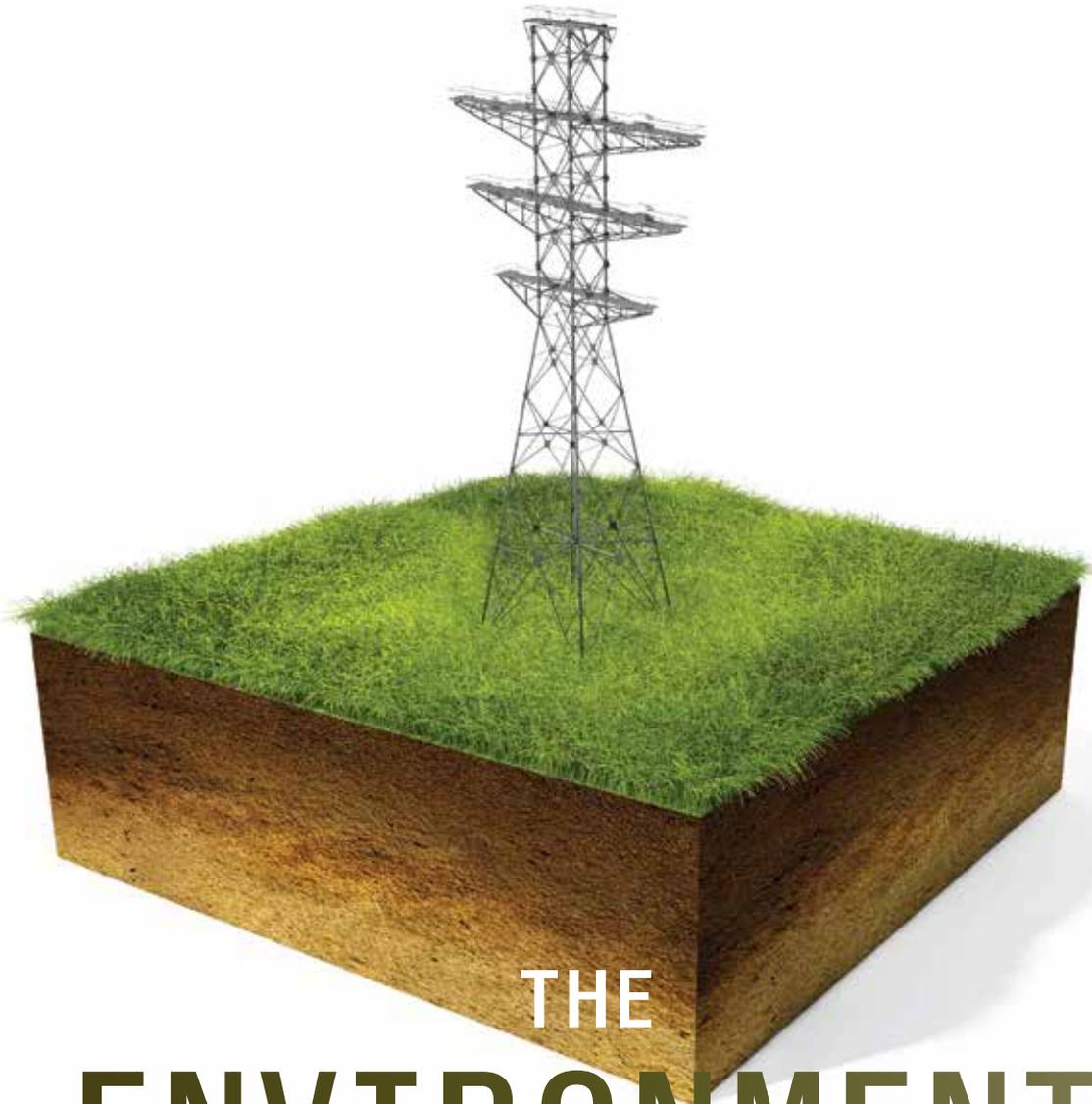


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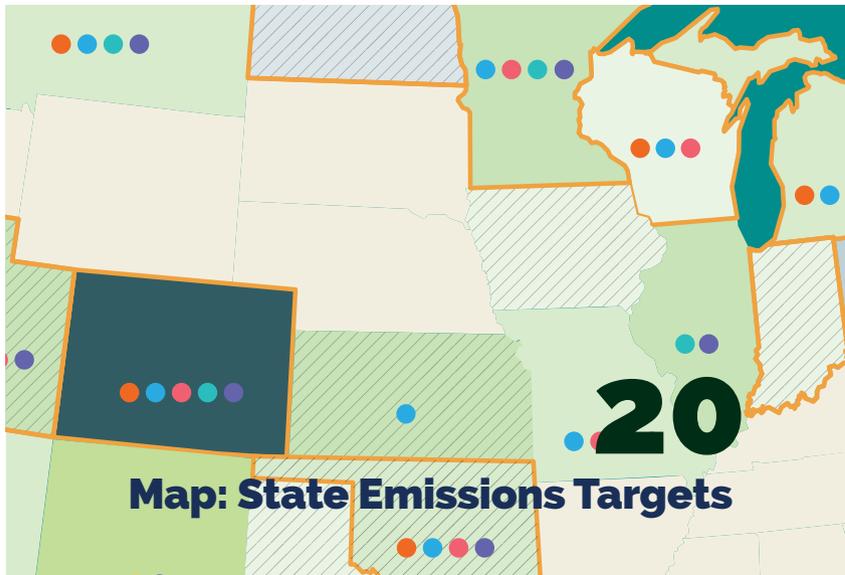
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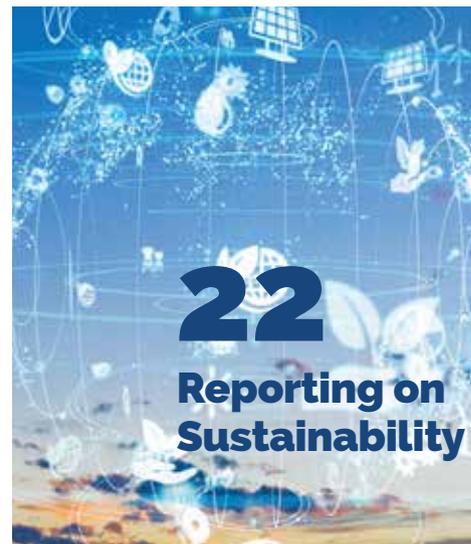
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Senior VP, Advocacy
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& General Counsel

Paul Ciampoli
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Susan Partain
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& Content Strategist

Robert Thomas
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Sharon Winfield
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Samuel Gonzales
Director, Digital & Social Media

David Blaylock
Senior Manager, Integrated
Media & Communications

Tobias Sellier
Director, Media Relations
& Communications

Taelor Bentley, Integrated
Media & Communications
Assistant

INQUIRIES

Editorial
News@PublicPower.org
202-467-2900

Subscriptions
Subscriptions@PublicPower.org
202-467-2900

Advertising
EHenson@Naylor.com
352-333-3443

Advertising is managed by Naylor LLC.

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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 federal government to protect the interests of the more than 49 million customers that public power utilities serve, and the 93,000 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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The complexity of climate change

JOY DITTO, PRESIDENT & CEO, AMERICAN PUBLIC POWER ASSOCIATION

As of this writing, I am exactly four weeks into my tenure as president and CEO of the American Public Power Association. It is a great privilege to be representing service-oriented, community-focused public power utilities in this capacity. However, when I learned during my second week that the topic for my first Public Power Magazine editorial was climate change, I realized there would be no honeymoon period. So, here goes.

It was clear to me during my previous 15-year tenure at APPA that our industry was in an extended era of change, and my four years away have only heightened that perspective. This evolution of our industry has come with a significant increase in complexity, bringing to mind the game Whac-A-Mole. For example, as we have added digital technology to enhance grid operations, improve efficiency, and integrate intermittent renewable generation, we have opened the Pandora's box of cybersecurity risk that must be expertly managed now and into the future.

The Whac-A-Mole comparison is even more apt when discussing the industry's need to respond to climate change risk. As we have begun to move away from coal as a key power generation source, we have significantly reduced greenhouse gas emissions but have had to reevaluate our reliability and resilience posture. For example, coal can be stockpiled on-site at a power plant, while in many areas natural gas cannot be stored. This has created the need for the industry to better understand natural gas-electric interdependencies. In deploying cleaner resources such as wind, we have had to address unintended consequences like migratory bird impacts and the need for new transmission pathways. As we increase use of distributed generation resources, typically intermittent renewable generation like



solar, we must deploy very granular digital technology to integrate such resources while maintaining electric reliability — which, again, raises cybersecurity risk.

In pointing out this increasing complexity, I am not complaining, nor are public power utilities. Rather, as we continue to significantly reduce GHG emissions in our industry (and as we increasingly help the transportation sector electrify), I am encouraging an eyes-wide-open approach to the benefits and costs. This approach will enable us to optimize our resource mix and infrastructure over time so that all the moles are eventually whacked, and, ultimately, our customers benefit from a continued supply of safe, reliable, affordable, and very clean electricity. The public power util-

ities featured throughout this issue can attest to the complexity of taking this approach to everything from making changes to their resource mix (see page #) to hardening other infrastructure and assets (see page #) and reporting sustainability efforts to their communities (see page #).

As an association, like our members, we have not rested on our laurels as policymakers and regulators have grappled with how to tackle the complex climate change issue. The following is an excerpt from the preamble to APPA's revised climate change policy resolution, to be considered by our members on Feb. 25, 2020. It explains our climate policy development and decision-making over the last 14 years and how the legislative and regulatory landscapes have evolved during that timeframe. It is worth the read, and I sincerely hope that the membership will have approved the entire resolution with the resolved clauses by the time this is published. If it has, then I encourage you to read both the preamble and the resolved clauses on our website at www.PublicPower.org/Policy-Resolutions.

"The American Public Power Association (APPA) supports congressional action to address climate change. In 2006, APPA formed the CEO Climate Change Task Force to assist the association in developing its climate change policy. For the last 14 years, the task force (now called the CEO Climate Change & Generation Policy Task Force) has played a key role in the development of APPA's policy positions on federal climate change legislation and Environmental Protection Agency (EPA) regulations.

Following the U.S. Supreme Court's 2007 decision in *Massachusetts v. Environmental Protection Agency*, which held that EPA has the authority to regulate tailpipe emissions of greenhouse gases (GHGs) under the Clean Air Act, legislative activity on climate-related issues increased significantly. In 2007, Congress approved legislation to direct EPA to publish a rule requiring the public reporting of GHG emissions from large sources. Less than two years later, in 2009, the House of Representatives approved the Waxman-Markey bill to create a cap and trade program. When the Senate failed to pass its own climate bill in 2010, activity on climate change issues shifted to EPA, with the agency issuing the Clean Power Plan (CPP) in 2015 to regulate GHG emissions from fossil fuel-fired power plants. The CPP was appealed, and the U.S. Supreme Court

eventually stayed its effectiveness. In 2019, EPA repealed the CPP and replaced it with the Affordable Clean Energy (ACE) rule. The ACE rule has now been appealed as well. These events have created substantial and ongoing policy uncertainty for electric utilities, including public power utilities.

