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OUR TEAM Editor Susan Partain

Design Julio Guerrero Sharon Winfield

Contributing Writers

Jackson Bedbury Lisa Cohn Scott Corwin Betsy Loeff Latif Nurani INQUIRIES Editorial News@PublicPower.org

202-467-2900

Subscriptions Subscriptions@PublicPower. org

202-467-2900

Advertising Justin Wolfe, Justin.Wolfe@ theygsgroup.com Advertising is managed by The YGS Group.



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The American Public Power Association is the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. We advocate before the federal government to protect the interests of the more than 54 million customers that public power utilities serve, and the 96,000 people they employ. Our association offers expertise on electricity policy, technology, trends, training, and operations. We empower members to strengthen their communities by providing superior service, engaging citizens, and instilling pride in community-owned power.

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American Public Power Association

2451 Crystal Drive, Suite 1000 Arlington, VA 22202

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Keeping Our Reliable Advantage

BY SCOTT CORWIN, PRESIDENT AND CEO, AMERICAN PUBLIC POWER ASSOCIATION

Photo courtesy EPB, Chattanooga, TN

hen it comes to reliability, public power utilities lead the nation. It's not just in our taglines and messages to customers; it is an ethic and a point of pride in how we serve our communities.

In any particular season, reliability comes into the public consciousness through outages impacted by the twists of extreme weather and other notable events. Day to day, though, utility pros know that targeted maintenance, smart system design, proper investment, and customer education make for a better working grid across the entire system.

This hard work pays off. Year after year, public power utilities have the overall lowest outage time of any utility type by a significant margin. Public power's average outage time per customer, or system average interruption duration index (SAIDI), is often half the time of the average outage experienced by customers of other types of utilities, with or without major events. Looking at the latest comparable data from the Energy Information Administration from 2022, public power customers spent an average of about 90 fewer minutes without power than customers of other utility types, outside of major events. Even in major events, public power customers experienced nearly three fewer outage hours than the average customer of other utility types.

The importance of keeping the power flowing for public safety is paramount in the mind of the policymakers and managers at all levels, and of the hardworking crews who maintain and restore local distribution systems, including those of neighboring utilities during mutual aid events. Behind public power's consistent and clear edge across various reliability indices is a lot of effort in planning, perseverance, and collaboration. Yet concern over reliability is growing, even outside of major events. Issues around supply chain, workforce, grid security, permitting, and resource adequacy are just some of the areas in which public power is actively working to ensure a reliable system.

This issue of *Public Power* covers some of the challenges to maintaining reliability, whether in securing adequate long-term power supply, contending with extreme weather, mitigating threats to grid security, or being able to procure the right equipment and materials in a timely manner. The need to grow—and support economically sustainable growth—also underscores why many public power utilities have an "all of the above" strategy for a diverse power supply.

Many of the members featured throughout this issue are designated as APPA Reliable Public Power Providers, or RP3, utilities. Many also are among the hundreds of utilities subscribed to the eReliability Tracker, which has helped public power utilities identify potential problems and target system improvements for more than a decade.

Outside of the many benefits to customers in maintaining a reliable system, this dedication to excellence helps public power as a whole continue to prove that our model not only works but is setting the industry standard. Through our programs, advocacy, education, and communications, we remain committed to helping your communities maintain the reliability advantage and prepare for whatever the future holds.

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FINDING THE PIECES FOR THE RESOURCE ADEQUACY PUZZLE

BY LISA COHN, CONTRIBUTING WRITER lectrification, expanding data center deployments, increasing investments in manufacturing sectors — such as semiconductors — and more are driving new growth in electric demand. At the same time, existing power plants are aging, and increased amounts of intermittent renewable energy are getting added to the grid, whether by mandate or changing economics. Add in increasingly intense storms and other weather events, transmission constraints, and supply chain disruptions, and it's no wonder that the question of where the future power supply will come from — and if there will be enough to go around — keeps utility leaders up at night.

The Department of Energy laid out some of these energy resource acquisition challenges in an April 2024 report, The Future of Resource Adequacy. In its report, DOE called for utilities to create a diverse portfolio of resources and take advantage of provisions in the Inflation Reduction Act and the Infrastructure Investment and Jobs Act that have made billions of dollars in tax credits, loans, and investments available for deploying energy technologies.

"Reliability is a system attribute — no individual resource is perfectly reliable. Any single technology approach to addressing the combination of challenges is risky, partly due to substantial fuel delivery and availability issues that lead to correlated failures which can jeopardize the entire system during extreme weather," said the report.

As public power utilities ponder how they'll meet demand over the short- and long-term horizon, they also need to ensure their power supply choices keep costs to customers as low as possible. For utilities that buy power in the wholesale electricity markets, new and changing resource adequacy requirements could be contributing to increased projected costs. These requirements include setting appropriate planning reserve margins and identifying how much accredited capacity should be assigned to specific generation resources. These requirements aim to ensure there's enough supply to meet demand based on a defined level of reliability for an upcoming period.

FINDING THE PIECES FOR THE RESOURCE ADEQUACY PUZZLE

"As the markets in the West expand and change, resource adequacy is one of the things that will change the most by percentage of cost for many utilities."

JARED CARPENTER, ELECTRIC UTILITY DIRECTOR, TRUCKEE DONNER PUBLIC UTILITY DISTRICT, CALIFORNIA

Following is a look at how two public power utilities — Orrville Utilities in Ohio and Truckee Donner Public Utility District in California — are exploring ways to ensure they have the resources required to serve their customers' needs into the uncertain future.

FORECASTING BIG CHANGES

For Truckee Donner PUD, located between Sacramento, California, and Reno, Nevada, achieving resource adequacy requires both meeting California's ambitious renewable portfolio standard and planning for the robust adoption of electric vehicles. The state's RPS calls for 60% renewables in the utility mix by 2030 and 100% carbon-free by 2045. California already boasts the highest number of EVs, accounting for about 37% of all EV registrations in the U.S., and set a mandate for all new light-duty vehicle sales to be from zero-emissions vehicles by 2035.

Truckee Donner is ahead of the RPS target, with about 60% renewables already in its resource mix, said Jared Carpenter, electric utility director. But that doesn't mean resource planning is a breeze. In fact, Truckee Donner recently completed its first integrated resource plan, even though, with a peak load of less than 200 megawatts, it isn't required to file a plan with the state. But Carpenter wanted to map out all the resources available and plan for last-minute surprises, such as transmission constraints, low solar output, or unexpected outages, such as from wildfires.

The utility's resource mix includes biomass, small hydroelectric plants, wind, and renewable energy certificates, mostly for solar. Outside of balancing the intermittency of these resources, there are other aspects of their availability to consider. Specifically, Carpenter is seeing more maintenance on the lines that run from newer renewable energy plants. Truckee Donner does not directly own the transmission infrastructure that carries power from its power plants to its distribution system, and that creates some uncertainty due to lack of control and information.

"I see a lot more transmission line maintenance on renewable energy generation projects like wind and solar. I'm sure they're necessary. The challenge is when we are told there will be unplanned maintenance that leaves our generation sources stranded," he said. When that happens, Truckee Donner needs to replace that power from the market or other sources, generally within two weeks.

"You scramble fast, and you shop quickly and try to do it before everyone else does it, too, as best you can," he said.

