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JUNE 2, 2025

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State and Future of Power

Breaking Ground for What's Next



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Front cover, a painting by PUF's Paul Kjellander, "Breaking Ground for What's Next."

The First State and Future of Power

2018, That's When We Started Stating the State and Future

By Steve Mitnick, Executive Editor

On June 15, 2018, some seven years ago, Public Utilities Fortnightly published its first Special Issue on the "State and Future of Power." We've published a Special Issue with that theme each June since then.

In that first Special Issue, my editorial was entitled "State of Power by State." The message there was summed up in this sentence:

"When we assess the present state of power, and when we project the future, we know the states are really different."

Just as in mid-2018, during the first Trump Administration, here in mid-2025, during the second Trump Administration, the energy transition is largely being driven at the state level and is as diverse state-by-state as the states are.

Here's another excerpt from that editorial seven years ago that elaborates on this point of view:

"When one projects power's progress, one must take into account the political, cultural, economic, regulatory and resource differences between the states. Iowa is windy, full of wind power farms. Pennsylvania is gassy, full of natural gas producers. One leans towards traditional regulation, the other towards nontraditional competition. Perhaps forecasters need to give us an Iowa projection and a Pennsylvania one.

Texas is ever hungry to accelerate economic growth. The Lone Star State believes this requires minimizing electric rates through competition. The Empire State, New York, wants low rates too, but has a lot of other goals too. So, forecasters, give us a Texas projection and a New York one."

In that 2018 Special Issue was an article summarizing the results of our first annual Pulse of Power Survey. The Survey that year asked the Public Utilities Fortnightly readership to "share one word that best describes how you see the state of the industry today."

(Cont. on page 9)



Steve Mitnick has authored five books on the economics, history, and people of the utilities industries. While in the consulting practice leadership of McKinsey & Co. and Marsh & McLennan, he advised utility leaders. He led a transmission development company and was a New York Governor's chief energy advisor. Mitnick was an expert witness appearing before utility regulatory commissions of six states, D.C., FERC, and in Canada, and taught microeconomics, macroeconomics, and statistics at Georgetown University.

PUBLIC UTILITIES FORTNIGHTLY®
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EXECUTIVE EDITOR
Steve Mitnick | *smitnick@sepapower.org*

CONSULTANT PUBLIC UTILITIES FORTNIGHTLY PARTNERSHIPS
Joseph D. Paparello | *jpaparello@sepapower.org*

SENIOR ADVISOR
Paul Kjellander | *kjellander@fortnightly.com*

MEMBER RELATIONS MANAGER
Ashley Lucas | *alucas@sepapower.org*

•

EDITOR-IN-CHIEF
Lori Burkhart | *lburkhart@sepapower.org*

MANAGER, ART AND DESIGN
Michael Eacott | *meacott@sepapower.org*

EDITOR
Angela Hawkinson | *ahawkinson@sepapower.org*

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Views on State and Future of Power from Con Ed

From the Sidelines of Edison Congress 2025:
Conversation with Con Ed Shared Services President Bob Sanchez
and Con Ed Project Manager Research and Development Silvia Khurrum

Amid the keynotes, panels, and networking breaks at Edison Congress 2025, the PUF team was able to catch up with leaders from Con Ed. Including from a panel on the conference's first day, with a group of senior electric utility leaders, the President of Con Ed Shared Services Bob Sanchez.

So, we sat down and talked about the challenges and opportunities in New York and nationally across our industry. Silvia Khurrum, Con Ed Project Manager Research and Development, also talked about the State and Future of Power. Check out this great conversation which will take you slightly more than a New York minute to peruse.

PUF's Steve Mitnick: What are your roles at Con Ed, and what do you do on a typical day?

Bob Sanchez: I am the President of Shared Services at Con Edison with a focus on ensuring our shared services can scale to meet the increased pace and scope required to serve our customers and advance the clean energy transition.

Silvia Khurrum: I'm a manager in research and development. In my typical day, I focus on how to bring innovative solutions from pre-commercial and commercial stages through piloting into the market.

I evaluate new technologies and end-user applications that can make a significant impact in reducing greenhouse gas emissions from buildings, as that is one of the leading causes of GHG emissions in New York City. After balancing considerations that include affordability and climate goals, we then explore strategies on how Con Edison can adopt and scale to maximize the benefits for our customers and the grid while advancing New York policy priorities.

PUF: Give a sense of how Con Ed has become an innovation machine.

Bob Sanchez: Like many of our peers, we make continuous investments in the systems to strengthen services we provide and to maintain our nation-leading electric reliability, while balancing costs. Innovation that helps to eliminate future operation and maintenance costs is critically important for our customers.

The affordability of the vital services we provide is always front and center. So, when we're making investments in our infrastructure to deliver safe, reliable, resilient services, we're looking at ways we can reduce costs.

One of the items I mentioned earlier was tied to a gas-enabled methane detector that we've been installing. That was closely tied to our AMI, our smart meter investments. From that, we're able to receive an alarm before our customers even know there's a gas leak nearby.

It's important for us to make these types of investments as they make our system safer and more reliable for our customers and also improve our operating efficiency. So, there is a lot of value in these types of investments.

PUF: What about saying, "It's an interesting technology. That's going to make a difference for customers," versus, "We're trying to keep costs down, that's a risk." How do you decide to implement, and field test that tech and get it into the field?

We're already thinking a step ahead on low-carbon resources that will help us decarbonize our steam systems, such as hydrogen. We're also looking into the methane detectors. So, we're already building devices and technology for the future possibilities of the decarbonizing grid.

– Silvia Khurrum

Silvia Khurrum: To tie into Bob's comments, the AMI natural gas detector detects natural gas ten percent before the low explosive limit is reached. These are currently detecting natural gas, and the technology has the capacity to detect other kinds of gases. While this is what we have today, we're already thinking a step ahead on low-carbon resources that will help us decarbonize our steam systems, such as hydrogen. We're also looking into the methane detectors.

So, we're already building devices and technology for the future possibilities of the decarbonizing grid. That's one example.

These investments make sense for our customers, technology that keeps our customers safer, or technology that improves our operations or efficiencies while balancing affordability.

Often, many R&D solutions come from in-house at Con Edison. Sometimes, reducing energy and changing behavior doesn't require new technology. It's more of the culture or operational changes that don't have dollars associated with them.

PUF: Bob, where's Con Ed going in partnership with its customers in the vibrant area you serve, two to four years from now?

Bob Sanchez: Our focus is to support our customers as they transition to a clean energy future while continuing to provide safe and reliable power.

For customers who want to charge their electric vehicles, we want to make sure that the service is provided. For customers who want to take their form of heating and with electrification, convert it to electric, we want to be there for them.



We make continuous investments in the systems to strengthen services we provide and to maintain our nation-leading electric reliability, while balancing costs. Innovation that helps to eliminate future operation and maintenance costs is critically important.

– Bob Sanchez

Typical service requests that come in today are about one hundred twenty-five percent more than what we used to receive. We're seeing that increase in requests coming in, and our role is to ensure the infrastructure is there to support their choices.

The industry has taken many steps to help customers understand this transition. Energy efficiency ten years ago was brand new. Today, it's front and center, and is a quarter of the business.

These are the investments we need to make today to build the grid of the future and support our customers' energy demand, so that ten years from now, we're not necessarily thinking about the electrification of heating because that's already part of the system. It's important that we're thinking about how we're supporting our customers today and in the future, making sure we're doing it in a reliable and economical manner. Affordability remains top of mind for the industry more broadly.

PUF: Silvia, New York City has a lot of old buildings and streets. How do you look at the challenge with Con Ed and your team and say, "This is the best and most affordable way to do it?"

Silvia Khurrum: A lot of investments are made assuming a certain grid emission intensity. As the grid is decarbonizing, as the renewables are coming on, or not, the grid coefficient should be going down for the emission coefficient.

It is a balancing act of what happens on the demand side, reflecting what should be happening on the supply side. We're paying a lot of attention to the grid overall in terms of emission intensity, technologies needed to ensure compliance with Local Law 97, for instance, alongside energy demand.

It's complicated. But in terms of what kind of technologies are out there, there are plenty. It's the art of designing and optimizing it for the long term.

PUF: Bob, you are Chair of the Association of Edison Illuminating Companies, AEIC. You have a perspective industry-wide. Where is this industry going?

Bob Sanchez: I believe this industry is heading in the right direction. What's important is that the industry as a whole has the right attitude. Everyone rolls up their sleeves. They're

supportive of one another and mutual aid is a great example of that.

If someone's service territory has been impacted by storms in one area, resources can come from across the nation to help support response and recovery. The industry has the right mindset because we're focused on providing safe, reliable service for our customers in the most economical way possible.

PUF: Silvia, you also work with colleagues across the country, so how does that collaboration work?

Silvia Khurrum: It's exponential. I have to agree with Bob again. I have pride in our industry as we collaborate well. There are a lot of support structures and information sharing.

We are part of many collaborations, and I think the information and the quality of not only academia, startups, and industries, but also the access and speed of information we can share, is truly beneficial for sorting out what solutions are effective or not. PUF


Silvia Khurrum

The First State and Future of Power

(Cont. from p. 4)

The results were quite interesting. And as relevant here in mid-2025 as they were in mid-2018. Here's how the article in the June 15, 2018 Special Issue reported on the results of this question of the Survey:

"It was a lot of fun to see the diversity of answers to this one. One of you said discombobulated. Another said hijacked. Another said rocky. And another said trainwreck.

But the greatest number of you voted for transitional, transition or transitioning. And nearly as many voted for evolving or evolution. Which isn't all that different from transitional et al.

We also got a bunch of transforming and transformation. Again, it's all about change.

Which reminds me. Many of you voted for change or changing. And many voted for flux or in flux. Ch-ch-ch-ch-changes, turn and face the strange, sang David Bowie.

There was a group of you who went a different way with this question. A large number voted for uncertain or uncertainty. And a large number of you voted for confused, confusion or confusing. If you were in this group, you might think things are changing but mostly you think things are foggy." PUF

New Commissioner Orientation

(Cont. from p. 31)

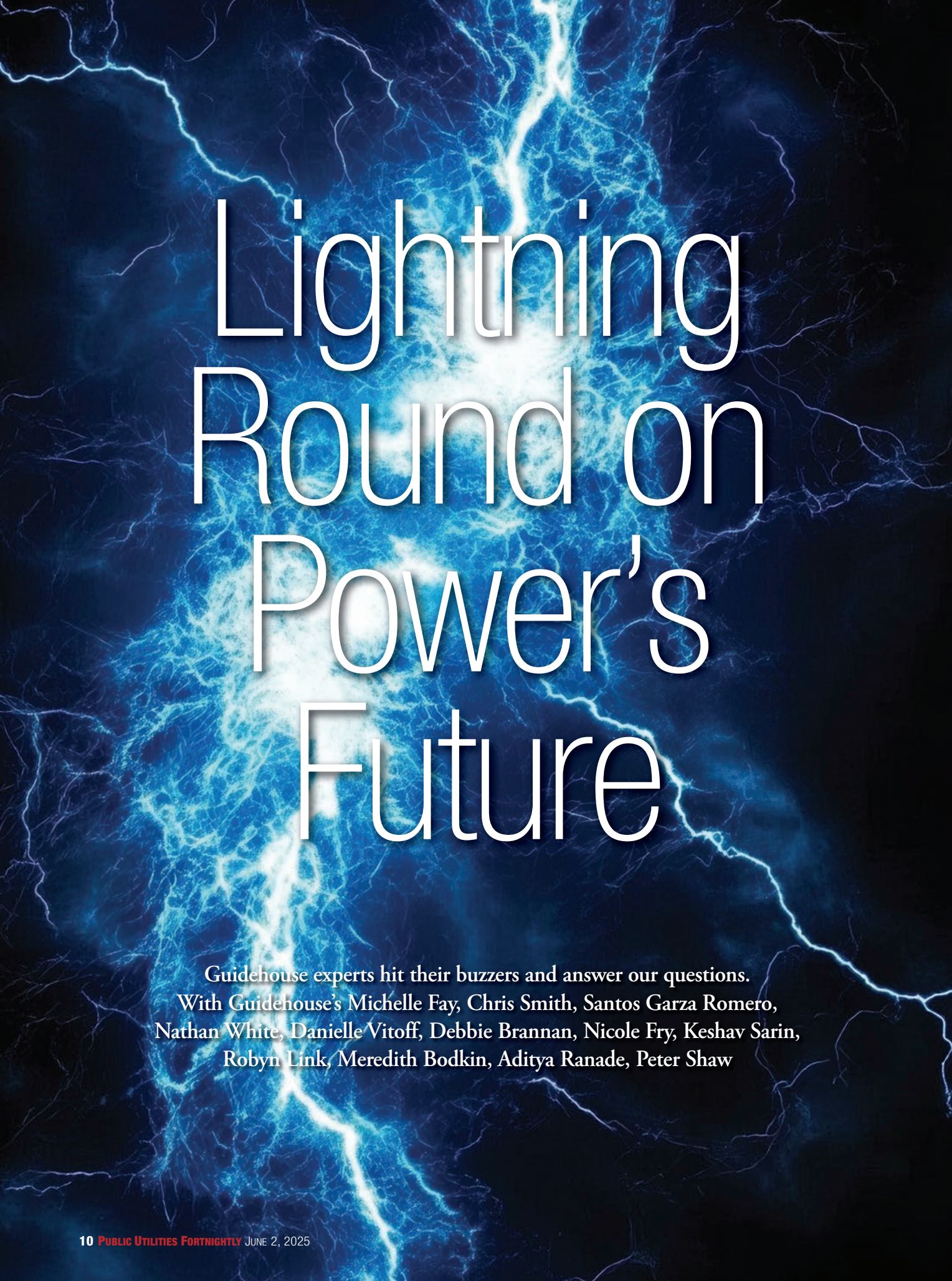
I've also enjoyed the opportunity to stay curious. I expect this will be part of my roles as First VP and NARUC President also. There are so many chances to learn, whether about law, economics, engineering, finance, or energy policy.