Congressional interest in addressing climate change continues to increase. Following the November 2018 congressional elections, where Democrats won back the majority in the House of Representatives, Democratic leadership has made addressing climate change a top priority for House Democrats in the 116th Congress. The Speaker of the House reinstated the Select Committee on Climate Change (now called the Select Committee on the Climate Crisis) and more than two dozen hearings were held in 2019 on the issue. In late July 2019,

the leadership of the House Energy & Commerce Committee announced its intention to begin drafting comprehensive climate change legislation to get the United States to net-zero emissions by 2050. Republicans on the House Energy & Commerce Committee expressed their belief that climate change is real and needs to be addressed, as well as their willingness to work with the majority on addressing climate issues through the promotion of energy innovation. In January 2020, House Energy & Commerce Committee Democrats released draft climate legislation.

In the 116th Congress, the Senate has also examined climate change issues in the Energy & Natural Resources Committee and Environment & Public Works Committee. Multiple hearings were held in those committees and legislation was approved to promote carbon capture and sequestration technologies. Key Republicans have expressed their concerns on the impacts of climate change and their desire to promote energy policies that will help reduce emissions and promote non-emitting resources, including research and development of needed technologies. Senior Senate Democrats continue to stress the importance of addressing climate issues, noting it is one of their top legislative priorities.

Public power utilities have already taken actions to reduce their carbon dioxide

(CO₂) emissions in response to changes in the economics of power supply resources, energy markets, and customer requests. They will continue to reduce their emissions. APPA members are undertaking a variety of approaches to reducing not only emissions from their generation, but also from their utility buildings and vehicle fleets. Further, many have adopted innovative energy efficiency programs to help their customers reduce their power usage. Many are also actively working in their communities to promote the electrification of the transportation sector, including deploying charging infrastructure, offering rebates for EVs, and developing special rate structures to incent off-peak charging. Others have developed policies to enable the interconnection of distributed energy resources (DERs) owned by utility customers and to purchase excess power generated by DERs.

For all of these reasons, the likelihood of climate change legislation moving in Congress in the next several years is increasing. APPA believes it is important that any such legislation is economy-wide, sets clear targets, and provides maximum flexibility to covered entities. For the electric sector, it is imperative that climate change legislation allows the sector to reduce emissions while also maintaining a reliable grid and affordable retail rates."

WORKING TOGETHER TO CLIMATE CHANGE

As members of the American Public Power Association look to adopt an updated resolution on climate change policy, we spoke with several members about how they have been affected by climate-related policies and how they expect utilities to be involved in setting environmental policy into the future.



ADDRESS



WORKING TOGETHER TO ADDRESS CLIMATE CHANGE



WORKING TOGETHER TO ADDRESS CLIMATE CHANGE

The interviews are with:

MARC S. GERKEN, PE, president and CEO, American Municipal Power

DAVE GESCHWIND, executive director and CEO, Southern Minnesota Municipal Power Agency

DAVID LEATHERS, general manager, Jamestown Board of Public Utilities, New York

JOLENE M. THOMPSON, executive vice president of member services and external affairs, American Municipal Power, and chair-elect of the American Public Power Association's Board of Directors

STEVE WRIGHT, general manager, Chelan County Public Utility District, Washington

In what ways have climate-related policies impacted your operations and planning, or how do you expect them to in the future?

STEVE WRIGHT: This is one of the most important issues for us — the markets in the West are driven by trying to make sure that there is resource adequacy, and, increasingly, policies with respect to carbon-emission reductions have a very significant impact on us. It's not just whether there's going to be a carbon policy, but what type of carbon policy. A couple of years ago, we initiated work with the Public Generating Pool to do a study on a least-cost approach to emissions reduction

in the Pacific Northwest. We were able to stop a lot of bad policies that the Legislature thought might have achieved carbon-emission reductions that would have been at a much higher cost than the alternative that the state ended up with. Our study was critical to the decision-making process.

MARC GERKEN: AMP has a diverse energy-supply portfolio, including both fossil and renewable assets, and AMP and our members have invested in carbon-free resources, including hydropower, solar and wind. From our viewpoint, it will be important for any carbon policy to recognize and award early actions to reduce greenhouse gas emissions, while also providing for an appropriate glide path for fossil-fuel-fired power plants with existing debt.

DAVID LEATHERS: We in Jamestown are grateful to have approximately 90% of our energy supply needs met with a hydropower allocation from the New York Power Authority's Niagara Hydropower Project. As good stewards of this important resource, the Jamestown BPU has aggressively implemented residential, commercial, and industrial energy efficiency and conservation programs as well as LED street lighting and electric vehicle infrastructure projects. We utilize thermal energy from our power plant for an award-winning district heating system that extends throughout our downtown corridor. These continuing efforts highlight our commitment to the responsible use of electricity, environmental stewardship, and reliable and affordable services.

New York state climate-related policies have increased costs for our customers through various state-driven programs and fee-based subsidies that are designed to move the state toward its carbon-free goals. However, these CO2 reduction programs, and nuclear plant and renewable project subsidies, represent new, significant costs for our financially challenged customers.

At the Federal level, we understand change is coming and we need to work hard to anticipate it and to integrate it into our long-term planning, both as it relates to challenges and opportunities.

WORKING TOGETHER TO ADDRESS CLIMATE CHANGE

DAVE GESCHWIND: Policy is a big part of the backdrop of looking where we need to take our generation portfolio. Minnesota has had state legislation related to climate change or renewable energy going back to at least 2001. We have requirements today to meet 20% of our energy needs with renewable resources, and that requirement increases to 25% in 2025. SMMPA currently has one large coal-fired resource on our system and it is looking like 2030 will be the retirement date for that resource. With that retirement, we expect to be 80% carbon-free by 2030. That also means that we will have achieved a 90% decrease in carbon emissions compared to 2005 levels.

Do you expect any environmental policy to be enacted/revised in the next five to 10 years that will affect your operations?

JOLENE THOMPSON: We expect some form of carbon policy will be enacted within the next five to 10 years. Whether it will be in the form of a clean-energy standard, carbon tax, or cap-and-trade format remains to be seen. Today, there is an increasing patchwork of goals, portfolio standards, and other similar efforts by states. We are engaged on behalf of our members to track these developments and ensure that policymakers understand our views.

GESCHWIND: There is too much momentum on this topic for nothing to happen. We think something is coming, if not at the federal, then probably at the state level. At the state level, there were proposals last session in Minnesota that would have required getting the state to 80% carbon-free energy by 2030 and 100% carbon-free by 2050. Those proposals didn't pass, but we expect there will be continued discussions around those targets. Given that, part of our planning is to assume there will be some constraint or price on carbon emissions in the future. When we are talking to policymakers, a key part of our message is about having an appropriate glide path to allow utilities to meet these carbon goals, whatever they may be, without making electricity unreliable or unaffordable for customers.

LEATHERS: It's hard to predict what will occur at the national level. New York state is driving climate policy with aggressive actions anticipated over the next five to 10 years. Anything at the federal level is not expected to be as consequential as what we're experiencing in New York. An important part of the



APPA resolution, the recent House draft legislation, and the Climate Leadership and Community Protection Act in New York is that all are looking at this in an economy-wide manner — not just with power generation. That's certainly a broader impact. If the transportation and home heating industries are going to transition, it is going to directly impact us. We need to be a part of those changes and understand how can we help our community with education, incentives, and new programs. We've already started moving in that direction.

WRIGHT: At the national level, the biggest question is what direction Congress is going to go. It is clear their intent is to begin to move during this Congress and the next. This is when the concrete is wet in the legislative process. It is very hard to change anything once it has dried. Critical elements are going to be decided in the next couple of years. But the problem is that these decisions don't all get made two or three years from now — it's a steady progression of decisions that leads to a final conclusion. We are pleased that the discussion is starting from a clean energy standard that includes all types of non-carbon-emitting resources rather than trying to focus on certain resources. We think that creates the best strategy for keeping costs low.

WORKING TOGETHER TO ADDRESS CLIMATE CHANGE

Are there any important roles utilities play in terms of addressing climate change that are often overlooked by policymakers or in the communities you serve?

GESCHWIND: Utilities have already accomplished a great deal. I don't think there's a utility out there that wouldn't be 100% carbon-free if they could be. Whether for economics or end-of-life issues, many traditional fossil resources are being replaced, and much of this is happening with no mandates to do so. Allowing that to continue, without creating time frames that might artificially increase the cost of compliance or jeopardize reliability, is important.

Another one of our messages to lawmakers is that the cost of achieving carbon reductions starts to increase exponentially when you get higher than 80% or 90% carbon-free. There is a lot of focus on the utility sector when it comes to carbon emissions. The electric utility sector was responsible for 28% of

greenhouse gas emissions in 2017, so we can't be 100% of the solution. It might be much more economical for other sectors to bear part of the burden.

THOMPSON: Public power utilities have already taken actions to reduce GHG emissions from their energy supply, as well as their municipal operations, in response to the communities they serve. We have the ability to lead by example and help the transportation and building sectors decarbonize through electrification.

LEATHERS: An important role we play is to consistently highlight the critical importance of reliability and affordability in addition to the environmental impacts. We prioritize working with our partners at the state level to understand their goals and planning, to make sure we are included in that process. Sometimes policymakers only focus on the environmental aspects, without accounting for effects on lower income customers and economic preservation and development. We must



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stress affordability and reliability. The utilities are an important group to not just talk about the environmental reasons for change, but also the importance of reliability and affordability as we consider how the change will occur.

WRIGHT: Utilities have an extremely important role to play, and we have to make sure our communities are engaged and our voice is heard. If we come from a perspective that either carbon-emission reductions are not important, or are the only thing that is important, we get hurt. The fundamental goal is always a three-legged stool: clean, reliable, and affordable. We need to recognize that climate change is an issue that the public at large cares about, and we need to put it in the context of what we're good at — that we have the expertise to explain how to solve for all three legs of the stool simultaneously. Deep decarbonization strategies don't work if you have an unaffordable or unreliable electric power system, because there is a need to electrify other sectors of the economy using clean electricity. There are times that if we don't speak up, there is a risk that you'll get something very focused on the clean element without capturing the affordable and reliable.

Why was it important for public power to update its resolution on climate change policy?

GERKEN: Public power utilities are community owned and have a heightened responsibility to ensure that our customer-owners are strongly represented at the table when policy changes impacting our industry are being considered. As the national organization advocating for public power, APPA is our voice in Washington with lawmakers and regulators. In order for APPA staff to secure a seat at the table, it's incumbent upon its members to ensure that they have a position to advocate.

GESCHWIND: The No. 1 reason is the age of the old one — it has been over a decade since the last resolution was adopted. Since then, there has been even more emphasis among our lawmakers and customers about climate change. We want to be more effective with policymakers, so it makes sense to work from an updated policy position from our national association. Wright: A lot has changed in 12 years. There is a shift going on in Congress and nationally. It is not just Democrats who are addressing climate change. I was particularly taken by Republican Rep. Greg Walden, who was honored as the Legislator of

the Year at the 2019 Legislative Rally, and how he and some of his colleagues said it was time to take action. That shift is important for public power to recognize. There's enough evidence out there now that it's time to update and think through where we want to be positioned. What I feel good about is that public power can work together, we can come together as we have with this resolution.