To aid in that scramble, as Truckee Donner completed its IRP, it also created an integrated resources balance sheet that shows resource options every hour of every day through 2040. If a generation resource needs maintenance, Carpenter can remove it from the balance sheet and use the document to consider other ways to fill the gap.

"It could be a bundle of energy in those blocks, or it could be by the hour," he said. Solar would likely fill the gap during daytime hours, he added.

Another challenge in resource planning is accounting for the potential damage to power plants and transmission infrastructure caused by wildfires. For example, fires near the transmission lines that send power to Truckee Donner across Nevada, Utah, and California could burn plains or the forest near where a hydroelectric dam is located, damaging the power line coming from the hydroelectric facility. In that case, it might take weeks to rebuild the power line. If the hydroelectric dam is part of Truckee Donner's renewable energy portfolio, the utility would try to replace that power with another source of renewable energy.

To help plan for such scenarios, public utilities need to diversify their resources, said Carpenter. And that strategy can create its own problems: With more power plants, more maintenance is required.

"It becomes very complicated," he said.

Truckee Donner's IRP looks at multiple scenarios for attaining a balanced portfolio, including low-, medium-, and high-growth options.

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FINDING THE PIECES FOR THE RESOURCE ADEQUACY PUZZLE

"If we have control and ownership of how much generation we want, the type of generation we want, we can better serve the needs of our customers."

JEFF BREDIGER, DIRECTOR OF UTILITIES, ORRVILLE UTILITIES, OHIO

Much of the growth is expected to come from residential and public EV charging and from electrification of homes.

Right now, about 90% of the projects Truckee Donner is considering are renewables. Carpenter is also looking at natural gas-fired plants in the hope that they can be converted to green hydrogen plants down the line. This option is on Carpenter's mind but isn't included in Truckee Donner's IRP, in part because it's still unclear whether California will characterize hydrogen as a renewable resource.

Here's how Carpenter envisions Truckee Donner would use hydrogen: It might buy into a portion of a gas plant in a region with high solar potential. It would then acquire solar energy when prices are low when there's too much solar available — and the energy could power an electrolysis machine, which requires electricity and water to make hydrogen. Truckee Donner would call on the hydrogen plant at night, when solar is no longer available, but the green hydrogen has been stored onsite.

Another challenge for Truckee Donner is meeting changing resource adequacy requirements, said Carpenter.

"As the markets in the West expand and change, resource adequacy is one of the things that will change the most by percentage of cost for many utilities," he said. To prepare for changing requirements, he attends industry events and tries to forecast how and when the rules and markets will change. He also looks to invest in power plants that meet the utility's needs and comply with the narrow flexibilities of resource adequacy — all under a timeline that aligns with regulation changes.

"For Truckee, we are doing this by building battery systems that we can dispatch to lower our coincidental peak and looking for generation like geothermal and hydrogen that will help us comply as the rules change and increase," Carpenter said. "Really, it's such an interesting puzzle to figure out."

MAINTAINING CONTROL

While Truckee Donner has a big focus on meeting California's RPS, Orrville Utilities, a public power utility serving the small city of about 8,000 people in Ohio, is concentrating on keeping prices as low as possible while adhering to environmental regulations. Its resources in 2022 included 29 MW of natural gas and coal, 12.4 MW of hydropower, 2 MW of wind, and 3 MW of solar, all of which are used to meet peak demand of about 60 MW.

"But that's not a long-term solution for us. We're capable of doing that with a very old coal and natural gas plant, but it's subject to the whim of the next round of Environmental Protection Agency regulations," said Jeff Brediger, Orrville's director of utilities. Older fossil fuel plants are also subject to high insurance premiums, he noted.

Through membership in American Municipal Power Inc., or AMP, which serves public power providers in nine states, Orrville Utilities can participate in a number of power supply options, including buying from the market.

Orrville can only generate or receive power from its natural gas/ coal plant during peak power periods because the EPA has imposed a generating limit on the plant. That means the utility buys about 35% of its power from the market and, as a result, is sometimes exposed to higher market costs during peak periods.

The bigger challenge in ensuring resource adequacy for Orrville Utilities is in overcoming transmission constraints.

"Buying the actual [kilowatt-hours] is one component of those market purchases," said Brediger. "The more concerning issue that we have in the marketplace is transmission access."

The Midcontinent Independent System Operator has placed limitations and restrictions on moving energy from a generation source

FINDING THE PIECES FOR THE RESOURCE ADEQUACY PUZZLE

to the end user because of transmission constraints. Three of AMP's hydroelectric projects and a coal and gas project are in MISO territory. So, even though Orrville Utilities obtained this generating capacity, the power can't always be moved from MISO, he said.

What's more, the generating units aren't always available when they're really needed.

During Winter Storm Elliott in December 2022, for example, temperatures in Orrville's territory dropped to 14 degrees below zero. Power plants froze up, and the utility couldn't get natural gas flowing. Fortunately, its facility was able to operate.

In the future, Orrville, working with AMP, wants to rely on more local, behind-the-meter distributed energy. The goal is to avoid depending on the grid and the wholesale market, which can cause planners to stay awake at night worrying, Brediger said.

"The more we can keep resources literally in our backyards, the less dependent we are on the grid to deliver that energy," Brediger said.

Focusing on behind-the-meter assets is a good way to cope with changing resource adequacy requirements, said Steve Lieberman, vice president of transmission and regulatory affairs for AMP.

"Anything Orrville can do to supply its demand from contracts and other arrangements is good," he said.

Orrville prefers to own and control power plants — natural gas or diesel generators or fast-start peaking diesel generators that are easier to permit and install. The few solar power acquisitions the utility might consider would have to include storage to address intermittency issues, Brediger said. And that might be too expensive.

A behind-the-meter strategy will help Orrville offset about 80% to 90% of transmission fees now levied by transmission system owners fees that can be as high as 40% of customers' bills, he said.

"If we have control and ownership of how much generation we want, the type of generation we want, we can better serve the needs of our customers," he said.



Public Power Leaders: Javier Fernandez



Q&A with Javier Fernandez, president and CEO of Omaha Public Power District in Nebraska since July 2021. He joined OPPD in June 2017 as its vice president and chief financial officer. Fernandez came to OPPD from the Bonneville Power Administration, where he served as its executive vice president and CFO. He holds a bachelor's degree in economics from Instituto Tecnológico Autónomo de México, an MBA from Yale University, a Utility Management Certificate from Willamette University, and a Utility Executive Certificate from the University of Idaho. He currently serves as board chair of the Federal Reserve Bank of Kansas City, Omaha Branch and Habitat for Humanity of Omaha; vice chair of the Large Public Power Council; and board member for Ameritas, Bellevue University, the Greater Omaha Chamber of Commerce, and the Askarben Foundation.

WHAT DREW YOU TO WORK IN PUBLIC POWER?

I was born and raised in Mexico City. I came here to go to school, get my master's, and seek a better life. Truly the U.S. is the land of opportunity, and I wanted to be part of it. When I graduated from grad school, I didn't have a clue of what I wanted to do, and I was fortunate enough to be offered a job in public finance. I fell in love not only with the complexity and the intellectual curiosity required in finance, but how purpose was injected into the work I do. It was no longer just a paycheck — what the financing was building was leaving a legacy.

