, and research institutions will soon face as AI reshapes not just what gets built — but who builds it.

And Finally: Affordability

The most urgent conversation this year wasn't about AI or DERMS. It was affordability. With rising load and rising expectations, the pressure is intensifying.

My takeaway is clear:
The future grid will be AI-enabled, automated, and data-driven, but it must also remain accessible and affordable for the communities it serves.

WATT'S on MANI'S MIND?

FROM CONSTRAINT TO CATALYST:

Turning Grid Bottlenecks Into Modernization Wins

By Dr. Mani Vadari, President, Modern Grid Solutions

The Grid Is More Constrained Than Ever — and That's Not All Bad

Every utility leader today is grappling with the same reality: the grid is constrained in more places, more often, and for more reasons than ever before. Load growth (accelerated by data centers and other large loads), electrification, DER integration, and extreme weather are converging to stress infrastructure that was never designed for this level of complexity or rapid change. Planning cycles are moving from 15-20 timeframes to 3-5 years.

Yet the very pressures that strain the grid are also clarifying where it's ready to advance. Constraints don't just expose vulnerabilities. They also highlight increased potential for investment options, new and innovative operating models, and advanced technologies that will deliver the greatest impact. For utilities that have invested in creating a modernization journey map, reading those signals and signposts makes the path forward sharper, more actionable, and more strategically aligned. Lastly, with the right focus, it also makes the utility nimbler and better able to change direction quickly.

Transmission Bottlenecks Are Driving Smarter Solutions

Historically, transmission congestion was viewed as a problem to be solved with more steel in the ground – more capacity, more lines, expanded substations, and so on. Today, congestion is prompting utilities to deploy a broader suite of grid-enhancing technologies (GETs) that increase transfer capability, redirect flows, provide localized congestion relief, and optimize the network in real time. These solutions fall into three complementary categories:

- **Flow-redirecting technologies**, including advanced power flow controllers, phase-shifting transformers, and FACTS devices that push power off overloaded lines and towards their destinations over underutilized corridors.
- **Capacity-increasing technologies**, such as advanced (carbon-core) conductors, high-temperature low-sag (HTLS) reconductoring, and dynamic line ratings that safely increase the usable capacity of existing assets or increase the number of hours they can operate closer to their limits.
- **Real-time optimization technologies**, including topology optimization, advanced analytics, PMUs, WAMS, and enhanced state estimation, that help operators identify switching actions and run the system closer to its true limits.

Source: Microsoft Copilot (AI-generated image).

Distribution Constraints Are Accelerating Innovation

Distribution-level constraints, from hosting capacity limits to EV clustering and DER variability, are pushing utilities to adopt a new generation of distribution-enhancing strategies that improve flexibility, visibility, and control. These include:

- **Targeted storage deployments**, especially battery energy storage systems (BESS) – either fixed or

mobile, that provide localized capacity, voltage support, and peak shaving.

- **Flexible load and managed charging programs**, including traditional and automated Demand Response.
- **Non-wires alternatives (NWAs),** such as microgrids and Virtual Power Plants that aggregate DERs and other distribution-level generation into dispatchable grid assets that defer or avoid traditional upgrades.
- **Advanced forecasting and granular edge-visibility tools** that improve situational awareness and predictability, helping the distribution operator under both normal and emergency operations.
- **Regulatory frameworks** such as Integrated Distribution System Planning (IDSP), NWA screening, and outcome-based incentives that encourage utilities to deploy DERs, flexible load, and advanced visibility tools as core system assets.

Together, these approaches help utilities manage uncertainty, maintain reliability, and avoid overbuilding in areas with highly dynamic load and DER growth, all with a focus on maintaining/enhancing reliability while keeping a watchful eye towards affordability.

What NERC's 2025 LTRA Says About the US Grid: A Nation Entering a Decade of Tightening Margins

The NERC 2025 Long-Term Reliability Assessment (LTRA) makes one point unmistakably clear: grid constraints are emerging across every region of the country, driven by rapid load growth, resource retirements, extreme weather, and transmission limitations. While the specific risks vary by region, the national pattern is consistent: reliability margins are tightening, and the grid is becoming more sensitive to stress events.

Across the U.S., NERC highlights several cross-cutting themes:

- **Load growth is accelerating faster than expected.** Data centers, electrification, and industrial reshoring are reshaping demand curves in multiple regions.
- **Resource adequacy is becoming more weather-dependent.** Extreme heat and cold are increasingly determining whether regions have sufficient capacity to meet peak demand.

Source: NERC 2025 Long-term Reliability Assessment

- **Transmission constraints are a national bottleneck.** Limited transfer capability reduces the ability to move power where it's needed most during emergencies.
- **Thermal retirements continue to outpace replacement capacity**. Many regions are losing dispatchable resources faster than firm, flexible alternatives are coming online.
- **Interregional coordination remains insufficient**. The grid's physical and regulatory fragmentation limits the ability to share resources across regions.