The strength of public power is local decision-making. There are many localities that believe something needs to be done to address climate change. Their constituents are demanding action. We also have members for whom climate policy is a significant threat to their local economies. So, in order to best represent public power, we needed this update. Otherwise, what we'll be doing is telling APPA's legislative staff, "We really don't want you to participate in this discussion."

LEATHERS: Primarily, it appears more likely that Congress will act in the near-term. There is common agreement that staff needs updated membership input on Association priorities to make sure we're part of this ongoing and important legislative process.

THOMPSON: Carbon policies are under discussion at the local, state and federal levels and the outcomes will have major impacts on our industry. It was timely to revisit and refresh the Association's existing federal carbon policies to provide APPA staff with clear direction as they represent members before Congress and federal agencies.

How does having this resolution help you in your work?

LEATHERS: Individually, it helps me and us to hear and better understand the broader priorities beyond what is occurring in New York state. As an organization, APPA is very spread across the country and is made up of small and large utilities; all members have different challenges and priorities. Related to our work in New York, [the resolution] helps to make sure that we have awareness and understanding of these broader priorities while we consider and progress on our own goals and objectives.

WORKING TOGETHER TO ADDRESS CLIMATE CHANGE

WRIGHT: We're in Washington state, which has chosen to be aggressive on climate change, but Chelan County is in the eastern, more conservative part of the state. As we engage with Congress, we'll be articulating policies, and it will be important to say that this isn't just the views of Chelan County, this is the view of the national trade organization. We're not an urban center that has a tremendous number of voters — if we can express that these views also represent the view of members from across the country, it brings more weight to our argument. There are a lot of different perspectives within public power, because we're all situated differently geographically or from a generating resource standpoint. The power of this resolution is the fact that it represents utilities who represent a very diverse group of interests.

GERKEN: Having the resolution helps guide the Association's strategy and positioning with federal legislators, regulators and other stakeholders. The tenets of the resolution also provide a list of priorities for APPA members to consider as they are faced with state and regional action.

GESCHWIND: It provides guideposts and more weight for us when we're talking to policymakers, whether at the federal or state and local levels. By having our message consistent with that of our national association, we can let policymakers know that our positions are not just ours, but that they also represent a consensus of many, many public power utilities.



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RIDING THE STORM: INCREASING RESILIENCY FOR EXTREME WEATHER EVENTS

BY JESSICA PORTER, CONTRIBUTING WRITER



From the wildfires in Australia and tropical storms in the Caribbean to drought and flooding in the United States, no corner of the globe was immune to extreme weather events in 2019 — and no corner expects to be in the future.

While system hardening plans are nothing new for utilities, some public power utilities are taking a fresh look at how their infrastructure can be increasingly resilient in the face of increased frequency of some natural disasters.

RESILIENT DESIGN

The Fort Pierce Utilities Authority — a public power utility providing electric, water, wastewater, natural gas and internet services on Florida's east coast — is one year into its 10-year system hardening plan. The plan serves as a guide for protecting its infrastructure from extreme weather, which includes almost yearly hurricanes and tropical storms, as well as daily spring thunderstorms.

Though the utility has always taken measures to protect against extreme weather, Paul Jakubczak, PE, FPUA's director of electric and gas systems, said the conversation is changing.

"It's more important now because electricity is no longer a luxury — it's a necessity. In Florida, people use 26% more electricity than the national average, primarily because of air conditioning use."

The utility gathered data from its outage management system, reviewed outage reports and collected institutional knowledge from field workers to create its system hardening plan.

The plan was presented to the utility's board of directors and approved through its capital improvement budgeting process.

A major component of the plan is inspecting all poles and replacing them if needed. FPUA conducts inspections on a five-year cycle, more quickly than the Public Service Commission's recommended eight-year cycle.

The utility is working on replacing all wood feeder poles with concrete or ductile iron utility poles, which carry a 70-year life expectancy compared to the 40-year life expectancy for wood.

Pole replacement also is a component of the system hardening plan created by the Guam Power Authority, which serves approximately 52,000 customers on the Pacific island. Having a plan to prepare for extreme weather is key for Guam, which is located in "Typhoon Alley," a region notorious for being in the path of almost every storm headed toward Asia, according to John M. Benavente, PE, GPA's general manager. As a result, it regularly deals with typhoons (known as hurricanes in the Atlantic) that exceed a Category 5 rating.

"GPA has to resort to the solutions or fixes we've implemented for economic and sustainability reasons. Our customers include the U.S. military and federal government installations, which account for approximately 20% of our load," Benavente said. "National and homeland defense are of paramount importance, and, therefore, GPA continues to improve the system to ensure a reliable and sustainable energy environment."

GPA also is preparing to protect itself from rising sea level storm surges and tsunamis. In 2017, scientists visited GPA with concerns that a tsunami may hit the island in the next few decades.

Pole replacement helps prepare for increasing storms and weather events, but it's nothing new to the utility. GPA began replacing all wooden poles with spun concrete poles in the 1980s. It regularly replaces poles and uses concrete poles for all new line extension projects. Today, 90% of its more than 36,000 poles are concrete.

GPA also is working on moving to a hybrid system consisting of a primary distribution line that's an overhead concrete pole and a second-

ary system that's underground. Energy from the transformers mounted on concrete poles serves customers through an underground line connected to their homes and businesses.

"This hybrid system eliminates the aerial secondary line typically attached to customer homes through a weather head on their roofs. During a typhoon on Guam, this secondary line system typically gets damaged the most, and storm recovery then takes a substantial amount of time."

The utility recently converted an additional 500 customers to the secondary underground system. Approximately 20% of GPA's distribution system serves customers with underground lines. "In the last storm, once the main primary lines were repaired, those 500 customers were immediately restored."

GPA plans on installing underground systems on most of the island in the next 25 years, which should mitigate much of the damage from future typhoons.

Moving systems from overhead to underground is not without complications. This process requires trenching, so GPA works with the Guam State Historic Preservation Office and other local government agencies for permits and clearances.

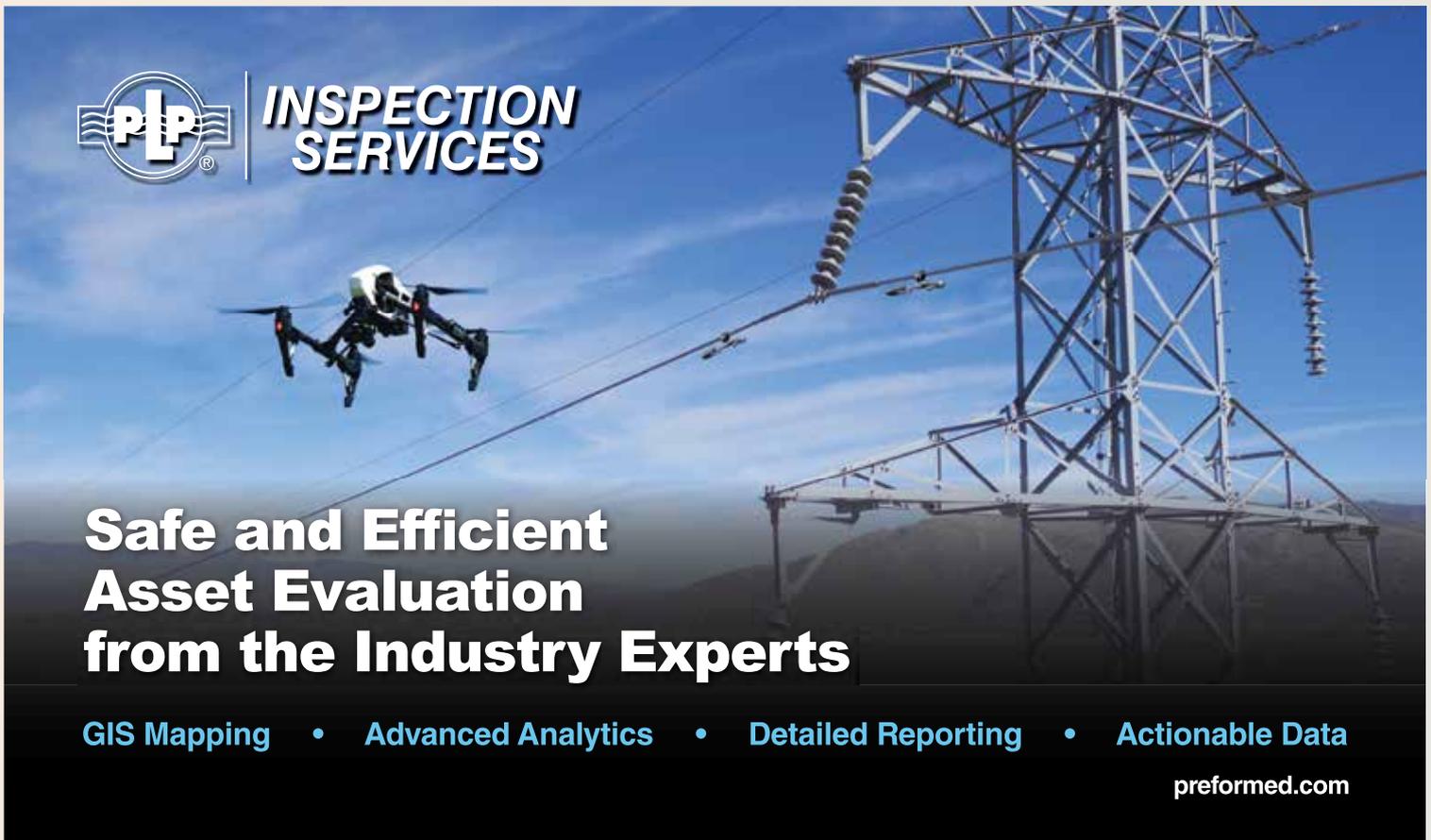
To fund this and other projects, GPA issued long-term bonds. "We don't have the ratepayers of today paying for the entire investment, which would last for decades," Benavente said. "Furthermore, additional funds generated as required by bond indentures in the form of debt service coverages are used on capital improvement projects."

RETHINKING OLD WAYS

In addition to burying power lines to protect against future typhoons, GPA recently signed a contract with the Korea Electric Power Corp. to build a 198-megawatt baseload power plant, which is scheduled to go online in October 2022.

The new plant will be located 300 feet above sea level, which will protect generators and equipment from tsunamis and storm surges. Previously, GPA constructed all conventional baseload generating plants at or near sea level to take advantage of seawater for cooling.