I was only planning on staying in the U.S. for a couple of years. After doing this for a few years, it became a passion for me. It was a way for me to give back to this country that was giving me so many opportunities. It was super personal for me to be part of the solution, to help build this country.

As an investment banker, you're traveling like crazy. When my wife and I had our first child, I was sleeping in hotel rooms four nights a week. I decided that was not what I wanted for my daughter. I needed a different industry that required less travel but that still stimulated me intellectually and allowed me to continue to help build. That's where the electric utility industry came in.

Now I've had 14 years in the industry, all in public power. It's exhausting, very taxing, and you have a lot of weight on your shoulders. But it's rewarding. The American economy literally depends on what we do. The toughest days I've had at work are also the brightest days, because you can come home and say that you contributed something that helped people stay alive. There's nothing more honorable.

ARE THERE THINGS THE FINANCIAL/BANKING WORLD TENDS TO NOT GET QUITE RIGHT ABOUT THE PUBLIC POWER PERSPECTIVE, OR VICE VERSA?

My colleagues in the financial world, and across the utility world ... many of us grew up professionally in the 1990s and 2000s. And in the past 30 years, we've enjoyed an abundance of capacity and transmission. So, for the past 30 years, it was all about designing markets to optimize the resources we have. The [regional transmission organizations] started playing a big role in market design and measuring growth both in fixed income and commodities trading. Sending price signals, hedging positions ... it was all about dollars and transactions.

What has changed now, dramatically, is that what we relied on the most — an abundance of energy — is no longer there. I explain to many people about the resource adequacy challenges we are having. And still, 8 out of 10 conversations today continue to talk about financial concepts — a different pricing mechanism, or capacity markets, or auctions — like we did 20 years ago. It's not a matter of money; we don't have enough electrodes. That's a big shift. You hear a lot about market design, but let's build more margin so we can have more electrodes. You can break every other law except for the laws of physics, and that describes where we are today.

WHAT DO YOU HOPE TO INSTILL AT OPPD UNDER YOUR LEADERSHIP?

I am standing on the shoulders of giants. Many leaders have built us to where we are today. We have been studying the problems, the load-growth conditions, and it has been a thoughtful and methodical approach. A big part of my tenure is execution. I literally have to double the size of our generation portfolio by the end of the decade. We cannot continue to tinker and debate to find the perfect solution — it is time to get going.

The last time we built a new power station was 2009. In 2024, we are building three new power stations totaling 700 megawatts — we are cutting ribbons on one in the next few weeks. When I look back, I want to remember not just studies and strategies, but assets on the ground. Just on the generation side, we have 3.2 gigawatts we are building. We still have 2,500 MW to deliver, including 900 MW of new natural gas. That would result in four new units delivered in 2028 and 2029, including about 1.5 GW of new solar. And believe it or not, that's not enough. We already need to start planning for what's next. We have no time to spare.

WHAT SKILLS DO PUBLIC POWER LEADERS OF THE FUTURE NEED TO TACKLE THE CHALLENGES BEFORE US?

The industry is transforming. Our boards are asking us to do the unimaginable, which is decarbonize our fleet while we are seeing gigantic electrification of the economy. And we have to do it all really fast, without losing reliability or making rates unaffordable. It's not for the faint of heart.

It's a combination of execution and delivery, of course. You have to be strategic — you can't just go out building. It's important for public power leaders to have a good grasp on the reality of the system. It's no longer the system we grew up with 20 years ago. We need strategy, financial skills, and a sense of urgency. We don't have decades to begin planning this. We need to begin building now. It's going to take you eight years when you say you'll get started in three.

And being nimble — I've learned so much more about meteorology than I ever cared. Water scarcity is a big issue. Sit down with the experts, listen to what they have to say, and translate that into how you can mitigate risks in the most efficient manner.

We in public power — and not just public power, but the entire industry — we take a lot of pride in being out of sight, out of mind. And that's certainly our mission. It's important for us to have a sense of humility that we are in a really tight situation. We are all struggling. I don't know of a single utility today that is just sitting with plenty of capacity.

If we were facing a complete collapse of financial system, if it had gone dark for a time, would you call it a crisis? That's where we are now with electricity. We're seeing calls for conservation, having rolling blackouts. Yet we don't call it a crisis. We have to change the narrative. We need to have good, responsible communication skills and an intellectually honest conversation with federal and local officials and among utility CEOs. This is not about us being more efficient or having better rates — this is about keeping the lights on. This is the time to say, "How do we come together?"



DATA GUIDES SMART CHOICES FOR HIGHER RELIABILITY

BY BETSY LOEFF, CONTRIBUTING WRITER

hile some of the biggest causes of electrical outages are from events that happen without much warning, such as tornadoes, improving reliability doesn't happen by chance.

When you look at aggregate outage data compiled by the Energy Information Administration, the reliability of public power suppliers beats that of cooperatives and investor-owned utilities. Among the public power providers recognized for reliability by the American Public Power Association, there's often a common denominator: Many use the eReliability Tracker, a service for collecting, organizing, and summarizing outage information that was first released in 2013. The tracker lets utility managers delve deep into the causes of outages and the areas they hit most. Here's how three long-time users have leveraged the data.

Keeping Track of the Details

Since many users of the eReliability Tracker are inputting data manually rather than having it imported automatically from an outage management system, choosing what to put into the tool is a personal decision.

"I know a town close to us that doesn't count it as an outage unless they have to roll a truck, but we do it a little differently," said Josh Roberts, operator mechanic, special services, for Macon Municipal Utilities, which keeps power on for around 3,200 homes and businesses in Macon, Missouri. "We count all of our outages, especially now that we have smart metering." He's talking about momentary outages as well as partial power at someone's home, which can happen when damage shorts out one of the three lines feeding a customer's breaker box.

Electric Superintendent Al Sullivan of Bryan Municipal Utilities in Ohio also tracks everything for the system that serves about 6,000 meters. "Whether it be an instantaneous or a sustained outage, we call it an operation, something that opened the circuit up."

DATA GUIDES SMART CHOICES FOR HIGHER RELIABILITY

"We could just put all our outage information into a spreadsheet, put some formulas in there, and do this ourselves," said Jeff Teel, director of engineering, operations, and technology, at Northern Wasco County People's Utility District, which delivers electricity to nearly 25,000 people and businesses in Wasco County, Oregon. "If we did our own spreadsheets, we wouldn't get the ability to quickly sort and filter data based on different criteria."

By putting every detail into the tracker, "we can calculate systemwide or one feeder's reliability over the previous five years," said Teel. "Is it getting better? Is it getting worse despite the investments we're putting into it? The tracker takes all the outage information you put in there and does the calculations for you. It does them on the fly as you filter the data."

How Data Delivers Value

Having the data at your fingertips is only valuable if you can turn it into useable information. Predictive maintenance is one popular application for using outage and reliability data.

In heavily wooded Macon, some 80% of outages can be traced back to squirrels and other wildlife, Roberts said. "When we first started tracking outage data, we really used it to figure out where squirrel guards needed to be on our power lines," he explained. "We could graph the data, and it would show exactly which circuit was having the most problems. That was invaluable."

In Ohio, Sullivan also uses the data to see where animal guards should be placed, and he also looks for spots where tree-trimming operations might be needed. "When we see a lot of outages due to tree limbs hitting power lines, we know it might be time to budget a little more money next year on trimming to make sure we're getting the limbs cut back far enough," he said.