I'm constantly challenged not to hesitate to ask questions and look to my colleagues, as well as NARUC's expert Staff, to develop my knowledge on topics that impact my decisions as a Commissioner and my leadership of NARUC.

Third, and I can't stress it enough, is the power of collaboration. It can take a variety of forms: state Commissioners with federal Commissioners, Commissioners with NARUC Staff, state Commissioners with each other, even me with my own Commission Staff.

Through these communications, we learn new information and come to appreciate the other side of issues. Collaboration makes us better regulators and stronger leaders.

Last, which is most important, I've been learning patience, both with others and myself. Regulatory work is intricate, and good judgment is developed over time. This career is one of public service. Being patient with myself and others, and not rushing to a decision, is a key to being the best public servant I can be. PUF



Lightning Round on Power's Future

Guidehouse experts hit their buzzers and answer our questions.
With Guidehouse's Michelle Fay, Chris Smith, Santos Garza Romero, Nathan White, Danielle Vitoff, Debbie Brannan, Nicole Fry, Keshav Sarin, Robyn Link, Meredith Bodkin, Aditya Ranade, Peter Shaw

What are the most pressing strategic challenges utilities face today, and how should leadership teams prioritize their response?

Michelle Fay: Utilities today face several pressing strategic challenges that require careful prioritization by leadership teams to ensure reliable and affordable service.

Increased Demand from Data Centers and Electrification – The growth driven by data centers powering AI and the electrification of buildings and transportation is unprecedented since the 1980s. Utilities must adapt to this surge by enhancing their infrastructure and planning capabilities. This involves identifying planning needs and least-cost solution alternatives to efficiently manage the increased demand.

Supply Chain Disruptions – Infrastructure development necessitates the timely acquisition and deployment of equipment. Utilities must navigate supply chain disruptions that can impact the availability and cost of essential materials and equipment. To address this, utilities should change the way they plan for and acquire equipment, as well as diversify their vendor community to ensure a stable supply chain.

Resiliency Due to Extreme Weather Events – Utilities need to evaluate how susceptible their assets are to extreme weather conditions. This involves developing correlations between historical weather data and their systems, such as inspections and outage databases, to predict future asset vulnerabilities to climate-driven natural hazards like storms, floods, and wildfires.

Protecting significant investments in load growth from extreme events is crucial. Leadership should establish a framework for identifying and realizing business benefits from investments, allowing utilities to measure interim progress, adapt as needed, and ensure investments yield expected benefits.

Digital Transformation – Embracing flexible, modern workforce models, including digital workers, is necessary to generate the capabilities and capacity needed to innovate and mature at the pace of today's market demands. Establishing strong data governance and creating centers of excellence to drive innovation are crucial steps. Leadership should adopt innovative technologies like AI and automation to standardize and tech-enable methods and processes to improve accuracy and efficiency.



When prioritizing, utilities must consider the value each investment will bring in the short and long term, risk appetite of the organization, and ability to support the investment within the context of their specific organization.

– Michelle Fay

All of this must be done while continuing to meet and exceed increasing customer expectations and responding to increased cost pressures. Utilities must embrace innovative technologies that can support improved accuracy and efficiency. They must develop investment strategies for a sustainable energy system while managing the long-term risk of changing policy objectives. Identifying and advocating for needed policies and regulations is essential to manage these cost pressures.

When prioritizing, utilities must consider the value each investment will bring in the short and long term, the risk appetite of the organization, and the ability to support the investment within the context of their specific organization.

By combining these elements into an integrated strategy, utilities can optimize outcomes for their customers and reduce operational and financial risk. Leadership can direct resources where they are needed most, positioning the utility as an enabler of continued growth. ❍

What near-term actions should utilities take to address the prospect of exploding load growth and what should they be doing to deliver necessary capacity and optimized outcomes for all stakeholders?

Chris Smith: Arguably no issue has received more industry attention over the past year than rising electricity demand. The confluence of data centers to power AI, onshoring manufacturing, and longer-term electrification of buildings, transportation, and industries indicates an extended growth period not witnessed since the 1980s.

A recent Grid Strategies report, "Strategic Industries Surging: Driving US Power Demand," that analyzed public filings, determined that U.S. electricity demand could rise one hundred twenty-eight gigawatts over the next five years – a seventeen percent increase. This growth will likely be concentrated in certain regions, so it could significantly strain aging electric systems absent substantial new capital investment on an accelerated timeframe.

Meeting this challenge requires focused attention if utilities are to maintain reliable and affordable service. Today's electric system planning, construction, and regulatory processes are designed to manage moderate levels of growth, but lack the flexibility, scaling, and pace needed to manage sustained surges in new customer connections and large load additions. Further, building new infrastructure to connect large customers introduces financial risk if loads do not manifest at the anticipated size.



Today's electric system planning, construction, and regulatory processes are designed to manage moderate levels of growth, but lack the flexibility, scaling, and pace needed to manage sustained surges in new customer connections and large load additions.

– Chris Smith

A multi-faceted, integrated approach using a centralized capital programs office could accelerate the new ways of operating and planning systems. Key elements include:

Planning – Identifying planning needs and least-cost solution alternatives;

People – Scaling and capability building to manage an increased capital portfolio;

Process – Standardizing project management practices to scale and gain process efficiency improvements;

Technology – Enabling advanced analytical capabilities through AI and automation;

Policy and regulatory – Identifying and advocating for needed policies and regulations; and

Value realization – Establishing a framework for identifying and realizing business benefits.

By combining these elements into an integrated strategy, a utility can optimize outcomes for its customers, reduce operational and financial risk, and strengthen its reputation. With improved line of sight, leadership can direct resources where they are needed most so that the utility is ultimately viewed as an enabler, rather than a barrier, to continued growth. ❍

Given the all-of-the-above generation buildout strategy that many utilities are embracing, how should they streamline their transmission planning and interconnection approaches?

Santos Garza Romero: Before FERC Order 2023, utilities and balancing authorities reviewed interconnection applications in series, looking at generation and load projects individually in their respective interconnection queues.

As the number, size, and type of projects began growing and changing, this approach became unsustainable. According to the Lawerence Berkeley National Laboratory, new generating capacity entering the queues grew from one hundred twenty-seven gigawatts in 2010 to nine hundred eight gigawatts in 2023.

Looking for a new approach, utilities must first limit the size of each queue. At the same time, they must train and develop a workforce and implement software tools to analyze and manage the queue process, and capable hardware to handle the increased computational demands – as

MISO has done by adopting Pearl Street's SUGAR tool.

At least in the early phases of a study, utilities must develop automated tools for qualifying and quantifying the upgrade requirements for interconnecting the cluster, though generation projects increasingly require specialized studies, such as electromagnetic transients. All of these tests should occur before they are mandated by requirements such as the high penetration of inverters.

Depending on the number of clusters analyzed each year, a utility could transfer the results into its annual transmission planning process, combining to capture benefits from new load, generation, and transmission all in one model. The transmission plan will capture necessary grid upgrades along with the CAPEX needed to implement them.



Producing a transmission plan is an arduous process that can vary annually because of changes in regulatory frameworks, load growth, or power consumption profiles, so utilities must design and implement tools and processes that constantly revise key assumptions and automate their modeling.

At least in the early phases of a study, utilities must develop automated tools for qualifying and quantifying the upgrade requirements for interconnecting the cluster, though generation projects increasingly require specialized studies, such as electromagnetic transients.

– Santos Garza Romero

How should utilities collaborate with states and local communities to meet future load growth and resiliency needs?

Nathan White: With the grid's role evolving, utilities have an opportunity to work with state and local communities to drive economic growth from data center and manufacturing development. A resilient grid must be able to manage extreme events, with every dollar in grid hardening estimated to save four to six in restoration and economic impact – ensuring downtimes are shorter and commerce can resume quickly.

Thus, as Guidehouse outlined in its article about creating a successful decarb hub, state and local communities can be force multipliers for addressing some of the utility industry's biggest challenges through both one-time and ongoing capital incentives. Stakeholders must be engaged early and often.

Public and private entities must align on proactive measures to enable a collaborative framework that cuts through red tape and bureaucracy and establishes clear lines of communication for accelerating growth and deployment. Ultimately, collaboration between energy providers and state and local stakeholders is essential for dismantling historical silos, aligning incentives, and accelerating data center deployment.



Ultimately, collaboration between energy providers and state and local stakeholders is essential for dismantling historical silos, aligning incentives, and accelerating data center deployment.

– Nathan White

Steps must be taken to protect signifi-

cant investments in load growth from extreme events. In 2024, there were twenty-seven disasters costing billions of dollars, which resulted in 182.7 billion dollars in damages, with Hurricanes Helene and Milton costing 78.7 billion dollars and 34.3 billion dollars respectively. The direct damage was significant, and the indirect economic impact, along with rapidly increasing insurance costs, underscores the critical importance of resilience measures.

The challenges ahead can be daunting, but by collaborating with state and local partners and engaging stakeholders transparently, utilities can transform the grid into a platform for economic vitality. ❍

What are some no-regrets AI use cases that utilities should consider, and which can have a sustained long-term impact?



By prioritizing no-regrets AI applications to support enhanced customer service, employee operations, and regulatory activities, utilities can be better prepared to navigate the complexities of the evolving industry and drive a reliable, affordable, and resilient energy future.

– Nicole Fry

Nicole Fry: The energy industry is at a pivotal moment, with utilities increasingly turning to AI to address pressing challenges and seize new opportunities. Among the myriad AI applications, several stand out as no-regrets use cases that utilities should consider for immediate benefits as well as long-term impact.

Customer Service – Enhanced customer service improvements offer clear value but can be challenging because existing systems are both embedded and heavily customized. To overcome these challenges, utilities should start by exploring solutions that enhance customer service capabilities without fully replacing their core systems. These solutions can streamline processes, improve information access, and enable smarter, faster searches, delivering immediate value to customers and employees alike.

Employee Operations – AI can also significantly improve the efficiency and satisfaction of utility employees by simplifying how they fill out forms, improving access to information, and enabling smarter, faster searches. These enhancements not only boost productivity, but they also contribute to a more engaged and motivated workforce.

Regulatory Activities – Finally, AI offers substantial benefits for regulatory support activities. Utilities can leverage AI to streamline regulatory tasks, such as gathering and analyzing data for benchmarking and supporting compliance filings. By automating these processes, AI reduces the administrative burden, enhances accuracy, and ensures timely compliance with regulatory requirements.

Looking into the future, more comprehensive strategic use cases like load generation and demand management should be in the pipeline for utilities as well, but these will take longer to develop and will require more advanced data integration. By prioritizing no-regrets AI applications to support enhanced customer service, employee operations, and regulatory activities, utilities can be better prepared to navigate the complexities of the evolving industry and drive a reliable, affordable, and resilient energy future. ❍

Thomas Edison had 1,093 U.S. patents, including his first on June 1, 1869. It improved the voting machine for legislative bodies.