Instead, the new plant will be located close to the Guam Waterworks Authority's Northern

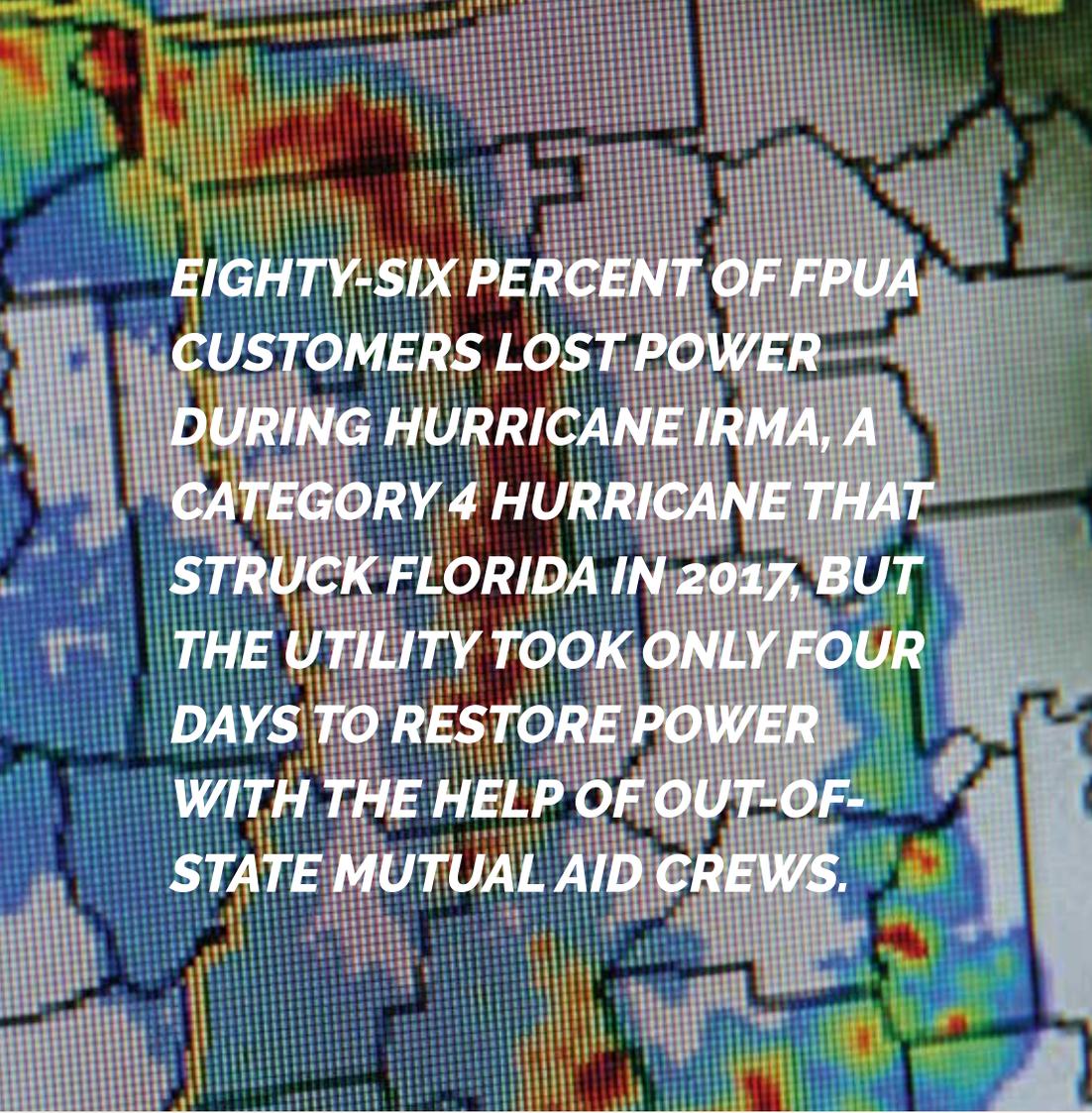


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EIGHTY-SIX PERCENT OF FPUA CUSTOMERS LOST POWER DURING HURRICANE IRMA, A CATEGORY 4 HURRICANE THAT STRUCK FLORIDA IN 2017, BUT THE UTILITY TOOK ONLY FOUR DAYS TO RESTORE POWER WITH THE HELP OF OUT-OF-STATE MUTUAL AID CREWS.

This became a problem during Hurricane Matthew, a Category 4 hurricane that hit Florida in 2016. During the hurricane, a substation tripped off twice because of this salt spray, which required the utility to use the fire department to spray the insulators with water to remove the salt build up. Since then, the utility has purchased pressure washers for its two substations sited near the Atlantic Ocean. FPUA is also installing higher-class insulators. Though it has a 13.2-kilovolt system, it installed 23- and 35-kv insulators to increase the distance between the energized conductors and the pole or cross arms which they are mounted on.

Two years ago, the utility did a system study that indicated problematic substation breaker operations, including fuses not blowing when they encountered a fault. As a result, the utility changed its distribution fuse protection philosophy and began using a fuse blow philosophy that helped with restoration times and decreased breaker operations. FPUA also installed trip savers, which maintain customers' power if there's a momentary outage, such as from a tree branch touching a wire.

In the six years Jakubczak has been with the utility, he has noticed the frequency of storms increase.

"They talked about hurricanes not making landfall in Florida for over 10 years, but that all changed in 2016 with Hurricane Matthew. Since then, hurricanes seem to be coming one after another. Fort Pierce was in the line of fire for Hurricane Dorian before it stalled over the Bahamas. If it hadn't, we would have been right in the bullseye, and we would have had a lot of customers without power," Jakubczak said. "Since I've been here, some of the system hardening techniques that we implemented have decreased the number of outages. We are seeing both the reliability numbers and the customer benefits improving."

Wastewater Treatment Plant, which will allow GPA to repurpose approximately 3 million gallons of sewer water to treat and use for cooling the steam turbine part of the combined-cycle units — without any impact to Guam's water aquifer. Working with the wastewater treatment plant will also reduce the sewage waste that currently flows into the ocean.

Siting the power plant adjacent to the wastewater facility will also increase reliability, as it is a large power load demand area and most of its transmission lines are underground. In addition, the plant will hold adequate water resources, as well as 30 days of fuel oil capability, in case a tsunami cuts out fuel supplies to the new plant.

The Ukudu power plant will be constructed by an independent power producer under a build-operate-transfer contract. The contract includes an option for the transfer of ownership to GPA either in 25 or 30 years.

MANAGING ENVIRONMENTAL CONDITIONS

As part of its system hardening plan, FPUA focuses on vegetation management and performs a four-year growth cut back every three years. This is particularly important in Florida, because its continuously warm and moist climate allows for year-round vegetation growth.

With so much of its infrastructure located close to the ocean, the utility also must mitigate damage from salt spray.

"As the ocean air blows in, salt is deposited on insulators, which cakes up if you don't get a good rain," Jakubczak said. "When you get the first dewy morning or light misty rain, electricity travels across insulators and could cause an outage."

IDENTIFYING PRIORITIES

After a storm, FPUA now restores power 24 to 36 hours more quickly than nearby utilities. Eighty-six percent of FPUA customers lost power during Hurricane Irma, a Category 4 hurricane that struck Florida in 2017 and affected all public power utilities in the state, but the utility took only four days to restore power with the help of out-of-state mutual aid crews.

To determine where to focus its efforts, FPUA relies on data from reporting mechanisms to prioritize worst-performing areas that need pole upgrades or lines buried. It keeps a close eye on critical community infrastructure such as hospitals and water and wastewater treatment plants.

FPUA is deploying advanced metering infrastructure, which will provide additional data that can be reviewed to determine whether the utility is spending money on improvements in the best possible way.

Jakubczak recommends utilities participate in the American Public Power Association's Reliable Public Power Provider program as a way to begin creating a system hardening plan. As part of the program application, utilities are asked questions about how they track and manage reliability, and whether they have a capital improvement plan to address these metrics.

"Just thinking about [system reliability] makes you think about how you track outages. Is it based on customers calling? Is it based on animal or tree issues, or system location, or age?" Jakubczak said. "Once you start thinking about those scenarios, you create a plan and a budget and then work on an implementation strategy. Each utility has a unique approach to how they want to keep the lights on — we are all a little different."

INCORPORATING COMMUNITY FEEDBACK

For customer-owned utilities, communication is a vital part of system hardening efforts. Twice a month, FPUA holds board meetings, which are televised and available on its website. FPUA also posts information related to storms and storm preparation for customers on social media outlets such as Facebook and is working on making its online outage maps more interactive.

GPA holds outreach meetings in villages and at the utility headquarters. The working sessions and monthly meetings of the Guam Consolidated Commission on Utilities — a five-member board of commissioners elected to serve both GPA and GWA — are open to the public, live-streamed and recorded. It mails a monthly newsletter to customers with billing statements, and it sends out media statements, public service announcements, and paid advertising as necessary.

"GPA strives to foster cooperation on all fronts, is committed to transparency of its operations to our island community, and has always reached out

FOR CUSTOMER-OWNED UTILITIES, COMMUNICATION IS A VITAL PART OF SYSTEM HARDENING EFFORTS.

to inform the ratepayers and public on various matters," Benavente said. "GPA is owned by the ratepayers and has a successful track record of achieving community support of its efforts."

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The advertisement features a blue background with yellow and white text. It shows several utility poles with various signs and markers, including a vertical sign with 'VM 1-16', a horizontal sign with '20/140', and another vertical sign with '33330'. A small inset image shows a person working on a pole.

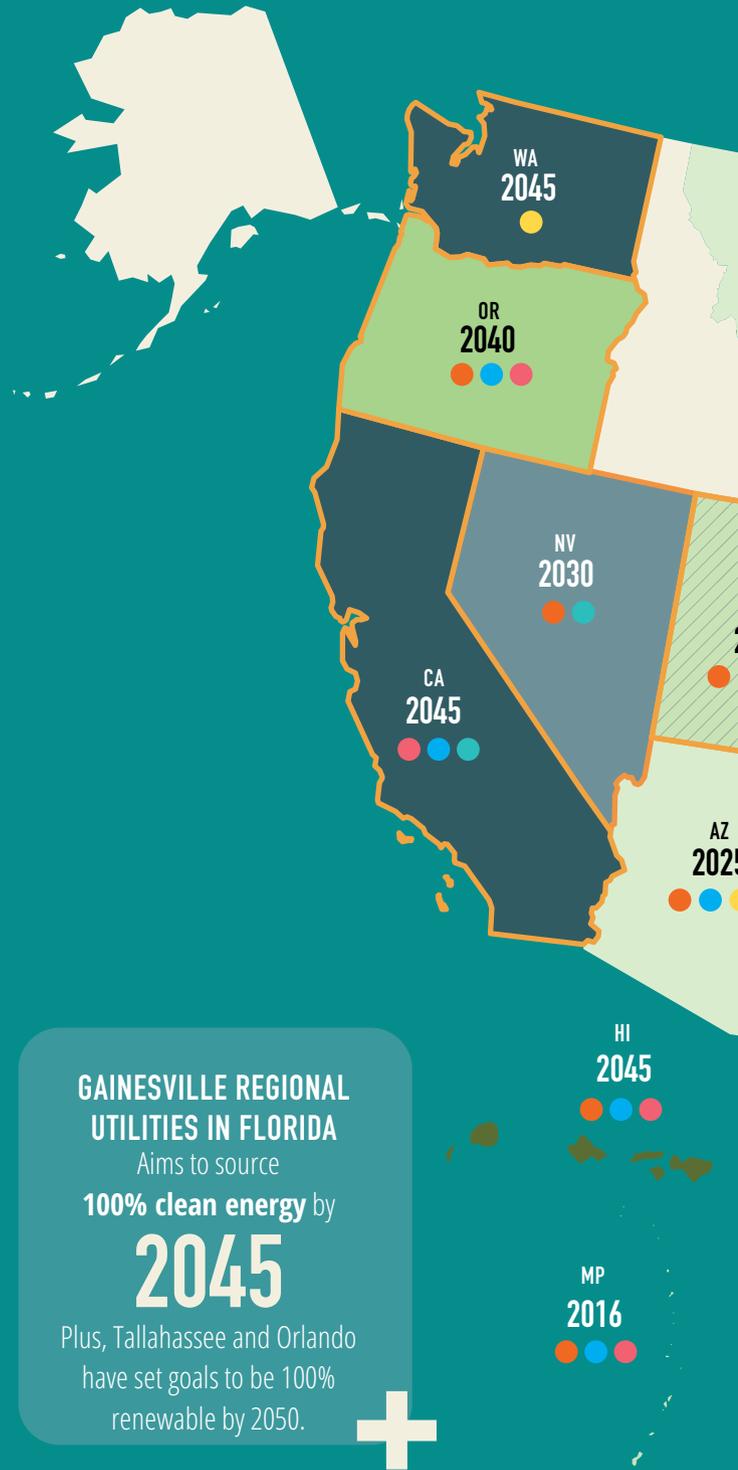
HOW AND WHEN STATES PLAN TO REDUCE CARBON EMISSIONS