Investment planning is another common use for reliability data. "We use that data to help us prioritize where we'll invest capital funds," Teel said. He and his

"Customers want to know if the issue is going to be recurring and what we're doing about it. The tracker helps us give them good data."

AL SULLIVAN, ELECTRIC SUPERINTENDENT, BRYAN MUNICIPAL UTILITIES, OHIO



team run reports on every feeder. They also use SCADA data in their evaluations because it allows the planning team to "monitor increases or decreases in loading throughout the system," so they'll know if assets are properly sized.

Bryan Municipal's team tracks faults on underground power lines because the city tries to complete a few underground replacement projects each year. "Thirty or 40 years ago, we direct-buried everything," Sullivan said. Along with direct burial, the utility used concentric neutral conductors, which sit outside the power line cable without a protective coating like the type installed today. The bare, exposed neutrals can corrode. "We have areas where we lose that neutral, and it causes the line to fail," Sullivan said.

Along with investments, the Bryan team uses reliability data to plan purchases. "We just ordered single-phase pad-mount transformers here recently, and it will take more than a year to get them, Sullivan noted. "We're tracking how many transformers we'll need each year. You really have to plan ahead."

Roberts uses data to plan operations. "If we know the outage wasn't a squirrel or tree limbs, then we start looking at equipment," he said. "We do thermal imaging, so the tracker helps us see where we need to send crews to check if the line is breaking down."

When it comes to service for commercial and industrial clients, tracker data can provide better service. "If a factory in town is claiming that they've had a lot of operations over the past year, we search through the data and have a good record to use when explaining things to them," Sullivan explained. By operations, he means lost power on the entire substation circuit, whether instantaneous, momentary, or sustained. "These customers want to know if the issue is going to be recurring and what we're doing about it. The tracker helps us give them good and accurate data."

Finally, the tracker data gets used for board reporting in both Macon and Northern Wasco County. "Every month, our board members get reliability numbers for the previous 12 consecutive months, and once a year, I give a presentation," said Teel. "They're our governing body, and it's important for them to understand these numbers. I explain what reliability indices mean and where we stand compared to other utilities."



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Results From Data-Driven Decisions

Northern Wasco County PUD has been using the tracker since 2015, and Teel said using the data in decision-making has paid off. "One thing we identified as a major cause of outages is solid copper wire in our system that was installed many years ago," he noted. "It gets very brittle and has a tendency to break in winter storms." The utility used this information to prioritize the replacement of copper wire in as many power lines as feasible. "For the past two winters, we've seen a marked decrease in outages due to broken copper wire."

The PUD also has had troubles with large migrating birds — mostly raptors, such as osprey. Finding this correlation through the data made the utility change its construction standards on power poles. "The crossarms on top of the poles are longer, so the wires are spread wider apart from each other, and the clearance between the wires is greater," Teel explained. "We've seen reliability improvements as a result of those actions."

Macon's investments have had an impact, too. "The squirrel guards have prevented a lot of momentary outages," Roberts said. "Ten years ago, we would have about 70 outages a year, 80% of them momentary. Now we have 30 to 40 outages a year, with better than 80% of them momentary."

Similar results are showing up in Bryan, Ohio. "We've really hit our tree trimming hard," said Sullivan. "Now we don't get lights flickering during windstorms or operations due to limbs blowing onto the lines." He added that they still see instantaneous outages due to squirrels, but the sustained outages from limbs taking down lines are gone. "We just don't see those anymore."

"Ten years ago, we would have about 70 outages a year, 80% of them momentary. Now we have 30 to 40 outages a year, with better than 80% of them momentary."

JOSH ROBERTS, OPERATOR MECHANIC, SPECIAL SERVICES, MACON MUNICIPAL UTILITIES, MISSOURI



"We want to give people the highest reliability at the lowest cost possible, so we have to target investments in the areas that need them."

JEFF TEEL, DIRECTOR OF ENGINEERING, OPERATIONS AND TECHNOLOGY, NORTHERN WASCO COUNTY PEOPLE'S UTILITY DISTRICT, OREGON

Benchmarking Benefits

Utilities subscribed to the eReliability Tracker receive a personalized annual benchmarking report that uses data from the service to let utilities see how they do in comparison to other utilities' reliability indices.

Sullivan looks at the benchmarking to see how Bryan Municipal Utilities is doing.

Teel does, too. "If we see our outage durations and outage frequencies go up — which is bad — we don't know if that is due to something in our system or something else," he said. "When we can benchmark it with other utilities and see they saw similar jumps, it gives context to the numbers. Maybe it was just a bad winter."

Roberts said he doesn't look at the report much because while Macon counts momentary outages in its figures, others in the area don't, so it's not an apples-toapples comparison.

Teel also noticed the PUD beat others when it came to frequency and duration of outages, but it was lagging in terms of the customer average interruption duration index, which reflects the average service restoration time. "Seeing that made me think about what we might need to do about this," Teel said. "Do we need to increase staff? Is there something else we need to do?"

Having seen this comparison for two years now, the PUD is starting to explore options. The team is considering using drone cameras for enhanced system inspection. It's also looking at adding switching equipment and reclosers.

"Our mission is to provide reliable, competitively priced energy and related services that benefit our customers," Teel said, and his interpretation of that mission is simple. "We want to give people the highest reliability at the lowest cost possible, so we have to target investments in the areas that need them."

Tracking pinpoints those areas. "It helps us understand where we need to address issues," he added.

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WHAT CAUSES ELECTRICAL **OUTAGES?**

According to data submitted by more than 320 public power utilities to the American Public Power Association's eReliability Tracker, more than 5.3 million customers were affected by 73,694 sustained outages in 2023. Understanding the causes of these outages helps public power utilities identify and prioritize areas for improvement to retain their reliability edge.

Cuuces of Outages in 2023		
Top 1	0 Causes of	
	Outage Cause	Total
	Tree	8,503
Øø	Equipment	8,205
5	Squirrel	7,196
?	Unknown	6,992
9	Storm/Weather	5,471
9	Weather	4,329
5	Other Wildlife	4,193
Q O	Equipment Replacement (planned)	2,785
	Electrical Failure	2,511
	Bird	2,506



LEADING PUBLIC POWER TO A MORE RELIABLE FUTURE

RESPONSES ARE FROM:

BY JACKSON BEDBURY, COMMUNICATIONS COORDINATOR, AMERICAN PUBLIC POWER ASSOCIATION

he following Q&A with select individual recipients of the American Public Power Association's 2024 national awards offers a range of perspectives on what it takes to create and keep a utility culture that prioritizes reliability and is ready for the challenges and changes ahead.

What have you found to be the most important aspect to maintaining a reliable system?

CAIN: Our people. My co-workers and I must believe in our utility and have the desire to want to improve. Furthermore, we have to believe in public power as a whole and work closely with other utilities to assist one another where we can to become more reliable together. Close communication within our utility, with other organizations, and across our region allows for us to gain a strong network and grow into tomorrow's level of public power.