Where are utilities currently lagging best practices for managing risks to critical infrastructure? What immediate actions can they take today to mitigate those risks?

Keshav Sarin: Despite providing essential services such as electricity, water, and gas, many utilities lag in best practices for managing risks to critical infrastructure. Often, utilities are most comfortable on the lagging side of the technology curve, especially with operational technology, where refresh rates are measured in decades rather than years.

Key issues contributing to risk include outdated systems, a retiring workforce, interconnected networks, lack of automation, insufficient cyber resources, and poor visibility into security controls. If utilities are to address these challenges, they must immediately strengthen their infrastructure's resilience measures.

Legacy systems are one of the most pressing issues the industry faces. Many utilities make themselves highly vulnerable to cyberattacks by relying on aging infrastructure that lacks modern security features.

As utilities' staff embrace digital transformation, interconnected networks increase the risk of cyber threats spreading across systems. Interconnectivity benefits efficiency and revenue generation, but it expands the attack surface, particularly when utilities have been slow to adopt automation and advanced cybersecurity technologies that could identify and mitigate threats in real time.

The loss of experienced workers can lead to decreased network reliability, construction project delays, and higher costs. A resulting lack of skilled resources exacerbates the problem, leaving utilities ill-equipped to respond to emerging threats. Lastly, because of poor visibility into operational risk indicators, utilities can have difficulty with security controls and vulnerabilities, detecting adverse conditions, securely responding to incidents, and ensuring compliance with best practices.



To mitigate these risks, utilities must identify, prioritize, and protect key systems and networks by upgrading legacy infrastructure and segmenting networks to reduce the spread of cyber threats.

– Keshav Sarin

To mitigate these risks, utilities must identify, prioritize, and protect key systems and networks by upgrading legacy infrastructure and segmenting networks to reduce the spread of cyber threats. Continuous monitoring and enhanced threat intelligence capabilities should be implemented to detect and mitigate adverse conditions in real time.

Recognizing that human error is a major vulnerability, utilities should train all employees on cybersecurity risks and best practices. Leveraging automation in operational and security processes can improve efficiency, reduce human error, and lessen the burden on staff.

Automation, especially AI, can improve visibility into all systems, reduce the total number of resources needed to monitor increased efficiency, and improve the overall risk posture. AI can help utilities design resilient, high-capacity networks that ensure reliable power delivery while minimizing infrastructure costs. One caution is that AI-driven facilities can lead to voltage fluctuations and grid imbalances, which utilities must manage if they are to maintain a consistent power supply.

By taking these actions today, utilities can significantly enhance their resilience and protect critical infrastructure from evolving risks. ❍

The electric meter was patented on June 14, 1881, leading to a near infinite number of hours of discussion, debate, and dispute.

What are the most important actions that utilities can take today to prepare for an America First energy policy agenda from the Trump Administration? How can utilities enhance energy security goals and what role will decarbonization and clean energy play going forward?

Danielle Vitoff: A driving force behind utility investment today is the generational growth in demand. This trend and the need to replace aging infrastructure drive the majority of project investment decisions.

Utilities fully understand that their asset investment plans will persist beyond any one federal administration or federal policy decision. Given that they must develop investment strategies for an enduring energy system, utilities must take advantage of near-term opportunities, offered through supportive policy, to achieve long-term project development goals, while managing for the long-term risk of changing policy objectives.

The Trump administration's America First policy creates a supportive environment for an all-of-the-above approach – one that recognizes that both molecules and electrons will have a place in powering the future. This federal policy transition prioritizes commercial competitiveness over specific policy objectives, which will result in a wide range of projects that are fit to purpose for the location where they are to be built. In addition, a fully deployed America First policy would onshore energy technology supply chains, removing an additional hurdle to clean energy development that many utilities encounter in their investment planning.



Under an energy scarcity regime, such as the U.S. is entering due to projected load growth, energy efficiency and load shifting must be reconsidered as critical energy resources.

– Danielle Vitoff

Under an energy scarcity regime, such as the U.S. is entering due to projected load growth, energy efficiency and load shifting must be reconsidered as critical energy resources. Every molecule and electron that can be saved can be leveraged for additional economic output. In a world of growing demand, capturing efficiency gains should be considered equivalent to developing new energy resources.

The current federal administration's energy policy objectives may seem to favor traditional energy solutions. However, tailwinds combined with a policy supportive of project development as a whole may provide the avenue for utilities to bolster energy security, while investing in alternative solutions. Beyond the reasons already mentioned, if America is to further establish itself as an energy powerhouse, it must continue developing a varied energy supply and supply chain. ❍

Michelle Fay is a partner in the Communities, Energy & Infrastructure segment and leads the firm's global Energy Providers practice, supporting clients as they implement transformational programs. She brings more than twenty-five years of experience planning and delivering complex and innovative programs for utilities.

Michelle's expertise includes program and project management, organizational change management, account management, process and performance improvement, grid modernization, energy efficiency, and analytics. She is an experienced leader specializing in emerging technologies and is respected for her integrity, leadership, team building, strategic planning, and laser-focused execution.

Chris Smith is a director in Guidehouse's Communities, Energy & Infrastructure segment, where he specializes in energy policy and regulatory strategy. Leveraging his firsthand experience working at large investor-owned and municipally owned utilities, Chris advises utilities

How do you see the utility's role in energy efficiency and electrification evolving amid significant load growth accelerated by data center buildouts?

Robyn Link: Utilities are at the forefront of addressing the challenges that come with managing high-density data center loads. They must solve issues for both grid and customer needs, while providing reliable and sustainable power. As data center demands surge, their role in energy efficiency and electrification could evolve in several ways.

Enhance Grid Efficiency – Utilities should deploy smart grid technologies. With real-time data, sensors, and automation, they can reduce energy waste and better predict and monitor energy flows, manage grid conditions, and optimize power distribution to accommodate growing data center energy demands.

Advance Energy Efficiency with Liquid Cooling – Utilities should develop incentive programs encouraging data centers to adopt energy-efficient cooling technologies like liquid cooling and direct-to-chip cooling. By improving operational efficiencies and easing grid constraints, these technologies reduce overall energy consumption significantly more than traditional air-cooling methods do.

Target High-Usage Data Centers – Programs should target data centers with the highest potential for energy savings. The average power usage effectiveness (PUE) of U.S. data centers is about 1.5. High-efficiency data centers can currently achieve a PUE close to 1.1, which demonstrates a significant opportunity for improved efficiency.

Support Electrification and Demand Response – Utilities can create win-win situations by offering incentives to data centers to shift power usage during peak periods, which then allows utilities to manage grid capacity more effectively, while potentially reducing the need for costly new infrastructure. Utilities can also provide energy storage options that support grid stability and give data centers more flexibility in managing their operations – in turn avoiding high demand charges.



Utilities should develop incentive programs encouraging data centers to adopt energy-efficient cooling technologies like liquid cooling and direct-to-chip cooling.

– Robyn Link

Combinations of Renewable and Energy Storage – Utilities can help data centers electrify with renewable power and energy storage to build in redundancy and backups. They can offer tailored green energy tariffs or broker power purchase agreements that fuel data centers with solar, wind, or hydropower.

They can also develop offerings for microgrids, storage, and distributed energy resources, ensuring reliable, sustainable energy wherever data centers are.

Utilities are actively shaping energy's future. They are leading the charge to power the data-driven world of tomorrow while ensuring that energy use remains reliable, smart, clean, and efficient. ❍

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in the development and execution of strategies for meeting organizational goals, pursuing growth opportunities, mitigating risk, and achieving ambitious policy objectives.

With a background in utility regulation, ratemaking, wholesale power markets, energy resource planning, and decarbonization strategies, he brings a deep understanding of the complex regulatory and stakeholder engagement processes that impact utility planning, rate design, and program design.

Santos Garza Romero is a natural gas and power industry executive with twenty-plus years of international experience in the power and natural gas markets, as well as in infrastructure development, corporate planning, electrification value chains, strategy and energy consulting, and commercial negotiations and capital investment evaluations for energy commodities.

He has supported the technical and commercial development of more than ten gigawatts of traditional and

Where do you see AI and new technologies having an immediate impact on utility operations today? What can utilities do to position themselves as fast followers?

Debbie Brannan: New technologies like AI are having an immediate impact on utility operations today, particularly in corporate services, such as customer service operations, regulatory compliance, and supply chain management.

AI tools automate routine tasks and transform vast amounts of data into actionable insights, leading to better decision making, reduced risk, improved customer service, improved accuracy, and enhanced safety. For example, in customer service, AI offers personalized interactions, cost-effective solutions, faster response times, and data-driven insights that boost customer satisfaction, operational efficiency, and resource allocation.

AI is also driving innovation in process-oriented services, such as field operations and storm recovery. Predictive analytics, real-time damage assessments, and optimized crew deployment enhance these operations. For instance, AI can forecast storm impacts, identify vulnerable infrastructure, and pre-position resources, reducing response times and improving safety. AI-powered tools like drones and automated dispatch systems streamline inspections and prioritize repairs, allowing faster service restoration while minimizing costs and risks.

If utilities are to become fast followers in AI adoption, they should build a robust ecosystem that strategically integrates AI and other new technologies into their operations and across their networks.



If utilities are to become fast followers in AI adoption, they should build a robust ecosystem that strategically integrates AI and other new technologies into their operations and across their networks.

– Debbie Brannan

The starting point is establishing strong data governance to ensure data quality, accessibility, and security, because clean and structured data is essential for effective AI implementation. Utilities should also create centers of excellence to drive innovation, identify high-impact use cases, and scale successful pilots across the organization.

Cross-functional teams can foster collaboration between IT and business units, ensuring alignment with organizational goals and accelerating deployment. Training employees to build AI fluency is crucial because they can then effectively leverage AI, foster innovation, and become agents of change, ensuring a successful digital transformation. By combining these strategies, utilities can achieve early wins that lay the foundation for long-term AI integration. ❍

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renewable power generation projects internationally, including a three gigawatt, liquefied-natural-gas-based energy generation hub in Brazil.

Santos received an MBA from the Kellogg School of Management at Northwestern University and a BSc in chemical and systems engineering from the Monterrey Institute of Technology (Tecnólogico de Monterrey) in Monterrey, Mexico.

Nathan White is a director at Guidehouse with fifteen years of experience advising utility and energy companies on strategies for meeting the evolving needs of the energy industry. Over the course of his career, Nathan has worked across multiple sectors and functions, including ECP (engineering, procurement, and construction), finance, technology, and regulatory and risk management, with a focus on delivering transformational enterprise initiatives. He partners with clients to navigate complex regulatory environments, optimize operations, and implement cutting-edge technologies to address the needs of today's energy landscape.

Danielle Vitoff is a director in Guidehouse's Communities, Energy &

How should utilities transform their organizations and workforce to be competitive in today's rapidly evolving landscape?

Meredith Bodkin: Utilities today face a more rapidly evolving, highly disruptive landscape than ever before, antiquating the static business models and one-way transmission and distribution of past decades.

With heightened regulatory environments, shifting work paradigms, suffering workforce cultures, and increasing customer load demands, utilities that want to remain competitive must make continuous transformation a core component of day-to-day operations. Utility workforce and operating model innovations are essential for cultivating the agility required to adapt to rapidly changing market dynamics.

Utilities must embrace flexible, modern workforce models, including multi-sector workforces, to generate the capabilities and capacity they need to innovate and mature at the pace of today's market demands. The race for skilled resources is more competitive than ever as the existing workforce ages and labor markets wane, making enterprise alignment on talent acquisition strategies, career pathways, and succession planning critical.

In addition, skill gaps are becoming more apparent with advances in technology (particularly AI) and innovation in core business processes, creating a greater need for investment in upskilling, reskilling, and retaining top talent to drive sustainable change and profitability.

Organizational structures must evolve in lockstep with the workforce. The emerging distributed, intelligent, and mobile grid requires an innovative, collaborative, and dynamic operating model. Utilities must redesign their internal structures, processes, and technologies to deliver greater customer value.

Structures must remain flexible so they can rapidly respond to changing market demand and more easily adopt new business models and emerging technologies, such as advanced analytics and modern IT/OT systems.