Taken together, these trends don't just highlight risk; they clarify where modernization will have the greatest impact. The constraints are real, growing, and increasingly consequential, and they demand modernization, not incremental fixes.

Innovation Begins With a Shift in Mindset

The pressures facing today's grid aren't just technical. They're also organizational. Modernization requires more than new tools; it requires new ways of thinking, collaborating, and engaging, both within the utility and externally. As constraints multiply and planning horizons compress, utilities that thrive will be the ones that break old patterns, embrace cross-functional problem-solving,

and treat innovation as a shared responsibility rather than a specialized function.

- **Breaking down traditional utility silos** so planning, operations, engineering, customer programs, field crews, and regulatory teams work from the same assumptions, data, and modernization journey map.
- **Building internal fluency in emerging technologies**, whether through utility-run pilots or lessons learned from peer utilities, so teams can confidently evaluate non-traditional solutions.
- **Expanding the solution set** by considering NWAs—storage, flexible load, DER portfolios, microgrids, and VPPs—alongside conventional upgrades.
- **Exploring market-aligned opportunities where appropriate**, identifying new revenue streams or customer value propositions that benefit both shareholders and ratepayers.
- **Strengthening transparency with regulators**, using pilots and demonstrations to build shared understanding of new approaches and the benefits they can unlock.
- **Creating a culture that rewards curiosity and adaptability**, recognizing that innovation and modernization are as much about mindset as they are about technology.

A More Constrained Grid Can Be a More Modern Grid

The grid will always have constraints; that's the nature of a complex, interconnected system. The utility cannot design and build a gold-plated system that accommodates all alternatives – it would be too expensive and unaffordable for most people. The question is whether we treat constraints as obstacles or as directional cues pointing toward smarter, affordable, and more resilient ways of operating.

In 2026, the utilities that lead will be the ones that recognize constraints as early indicators of where innovation can deliver the most value and who respond with urgency, clarity, and a modernization mindset. A more constrained grid isn't a setback; it's a moment of focus that's revealing exactly where the system is ready to evolve next.

DID YOU KNOW...

Getting Through the Interconnection Queue Can Make or Break AI Data Center Projects?

As hyperscale AI campuses proliferate across the U.S., one of the biggest barriers they face isn't land, water, or even generation — it's the interconnection queue. Today, large energy projects spend an average of five years or more waiting for studies, approvals, and cost allocations before they can connect to the grid.[1] For AI developers racing to meet explosive compute demand, that delay is longer than an entire product cycle.

Fun Fact: *The U.S. now has more than **2,500 GW** of generation and storage capacity stuck in interconnection queues — more than **double** the current installed capacity of the entire grid.*[1] *These delays ripple across the system: utilities struggle to plan new transmission, developers face escalating costs, and communities wait years for promised economic benefits*.

But some states are beginning to rewrite the playbook. In early 2026, Louisiana approved META's new AI data center campus under its Lightning Amendment, a fast-track process designed for "large load" customers. The amendment compresses the regulatory cycle to just eight months, enabling META to move forward with a project that includes 7.5 GW of new gas generation and hundreds of miles of transmission, infrastructure that would typically spend years in study cycles before receiving a green light. [2] [3]

This shift highlights a growing reality: regulatory speed is becoming as critical as power availability. And it underscores something utilities can no longer ignore: hyperscalers can't be treated as ordinary customers waiting their turn in line. If a utility waits for a developer to enter the interconnection queue before engaging, the game is already lost. Developers will hedge by submitting speculative, preliminary requests — what many utilities call 'Phantom Data Centers' — to multiple providers, creating an air of uncertainty that helps no one. Instead, utilities need to work with data center developers early and directly to validate that the load is real, the timeline is real, and the infrastructure plan is credible. Collaboration, not queue-based sequencing, is becoming the new prerequisite for managing large-scale load growth.

The stakes are enormous. Interconnection delays can add hundreds of millions of dollars to project costs, stall regional economic development, and slow progress toward state energy goals. By streamlining approvals and clarifying cost allocation, Louisiana is offering a model for how states can support large-scale load growth without compromising grid reliability or shifting costs to other customers. [2] [3]

But Louisiana isn't the only state trying to break the bottleneck. Across the country, regulators are accelerating interconnection timelines through a mix of cluster studies, stricter readiness requirements, and penalties for missed deadlines. Nationally, these reforms are being driven by the same challenges documented in Lawrence Berkeley National Laboratory's Queued Up 2025 report — ballooning queues, multi-year delays, and the need for more predictable study processes.[1] FERC's Order 2023 is pushing all transmission providers toward faster, more standardized study processes [4], while regions like PJM, MISO, and CAISO have launched their own queue reforms to clear multi-year backlogs. Against this backdrop, Louisiana's new Lightning Amendment stands out for going even further — compressing the approval cycle for META's AI campus to just eight months, compared with the national average of five years or more.[1] [2] [3]

Looking ahead, AI-driven load growth is expected to accelerate even faster than previously forecast. As more states confront the tension between demand growth and regulatory bottlenecks, interconnection reform may become one of the most important levers for enabling the next wave of digital infrastructure.