Many states have set goals or standards to reduce carbon emissions from electric generation sources within the next 30 years. This map is a snapshot of how each state plans to reach its target — including a differing mix of non-carbon emitting sources, timeline, and to different degrees.

Approximately one-third of public power utilities are included in these targets. Additionally, public power entities set individual goals that might exceed state mandates.

As of January 2020, seven public power utilities net 100% of generation from renewable resources.

Note: All state targets in this map include at least some hydropower. Many have qualifications on which facilities can be included. State mandates that include only smaller capacity hydro facilities in certain cases are denoted.



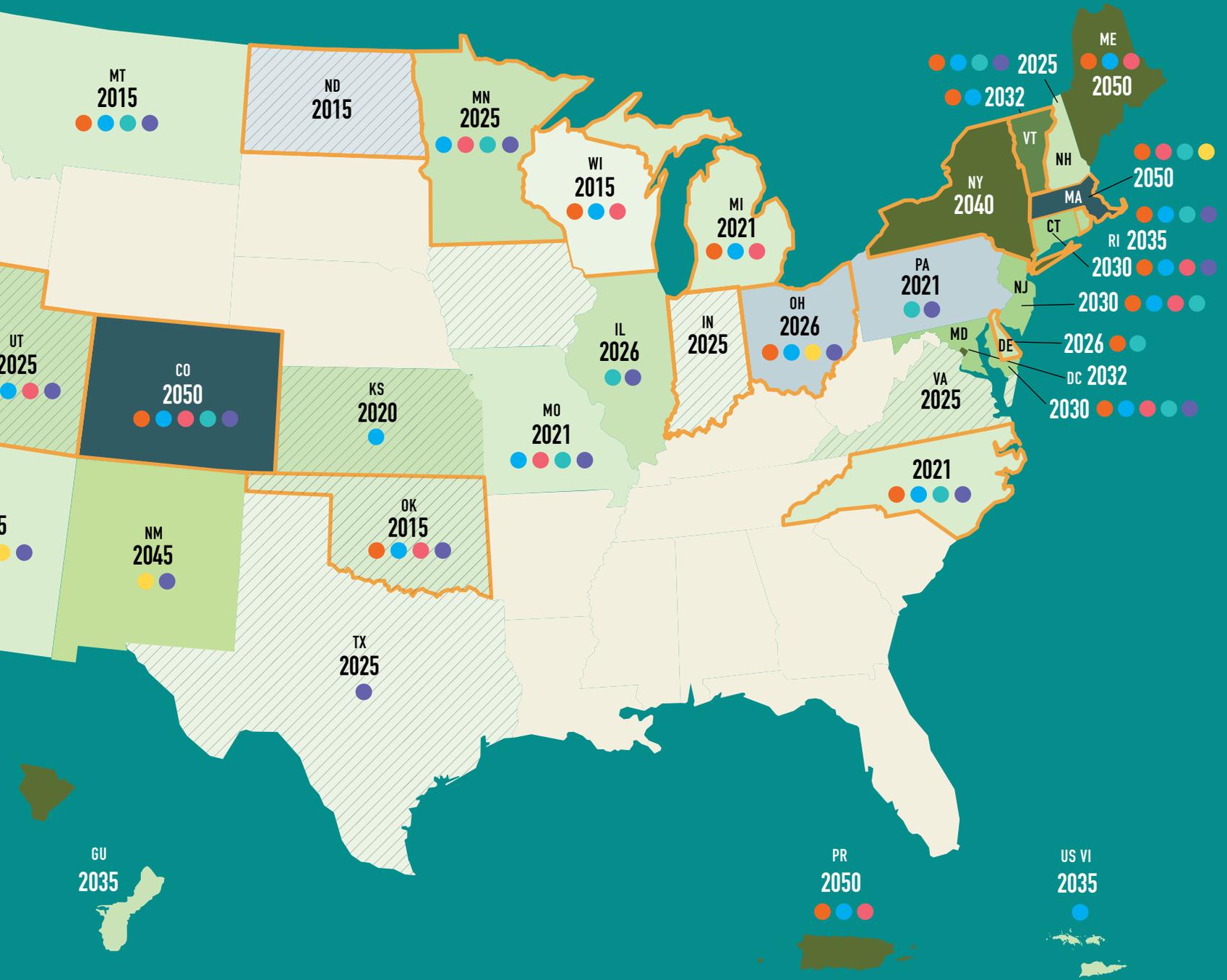
PLATTE RIVER POWER AUTHORITY
 Goal to be **zero-net carbon** by **2050**
 Supplies 4 public power utilities in Colorado.

MUNICIPAL ENERGY AGENCY OF NEBRASKA
 Goal to be **carbon-neutral** by **2050**
 Supplies 69 public power communities in 4 states.

GAINESVILLE REGIONAL UTILITIES IN FLORIDA
 Aims to source **100% clean energy** by **2045**
 Plus, Tallahassee and Orlando have set goals to be 100% renewable by 2050.

SOUTHERN MINNESOTA MUNICIPAL POWER AGENCY
 Goal to be **80% carbon-free** by **2030**
 Supplies 18 public power utilities in Minnesota.





RENEWABLE PORTFOLIO

STANDARDS require or encourage electricity producers to supply a certain minimum share of their electricity from designated renewable resources.



CLEAN ENERGY STANDARDS tend to be market-based, technology-neutral portfolio standards that require a certain percentage of retail electricity sales come from non- or low-emitting sources.



ENERGY SOURCES INCLUDED, IN ADDITION TO RENEWABLES LIKE SOLAR AND WIND

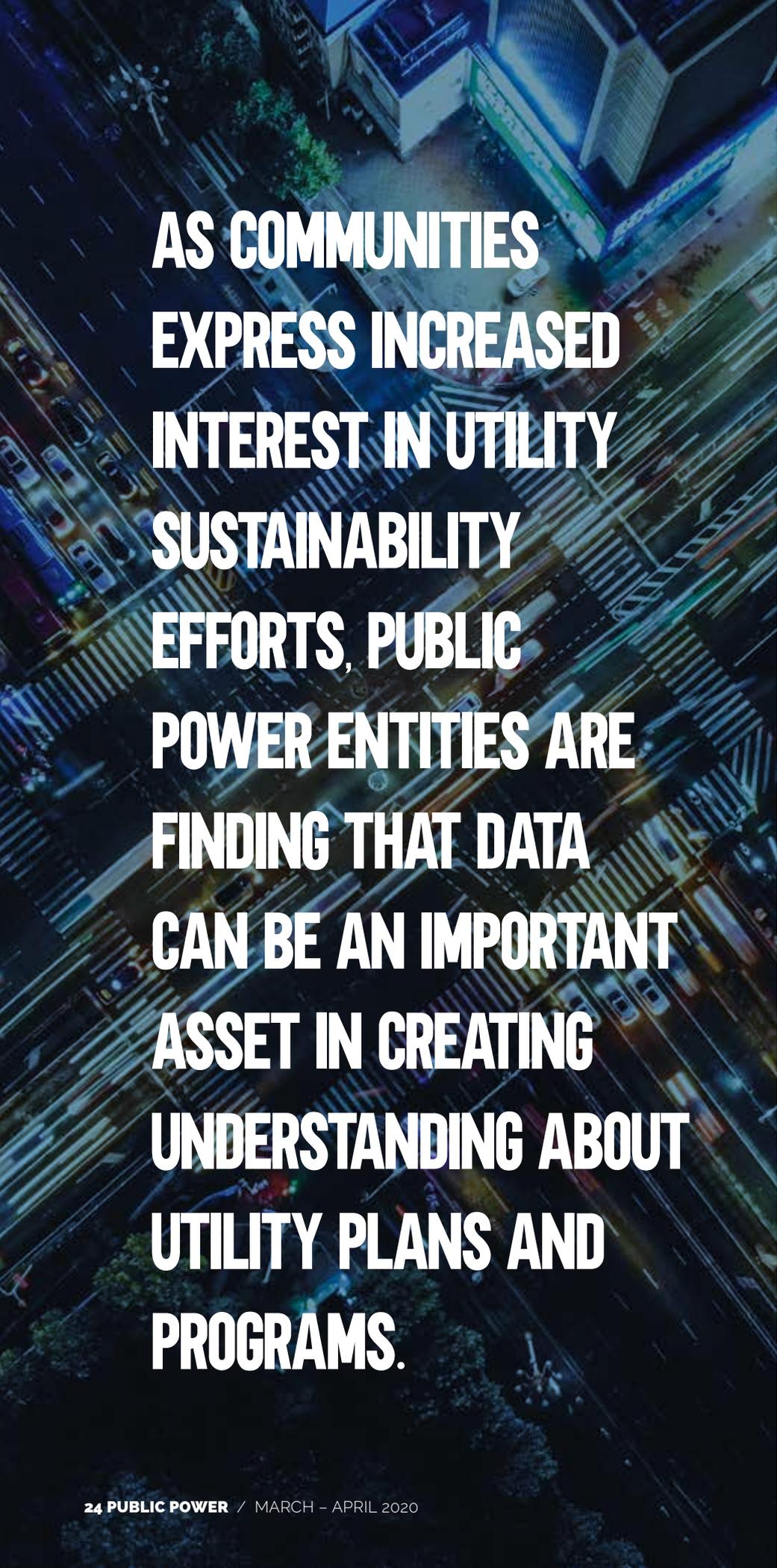
- Geothermal
- Landfill Gas
- Municipal Solid Waste
- Small Hydro
- Nuclear
- Other



GLOBAL ISSUE, LOCAL IMPACT: REPORTING ON SUSTAINABILITY

BY JAMES PATERSON, CONTRIBUTING WRITER





**AS COMMUNITIES
EXPRESS INCREASED
INTEREST IN UTILITY
SUSTAINABILITY
EFFORTS, PUBLIC
POWER ENTITIES ARE
FINDING THAT DATA
CAN BE AN IMPORTANT
ASSET IN CREATING
UNDERSTANDING ABOUT
UTILITY PLANS AND
PROGRAMS.**

GATHERING DATA, NOT DUST

It would have been easy for the 30-page report on greenhouse gas emissions at Kirkwood Electric in Missouri to become one of those studies that is stored away in a binder to gather dust on a conference room bookshelf, rarely getting further attention.