Organizational transformation should also include external elements for additional agility and resilience. Building partnerships with technology providers, government, and industry accelerates capability building, allowing utilities to innovate more effectively and set new industry standards. The transformation utilities must experience is ultimately a generational one, and the people side of change cannot be neglected. When these issues are addressed effectively, utilities are better positioned for significant growth. ❍



The race for skilled resources is more competitive than ever as the existing workforce ages and labor markets wane, making enterprise alignment on talent acquisition strategies, career pathways, and succession planning critical.

– Meredith Bodkin

Infrastructure segment. An architect by training, she applies a wide range of multidimensional problem-solving skills to her work with clients.

Danielle is adept at managing diverse stakeholder networks and driving forward strategies with wide support. She has extensive renewable energy expertise, comprising wind, solar, hydro, nuclear, carbon capture, hydrogen, biofuels, geothermal, and sustainable aviation fuels.

Among Danielle's notable engagements are the Valley Pathways Study for the Tennessee Valley Authority, a decarbonization business plan for a gas utility facing significant carbon reduction targets, and the development of the San Antonio Climate Action and Adaptation Plan. Danielle was included in Public Utilities Fortnightly's Under 40 list in 2022.

Debbie Brannan is a director at Guidehouse leading a team that delivers data and analytics services to commercial energy providers. She brings fifteen years of experience partnering with clients to develop analytics solutions that enable data-driven decision-making in a rapidly changing industry.

How are leading utilities advancing resiliency programs today in anticipation of increased threats to their customers and infrastructure from climate change, storms, and wildfires?

Aditya Ranade: Leading utilities are taking a few key steps in addressing resiliency. The first is to assess their assets' vulnerability to extreme weather events by developing correlations between historical weather and their systems, such as inspections and outage databases. They can then use these correlations to develop future asset vulnerabilities to climate-driven natural hazards such as storms, floods, and wildfires.

Leading utilities' resiliency programs are also typically ahead in their digital journeys by developing geospatial asset registries, accessible outage management systems, and digitized inspection data. A plethora of public and private datasets with downscaled climate data is available to choose from, so selecting among the choices can sometimes be overwhelming.

Utilities should think through the appropriate timeframe and climate scenarios for these hazards and choose datasets with appropriate spatial and temporal resolution for various situations. Some hazards, such as wildfires, are worsened by climate change and are a persistent threat today.

Others, such as chronic heat, may not take effect for a couple of decades, and yet others, such as flooding, are impacted by land features such as elevation and topography.

Quantified benefit-cost analysis typically ensures smoother regulatory proceedings including approvals and cost-recovery, so the second step is for utilities to use this quantitative understanding of vulnerability for benefit-cost analysis on specific resiliency programs, such as pole replacements, undergrounding, and substation flood control. ❍



Leading utilities' resiliency programs are also typically ahead in their digital journeys by developing geospatial asset registries, accessible outage management systems, and digitized inspection data.

– Aditya Ranade

Nicole Fry is a director in Guidehouse's Communities, Energy & Infrastructure segment, leading strategic engagements for utilities across North America. Nicole helps clients navigate the global energy transition, applying nearly fifteen years of experience advising the U.S. Department of Energy in the areas of program and project management, market analysis, and regulatory studies to support decarbonization, reliability, and resilience. She is passionate about delivering transformational outcomes and excels at leading cross-functional teams that collaborate to solve complex challenges using innovative approaches and new technology.

Keshav Sarin is a director and leads the cybersecurity and compliance solutions team in Guidehouse's Communities, Energy & Infrastructure segment, helping commercial clients, state and local governments, and federal agencies with cybersecurity strategy and implementation. Keshav brings more than twenty-eight years of professional experience in a variety of cybersecurity roles related to risk management, information systems development, and security controls management.

Robyn Link is a director in Guidehouse's Communities, Energy & Infrastructure segment. With more than twenty years of experience in the energy industry, she has partnered with eighty-plus utility companies in North America to create and deliver new, transformational load management and customer engagement solutions that drive results and resolve significant business challenges.

Meredith Bodkin is a partner at Guidehouse, specializing in business transformation. With more than seventeen years of experience, she leads large-scale transformation projects for public sector and commercial clients, enhancing performance and operational efficiency.

What innovations in regulatory mechanisms do you see utilities considering to meet future customer needs while maintaining affordability for all customers?

Peter Shaw: A confluence of policy and market drivers is causing upward pressure on utility customers' bills. These drivers are spurring generational capital spending on utility infrastructure, as well as increasing electricity consumption at the point of use.

Replacing aging generation fleets with renewables, hardening grids in the face of accelerating climate hazards, and electrifying the transportation and space heating sectors are well documented trends driving utility integrated resource plans and utility revenue requirements.

Adding to the issue of unprecedented growth in power demand from data centers and manufacturing, the current cost-of-service ratemaking paradigm is ill-equipped to handle the affordability challenges facing utilities and consumers.

Regulatory mechanisms exist to blunt the deleterious effects of rate increases. First and foremost, beneficial demand growth holds the greatest potential for spreading capital recovery costs across a greater volume of delivered energy, allowing utilities to earn their revenue requirements while mitigating rate increases. Creative regulation that promotes electrification load growth can contribute to electricity's long-term affordability.

In another example, cross-sector compensation/incentive mechanisms can enable gas utilities to earn on system investments, while providing peak capacity relief to electric utilities in exchange for avoided capacity compensation, potentially lowering bills for all consumers.



Regulatory incentives focusing on improving overall system utilization create a net downward pressure on rates, just as prioritizing rate impact benefits over other benefit-cost tests helps lower rates more readily than do traditional avoided capital cost tests.

– Peter Shaw

Finance innovations including public-private partnerships can be leveraged to encourage investments in distributed energy resources – like onsite or collocated generation and storage – to provide energy at a cost that is less dependent on utility rates.

Moreover, regulatory incentives focusing on improving overall system utilization create a net downward pressure on rates, just as prioritizing rate impact benefits over other benefit-cost tests helps lower

(Cont. on page 38)

Meredith is known for her strategic insights and ability to navigate complex challenges in organizational and operational transformation, workforce planning, procurement, program management, and change management. She is dedicated to leveraging technology and innovative solutions to drive impactful change.

Aditya Ranade has nearly twenty years of experience in both the public and commercial sectors, serving corporations, utilities, investors, and government officials. Currently he leads the infrastructure resilience solutions team for Guidehouse, serving energy providers and specializing in climate resilience, grid modernization, and regulatory policy. He holds a PhD in materials science and engineering from Case Western Reserve University and an MBA from Babson College.

Peter Shaw is a director in the Communities, Energy & Infrastructure segment, where he leads a team of experts in regulatory and pricing strategies. His energy-transition advisory work for electricity and gas utilities focuses on regulatory compliance and innovation strategies for greenhouse gas mitigation, climate risk management, and corporate resilience.

Before joining Guidehouse, Peter's energy industry work included senior strategy roles at EY-Parthenon, J.D. Power, and cleantech startups and focused on demand response, AI/machine learning, and industrial energy services. ❍

MISO Chief Customer Officer on Resilience

Conversation with Midcontinent Independent System Operator Senior Vice President and Chief Customer Officer Todd Hillman

MISO is responsible for grid operations in the central United States, across fifteen states and Manitoba. It's a big job. And recently an increasing challenge given the simultaneous trends of rapidly increasing demand for electricity, including the addition of very large point sources of industrial demand, the retirement of a great number of coal-fired baseload power plants, and the surge in renewable power generators on both sides of the customer meter.

Among the voices in the last few years cautioning the industry that these trends are combining to introduce new risks to reliability, MISO has been at the forefront. The aim is to stir us all to accelerate the development and implementation of innovative policies, strategies, and technologies to address the new risks.

Speaking on behalf of MISO is often the role of its Chief Customer Officer, Todd Hillman. In this Special Issue of Public Utilities Fortnightly, on the State and Future of Power, it is then fitting that Hillman sat down with the PUF team to share his thoughts on the latter part of that equation, the Future of Power.

PUF's Steve Mitnick: What are the top issues that you, leadership of MISO, and membership are worried about?

Todd Hillman: The number one thing is always maintaining reliability. It's job one. If you don't have that then other pieces of this puzzle have issues.

The load growth we're seeing is unprecedented. I've heard the word renaissance being described for this load growth. Data centers and load growth are talked about a lot – the hyperscalers.

Indiana's got semiconductor chip foundries. Louisiana's got car steel plants and Arkansas has lithium mines. Especially in the south, the amount of growth has always been big, but this is to a whole other level.

We haven't seen that much growth in quite a long time. Now, we're seeing exponential growth. That's one side of the coin.

The other side of the coin is there are a fair number of retirements. The amount of generation we're getting on the system looks different than twenty-five years ago in the last big boom.

For us, this has largely been solar, wind, and some batteries. These are the four-hour, lithium-ion batteries. The MISO system's already tight, as we just saw from our planning resource auction.

Summer prices have cleared at the level they should be, given the tightness on the system. That's okay, but all these resources coming on have a lower accredited capacity than the traditional resources. You have to make sure you're meeting that supply-demand balance in an already tight market. That's what we're focused on.

We're also focused on getting more transmission built. Our long-range transmission plans over the last four or five years included bringing on significant transmission. But we're also seeing these projects have been expedited.

People are coming to us and saying, "We have a legitimate load. We need transmission but we can't wait through these processes." MISO has stepped up and responded. We got a cap on our generation queue studies from FERC, that was approved and hope to be hearing soon about our expedited resource addition studies.

Those are like what PJM just got approved and the SPP is now going to put through. How can we work on getting these large loads to market as quickly as possible? This load's important to have from a security perspective.

All these resources coming on have a lower accredited capacity than traditional resources. You have to make sure you're meeting that supply-demand balance in an already tight market. That's what we're focused on. We're also focused on getting more transmission built.

From an economic perspective, from a job's perspective, we don't want to be the ones in the way of that economic process. That's why we're being so aggressive at FERC. Our members are coming along with us. We have the majority of our state commissions.

Back to your question about what our members are focused on and thinking about? The great news is I have this new load, what I need to know is that I have generation online commensurate with it.

But that's when we get into the supply chain issues. We have supply frictions and deals needing to be renegotiated because it's been some years since they've had those issues.

There are permitting, siting, and state policies. A whole bunch of issues all in that big bowl of gumbo, and we want to make sure we're the right helper for our members and states.

We want to help stir that gumbo, season it a bit from time to time but we want to keep the heat on with the temperature at a good level. We want it to be the gumbo folks want to eat. That's our focus.

PUF: How optimistic or pessimistic are people who are involved in this?

Todd Hillman: We should be realistic. We ought to focus on what we can control. So, MISO can control how fast things get



If you look at the operators and different control rooms, they are saying the same thing. 'How do we figure out a way to do this and work together?' A lot of work has been done with SPP lately on transmission coordination. That was a huge victory with our Joint Targeted Interconnection Queue.

through the queue. MISO can control how much transmission gets recommended to be built and by whom.

Create prices for markets and then reliably operate markets. Outside of those key issues, I can't build the transmission. I can't build the generation, I can't make steel go faster, and I can't get more turbines.

We wish we could do more. I'd love to get some grid-enhancing technologies on faster and see long-duration storage happen tomorrow. That could be a game changer. We talk with a lot of folks about building these new technologies.

Small modular reactors have been a big source of conversation. However, it's years away, not commercial yet, and there is no clear winner. We're waiting on one technology to step up and be the game changer.

Most of the units coming through this expedited process are natural gas, because it can come on fairly quickly. High factor capacity gas in the U.S., especially in the Midwest, is fairly abundant.

Pipelines need to be built. That work must be done. Gas is proven, storable, and can be built fairly quickly. But there are states that truly believe they can get there with renewables.

We need to be able to accommodate both policies. Because some states don't want gas. That's okay. We must figure out how to get all of that through.

All the above applies to transmission, generation, and markets. So, getting that all-of-the-above strategy is what's critical for us, and not being in the way.

PUF: The MISO region is above average as far as getting infrastructure built. Is there a secret sauce?

Todd Hillman: The magic for us was long-range transmission plans. Our first one was in 2011. The multi-value projects that came in 2011 to build a lot of renewables, moving from west to east on our footprint to major population centers took a while for us to get there but at the time were fairly groundbreaking.

When we came back with the long-range transmission plan Tranche 1 and 2.1, it was building on that foundation. Our members and states looked to all of that and said, "Number one, we understand why you're doing it. Number two, we have a cost allocation already in place." Number three, they were able to all get together and collaborate.

