

The logo for Public Power Magazine features the words "PUBLIC", "POWER", and "MAGAZINE" stacked vertically. "PUBLIC" is in red, "POWER" is in blue, and "MAGAZINE" is in a smaller blue font. The letters are bold and sans-serif. A diagonal line runs from the top left to the bottom right, passing through the letters. The background is a light yellow with a subtle grid pattern.

THE INNOVATION ISSUE

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HAPPY 40th BIRTHDAY
DEED
DEMONSTRATION BY ENERGY
& EFFICIENCY DEVELOPMENTS

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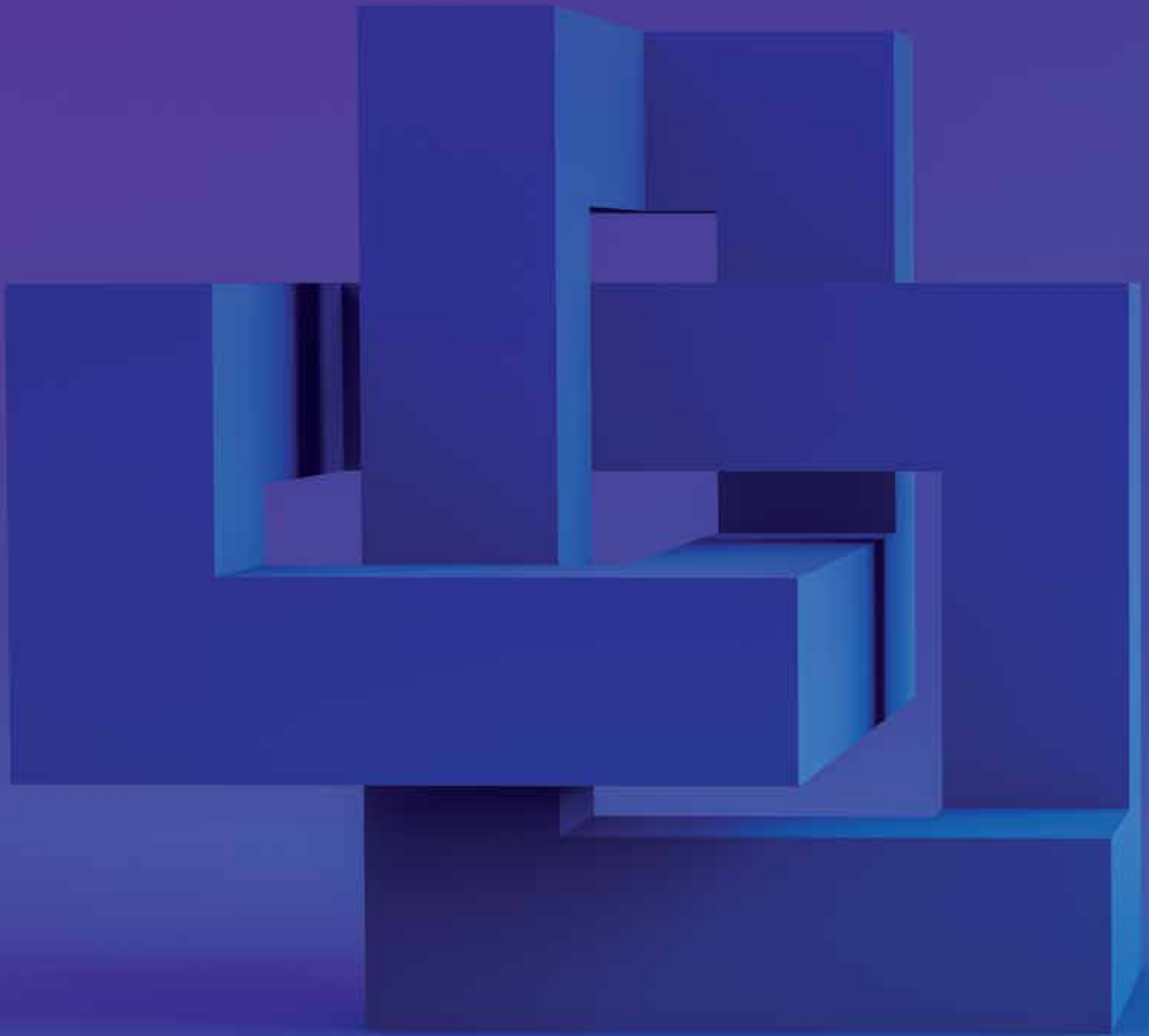
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The American Public Power Association is the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. We advocate before federal government to protect the interests of the more than 49 million customers that 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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INNOVATION IS A STATE OF MIND

BY JOY DITTO, PRESIDENT AND CEO, AMERICAN PUBLIC POWER ASSOCIATION

The word “innovation” has become a bit of a buzzword in recent years, and I understand why. As technology changes rapidly, we must embrace the new. This need to embrace the new has been on full display as we have responded to the COVID-19 pandemic as a country, as public power utilities, and as your national trade association. It was on display when we began instituting additional safety procedures for our workers such as masks, social distancing, and sanitation practices back in March. These new processes, as well as additional steps like sequestering control room operators and contact tracing, might seem like old hat now that we are at the end of July (as of this writing).