But Kirkwood Director Mark Petty and others there thought it could be more than that, and in the decade since the Baseline Greenhouse Gas Emissions Inventory was produced, the report has helped identify and guide three significant and popular projects at the utility and has been a vehicle for broad customer connections, which may be one of its most valuable byproducts.

“We wanted to be sure it wasn’t just an academic exercise. So, we really used the numbers and the details about where our emissions were coming from,” said Petty. “And we involved the community at every step, which paid off in several ways.”

Rather than gather dust, the report laid the groundwork for a statewide wind energy project that resulted in major energy cost savings and fueled projects to shift the city to electric vehicles and change traffic management in an effort to cut emissions and improve the flow of vehicles, all projects applauded by many of the approximately 28,000 residents of Kirkwood, located just southwest of St. Louis.

The report developed detailed data about GHG emissions by the municipality, along with specific recommendations, with extensive involvement from citizens. It called for a sustainability task force and mentioned public involvement in three of its five recommendations.

These recommendations included “Bring city and citizen leaders together to analyze and coordinate future efforts for sustainability within municipal operations and throughout the

“WE WANTED TO BE SURE IT WASN'T JUST AN ACADEMIC EXERCISE. SO, WE REALLY USED THE NUMBERS AND THE DETAILS ABOUT WHERE OUR EMISSIONS WERE COMING FROM, AND WE INVOLVED THE COMMUNITY AT EVERY STEP.”

MARK PETTY
DIRECTOR, KIRKWOOD ELECTRIC
MISSOURI

community,” and to form a team to “streamline the data collection process to effectively monitor progress of government-specific and community-wide reductions.”

Petty noted that outreach should involve informing the community about the utility’s environmental footprint and what plans are in place to address any concerns; seeking community input; using publicly generated ideas effectively; and, importantly, showing how any concerns were addressed.

“It is important to provide information and get input, but then move past the discussion stage and take action — and let people know that you have,” Petty said.

FROM DATA TO ACTION

Rebecca Tolene, vice president for the environment at the Tennessee Valley Authority, noted that TVA has stepped up efforts to get public input on its integrated resource planning.

“Their interest has grown, and that dialogue has become more important to us,” she said. “And we have found that the more people know about how energy is created and the balancing act we have in providing affordable energy and maintaining environmental stewardship, the better.”

Tolene said that TVA has significantly increased the opportunities for public input about sustainability efforts, while also learning to avoid being overly attentive to the “loudest factions.” Meanwhile, Brian Child, vice president for enterprise planning, who oversees the production of TVA’s IRP, said that the agency process included about four months total of public input on the latest 20-year plan, which was approved by the board last August.

“For the 2019 IRP, we held a number of scoping sessions, then got input on the draft report at seven public meetings and took advantage of technology by offering a webinar on the topic and a new interactive report on the website. We received over 1,200 public comments on the draft report,” he said.

From the outset, TVA relied on a diverse, 20-member working group from each segment of its stakeholder base. It included representatives from utilities in the region and economic

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REBECCA TOLENE
VICE PRESIDENT FOR THE ENVIRONMENT
TENNESSEE VALLEY AUTHORITY



development, environmental, industry and community groups, state governments, and academia. The group met 14 times throughout the process.

It also fine-tuned the public sessions by streamlining the comments and then allowing for an open house period, when interested people could meet TVA leaders and specialists face to face for a dialogue.

SIMPLE AND RELEVANT

American Municipal Power, Inc. (AMP), which serves 135 public power utilities in nine states, developed a tool to assist members reporting utility emissions to the public. After three years of use, AMP then assessed the use of the tool, with an eye toward streamlining relevant information and updating emissions data sources, according to Erin Miller, director of energy policy and sustainability for the Columbus, Ohio-based wholesale provider of energy supply and services.

The template for reporting emissions associated with energy supply is part of a Sustainability Reporting Tool developed through funding from the American Public Power Association's Demonstration of Energy & Efficiency Developments (DEED) program.

"We simplified the member sustainability reports to cover three primary pollutants: CO₂, NO_x, SO₂," Miller said. "Also, instead of using the U.S. Environmental Protection Agency's Emissions & Generation Resource Integrated Database 2016 data, we use the PJM market emission rates and the emission rates from the AMP assets that our members subscribe to, both of which are updated annually."

Miller said she observed an increased interest in the tool by members, noting that many customize it to meet their specific needs. For example, some members' commercial and industrial customers with sustainability, emissions or carbon reduction goals have requested information about their energy supply and overall sustainability efforts within the community.

Tolene noted that businesses considering a new facility or expansion often now want to know about the local utility's carbon footprint, and financial institutions increasingly are interested, likely because they are examining how forward-thinking some utilities and municipalities are about their environmental impact and how their solutions affect finances.

Petty also noted that municipal and elected officials are increasingly likely to seek sustainability information, and utility officials should encourage their knowledge about it to get their support and help in informing the public.

TAKING ADVANTAGE OF MEDIA INTEREST

At a session on communicating about environmental issues during the APPA's 2019 National Conference, panelists recommended strenuous efforts to engage customers, noting that interest in sustainability increasingly cuts across demographics and political affiliations. The panelists emphasized that talking about public power's community ownership helps remind customers that they have a voice in decision-making and are part of the two-way communication between public power utilities and their customers.

At the panel discussion, Steve Roalstad, communications and marketing manager at Colorado's Platte River Power Authority, said that the joint action agency extensively promoted a plan to develop a 50% non-carbon portfolio by 2021, along with a report suggesting that a zero net-carbon energy mix could be achieved. He said that promoting those sustainability efforts resulted in media coverage that, if done as paid placements, might have cost half a million dollars.

Petty agreed that stories about the environment gain media attention. The utility got positive coverage when it published its sustainability report in 2008, and the projects that grew from the report get even more attention today.

For example, recent efforts at the state level proposing the collaborative project to bring more wind power to Kirkwood and other state utilities — an initiative that had its roots in the report and was fueled by Kirkwood — has been covered by the media in a favorable light, noting how it will save Kirkwood customers \$1 million annually and nearly \$13 million statewide, while significantly cutting GHG emissions.

The media is quick to report on projects such as solar plants or wind farms and other visible efforts to cut GHG emissions, Tolene said. “That sort of project gets a lot of attention.”

Petty has found that social media can play a critical role in describing utility efforts and in getting feedback from the public. “It can give citizens the information, but also an opportunity to comment, and can be a good place for

synergy to develop about an issue with opinions being debated and a consensus forming,” he said. “Things can become clarified when we present good information and clearly talk about these issues and get feedback.”

CLOSING THE LOOP

Tolene noted that because of heightened public interest in its sustainability efforts, TVA has made it a priority to assess the comments from the public and respond to their queries, though doing so poses a challenge given the volume.

“We receive thousands of comments a year, and we try to bundle them in connection with the issue they address, but we still have work to do in that area. We are studying ways to have this process be more of a two-way street,” she said, noting that it is critical to inform the public about how their concerns are addressed, especially as interest in sustainability continues to grow.

“Previously, customers were interested in issues such as their rates and our policies about the waterways. But now they want to know about our carbon footprint and are expecting to have a say in how we address it in the future.”



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À CUT ABOVE: ALIGNING TREE TRIMMING AND ENVIRONMENTAL STEWARDSHIP

BY BETSY LOEFF, CONTRIBUTING WRITER

Coast to coast, in the city or countryside, public power providers face the never-ending task of tree trimming. Ensuring that trees are properly pruned is a major contributor to a reliable system, as public power utilities reported more than 8,375 tree-related outages in 2019 through the American Public Power Association's eReliability Tracker. Reliability is only one part of the equation, though. Keeping trees properly pruned, without sacrificing aesthetics or environmental integrity, requires careful coordination with one's community and partnering with local and federal landowners.



PHOTO COURTESY CITY OF TALLAHASSEE



“We’d like to help grow that knowledge base within the agencies. We want to help them become more familiar with electrical systems, what it takes to maintain them, and why a section of line really does need tree trimming within a certain distance.”

SCOTT CORWIN

EXECUTIVE DIRECTOR
NORTHWEST PUBLIC POWER ASSOCIATION

BIGGER CUTS, FEWER OUTAGES

There are some 3,400 communities that participate in the Tree City USA program, which has been greening up urban areas across the U.S. since 1976. Tallahassee, Florida, home to nearly 200,000 residents, is one of the most successful program participants nationwide. Here, tree canopy covers 55% of the city, more than twice the national average of 27%.

Tallahassee is committed to its urban forests, said Rob McGarrah, general manager for the city’s electric and gas utility. This dedication shows in the tree-trimming policies adopted by the city 23 years ago. “Other utilities in Florida trim back 8 to 12 feet from the wires, and they do that trimming every three years,” McGarrah explained. “Following community dialogue, we changed our tree-trimming program to trim 4 to 6 feet every 18 months. We trimmed half the

distance twice as often because of the commitment to trees in this community.”

That strategy succeeded in giving Tallahassee its signature dense tree canopy, but the cooling shade of those trees didn’t come without a price. “Historically, over half of our distribution outages have been tree-related or due to animals,” McGarrah said. Because the primary nuisance animal is squirrels, he said that much of the animal intrusion is tree-related, too.

The role trees clearly played in reliability problems prompted McGarrah and his colleagues to launch a pilot to test alternative trimming approaches. Before launching the pilot, utility staffers sought public support for the changes they wanted to make in the tree-trimming policy. Through public meetings, city workers explained to residents that outages mostly stemmed from trees and tree-dwelling animals.

“We told people, ‘We think we can do something to improve reliability in your neighborhood, but we need your buy-in and support

to do it,’” McGarrah said. “We didn’t do a house-by-house vote, but we had ample opportunities for everybody in the neighborhood to come out and publicly provide feedback.”

After gaining that nod of approval, Tallahassee tree trimmers went back to cutting back limbs 8 to 12 feet away from power lines in 2015. By March 2016, McGarrah was able to report a 25% reduction in total outages for these pilot areas and a 75% reduction in outages that were longer than one minute compared to outage figures from 2012 through 2014. “We saw reliability improvements almost immediately,” he said.

Based on these results, the city decided to intensify tree-trimming through most of the system. This does not include the nearly 78 miles of roadways in Tallahassee that have been designated as “canopy roads.” Lined with moss-draped oak trees and other greenery, canopy roads are verdant pathways “that have enhanced protections in our community,” explained McGarrah. Tree trimming along those routes

A CUT ABOVE: ALIGNING TREE TRIMMING AND ENVIRONMENTAL STEWARDSHIP

is less intense but occurs more often, and the utility uses other system-hardening techniques, such as partially insulated conductors and crossarms engineered for added strength, to reduce outages.