If not starting from that position of everybody's in this together to get this stuff done, a lot of time will be spent figuring out, what's happening, who's doing it, how's that going to work? We had a lot of that already in place. MISO and SPP had a lot of wind come on our system early.

In '03, '04, '05, we were already seeing one thousand, two thousand megawatts of wind. It was different for us, and we

didn't know what the queue would look like, so we had to figure it out. How to dispatch it? How do you regulate up and down those type of assets?

We're almost twenty years in, or fifteen to seventeen years in on managing those. That has been a huge advantage for us because we're now up to thirty-five thousand or thirty-six thousand megawatts of wind in the MISO system.

We're up to over ten thousand megawatts of solar. It has come on the system quickly, a lot faster than the wind adapted to the system. Those bring different operating and reliability characteristics that we need to work through. We need system adequacy, flexibility, and stability.

We just saw what happened in Portugal, Spain, and France. More is coming so we're still waiting to hear the facts. The facts are important here. A lot of questions must be asked. We've already started work on the MISO end to ask if something like that from a voltage, inertia, and stability issue happens, how would MISO handle that?

We feel good about the answers but want to hear all the facts from what happened first. The questions of what to do or how to approach it? Our operations people are working with our seams partners, and we feel comfortable that we're in a good position.

PUF: In MISO there are a mix of states politically. How do you resolve issues?

Todd Hillman: The key for us is always listening. That sounds a little corny but it's true. We've always tried to foster a good relationship because fourteen out of our fifteen states are still traditionally regulated.

A lot of them still go with that dynamic of generation, load, transmission, distribution, and customer billing. Illinois is different, and we understand that it's different. Ten percent of Michigan is different.

We always must look through that lens. What's interesting about Illinois is it is both in PJM and MISO. There is the PJM, MISO dynamic going on. The Organization of MISO States is a great group of folks that get together with a common purpose. They talk a lot about affordability and reliability.

Those public servants are focused on trying to do the best job they can in their states, but also with that OMS hat on. We say that term a lot here. Somebody will be focused on their state, but I see them taking that hat off and, importantly, putting that OMS hat on.

Thinking about, while it might not be the greatest thing for my state, it's valuable to the region, and I will get some value out of it for my constituents. That bigger focus has been a blessing to work on with these folks. We don't agree on everything. The amount of outreach and listening we do is tremendous.

PUF: With SPP, ERCOT, PJM, and the great unknown of the west, how do you all work together?

Todd Hillman: We take tremendous pride as RTOs and ISOs, as well as our coordinated partners like TVA, Southern Company, and others. When the oscillating air device gets hit with fertilizer, we're together on what we're thinking about.

That's a testament to the industry overall. With a storm, no one cares whether it's my poles or your wires or what, people just get together to get the lights back on.

If you look at the operators and different control rooms, they are saying the same thing. "How do we figure out a way to do this and work together?" A lot of work has been done with SPP lately on transmission coordination.

That was a huge victory with our Joint Targeted Interconnection Queue. It was a one-and-a-half billion dollars with a five hundred-million-dollar DOE grant coordinated with the state of Minnesota. Just two groups that had not gotten together on this finally said, "Hey, listen, here's this blank piece of paper. How would this look?"

Pipelines need to be built. Gas is proven, storable, and can be built fairly quickly. But there are states that truly believe they can get there with renewables. We need to accommodate both policies. Because some states don't want gas. That's okay.

We came up with a decent-sized portfolio. We're working on the same with PJM now and coordinating with their state commissions and our state commissions.

The seams work continues. We just signed an emergency agreement with the Tennessee Valley Authority to try and operate better when those emergencies come up.

Putting everything else aside, we need to make sure that the first thing you're doing is maintaining reliability. That absolutely comes first. Everything else will come after that.

It also helps that we're coordinated with our regional organizations, with NERC. That also is playing into that. As puzzle pieces all come together, that's how we make it work. But it is getting tougher and tougher with this foundational shift in generation, and transmission, and now load into the U.S.

PUF: What do you do on a typical day?

Todd Hillman: A fair amount of being in the field with our members and states is a big part of what I do. Collaboration and communication are critical. I also have responsibility for the MISO messaging.

How do I make sure that we're putting the right messages

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NARUC President on Commissioner Chairs Meeting and Second Vice President on New Commissioner Orientation

Conversation with NARUC President Tricia Pridemore
(also Georgia PSC Commissioner) about the Chairs Council Conference,
NARUC Second Vice President Jehmal Hudson
(also Virginia SCC Commissioner) about New Commissioner Orientation,
with PUF Senior Advisor Paul Kjellander

NARUC held its 27th New Commissioner Regulatory Orientation on April 27-29 at its offices in Washington, D.C. NARUC also held its Chairs Council Conference at the same time.

NARUC Second Vice President and Virginia Commissioner Jehmal Hudson presided over the New Commissioner Regulatory Orientation, which educated them with information and resources to navigate an interconnected regulatory world. District of Columbia Chair Emile Thompson and Iowa Chair Erik Helland presided over the Chairs Council Conference, which educated them on administrative and regulatory functions, as well as helping build relationships.

PUF Senior Advisor Paul Kjellander met with two regulatory leaders on the importance of these educational meetings. He spoke with NARUC President and Georgia Commissioner Tricia Pridemore, as well as NARUC Second Vice President and Virginia Commissioner Jehmal Hudson.

NARUC President and Georgia Commissioner Tricia Pridemore

PUF's Paul Kjellander: You brought together some of the Commission Chairs to Washington, D.C. in late April. Why the focus on Commission Chairs?

Commissioner Tricia Pridemore: As a former Commission Chair, I recognized quickly that there is a whole host of managing and operating at any Commission that falls outside the ordinary daily responsibilities of regulating.

There is a state agency that must be managed. There are staff, budgets, and relationships with our respective legislatures and governor's offices. A variety of stakeholders are involved and it's important for Commission Chairs to be able to talk openly in a Chatham House rule environment with their peers on how to navigate some of the challenges that are outside of the daily responsibilities of a regulator.

PUF: The administrative functions of the Commission Chairs may be new to them. Is that what you look at as one of the common themes that you want to address?

Commissioner Tricia Pridemore: Absolutely. Back when I was a Commission Chair, I and two other Chairs from across the country had a monthly call. We would share job descriptions and talk about salary ranges.

Hiring is such a big important part of what Commissions do and making sure we have access to great talent. What online tools are we using to recruit folks? We would talk about our work where we interface at the federal level, especially on important aspects of federal programs, such as PHMSA and LIHEAP.

There's a good amount of management that Commission Chairs must do, and we saw this as an opportunity to open it up into a larger format and invite all the Chairs to voluntarily share among their peers and learn.

Besides administrative functions, there is increased turnover of Commissioners and Commission Chairs. We need to get them up to speed and ensure they understand the basics of the regulatory compact, their roles as Commissioners, and how it works within their requisite states. Then, it is making sure they have relationships built with other Commission Chairs.

As a former Commission Chair, I recognized quickly that there is a whole host of managing and operating at any Commission that falls outside the ordinary daily responsibilities of regulating.

They can pick up the phone and call at a moment's notice, and it helps sets the tone for how they can relate to one another outside of the three yearly, standard NARUC conferences where every Commissioner is busy and running from committee meeting to subcommittee meeting to vote, representing the interests of their states. We saw this as a great place for NARUC to come in and provide this forum.

The response from the Commission Chairs was overwhelmingly positive and I'm not just saying that because I'm president of NARUC. They seek the opportunity to talk with other Chairs, especially those with similar considerations going on in their states.

Provisioning electricity generation for data centers is huge. On the gas side, pipeline permitting reform is huge. We've got states mining through legislative and Commission priorities, and this provides an opportunity to talk with like-minded Commission Chairs, learn, engage, and be together.

PUF: A common theme is staff turnover, and the role Commission Chairs have in trying to address retention and recruitment. What are you hearing?



Besides administrative functions, there is an increased turnover of Commissioners and Chairs. We need to get them up to speed and ensure they understand the basics of the regulatory compact, their roles as Commissioners, and how it works within their states. Then, it is making sure they have relationships built with other Commission Chairs.

Commissioner Tricia Pridemore: The two staff areas that every state seems to struggle to fill are engineers and attorneys. Much of the conversation I had with Commission Chairs this last week was about how to fill those critical roles, especially considering we're dealing with state budget salary ranges.

States used to attract top talent right out of top tech engineering and law schools. That was because of pension programs and what state employment afforded into retirement.

Most states don't have that anymore. We talked about how to effectively recruit people into predominantly engineering and attorney-based roles, whether through insightful ways to talk with governors and legislatures to get staff salaries increased, best places for recruitment, and recruiting tactics.

That is at universities or programs that are either NARUC adjacent, offering degree programs needed as an industry or those within our requisite states. There was great conversation about recruiting and holding on to top talent and how critical it is to Commissions to operate.

There's a lot of best practices sharing on HR and planning, and of course Commissioners. We love to talk about how we can properly express our needs to state legislatures.

PUF: We used to joke that it was easier for Commission attorneys to go toe-to-toe with utilities' attorneys because of the salary we paid. Then the salaries became lower.

Commissioner Tricia Pridemore: It's true. From a Georgia perspective, we fought hard this last session with our legislature and on behalf of our attorneys to get them raises.

It takes so long to come up to speed on these detailed, intricate regulatory issues that are so important to our state. We hate the idea of bringing somebody in, and once they get up to speed, they get scooped up by the industry. We get them trained and then they leave.

I spent time with some Commission Chairs discussing how we got those raises out of the legislature, the points we made, the value proposition we presented, and what we offered to cut out of our own budget to help with this.

I can't say it enough. Commissioners and Chairs are scrappy people. For the most part, we are invested in the intricacies

of these jobs, and work hard to find solutions to complex problems.

PUF: Some Commission Chairs are appointed by a governor, others are elected by Commission colleagues, and some rotate on a regular schedule to allow other Commissioners to serve. There are times one becomes a new Commissioner and Chair simultaneously.

Commissioner Tricia Pridemore: We recently had the new Commissioner orientation going on in a separate conference room and had two Commission Chairs eligible to be in both rooms.

Not only are they coming in as new Commissioners, but they're also coming in as new Chairs of their Commissions. There're four ways that you can come into the Chairmanship. In states like mine, we're elected among our peers.


FERC Chair Mark Christie was an instructor.

In other states, you're appointed by the governor to be chair. There are states that rotate. We have states where the Chair runs statewide and is elected by the voters. Sometimes Commissioners come into the role voluntarily and sometimes by default.

PUF: You're currently NARUC President and formerly Georgia commission Chair. What is the best advice received as you stepped into that role?

Commissioner Tricia Pridemore: Any new Commission Chair should first make sure that the surrounding team can be communicated with, and that you know the specific challenges before the Commission at any given time. Don't try to conquer them all at once but prioritize the areas where you know that during your time as Chair, you can make a difference to improve the agency.

That might be in hiring, budgets, and right sizing your agency. It could also be in updating the agency from a technological perspective, prioritizing what needs to be done and ensuring you've got the right people on staff to help with it, which is important.

I always tell a story from when I was Chair, when I first was elected to the Georgia Public Service Commission. State law requires all utilities to submit their rates, in either a monthly or quarterly fashion depending upon the utilities.

This applies to utilities that the PSC in Georgia doesn't rate regulate. It's easy with those we rate regulate, as staff just enters them into the system. But for those we don't regulate, up until I was Chair, all information was coming in on either a quarterly or monthly basis based upon their requirement to file on a CD-ROM.

When utilities told me they were buying CD-ROMs on eBay and CD-ROM burners on eBay to ensure they were meeting the deadline that the state gives them to submit, I was blown away. I was thinking that it's 2021 and you are buying materials to do your job in a secondhand market.

Any new Commission Chair should first make sure that the surrounding team can be communicated with, and you know the challenges before the Commission at any given time. Don't try to conquer them all at once but prioritize the areas where you know that during your time as Chair, you can make a difference to improve the agency.

I knew immediately I had to make that a top priority and ensure we could legally collect utilities rates in a safe and protected

manner that abided by the statutes of reporting. But my goodness, let them file it electronically.

That's an area that sadly is state government, and it took a couple of months to get it done. But it got done. Now, we have a simple format, no longer where someone goes to four or five utilities in South Georgia and drives the three hundred miles to Atlanta or sends them in a FedEx.