MARC CAIN

power plant operator, City of Augusta Electric Utility, Kansas, and winner of the 2024 Robert E. Roundtree Rising Star Award





JASON FRISBIE

general manager/CEO, Platte River Power Authority, Colorado, and winner of the James D. Donovan Individual Achievement Award



INSIGHTS FROM 2024 AWARD WINNERS

engineering and operations manager, Braintree Electric Light Department, Massachusetts, and winner of the 2024 Harold Kramer-John Preston Personal Service Award

HAROLD PUDLINER

borough manager/CEO, Weatherly Borough Electric, Pennsylvania, and winner of the 2024 Larry Hobart Seven Hats Award

LEADING PUBLIC POWER TO A MORE RELIABLE FUTURE

"We have to believe in public power as a whole and work closely with other utilities to assist one another where we can to become more reliable together."

MARC CAIN

LI: Ongoing system improvements — build it right, factor in redundancy, continue to harden it, and keep up with proper maintenance. Being a not-for-profit municipal system, BELD prioritizes reinvesting in the system to improve it. We emphasize proactive maintenance to ensure a reliable system.

PUDLINER: Infrastructure maintenance is crucial to maintaining a reliable system. For us, that includes tree trimming, pole maintenance, and infrared monitoring, in addition to upgrades to the substation and the oil testing of larger transformers on a required basis. Asset and inventory management has become critical for maintaining reliability, with equipment sometimes taking months or even a year to obtain.

What do you see as the biggest threat to grid reliability?

FRISBIE: Obtaining permitting for dispatchable resources and having adequate transmission infrastructure are certainly at the top of my list. I believe RTO markets must create sufficient incentives to ensure resource adequacy, and I am also concerned about cyber threats that seem to be increasing at an alarming rate. Additionally, renewable energy is crucial for sustainable development, but its intermittent nature poses challenges

for grid management. Increasingly severe weather such as hurricanes, wildfires, heat waves, and ice storms can impact renewable power supply, gas pipelines, and power transmission lines and test the grid's resilience. Additionally, inconsistent or shifting energy policies can complicate long-term planning for grid improvements and investments.

PUDLINER: We have seen that power systems can be attacked by local or foreign groups. Severe weather has also tested the reliability of generation and presented the prospect of losing generation during these events, when it is most needed. Moreover, we are beginning to feel the effects of climate change as increasingly frequent severe storm events and temperatures strain our grid.

CAIN: In a time of great advancement in technology and improvement to the grid, we have also opened ourselves up to many threats. I do not believe we are ready for increased loads from mass electrification, as our systems weren't designed for that kind of demand. The costs of upgrading are too high for many utilities, especially public power utilities, which strive to provide affordable power to our communities. For those of us able to invest into modernizing our systems with technology such as [advanced metering infrastructure] and Wi-Fi-controlled SCADA systems, we also must acknowledge the need for a robust cybersecurity provider and incident response plan.



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LEADING PUBLIC POWER TO A MORE RELIABLE FUTURE



"To stay competitive in attracting and retaining young talent, public utilities may need to get even louder in promoting the benefits of public power, as both a service and an employer."

WEIJUN LI

How has your organization adapted to address broadening electrification and changing end-user behavior?

FRISBIE: We spend more time engaging with our customers to better understand their needs and educate them on the best ways to reduce their carbon footprint and manage their energy costs. This is accomplished, in part, by offering incentives for energy-saving behaviors and products. I find that most customers want to help us achieve this energy transition but do not have the time or expertise to understand the best way to support their utility. I believe it is our job to provide that support to them.

Are public power utilities taking the right steps to attract and retain engineering talent? What else could they be doing to develop these leaders?

LI: Public power utilities, especially smaller ones, might not always be in an advantageous position [to attract talent] when compared to big investor-owned utilities. Public power utilities' community-focused management and operations make them attractive, though, and there is plenty of excitement working for a municipal power company. BELD has a co-op/internship program that has been successful in developing young engineers. We encourage them to earn their master's degree (while working full-time) and pursue their PE license. We also provide them with opportunities to participate in management and leadership programs. To stay competitive in attracting and retaining young talent, public utilities may need to get even louder in promoting the benefits of public power, as both a service and an employer.

As someone relatively new to the industry, what would you share with more seasoned public power leaders about how they can help younger workers grow their skills and knowledge?

CAIN: Let your staff know that you believe in them, and then prove it. Invest in your staff by educating them, listening to them, trusting in their abilities, and sending them to conferences and workshops. The more they learn, the better the utility will be set up for the future. They will trust themselves more in their roles and will also be building a network of people that they can call upon later, both of which are vital to our future.

How has management of a small electric utility changed over your decades of leadership? What skills are essential for small-system managers to have?

PUDLINER: The availability and cost of equipment has drastically changed. We have also faced increasing difficulty in finding individuals who want to work in the electric field. As for essential skills, managers of small electrical systems have to constantly be aware of asset management, financial positions amid increasing customer debt, and increasing costs of energy and transmission fees. Managers also have to get into the field and know the system as well as their line supervisors in order to make critical decisions. Managing an electrical system requires a person to constantly look ahead for potential dangers and plan for system problems. Most importantly, managing an electric system requires complete dedication to the customers and to the safety of workers, who maintain and repair infrastructure in the worst weather conditions.



LEADING PUBLIC POWER TO A MORE RELIABLE FUTURE



How has public power management changed over your decades of leadership?

FRISBIE: While I'm not sure public power management has changed during my time in leadership, I believe successful and impactful leadership is about listening, inspiring, and empathizing, as well as adaptability, curiosity, consistency, and culture. Our industry is going through a massive transformation as electricity, a public health and safety service, becomes increasingly political. I firmly believe that people who choose to be in this business come from a culture of public service and have immense pride for the communities in which they live and work. As leaders, we must stay focused on continuous improvement to help the next generation accomplish greater things.

How are you helping your utility plan for the future?

LI: I pay close attention to trends in the power industry and do what I can to help BELD stay current or ahead of the curve. We keep up with our system planning studies and continue to implement system improvements such as securing facilities, conducting substation rebuilds, protecting system upgrades, performing overhead reconductoring, completing underground feeder cable replacements, and adopting and deploying new technologies. We also endeavor to prepare the utility for the clean energy transition and expanding electrification.

PUDLINER: We are in the process of upgrading our substation. All of the wiring, insulators, and switches have been upgraded, and then we will be upgrading our reclosers. We are looking at installing AMI metering, as well as a SCADA system. We are part of the R.I.C.E. program with American Municipal Power. We will also be installing more electric vehicle charging stations.

LEADING PUBLIC POWER TO A MORE RELIABLE FUTURE

"I firmly believe that people who choose to be in this business come from a culture of public service and have immense pride for the communities in which they live and work. As leaders, we must stay focused on continuous improvement to help the next generation accomplish greater things."

JASON FRISBIE

CAIN: We focus on investing into our staff and adopting industry best practices. Currently, we are completing numerous improvements to both our grid and our Municipal Electric Plant II. We have also become more involved with KPP Energy, Kansas Municipal Utilities, Kansas Municipal Energy Agency, and Kansas Municipal Gas Agency to help where we can and learn from others within the organizations.

FRISBIE: As the CEO, it is important that I set the vision, mission, and strategy to support transitioning our resource portfolio in a reliable, financially sustainable way. This includes developing a comprehensive strategic plan that aligns with our board's long-term goals and anticipates various future challenges and opportunities. Equally important is planning for our future workforce needs by designing a competitive total rewards strategy that helps us retain and attract the right talent for our evolving industry.