RIGHT TREE, RIGHT PLACE

Trimming trees isn't the only thing utility foresters do in Tallahassee. They've also worked closely with the city forester on a comprehensive urban forestry plan created after a careful inventory of existing

foliage. "At the beginning of the process, the utility foresters provided input concerning tree placement, growth rates and effects on utility infrastructure," McGarrah said. "They work closely with the city forester to mitigate problem trees and develop tree-replacement plans" that put the right tree in the right place to maintain the canopy while improving safety and reliability.

Right now, nearly 40% of Tallahassee's urban forest is made up of short-lived, weak-wooded species. In addition, 37% of the trees in Florida's capital city offer low resistance to wind, while another 16% have resistance categorized at medium-low. Only 22% of the trees are considered highly wind-resistant in this city that has seen impact from three hurricanes since 2016.

The plan utility and city forestry professionals created calls for more species diversity and a focus on long-lived, wind-resistant stock in the forest. Because 70% of the city's trees are planted on private land, reaching this goal will require considerable citizen outreach and education, something McGarrah said the city and utility already do routinely, and he anticipates good outcomes.

"Between the utility vegetation management changes and the planning associated with the urban forest master plan, we are comfortable the reliability of the electric system will be enhanced," he said.



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BURNING QUESTIONS

Just as Tallahassee alerts residents to upcoming tree-trimming operations and balances citizen input in its tree-trimming plans, many of the 158 electric utilities represented by the Northwest Public Power Association have two important landowners they must work with before pulling out their chain saws: the Bureau of Land Management and the U.S. Forest Service.

NWPPA member utilities operate in Washington, California, Oregon, Alaska, and other western states. “Geographically, we exist where much of the land is under federal ownership and where many of the largest wildfires occur,” Scott Corwin, the organization’s executive director, said in public testimony before the U.S. Senate this past December.

Some of NWPPA’s member utilities operate in areas where as much as 80% of their service territories traverse federally owned land. Trimming policies differ in part because the two biggest landowners — the USFS and the BLM — are in two different cabinet departments within the federal government. Plus, rules and processes can vary on an office-by-office basis within the land-management agencies.

According to Corwin, utilities often have a line that spans multiple jurisdictions. “Lines can pass from Forest Service land to BLM land or from one forest to another, which means they have to deal with different U.S. Forest Service districts,” Corwin said. On top of this, the power providers also deal with multiple state agencies, he added.

Along with different policies, there are disparities in how rules are applied from one office to the next, as well as other issues. “Some of it’s staffing and resource allocation,” he said. “If they have a backlog or don’t have the staff with expertise on hand to analyze whether the tree trimming is needed, it can get hung up.”

This last issue is why Corwin has been pushing for provisions within agency policies that allow for training of agency staff by utility staff. “We’d like to help them grow that knowledge base within the agencies,” he said. “We want to help become more familiar with electrical systems, what it takes to maintain them, and why a section of line really does need tree trimming within a certain distance.”

Mostly, however, Corwin joins other leaders of industry organizations — including the American Public Power Association — in pushing for a “responsive, consistent and coordinated process for allowing access to infrastructure and vegetation management on public lands.”

OVERCOMING INCONSISTENCY

In January, Dave Markham, the executive director of a cooperative utility in Oregon, told U.S. House of Representatives members how different federal agencies can be in approving tree-trimming requests from power providers.

In one instance, his utility requested permission to remove 30 dead or dying trees, a task that took just three days to complete but nearly three months to get the go-ahead for from the

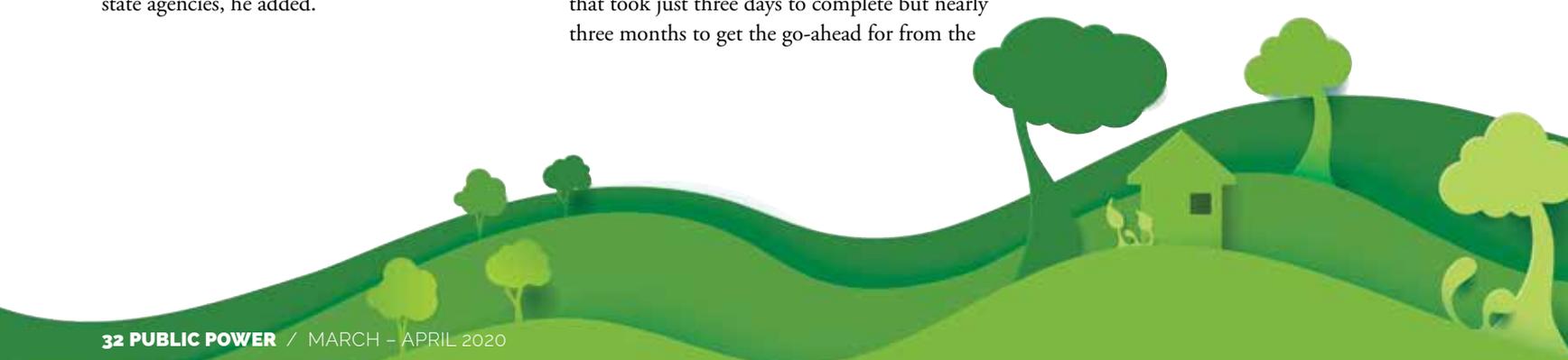
federal agency managing the land. In another agency’s district, a similar request to remove 50 trees was approved almost immediately, Markham said.

“This situation highlights the inconsistent application of policies by federal land managers,” he told lawmakers. “There should not be differing cooperation and responsiveness between neighboring district offices, especially when it comes to removing vegetation that can come into contact with electric lines and create wildfires.”

Right now, the USFS is working on reshaping policies related to managing vegetation on public lands, and Corwin has been among the industry players working to ensure the new rules are more consistent and provide timely response when utilities identify a risk area. The BLM may engage in similar rule making in the future, but, for now, it has issued instructional memos to state offices.

In the meantime, Corwin has several changes he’d like to see the USFS make in its new rules. Among them are coordinated guidelines between offices and districts as well as the elimination of case-by-case approvals. He also calls for categorical exclusions to lengthy review under the National Environmental Policy Act for routine work on rights-of-way or in the case of hazard tree removal.

“Every fire season reminds us that we are out of time to address hazardous vegetation,” Corwin said. “Continued delays are not an option.”



OUT WITH THE OLD, IN WITH THE NEW: SUSTAINABLE DECOMMISSIONING

BY ALICE CLAMP, CONTRIBUTING WRITER

Turning electrical devices on and off might mean a simple flick of a switch, but the process to shut down or repurpose a generating facility is complex and requires careful planning and considerations as varied as reliability, workforce, environmental impact, and cost.

Two large public power utilities — Salt River Project and the Los Angeles Department of Water and Power — shared their thoughts on the decommissioning process and how they addressed a suite of challenges.

PRIORITIZING SAFETY

Until it was retired at the end of 2019, the 2,250-megawatt Navajo Generating Station in northern Arizona was one of the largest coal-fired plants in the country. The plant owners include Salt River Project, Arizona Public Service, Tucson Electric Power, Nevada Energy, and the U.S. Bureau of Reclamation.

Faced with the potential cost of new emission control equipment, and increased competition from other low-cost resources, a grim economic outlook drove the difficult decision to close NGS, said Scott Harelson, SRP's supervisor of media relations. "The price of other resources, primarily natural gas, made continued operations of NGS uneconomical and not in the best interest of our customers," he said.

Economics is a common thread in the closure of many U.S. coal-fired plants, according to the Energy Information Administration. Between 2010 and 2019, the EIA reported that more than 546 coal-fired power plants in the U.S. — roughly 102 gigawatts of generating capacity — announced their retirement. And another 17 GW of coal-fired capacity is set to retire by 2025.

The very first priority from the time the shut-down decision was made in 2017 was to keep the plant safe, said Joe Frazier, the former NGS manager who is now overseeing the decommissioning. "Knowing that the plant would close in two years was a huge distraction that could easily get someone hurt if that person is not focused on the job."

Decommissioning began in the fall of 2019 and is expected to be completed within five years. However, Frazier said the current schedule has the decommissioning process completing within three years.

One challenge is demolition, which Frazier said is a dangerous process. "Keeping folks safe will be our No. 1 focus," he said, adding that the process and procedures now in place will do that.

SUPPLANTING ENERGY

SRP is working with the Navajo Tribal Utility Authority — a public power utility that serves the Navajo Nation — on land clearance and any future use. Once decommissioning is completed, the Navajo Nation will repurpose the restored land as it sees fit.

In the meantime, SRP is working with NTUA on a solar facility some 100 miles from the NGS site. Kayenta I is the first utility-scale solar project to be developed on the Navajo Nation, and it set the stage for future development, including Kayenta II, a nearly 28-MW solar facility developed, owned and operated by the NTUA. Together, the two facilities have a capacity of 55 MW, and the output of both is delivered to Navajo Nation residents.

Through a long-term power purchase agreement with NTUA, SRP purchases energy and renewable energy credits from the Kayenta facility. Because there is no transmission infrastructure to carry the energy to SRP's grid, NTUA delivers an equivalent amount of energy to SRP from other resources within its portfolio that are interconnected to SRP's system.

MINIMIZING WORKFORCE DISRUPTIONS

A second priority, said Frazier, was to offer jobs to all employees who wanted to stay with SRP. Of the 433 SRP workers at NGS, 294 have accepted other positions within the utility, said Renee Castillo, the utility's senior director of human resources.

"The majority of our NGS employees accepted an offer to redeploy and are working in a variety of different jobs — from our power plants in St. Johns and Gila Bend to administrative positions at SRP headquarters," she said.

Twenty-two employees, all Navajo, are performing site services activities. They are focusing on assisting with the initial decommissioning of NGS. Twenty-one employees left SRP, and some have chosen to work for contractors involved with the decommissioning efforts.

GETTING CONSENSUS FOR CHANGE

The decision to repower the 1,800-MW Intermountain Power Project, a coal-fired plant in western Utah, was driven in part by the Los Angeles Department of Water & Power's commitment to stop using coal for electricity generation in part by 2025.

A California state bill passed in 2006 requires that any long-term investment in new baseload power generation cannot exceed 1,100 lbs per megawatt-hour in greenhouse gas emissions. Another California state bill established a cap and trade program, requiring power plants to purchase carbon emissions credits, making coal plants uneconomical.

The plant is owned by the Intermountain Power Agency and generates electricity for 35 utilities in Utah and southern California, including LADWP. IPA obtained agreement from all the participants to replace the IPP coal facility with a natural gas-fired facility, and in 2015, the LADWP board approved the construction of a 1,200-MW combined-cycle plant at the IPP site.

Agreements among participants stipulated that construction of the natural gas-fired units must begin by 2020 and be completed by 2025. A key component of the agreements allows LADWP and the other Southern California participants to maintain rights to two critical transmission systems connecting existing and future renewable energy from Utah and the southwestern U.S. to Los Angeles.