There are opportunities for improvement and efficiencies inside of a state agency that always exist. Chairs should have their ears open and a heart to make it better, so the Commission serves the public interest in the best possible way, and it is why we're there.

We are there in the public interest. Anything a Commission Chair can do to improve the public and the public interest's interaction with the regulatory body should be done. ❍

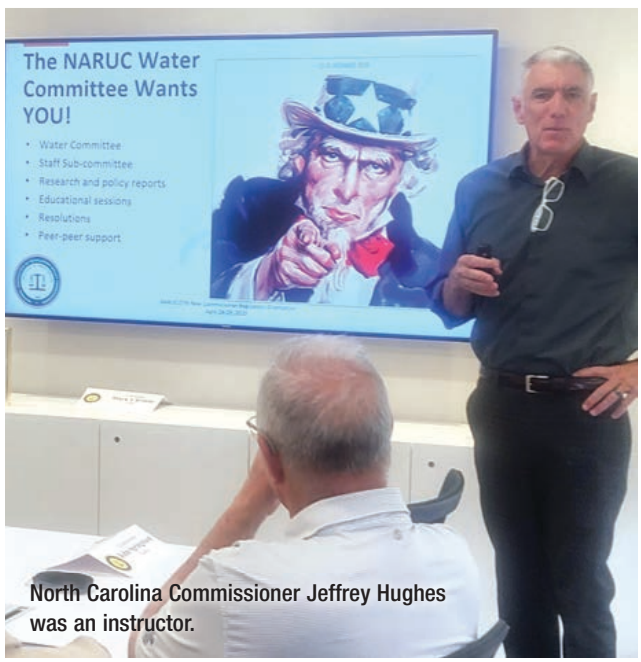
NARUC Second Vice President and Virginia Commissioner Jehmal Hudson

PUF: You're a Commissioner and the Second Vice President of NARUC. One of the responsibilities of Second Vice President is helping new Commissioners. Talk about that role.

Commissioner Jehmal Hudson: My role now is to be the main coordinator of the new Commissioners' regulatory orientation. This program provides a critical foundation for new top-level regulators entering an incredibly complex environment.

Regulation today is not just about setting fair rates. It's increasingly about managing cybersecurity risk, evaluating infrastructure investment needs, balancing affordability with innovation, and preparing for even more changes in the future.

Orientation offers new Commissioners the chance to learn directly from peers, understand the legal and policy frameworks that will help shape their work, and most importantly, build relationships that will last throughout their careers. It's about equipping Commissioners with the knowledge, tools, and networks they need to lead effectively.



North Carolina Commissioner Jeffrey Hughes was an instructor.

Orientation offers new Commissioners the chance to learn directly from peers, understand the legal and policy frameworks that will help shape their work, and most importantly, build relationships that will last throughout their careers.

PUF: Just coming off the new Commissioner orientation that is held once a year, talk about that and its value.

Commissioner Jehmal Hudson: The main focus of the orientation is education. New Commissioners today are stepping into a rapidly changing landscape. Growth in electric demand, particularly from electrification and data centers, is forcing Commissioners to think strategically about long-range planning, rather than take short-term, more reactionary approaches to these concerns.

There's a panoply of issues impacting the utility sphere, such as the rise of distributed energy resources, extreme weather events, cybersecurity threats, and growing expectations around affordability. Commissioners must weigh a much broader set of risks than ever.

Orientation arms new Commissioners with information and resources to navigate an interconnected regulatory world where decisions at the federal level and within their own states, as well as innovations, technology, and stakeholder expectations are evolving simultaneously.

In this most recent orientation, we emphasized how to manage uncertainty, while maintaining a strong commitment to public service. We also stressed economic fundamentals, which are foundational to regulatory decision making.

PUF: The average tenure of a Commissioner continues to shrink and is in the three- to three-and-a-half-year range. How

do you see that factoring in as Second VP to address educational issues?

Commissioner Jehmal Hudson: I see my role as Second VP, and NARUC's education responsibility more generally, as surpassing the initial Commissioners' orientation. NARUC provides wide-ranging, ongoing support for Commissioners through committees, whether electricity, gas, telecommunications, or critical infrastructure, among others. Commissioners can discuss emerging issues, exchange best practices, and shape policy discussions through committee participation.

Our Center for Partnerships and Innovation also supports Commissioners by offering technical assistance and resources on cutting-edge topics like grid modernization, cybersecurity, water infrastructure, and gas transition planning. Additionally, programs like the Regulatory Training Initiative offer specialized professional development to deepen expertise.

I hope all Commissioners understand NARUC offers so much more than a one-time orientation. NARUC wants to partner in their continuous development throughout their public service journeys.

PUF: What kind of feedback are you getting from new Commissioners as they're leaving the orientation sessions?

Commissioner Jehmal Hudson: Thanks to input from new Commissioners, there are several issues we plan to address over the next five years. For example, load growth and expansion.

In addition, NARUC will provide training and collaboration opportunities on matters like reliability and resilience planning in light of significant increases in electric demand, not just from transportation electrification, but from AI, data centers, and manufacturing. We're also mindful that utilities must prepare to withstand more sophisticated cybersecurity and physical security threats.

As investment needs rise, regulators must balance the costs of these investments against the pressure to keep utility rates affordable. And we must consider whether resilience and reliability investments are prudent and forward looking.

Federal-state collaborations continue to be important. Increasingly, Commissioners must be ready to coordinate across jurisdictions on subjects like transmission planning under FERC Order 1920 and broadband deployment through NTIA grants, to name just a few.


Jehmal Hudson

This experience will help me never lose sight of the fact that I and my fellow Commissioners represent the public interest. Every case, every decision must be viewed through the lens of fairness, transparency, and the long-term value to customers.

Also critical, both to Commissions and utilities, is workforce development. We all must obtain, develop, and retain the next generation of skilled workers, particularly in areas like engineering, cybersecurity, and finance. Our employees are, and will be, the key to success.

PUF: As you look toward moving up to First Vice President, then eventually President of NARUC, how valuable has it been for you to be in this role with new Commissioner orientation?

Commissioner Jehmal Hudson: Helping new Commissioners find their footing in what can be a maze of technology, policy, and legal issues already has been valuable. And I anticipate it will help me grow into future executive leadership roles in four ways.

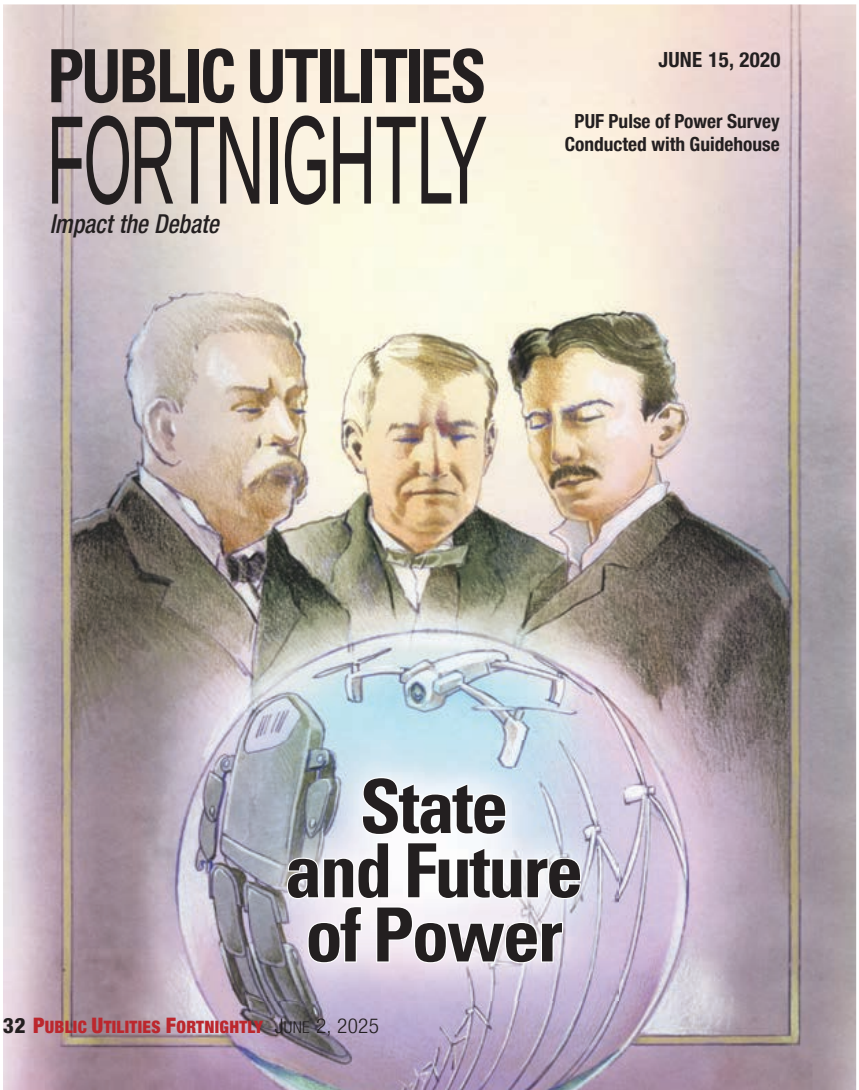
For one, this experience will help me never lose sight of the fact that I and my fellow Commissioners represent the public interest. Every case, every decision must be viewed through the lens of fairness, transparency, and the long-term value to customers.

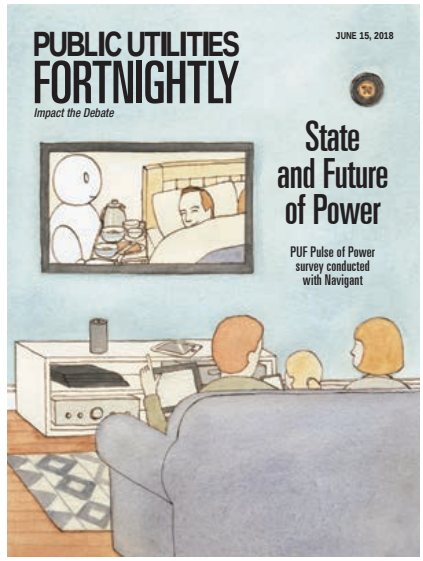
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Eight Years of June Special Issues on State and Future of Power, 2018-2025

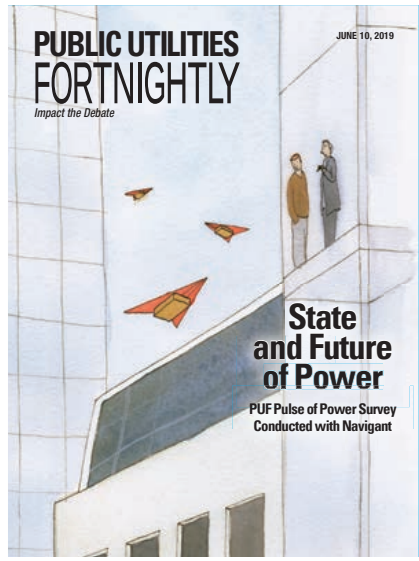
Each Year at this Time We Take Stock and Look Forward

Check out here the covers of all the Special Issues on State and Future of Power. Each Special Issue has been sponsored by Guidehouse (and its predecessor Navigant Consulting). The initial Special Issue in this series was published in June 2018. And then there was June 2019, June 2020, June 2021, June 2022, June 2023, June 2024, and now June 2025, with the latest cover entitled "Breaking Ground for What's Next."