We proactively engage with the communities and other stakeholders to maintain strong relationships and transparent communications about our energy transition. This includes regular community meetings with elected city officials and staff, as well as publishing news stories and social media posts that share our progress with the clean energy transition and the challenges we face.





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TIME WILL TELL IF NEW TRANSMISSION PLANNING RULE ACHIEVES ITS PURPOSE

BY LATIF NURANI,

SENIOR REGULATORY COUNSEL, AMERICAN PUBLIC POWER ASSOCIATION

n May 2024, the Federal Energy Regulatory Commission issued Order No. 1920, the longawaited rule requiring regional transmission planning and who should pay for it. This is the first time in over a decade that FERC has revised its rules for regional transmission planning, and it is one of the longest and most complex rules that FERC has ever issued.

The rule comes at a time of immense change: increasing demand, a rapidly changing resource mix, and growing threats from extreme weather and cyber and physical attacks, all while individuals face a growing affordability crisis. FERC perceives its new order as an essential step in getting new transmission planned, built, and paid for, which it sees as key to addressing these challenges.

How We Got Here

In 2007, FERC issued Order No. 890, which required transmission providers to implement local transmission planning processes for new projects that satisfy nine principles, including coordination, transparency, comparability, regional participation, and cost allocation. By 2011, FERC found that these requirements were inadequate in spurring the transmission investment needed to maintain reliable service at a reasonable cost.

FERC then issued Order No. 1000, which required transmission providers to engage in regional and interregional planning processes. As part of this process, transmission providers were required to jointly identify regional projects that would be more efficient or cost-effective than local solutions. This regional process was to consider transmission needs (and define cost allocation principles) across three categories: reliability, economics, and public policy. Further, Order No. 1000 introduced competition into transmission development by largely eliminating the federal right of first refusal for transmission facilities selected in a regional transmission plan for purposes of cost allocation.

Although heralded at the time as a landmark rule that would spur new investment in cost-effective regional transmission, Order No. 1000 did not produce all its expected benefits. A decade after its implementation, there had been limited investments in regional transmission projects. Outside of RTO/ISO regions, no projects had been selected for regional cost allocation; and even within RTO/ISO regions, most investment was in transmission projects that addressed immediate reliability needs rather than longer-term needs. Over the same time, it became increasingly time-consuming and expensive to interconnect new generation to the transmission grid.

TIME WILL TELL IF NEW TRANSMISSION PLANNING RULE ACHIEVES ITS PURPOSE

This led FERC to its latest set of changes, which includes Order No. 1920 and Order No. 2023, which focuses on improving the generation interconnection process.

The American Public Power Association has advocated for public power's interests throughout FERC's long effort to reform transmission planning. By submitting multiple rounds of public comments, participating in technical conferences, and meeting directly with FERC commissioners and staff, APPA has consistently urged FERC to focus on reforms that will result in the most efficient and cost-effective solutions.

What's Included

Order No. 1920's main innovation is to require transmission providers to engage in a long-term, forward-looking, comprehensive transmission planning process at least once every five years. This long-term regional transmission plan must: (1) develop at least three long-term scenarios to identify transmission needs over the next 20 years, (2) identify potential transmission facilities that meet such needs and measure the benefits of those transmission facilities, (3) evaluate those facilities for selection in the regional transmission plan, and (4) allocate the costs of those facilities within the planning region.

The order includes two requirements for these plans that may help contain costs: reevaluation and right-sizing of projects. The reevaluation requirement states that transmission providers must reevaluate projects if circumstances change such that the project might no longer satisfy the selection criteria, such as from delays in development, changes in actual or projected costs, and significant changes in laws or regulations. The right-sizing requirement aims to address the problem of transmission owners rebuilding old lines instead of regional lines that might be subject to competition by requiring owners to evaluate whether transmission facilities anticipated to be replaced within the next decade can be "rightsized" to better address a long-term transmission need.

Order No. 1920 also requires transmission providers to improve the transparency of local transmission planning, for which the public power community strongly advocated. This includes a requirement to hold at least three publicly noticed stakeholder meetings at least 25 calendar days apart and provide a suite of materials at least five days before each meeting. Transmission providers must also respond to questions or comments in a manner that allows stakeholders to meaningfully participate, but the order does not necessarily require written responses to all comments, nor an explanation of why alternative solutions were not selected.

These reforms are a step in the right direction but fall short of creating meaningful opportunity for stakeholder engagement. For example, the timelines will not allow stakeholders enough time to meaningfully analyze and comment on materials. And FERC declined to adopt local planning reforms that would affirmatively protect customers' interests, increase oversight and monitoring, require cost estimates, or require coordination with load-serving entities.

Still to Come

Despite its length, Order No. 1920 leaves many important issues unresolved. APPA, along with other public power entities, argued that FERC should include strong cost-containment measures in its final rule, including eliminating unnecessary incentives and encouraging joint ownership. Order No. 1920 defers consideration of those mechanisms.

Giving load-serving entities within a transmission provider's footprint an opportunity to own their share of a new transmission line has significant benefits for consumers. FERC initially proposed reinstating the federal right of first refusal for any project that included joint ownership between almost any two entities. APPA and many others strongly opposed that proposal, instead advocating for a narrower provision focused on joint ownership with load-serving entities. Order No. 1920 fortunately does not adopt the overbroad joint ownership proposal but unfortunately also does not adopt the narrower joint ownership concept that APPA advocated. Despite not adopting a joint ownership provision, some of the commissioners encouraged transmission providers to facilitate joint ownership structures and indicated that joint ownership will be considered in a future proceeding.

FERC originally proposed to eliminate the Construction Work in Progress incentive, which allows utilities to start collecting money from ratepayers even before a project is placed in-service, for projects selected through the new long-term planning process. APPA supports eliminating this incentive, as it can pose more risk to ratepayers in losing the expected benefit they paid for if the project doesn't get built. FERC declined to adopt the proposal in Order No. 1920, stating that it would be more appropriate to allow for a holistic approach to transmission incentives in a separate proceeding.

In short, while Order No. 1920 fails to deliver on most of public power's biggest policy priorities, it has the potential to spur on regional transmission projects that could benefit public power by providing economic and reliable service in a more cost-effective way than existing transmission planning processes.

Whether Order No. 1920 succeeds in its objectives — and whether it ultimately benefits consumers — will depend heavily on further proceedings before FERC and the federal courts.



AMERICAN PUBLIC POWER ASSOCIATION

mong the many concerns about how to keep electricity flowing reliably in the coming decades is how prepared the grid is for longer stretches of hotter days — when the temperature stays hot enough to keep equipment (or people) from being able to cool down on their own.

An analysis by ICF projects that the number of Americans that will be affected by heat that could significantly impact energy systems will increase from 19 million today to more than 78 million by 2050. ICF defines these conditions as 48 or more days per year where the average daily temperature exceeds 86 degrees Fahrenheit. The areas most likely to see increases in the number of energy-impacted heat days



are across the southern and south central U.S., with parts of Texas and Florida expected to see the biggest increase.

The ICF report proposed several suggestions for how utilities can mitigate the potential effects of this expected energy use, especially among community members that already face a higher energy burden. Actions include determining which parts of your service area face the highest risk amid prolonged heat, seeking community input on convenient places to locate cooling centers, educating and supporting building owners on passive cooling measures, and focusing shade tree programs within higher-risk communities.