A dispatchable power source is needed to maintain the high-voltage direct current line

The decision to repower the 1,800-MW Intermountain Power Project, a coal-fired plant in western Utah, was driven in part by the Los Angeles Department of Water & Power's commitment to stop using coal for electricity generation by 2025.

that runs from the plant and provides capacity to Southern California.

In 2018, LADWP and the other participants scaled back the size of the combined cycle plant, reducing it to 840 MW. Of that capacity, LADWP's share is 544 MW. The proposal required unanimous approval of the IPP participants and the board of the the IPA.

At the time the LADWP board increased the utility's renewable goals for 2025 to 55% and for 2036 to 70%, respectively. This action accelerated the decarbonization of LADWP's power supply portfolio by increasing the renewable portfolio standard targets by 5%.

BALANCING MULTIPLE ROLES

Decommissioning of the IPP will begin in July 2025, with oversight of the work provided by the IPP's Coordinating Committee, composed of representatives of IPP's participants. The plant's infrastructure, including administrative buildings and converter stations, will be upgraded for use by the new natural gas combined-cycle facility.

When decommissioning is completed, the IPP coal facilities will be returned to pre-construction condition, said Paul Schultz, LADWP's director of power external energy resources.

Groundbreaking for the natural gas combined-cycle facility will begin early in 2022, said Schultz. Over the next two and a half years, the

two combined cycle units will be built at the IPP site.

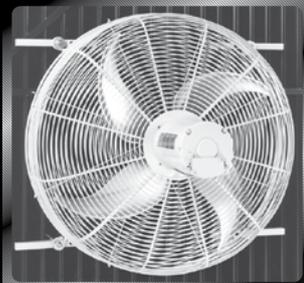
According to the IPA, an equipment, procurement and construction contract is expected to be awarded by the end of 2021, with Unit 1 in service by April 2025 and Unit 2 in service a month later.

The utility has two roles, said Schultz. "We're not only a participant in IPP, we're also the construction manager and the operating agent." As the project manager, the utility will direct and manage capital investments. As the operating agent, it will continue to oversee operation and maintenance work. The IPP Coordinating Committee is responsible for approving the operation and maintenance budget and capital investments.

The new plant's operator will be the Intermountain Power Service Corp., which operates the existing IPP coal facility.

Ultimately, LADWP expects the new plant to be fueled only by hydrogen, a dispatchable resource. At the time of startup in 2025, the units will burn 30% hydrogen. Three manufacturers have said they can support up to 30% hydrogen in the fuel mix, said Schultz.

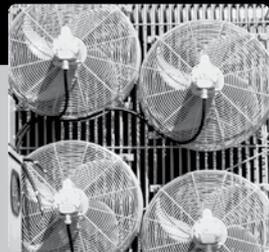
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THE PATH TO A MORE DECARBONIZED FUTURE

BY PAUL ZUMMO, DIRECTOR OF POLICY ANALYSIS,
AMERICAN PUBLIC POWER ASSOCIATION



According to data from the Energy Information Administration, the electric industry has reduced carbon dioxide emissions approximately 25% since 2005. State mandates, local policy goals, and internal utility policies are calling for further cuts in emissions. To achieve these goals, utilities will have to significantly increase the amount of non-emitting generation in their portfolios.

Wind and solar capacity is increasing every year. Total wind capacity now exceeds 100,000 megawatts, more than double what it was in 2011. The U.S. has more than 40,000 MW in utility-scale solar capacity and nearly as much installed distributed solar. Together, wind and solar account for 63% of utility-scale capacity currently under construction.

Public power utilities are in the mix as well. Because public power utilities cannot claim the investment tax credit for renewable generation, most choose to add renewable generation through power purchase agreements. According to a recent American Public Power Association survey, public power utilities have approximately 10,000 MW of wind and solar in their portfolios and at least 6,000 MW of planned additions in the coming years.

The pathway to achieving further carbon reductions is more affordable and operationally achievable if hydropower and nuclear are included in the mix. All forms of non-emitting generation account for over 40% of total U.S.

generation, and hydro and nuclear account for three-quarters of this generation. Several states have more than 50% non-emitting electricity generation already, including nuclear, hydro, and other renewables. New developments in nuclear technology, including small modular reactors, have the potential to increase the amount of nuclear capacity in the future.

Although hydropower and nuclear are integral to getting to a clean energy future, some states place limits on the size or type of hydro capacity that counts toward state renewable portfolio standard mandates, and some exclude nuclear from goals. Excluding these and other non-emitting forms of generation — including carbon capture, utilization, and storage — makes it much more difficult and costly to achieve an emissions-free portfolio in the future.

Even if all forms of generation are included, it is still challenging to get to 100% non-carbon-emitting

Even if all forms of generation are included, it is still challenging to get to 100% non-carbon-emitting energy



energy, as the costs increase appreciably the closer one approaches this level.¹ Adding more wind and solar will require more transmission upgrades, as wind and solar capacity is generally not sited near population centers. Since wind and solar are intermittent forms of generation, they also require backup power generation, such as natural gas and battery storage, with the latter technology not yet robust enough to provide significant utility-scale backup reliably.

Another issue is that electricity only accounts for 28% of all carbon emissions nationally. Other sectors of the economy — including transportation, agriculture, industrial processes, heating and others — account for the rest and might be more difficult to decarbonize. Electrification — especially in transportation, home heating, and water heating — can help reduce overall emissions but will require development of

new technologies to significantly decarbonize.

The electric industry has made great strides in reducing its carbon footprint, and projections indicate we will go even further in the future. In order to achieve carbon reduction goals, policymakers must give utilities the latitude to choose the right resource mix. Furthermore, policymakers will have to consider whether 100% emissions-free goals are attainable in the first instance given reliability and affordability priorities.

1. See, for example, *Pacific Northwest Low Carbon Scenario Analysis: Achieving Least-Cost Carbon Emissions Reductions in the Electricity Sector*: Energy and Environmental Economics Inc. Project Team: Nick Schlag, Arne Olson, Kiran Chawla and Jasmine Ouyang, December 2017; Energy Futures Initiative, *The Green Real Deal: A Framework for Achieving a Deeply Decarbonized Economy*, August 2019; and *Optionality, Flexibility & Innovation: Pathways for Deep Decarbonization in California*, May 2019.



Environmental Regulation: Where We Stand and What's to Come

BY CAROLYN SLAUGHTER, DIRECTOR, ENVIRONMENTAL POLICY, AMERICAN PUBLIC POWER ASSOCIATION

A host of regulations affect how public power utilities protect the air, water, and natural environment of their communities. This year marks the 50th anniversary of the Environmental Protection Agency. We expect the agency to limit the issuance of new rulemakings in 2020, and instead to be focused on finalizing rules (for which it took comments in 2019), such as the rule on greenhouse gas emission standards for new sources and new source review provisions in the Affordable Clean Energy rule.

As we follow the EPA's actions, here's a rundown on where we stand on these rules and other environmental regulations that saw significant action from October 2019 through February 2020.

- **The Affordable Clean Energy rule.** We continue to monitor the appeal of this rule, as public power utilities working with their states to develop unit specific performance standards could be affected by any court decision.
- **Project Emissions Accounting proposed rule.** We support the amendments to clarify the first step of the new source review applicability emissions determination, including the EPA's interpretation that emission decreases and increases are to be considered during this step.
- **Coal Combustion Residuals Phase II proposal.** We oppose certain aspects of the EPA's proposal to address beneficial use of coal combustion residuals and temporary storage. We believe the revi-

ENVIRONMENTAL REGULATION: WHERE WE STAND AND WHAT'S TO COME

sions would restrict important and growing CCR beneficial use markets. We support the large scale unencapsulated use of CCRs, if managed in a manner that protects human health and the environment.

- **Reclassifying a Major Source to an Area Source.** We support the EPA's proposed rule allowing major sources to reclassify as area sources under section 112 of the Clean Air Act. These changes would reduce the regulatory impact, particularly related to recordkeeping and reporting, while public power utilities continue to improve air quality.
- **MATS cost finding reconsideration.** We advocated for the EPA retaining the 2016 Mercury Air Toxic Standards Supplemental Cost Finding and finalizing its residual risk and technology review for coal- and oil-fired electric generating units. While we believe there are substantial legal and policy concerns with the 2016 MATS Supplemental Finding, we believe the agency should leave the underlining "appropriate and necessary" finding in place.
- **National Environmental Policy Act reforms.** We made several recommendations to the Office of Management and Budget and the Council for Environmental Quality to update and improve NEPA regulations. We emphasized that indirect effects and cumulative impact analysis should be limited to effects proximately

caused by the action under review and within an agency's authority to control.

- **Redefining Waters of the United States.** We requested clarity around the final definition of "waters of the United States" (WOTUS); that it strike a proper balance between federal and state/local authority; that the rule eliminate the interstate waters category; eliminate impoundments and ditches as standalone categories; exclude ephemeral features; and include the proposed tributary and adjacent definition as well as a definition for waste treatment systems.
- **Effluent Limitation Guidelines.** We generally support the EPA's proposed rule to revise the technology-based effluent limitation guidelines for stream electric generating units applicable to flue gas desulfurization wastewater and bottom ash transport water. We recommend that the EPA establish an alternative low-utilization threshold; create a subcategory for boilers retiring by 2028 (and recommended adding units that repower to it); allow states to set water quality best limits and monitoring requirements for bromine; allow a 10% by volume purge for BATW systems; and adjust the data used to set FGDW limits.

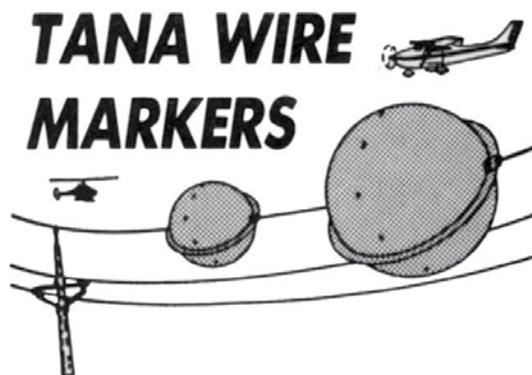
Looking ahead, a review of the national ambient air quality standard from particulate emissions is underway and a proposal

is expected in March. The EPA is not expected to lower the standard but will face significant pushback from the environmental and public health community should it decide to keep its 2012 standard.

In 2020, we also anticipate a proposal from the EPA on increasing consistency and transparency in considering benefits and costs in the Clean Air Act rulemaking process. How the agency determines costs and benefits has long been contentious, as illustrated in the MATS cost finding reconsideration. This new proposal would

seek to provide the public and stakeholders with a better understanding of the process and allow them to provide feedback to the EPA on potential future proposed rules.

Lastly, we expect to see federal agencies and aligned stakeholders vigorously defending regulatory reforms in court in 2020, such as amendments to the Endangered Species Act and the new definition of WOTUS. These agencies want to codify and defend as many reforms as possible should the political winds shift.



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Collaborating with other city departments to optimize environmental performance and processes, such as paperless billing, recycling, and sustainable supply management



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