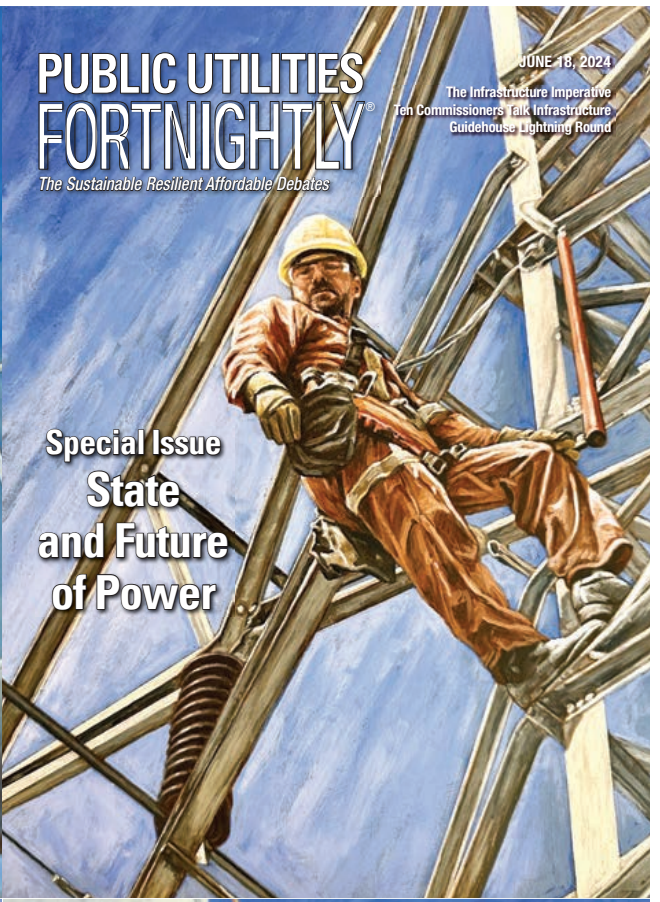




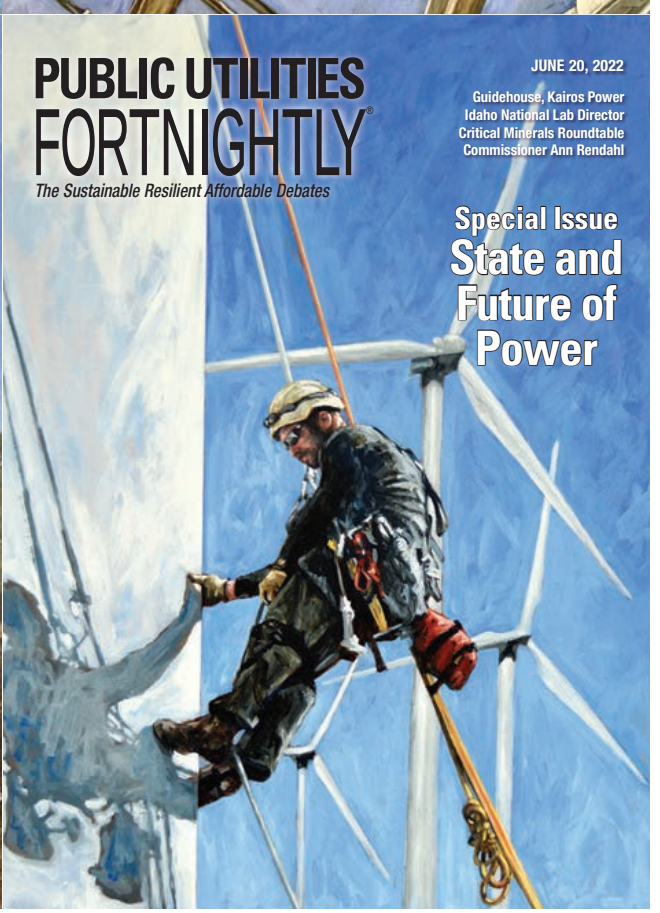


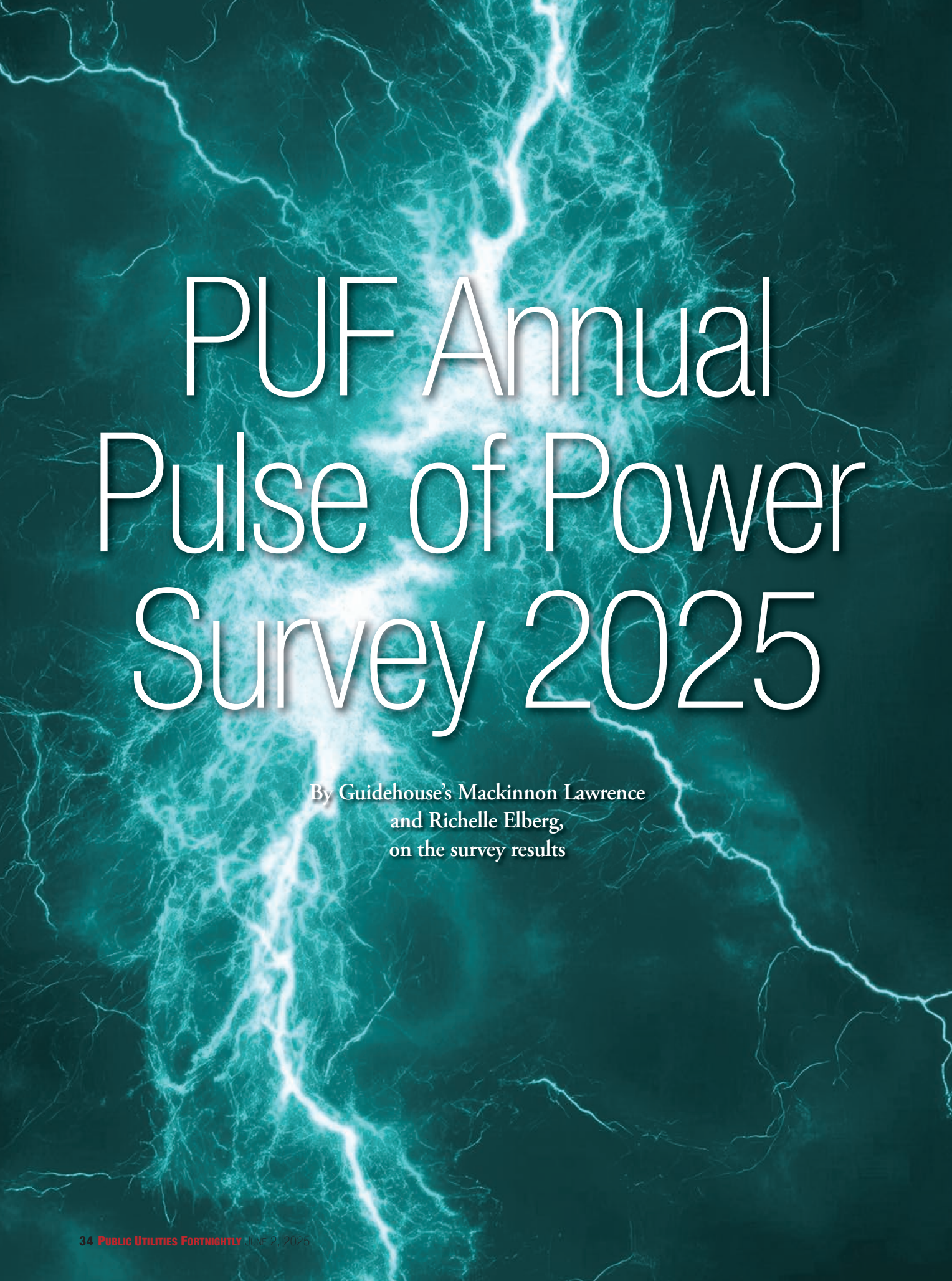



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PUF Annual Pulse of Power Survey 2025

By Guidehouse's Mackinnon Lawrence and Richelle Elberg, on the survey results

For the past decade, Guidehouse and PUF have partnered on their annual Pulse survey of utility industry executives and stakeholders to better understand the key issues and opportunities shaping the industry.

In our 2025 installment, more than three hundred respondents describe an industry grappling with accelerating load growth, infrastructure vulnerability, and policy uncertainty – even as they continue to work toward clean energy goals and distributed resource integration.

A New Year, a New President, and New Challenges

The power industry faces multiple uncertainties in 2025. It remains unclear how the Trump administration's 'America First' energy policy will impact existing incentives provided by the Inflation Reduction Act (IRA).

In 2024, Pulse survey respondents indicated this legislation would be remembered twenty years out for making clean energy resources the dominant energy source in the country, as well as for mainstreaming electrified transportation and accelerating T&D upgrades and system resiliency. Now it's uncertain whether those incentives will persist, although several of these issues remain top priorities for survey respondents.

Also new in 2025 is the rapidly accelerating emphasis on AI and the energy demands of burgeoning data centers. What were murmurs in early 2024 have become shouts as utilities, balancing authorities, and regulators wrestle with the prospect of inadequate energy supply in parts of the country.

What were murmurs in early 2024 have become shouts as utilities, balancing authorities, and regulators wrestle with the prospect of inadequate energy supply in parts of the country.

Nearly 95% of survey participants highlighted either the new administration's pending policy changes or the resurgence of measurable load growth as the single most disruptive factor to their operating environment in 2025, with more than half citing new policy priorities as the most disruptive.

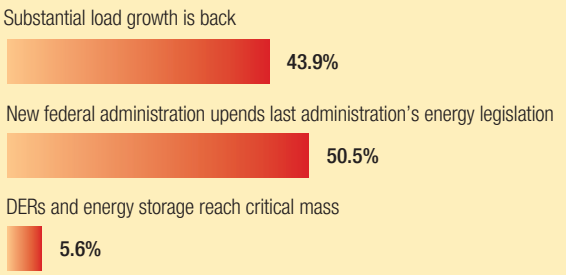
Fewer than 6% believed that rising DER and energy storage penetration will have a highly disruptive effect on utility plans. Long-term utility investments in renewables and storage are unlikely to change markedly in the near-term, given the lengthy approval processes, state mandates, and public support in many parts of the country. Utilities understand that, over the longer term, these clean resources will become an integral part of the energy mix regardless of who sits in the White House and are planning accordingly.

With respect to load growth related to AI and data centers, respondents were cautious. 61% indicated they are ready for some load growth but that system reliability issues will temper upside, while more than a quarter of respondents expressed concern that current grid infrastructure is inadequate to accommodate newly higher load forecasts. Just 13% of respondents were exuberant about the prospects of accelerating load growth.

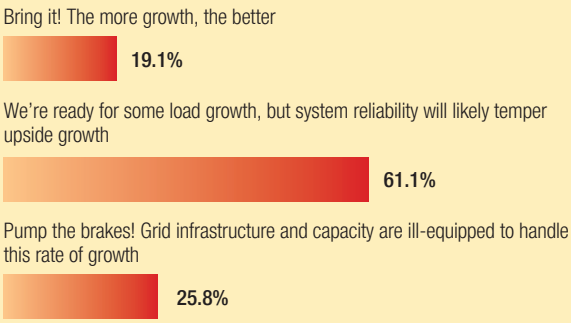
Guidehouse Research analysis projects data center load in the U.S. to double by 2030, to ~400 TWh, or 8.7% of total U.S. load in its base case scenario, although the impact of new efficiency technologies and challenges around new generation and interconnection make it difficult to predict how the data center market – and associated load – will truly play out over the next decade.

See Figure One.

What a difference a year makes. What single change from last year is likely to be the most disruptive to current utility plans?



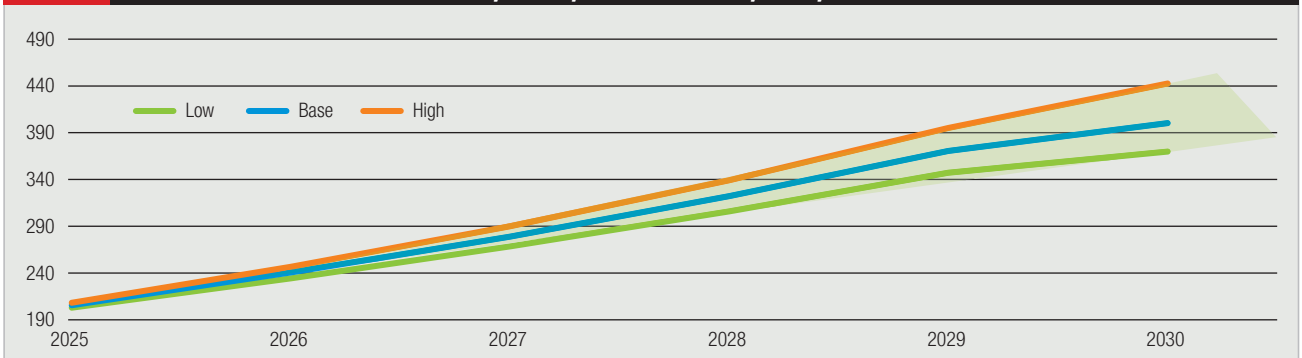
How prepared is your utility for substantial load growth from the AI economy and data center infrastructure?