"All year we are prepping to get ready for summer. It isn't just stress on our electric grid, but on generation, which is a challenge on its own."

PAUL RODRIGUEZ, DEPUTY ENERGY MANAGER, IMPERIAL IRRIGATION DISTRICT, CALIFORNIA

Recent news has highlighted the potential concerns related to if widespread power outages occurred during such heat waves, underscoring the importance of electricity to public health and safety. These stories have also called into question how prepared utilities are for keeping the electricity flowing throughout the summer. Here's how public power utilities in some of the hotter parts of the U.S. have been and continue to prepare for whatever the future holds, and how they are solving some reliability challenges.

Swings and Sag

The Imperial Irrigation District serves one of the hottest parts of California, and the country, serving about 160,000 electric customers across the southern inland valley of the state, down to the border with Mexico.

"High temperatures are our main issue," said Paul Rodriguez, deputy energy manager for IID, which serves the desert area that has seen highs reach almost 130 degrees Fahrenheit in recent years. "All year we are prepping to get ready for summer. It isn't just stress on our electric grid, but on generation, which is a challenge on its own."

In addition to the extreme heat, IID's service territory experiences severe wind events and monsoons that can knock out key portions of the grid, including transmission.

With these conditions, Rodriguez stressed that IID recognizes the need to take reliability seriously, "it's particularly a life and death situation because of the extreme temperature."

This commitment is behind IID's new Coachella Valley Energy Resilience Initiative, a three-part project that includes hardening transmission, improving infrastructure, and securing portable generators. The \$38 million initiative received significant funding from federal grants, including FEMA's Building Resilient Infrastructure and Communities (BRIC) program and the Department of Energy.

Rodriguez said that IID's system is mostly temperature-based and has a very low load factor. He said that while its peak load is above 1,110 MW, the average is around 400 MW. So, while the system needs to be prepared to handle over 1,000 MW, it needs much less energy most of the year.

Properly accounting for this swing is a challenge, as is having efficient operations with a population that is very disbursed across the service territory. "Given the rural areas [we serve], it takes time to get out there, there's a cost to drive out, and trying to find a trouble area is a challenge. But the best defense is a good offense, that's what we're shooting for," with the initiative, said Rodriguez.

"The challenge when we do design and transmission is to account for the heat — we see higher strain in conductors, which translates to sag," explained Rodriguez. To help, IID is adding more structures to shorten the distance between towers, including installing anti-cascading poles every mile, which are also rated to withstand higher winds.

"Our goal is to deliver reliable energy, and we pride ourselves as being one of the lowest cost utilities in California, and we want to keep it that way," added Rodriguez. He noted that the median income across the county is one of the lowest in the state, and that the service area has many rural, disadvantaged communities. The federal support for the effort provides a critical investment for these communities. Another game-changer for reliability, said Rodriguez, is having advanced metering infrastructure, which can better pinpoint outages and help in quickly dispatching field crews. IID is also looking at deploying some "self-healing" switches as well as an advanced distribution management system.

On the demand side, IID has been running a program that provides free shade trees to residential customers for a few years, which it this year expanded to nonprofit commercial customers as well.

"We have a system that is stressed out at times," said Robert Schettler, public information officer at IID, who noted how the effort is one of several to encourage customers to curb energy use where possible. "It is pretty hot here, so if you can block the sun from your house, it can go a long way."

Schettler also said that IID offers energy saving tips on its website and at community events and does energy audits focused on how customers can conserve energy and stay comfortable in the hot summer.



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This push to conserve is also coming at a time when electrification is accelerating. Despite a mandate in California for new homes to have solar installed, IID has continued to see about a 1.5% annual growth in load. Plus, the state has mandated that all vehicles move to be electric by 2035, which will lead to even more growth.

"We are vertically integrated, so we control our generation, load, and act as a balancing authority. All that responsibility is on us," added Schettler.

A Way of Life

In Florida, Michael Poucher, the director of electric utilities for the city of Bartow, said that while the system hasn't seen any marked increase in load from air conditioning, the peak demand associated with higher heat has been starting earlier in the year and going later.

Poucher recently moved to Bartow from Ocala, Florida.

"Florida has always been hot, AC load is just a way of life," he noted. The expectations around energy usage from air conditioning remain predictable, but the sudden cold snaps can cause problems, said Poucher, since most customers rely on electric resistance heating that can be less predictable in terms of demand.

Still, he said the summer peak days in Bartow see anywhere from a 30% to 40% increase in system load compared to the demand on mild winter days.

"If it gets hotter, we may see some increase in load, but at this point in time, we aren't anticipating a huge change in the way we do things," he added.

The bigger concern with increased load, said Poucher, is how the extended higher use will mean customers will see higher bills for more months. On the demand side, Bartow offers incentives for customers to better insulate their homes, whether by adding insulation to their roofs or in getting more energy efficient AC units.

The extended timeframe for higher temperatures hasn't affected how Bartow maintains any of its system components, which is mostly focused on getting hardened to better withstand another way of life in Florida hurricanes.

Hardening measures in Bartow have included undergrounding, enhanced pole inspections and treatment, installing trip savers, and improving tree trimming.

"A lot of the wind, by itself, generally our facilities could withstand that, but when it knocks down the trees is typically when the most damage is done," he said.

When hurricanes and other storms hit, Poucher said the mutual aid network — particularly within the state — is critical in helping Florida communities to recover as quickly as possible, such as after tornadoes hit the Tallahassee area in the late spring.

The utility has updated its tree trimming to a three-year cycle and adopted more effective practices. Poucher noted that utilities across the state have been putting resources into various storm hardening measures,

including installing wider poles set into bigger platforms, and improving conditions around critical facilities for about two decades. However, the wider poles and crossarms have supported another reliability threat in Bartow, which is nesting ospreys. In addition to building large nests on crossarms, they can often drop sticks while building the nests that end up in the lines. Poucher said that making the poles more "vertical," or setting another, taller pole nearby can help them decide to build their nest elsewhere, avoiding such incidents.

Since getting hit with multiple hurricanes in 2004, Bartow instituted an 8-year cycle for inspecting and re-treating or replacing poles.

Bartow has also pushed for mandating undergrounding service lines for new developments, which has helped in getting about a quarter of Bartow's service underground. Poucher estimated that the system could get to about 60% underground at some point, but that it is an expensive endeavor, especially when overhead service is already established.

One of the items that has helped the most in reducing sustained outages, said Poucher, is trip savers, which he said act like "mini reclosers" and help clear faults without causing power loss to customers. With about 100 such devices blanketing the system already, Poucher said Bartow has seen about a 30% reduction in sustained outages.

Adjusted Ratings

When asked to name a city in the U.S. that deals with heat, Phoenix, Arizona, likely comes to mind. Much of the Salt River Project's service territory is in the Sonoran Desert, where over half of the days of the year see high temperatures above 86 degrees Fahrenheit. An analysis from the Washington Post estimates that by 2050, Phoenix will endure an estimated 126 days each year with heat that reduces transformers' performance, or 19 more days of extreme heat than it currently experiences.