In short: *AI data centers don't just need power — they need timely power. States that modernize their interconnection processes will be better positioned to attract investment, manage grid impacts, and ensure that innovation doesn't outpace infrastructure.*

[1] Lawrence Berkeley National Laboratory (LBNL). Queued Up: 2025 Edition (Dec. 2025). https://eta-publications.lbl.gov/sites/default/files/2025-12/queued_up_2025_edition_12.15.2025.pdf

[2] Arbaje, Paul. "Louisiana's 'Lightning Amendment' Quietly Shifts AI Data-Center Costs..." Union of Concerned Scientists / The Lens (2026).

[3] Muller, Wesley. "Louisiana Creates Fast Track to Approve Power Plants for Data Centers." Louisiana Illuminator (Jan. 14, 2025).

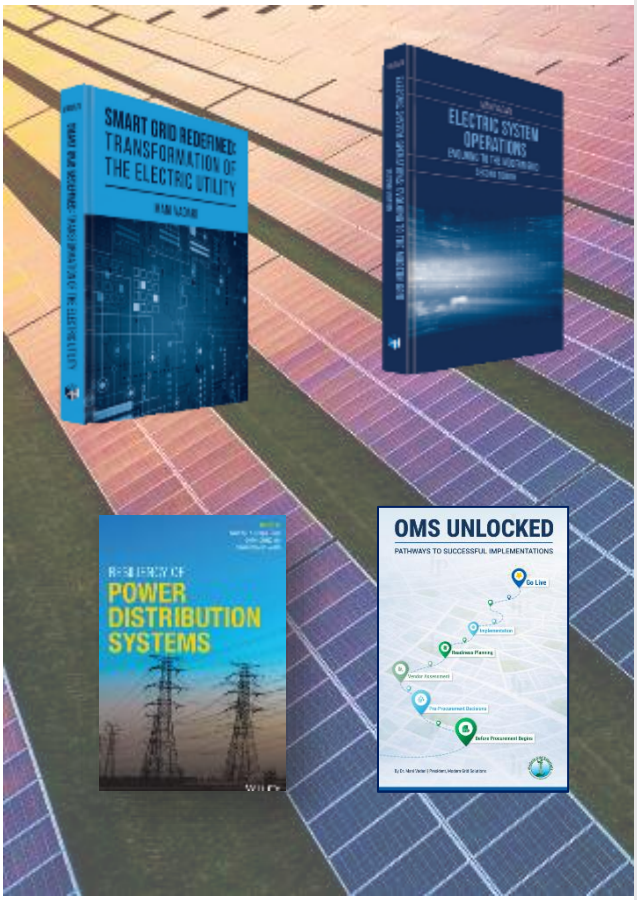
[4] FERC. "Explainer: Interconnection Final Rule (Order No. 2023)."

ABOUT MODERN GRID SOLUTIONS

Modern Grid Solutions (MGS) is a global supplier of deep expertise in the electric industry. Our team, each with over 25 years of industry experience, delivers innovative solutions to utilities, corporate clients, and policymakers. Our experts cover a wide range of areas, including engineering, technology, economics, and operations. We're passionate about helping clients navigate the complexities of the modern grid so they can focus on their core business. Our boutique consultancy stands out for its unique value proposition, where seasoned experts treat clients' businesses as their own.
Read more about MGS.

We focus on delivering value and actionable guidance to our clients, allowing them to flourish in the evolving energy landscape. Our ongoing projects include:

• California Municipal Strategic Modernization Journey Map	• Northwest Utility Transmission Strategic Planning
• Energy Service Provider Assistance	• Data Centers - Developers/Operators
• Business Architect Role	• Decarbonization Strategy
• Vendor Collaboration	• Startup Support



The guy (literally) wrote the books!

Dr. Vadari's books serve as widely used textbooks in universities across the U.S. and beyond. Personnel at several utilities use them as reference books.

- ***Smart Grid Redefined: Transformation of the Electric Utility***
- ***Electric System Operations – Evolving to the Modern Grid. 2nd edition***
- ***Resiliency of Power Distribution Systems*** - Chapter 14, *Technology and Policy Requirements to Deliver Resiliency to Power System Networks,* by Dr. Mani Vadari, Dr. Gerry Stokes, & John (JD) Hammerly.
- ***OMS Unlocked: Pathways to Successful Implementations*** **-** The online book and e-book are coming soon. Stay tuned for more news on their release.

Additionally, MGS is the trusted authority for conducting in-depth training sessions on critical industry subjects, including power system fundamentals and grid modernization. Ask us about our training programs.

Don't miss out on our incredible resources!
Head over to our new website and discover our eBook, "Utility Executive Quick Reference Guide," and Dr. Vadari's Blog, "Watt's on Mani's Mind?" And that's just the beginning! Explore much more on our website. Visit us and unlock a world of knowledge from our industry leaders.

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