Resilience and Cybersecurity Return to the Fore

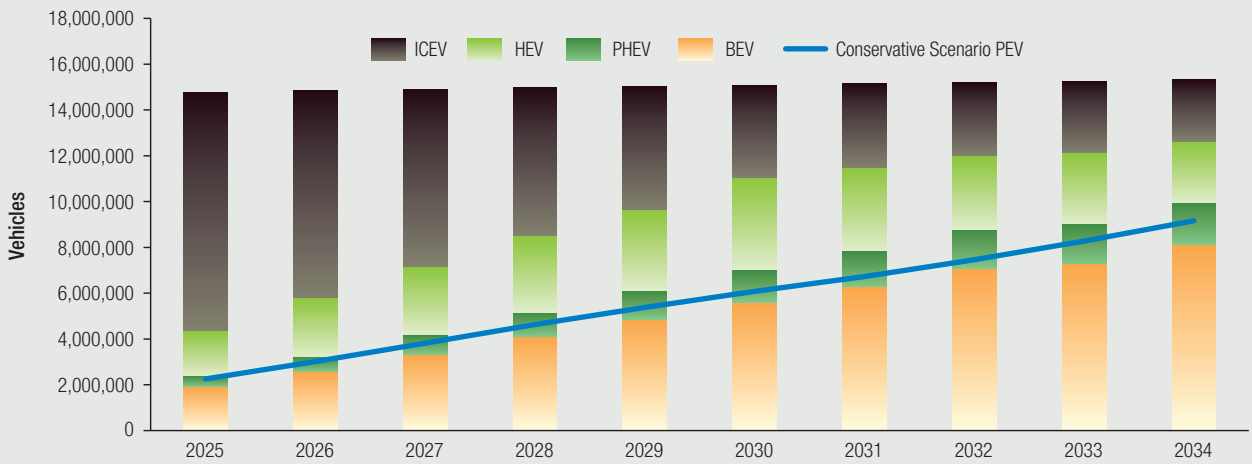
With the Biden administration's emphasis on clean energy and

Fig. 1 US Data Center Load In 2025, 2030, And 2035 Low, Base, And High Growth Scenarios (TWh)



Source: Guidehouse Research

Fig. 2 U.S. Electric Vehicle Sales by Powertrain: 2025-2034



Source: Guidehouse Insights

the passage of the IRA, survey respondents in 2024 demonstrated greater enthusiasm for topics such as transportation electrification, clean hydrogen, and net zero energy systems. In 2025, by contrast, a new policy agenda in Washington has utility stakeholders refocused on core priorities – most notably, more resilient grid infrastructure and cybersecurity.

When asked which three energy transition priorities utilities would continue to support despite the regime change, more than 86% selected T&D upgrades and improved system resilience. 74% selected cybersecurity and digitization of the energy system, followed by 37% who chose clean power and renewables. Just 27% indicated ongoing prioritization of transportation electrification and charging infrastructure – compared with the 56% of 2024 respondents who believed this transition would be an enduring legacy of the IRA.

Guidehouse Research has lowered its EV forecasts for 2025, based on the federal policy uncertainty related to EVs which were previously driving the adoption.

See Figure Two.

Support for green hydrogen plummeted to less than 10% of respondents, as did net zero energy, a drop of more than twenty percentage points for both from the previous year's survey. And carbon capture and reduction of industrial emissions garnered just 10% of respondents in 2025, less than half the share of respondents who saw it as important in 2024.

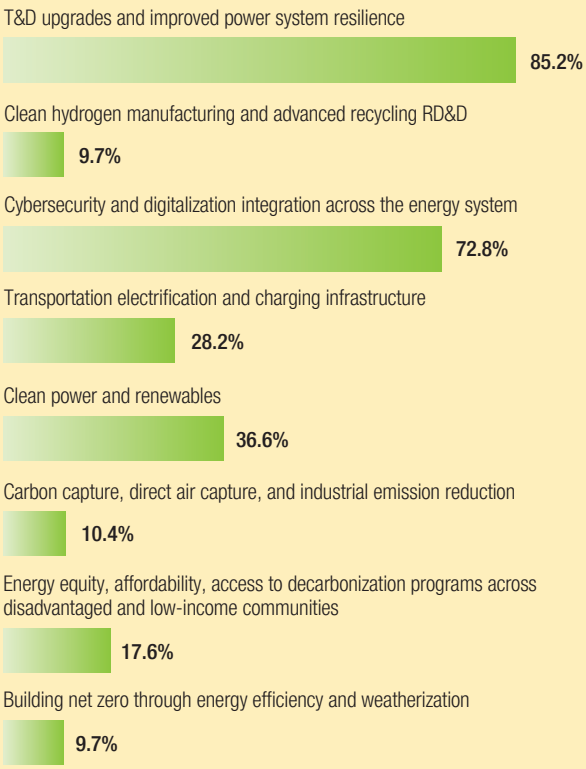
To some extent, these responses are likely a reaction to the uncertainty that currently exists around where federal energy policies will ultimately settle. Enhancing the grid's resilience to physical and cyber threats is generally considered important. And state-level regulations will continue to play a role in how utilities prioritize clean energy investments – as demonstrated by this category's third-place showing.

That said, Guidehouse Research has tempered its residential solar forecast for the U.S. in the near-term, based on homeowner uncertainty related to the job market and the threat to investment tax credits this year.

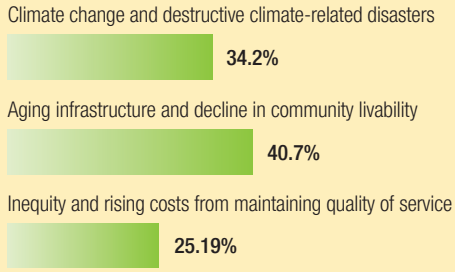
The More Things Change, the More They Stay the Same

Nonetheless, when asked to identify what they felt was the most disruptive longer-term threat facing U.S. utilities and their communities, this year's respondents showed virtually no change over last year's, with comparable shares citing aging infrastructure (40%), climate-related risks (35%), and inequity and rising costs (25%).

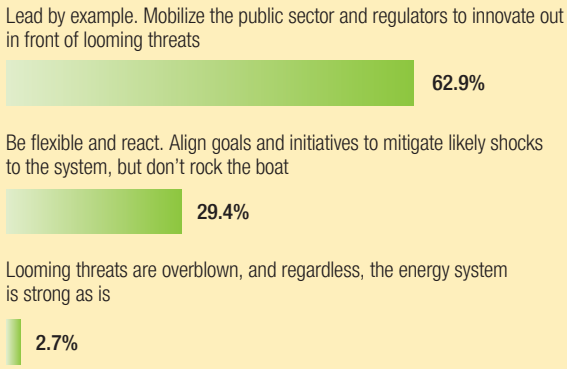
Which energy transition priorities from the last administration are utilities most likely to continue supporting regardless of changes in federal policy (select three)?



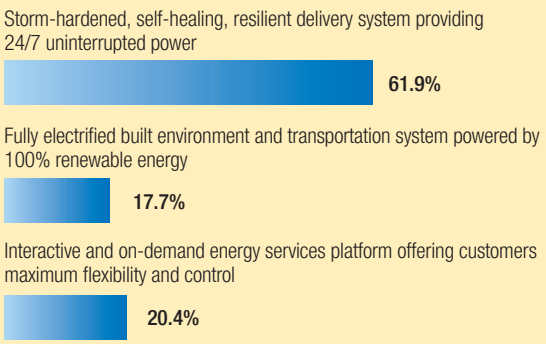
What is the most disruptive threat facing U.S. utilities and their communities?



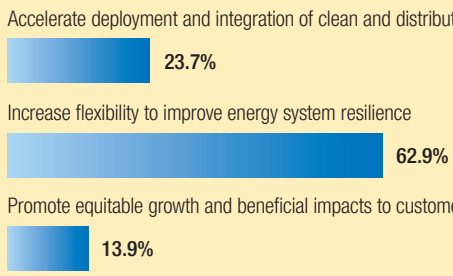
How can utilities best serve customers in the face of these threats?



What infrastructure-of-the-future would you most like to see utilities build?



Which of the following outcomes should utility infrastructure investments prioritize?



The risks from aging infrastructure are arguably increasing due to climate-related risks. As such, the need for more resilient infrastructure grows with more extreme climate threats. Combined, fully three quarters of survey respondents highlighted these concerns.

Also as in 2024, when asked how utilities can best serve customers in the face of these threats, a majority responded that utilities should lead by example and engage the public and regulators to innovate before problems increase. A smaller share (29%) said a more flexible, reactive approach would be preferred, but notably, less than 3% felt these threats are overblown.

Finally, with respect to what specific actions utilities should take in terms of prioritizing their infrastructure investments, nearly two-thirds of those surveyed would like to see a focus on increased flexibility and improving energy system resilience, compared with 24% preferring an acceleration in the deployment and integration of clean and distributed energy. Just 13% believe

investments should prioritize equity and beneficial customer impact. These figures are also very similar to Pulse survey respondents' 2024 answers.

Resilience First – for Now

In keeping with responses to the other questions in our survey, 62% of this year's respondents said the "infrastructure of the future" they would most like to see utilities build was storm-hardened, self-healing, resilient grids capable of delivering 24/7 uninterrupted power – up from 57% in 2024.

Meanwhile, those interested in interactive and on-demand energy services platforms fell from 26% to 20%. Here too, we see a return to fundamentals while the policy landscape remains uncertain.

As of this writing, the new administration has only been in office for three months, and it's been a period of transition for those working to continue or initiate investments in newer energy technologies. The agency cuts and tariffs have taken center stage – for now – but some clarity around energy policy should begin to emerge in coming months. The administration appears to be a strong supporter of AI and data centers, as demonstrated by its $500 billion Stargate data center project.

* * *

To achieve its goals for American leadership in the AI arena, the administration will have to address potential risks to energy supply, and new policies are no doubt in the works. In the meantime, utilities will continue to focus their attention on issues that everyone can agree on, like keeping the lights on, building resilience in the face of extreme weather, and preventing cyber breaches. PUF

Lightning Round on Power's Future

(Cont. from p. 21)

rates more readily than do traditional avoided capital cost tests.

Similarly, non-wires alternative investments can optimize the utilization of existing infrastructure to serve load growth and generate earnings more than infrastructure expansions do. By giving greater internal rate of return for non-wire alternative investments, regulators can help reduce rate base investments overall.

Policymakers and regulators should seize on the current period of exponential load growth to facilitate spending to upgrade the electric grid, which will help mitigate the financial impact on their customers. PUF

James Clerk Maxwell was born in Scotland on June 13, 1831. Arguably the third greatest physicist of all time, after Newton and Einstein, his impact was huge on the developments of electric utility service in the second half of eighteenth century. Maxwell's Equations have been referred to as the second great unification in physics after the first by Newton. Electricity, magnetism and light! What more could you want? (Ask Albert Einstein that.)

Maxwell, Gauss, Ampere, Faraday and Coulomb formulated the theory that the engineers like Thomas Edison and Nikola Tesla used to bring us engines, motors, transmission and distribution. Maxwell's four equations include Gauss' Law on flux, Gauss' Law on magnetism, Faraday's Law on induction, and Ampere's Law on circuits. Gauss' Law on induction can be used to derive Coulomb's Law and vice versa.

In his spare time, Maxwell proved that the rings of Saturn were not solid but composed of numerous small particles. And he even invented color photography.

MISO Chief on Resilience

(Cont. from p. 25)

out there? Our reliability imperative has been our message for the last three, four years. When I see things like the auction results or the NERC long-term assessment, both pointing out things are tight, we're the ones saying, "Yes. We've been trying to tell you for a couple of years now, at least, that things are going to get tight."

It's about getting the operations, the markets, planning that transmission system of the future, and keeping our systems safe and secure. We can't forget about cyber.

In the midst of AI and everything else, cyber has still got to be a core component of what we do. I do a fair amount of that. I also am here to serve our employees. I'm passionate about our diversity and inclusion efforts here.

When I see the auction results or the NERC long-term assessment, both pointing out things are tight, we're the ones saying, "Yes. We've been trying to tell you for a couple of years now, at least, that things are going to get tight."

I'm passionate about the employee experience and about just having fun. The public used to think, "As long as my light switch works and my lights are on, what do I care?" Now, energy and all of this is in the public consciousness. It's exciting.

I'm a little more fun to talk to at parties because I can explain what I do and they say, "Oh, that's interesting." Now I can at least get them to stick around for a little bit. PUF

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