"Providing reliable and affordable power during extended periods of extreme heat is a foundational aspect of Salt River Project's annual operations," said representatives from the public power utility. "To ensure a reliable power grid year-round, our engineering design standards and electric system planning reflect the impact of high temperatures on our equipment and our load forecast."

Recognizing that elevated temperatures may decrease the life of electrical equipment, SRP regularly reviews equipment standards to ensure it is using the appropriate sizing of electrical apparatus to account for high ambient temperatures. For example, while typical industry ratings of large power transformers expect 65 degrees Celsius over ambient temperature, SRP lowers this to 55 degrees for its ratings. SRP also tracks the performance, loading, and failure rates of its equipment, which allows it to replace heavily loaded equipment prior to failure.

SRP's team closely watches the long-term load forecast and bases weekahead planning on real-time weather information and predictions that can include the full range of high temperatures. SRP also recently revamped its long-term planning approach to an integrated system plan, instead of a long-term plan that solely focuses on power supply.

"Our Integrated System Plan is unique among utilities in that it takes a holistic approach to planning across generation, transmission, distribution and customer programs to develop a future power system that continues to responsibly deliver affordable, reliable and sustainable power," said SRP.

The plan models multiple factors and scenarios, including worsening climate conditions, to better understand how its whole system could be affected, including customer programs, pricing, and system operations.

Climate conditions are only one of a handful of anticipated changes affecting SRP's territory. SRP is seeing strong growth in electricity demand due to an increasing population, electrification, data center and industrial

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growth, and other factors. Through its ISP, SRP found it will need to at least double the number of power resources on its system in the next 10 years. It is preparing to add 7,000 megawatts of new renewable resources by 2035, including 6,000 MW of large-scale solar. SRP's plans also include new fast-ramping natural gas units, which the utility said will allow for meeting its customers' energy needs and better integrate the intermittent renewables, both pieces that it sees as critical to maintaining its industry-leading reliability.

"Adding this significant number of resources must happen at this pace to meet growing energy demand in the Phoenix metropolitan area and as SRP completes the planned retirement of 2,600 MW of coal resources," added SRP.

HELPING EACH OTHER FOR A MORE SECURE ELECTRIC GRID

FROM AN INTERVIEW WITH **LARRY MALLORY**, SENIOR DIRECTOR OF PHYSICAL SECURITY AND CRISIS MANAGEMENT, NEW YORK POWER AUTHORITY

wareness of a problem, especially one as complex as grid security, can be both good and bad. From the utility perspective, what affects one system can impart lessons to others across the industry. From the public perspective, putting attention on attacks to infrastructure can lead to undue panic or encourage copycat incidents.

While recent attention on attacks against electrical infrastructure isn't necessarily indicative of a surge in terms of incidents themselves, utilities can benefit from increased awareness that such attacks happen. This awareness also helps utilities to constantly readdress and understand their risks as things change. By nature, grid security is a little bit reactive. This is in part helpful, as the nature of attacks is constantly changing, so our responses need to be nimble as well. Just as with other facets of our sector, grid security is not just about what happens to NYPA or any other entity, regardless of size. While our set of assets might differ, remaining aware of what's going on across the industry helps utility leaders to learn from others' experiences.

Utility to utility, risk analysis should focus on what's important to you, and what risks your organization is willing to take. However, it's important for public power leaders to recognize that public power isn't immune to threats seen by the rest of the industry. There's not a separate threat landscape, and the landscape evolves quickly. Utilities need to make sure their toolsets are appropriately tuned accordingly. For example, utilities have focused on measures that keep people from being able to climb fences around critical facilities. But access to technology such as drones has made it so that other mitigation tools might be needed.

Awareness is more than just understanding threats, it involves assessing where you are and how well your controls work. The American Public Power Association's primer on physical security, Physical Security Essentials, can help with this assessment. Utilities should have a good handle on how to define the threat (e.g., by using the design-basis threat, or DBT, approach), and clear metrics to evaluate. This includes metrics related to threat detection, to ensure vulnerability plans work, and being realistic about what's a success and what's a near miss. The most successful organizations evaluate near-misses.

HELPING EACH OTHER FOR A MORE SECURE ELECTRIC GRID

Tracking successes and failures is also helpful for benchmarking, to see what has and hasn't worked for others, and why. I'm a big believer in awareness and information sharing. Public power is perfect venue for that.

Reducing risks isn't always a major endeavor. In fact, if you address the small things, then threats are less likely to become big things. And oftentimes, simple measures can have double benefits, such as good, robust lighting, which can help safety as well as security.

For a long time, there was a line between physical security and cybersecurity, but the line has gotten so small. They are separate disciplines, but they support one another. Keeping your cyber hygiene up to date in turn protects your physical assets, and vice versa. An incident could also easily be both a cyber and physical threat, so most successful organizations work together across everyone who deals with any aspect of security. Some utilities have consolidated both lines of effort under a Chief Security Officer or related executive function.

For small utilities, which are less likely to have an internal team dedicated just to security, maintaining a level of awareness means

leveraging the suite of resources available. That includes signing up to get information and updates from industry partners such as the Electricity Information Sharing and Analysis Center, or E-ISAC, and being comfortable in reaching out to organizations with more resources for help. This is a community – it's not just the grid that is interconnected, but the people who work within it. Just like the mutual aid we provide for storm response, we are willing to help each other and to share what we have learned. In that spirit, APPA members can share insights on the Security community group on APPA Engage (https://engage.publicpower.org), or in discussions at various public power events.

APPA and other utility organizations are also hosting a free physical security workshop in conjunction with the E-ISAC September 25 in Illinois, which will include a rundown of the current threat landscape, review of mitigation strategies and practices, and discussion of available resources to reduce risk. Sign up to participate at https://web.cvent.com/event/e84de295-eef2-4b99-be74-8e36d3dc5def/summary.

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THE COST OF (NOT) CUTTING TREES

Trees and other plants benefit our electric system, from providing shade that helps reduce energy usage to forming natural barriers for security purposes. Yet, vegetation presents some of the biggest threats to electric reliability. Outside of damage from contact with lines and other equipment, whether in storms or regular conditions, trees are also how wildlife (like squirrels) can reach equipment.

In 2023, public power utilities reported about

of all outages were caused by trees.1

This is less than a 2019 survey by CNUC, which found that



across all utility types, were attributable to trees.²

of public power tree-related outages occurred in the summer (from June - August).

1 2023 data from eReliability Tracker 2 Utility Vegetation Management in North America, CNUC, 2019. https://issuu.com/wrightservicecorp/docs/uwsp-cnuc_uvm_survey_report____ The Department of Energy estimates that outages cost Americans \$150 BILLION per year. Utilities focus on vegetation management to reduce outages and the ensuing costs to the community.

Annual spending on vegetation management

\$6-8 BILLION^{3*}\$27 MI Average per utility All utilities



of utilities indicated their vegetation management budget was not sufficient.⁵

YET. STUDIES HAVE SHOWN THAT IMPROVED **VEGETATION MANAGEMENT CAN REDUCE** STORM-RELATED DAMAGE FROM TREES BY AS MUCH AS **63**0

3 https://www.accenture.com/us-en/blogs/accenture-utilities-blog/vegetation-management-key-leversfor-cost-savings#_ftn1

- 4 CNUC
- 5 Ihid

6 https://www.mdpi.com/2071-1050/14/2/904#B2-sustainability-14-00904

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