By deploying these new processes, we were able to keep the lights on for our customers and mitigate the spread of COVID-19 among public power’s 93,000 workers.

Based on the Merriam-Webster definition of innovation, our pandemic response has been highly innovative.

Innovation

(noun):

a new idea, method, or device
the introduction of something new

Of course, innovation has been part of the electric sector since well before the pandemic.

There’s a third meaning of innovation that seems to underlie our discussions around the term. I would posit that much of what we think of as innovative in the electric sector is about the use of technology to improve operational efficiency or enhance our ability to deploy intermittent renewable energy, storage, or electric vehicle charging infrastructure, among other efforts. These are also valid uses of the term and are certainly uses that public power utilities have embraced and even initiated in some cases. In fact, for 40 years, the American Public Power Association’s

***JUST LIKE THE OLD
ADAGE THAT NECESSITY
IS THE MOTHER OF
INVENTION, THE PUBLIC
POWER STATE OF MIND
SPARKS INNOVATION.***

Demonstration of Energy and Efficiency Developments program, aka DEED, has provided seed money for public power utilities to explore the technologies mentioned above (see page 38).

The history of DEED’s grants and scholarships shows us that innovation is spurred by the public power people who want to improve upon the status quo. While there is often a technological component to this improvement, in some cases the innovation is about improving processes — creating more efficiency in meeting our ultimate goal of serving our customers (see page #). DEED has awarded grants to utilities that propose to improve customer outreach and communication in some key way. For example, Redding Electric Utility in California received a grant to develop a community engagement toolkit back in 2005, and in the past few years, Gainesville Regional Utilities in Florida examined how to better engage low-income residents in water and energy audits.

Just like the old adage that necessity is the mother of invention, the public power state of mind sparks innovation. Our innovation could be related to our cost-based electric service, local governance or, in some cases, our small size (see page #). We want to serve our customers reliably, affordably, safely, and with strong environmental stewardship. Balancing these four pillars is a challenge and requires ongoing innovation on the part of the public power workforce — from the lineworkers to the customer service reps to the control room operators to the CEOs (see page #).

As demonstrated in this issue of Public Power magazine, public power and innovation go hand in hand.

Innovation at any size:

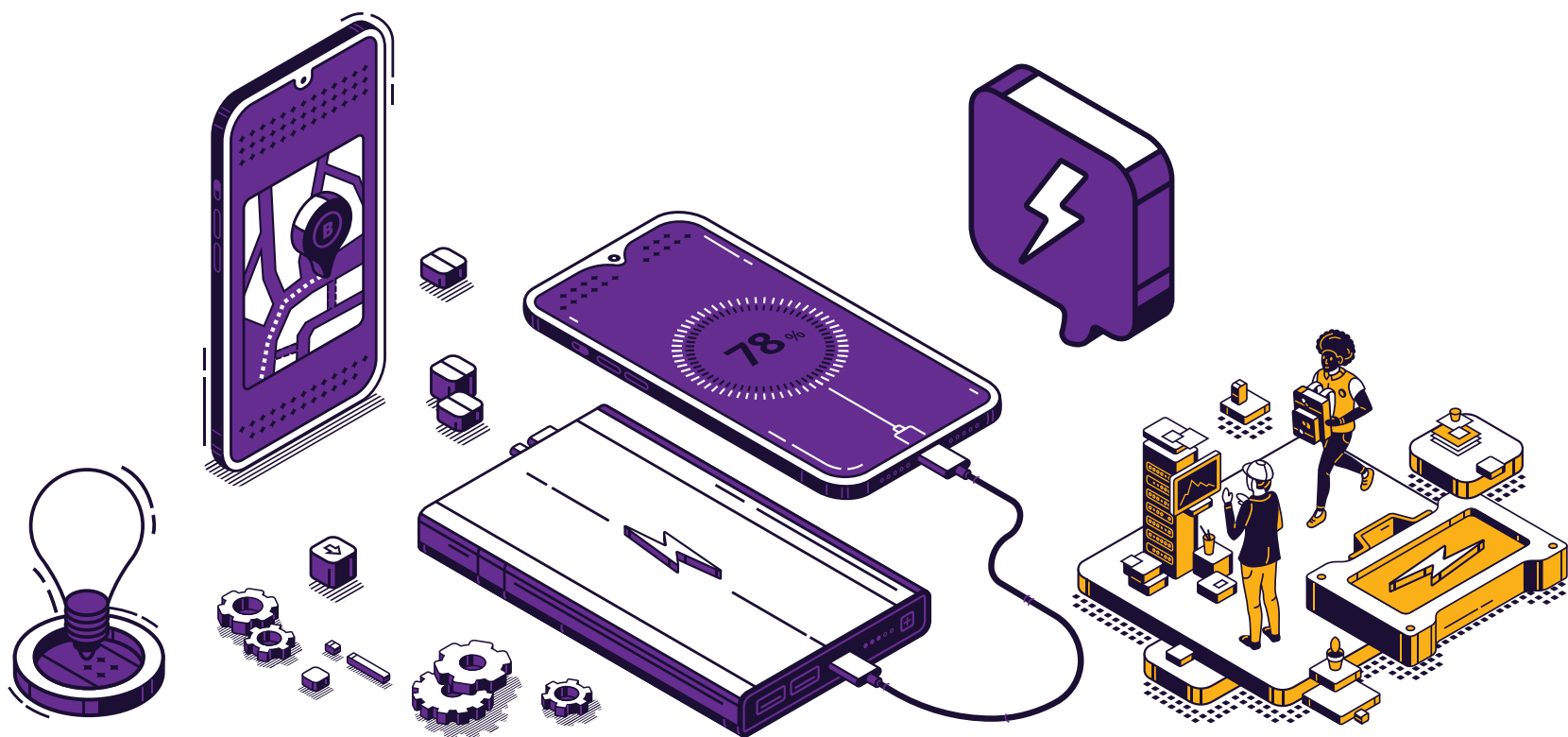
THREE PUBLIC POWER STORIES

BY BETSY LOEFF, CONTRIBUTING WRITER

Big utilities might grab more headlines for trying new technologies and approaches, but size doesn't dictate an organization's commitment to embracing change for the better. Here's a look at three public power utilities that are adept at bringing innovation to life.







Finding workarounds

The folks at Kaukauna Utilities, a community-owned utility in Wisconsin with about 16,000 electric customers, clearly remember the days before advanced metering infrastructure fed last-gasp outage notifications into an outage management system that helps dispatchers know where to send restoration crews. That's because for Kaukauna, the implementation happened in the middle of COVID-19 lockdowns.

Prior to implementing the outage management system, pinpointing an outage location was a manual chore built on a process more vulnerable to error. Customer service representatives who answered calls would relay a pile of handwritten notes — sometimes on scrap paper pulled from a recycling bin — which would be the basis of information used to direct restoration crews, said David Pahl, the utility's manager of generation and substations.

To identify precise outage locations, utility staff often had to drive the lines to find the trouble spots or return to customer premises multiple times to finalize restoration efforts.

The utility addressed these problems with both a new OMS and an interactive voice response system that allows customers to report outages and prompts them to sign up for text alerts on restoration progress. Integrating these technologies gave the utility a way to reach customers via multiple channels, which customers applauded. "Social media is so often a place for negativity," said Brittany Simonson, Kaukauna's communications coordinator. "There were many positive Facebook comments on our outage communications. People said how nice it was to have those text updates."

Implementing the OMS and integrated technologies as COVID-19 was ramping up meant that deployment activities such as staff training had to happen remotely during lockdowns.

Since the system developer had never trained utility personnel remotely, the Kaukauna team worked with its technology provider to hash

out an approach that included train-the-trainer sessions so that utility staffers could help each other through a variety of outage simulations. After training, staff circled back to help those who had bandwidth issues or needed training reinforcement.

The OMS implementation is just one of many examples of how Kaukauna considers how technology can offer solutions for utility operations. Tackling new approaches to doing things is part of the Kaukauna Utilities character, and Pahl said utility leadership has made innovation a strategic priority. Looking forward, Pahl said the utility will be examining the addition of electric vehicle charging stations and grid-scale storage to leverage the 50% of its capacity that comes from hydroelectric generation.

"One of our ideas is to store the hydroelectric power produced at night and use it during the day when purchase power rates are higher," Pahl said. "That will provide a cheaper source of energy for our customers during peak times." It would also increase the utility's renewable capacity.

Learning from the process

Environmental stewardship is a strong driver for innovation at Moorhead Public Service in Minnesota. “We’ve always tried to be just a little ahead of the curve,” said Dennis Eisenbraun, the utility’s energy services manager. Referring to a 1999 implementation, he quipped, “We did wind turbines before wind turbines were cool.”

MPS did solar gardens before they were cool, too, adding nine different offerings since 2015,

each of which sold out quickly. Between wind, solar and hydropower, some 55% of the power MPS delivers to its community of 44,000 comes from renewable generation.

In an effort to expand its green power offerings, MPS secured a grant through the American Public Power Association’s Demonstration of Energy & Efficiency Developments program, which funds research and technology pilots. “We’re trying to get people off of fossil fuels,” Eisenbraun said, adding that this is one reason the city began looking at a new twist on an old concept: district heating with geothermal power.

“One of the first things early utilities offered was district heating systems,” he explained. “They would have a central generating plant that ran a boiler to heat water, and then they

“We’ve always tried to be just a little ahead of the curve.”

DENNIS EISENBRAUN

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FINDING FAULTS IN INDUSTRIAL MOTORS

Riverside Public Utilities in California sponsored a DEED scholarship for a student at University of California-Riverside, Ehsan Tarkesh Esfahani, to develop and test an inexpensive multisensory wireless monitoring system for induction motors. Having such a continuing monitoring system can track faults as they develop, help identify their root cause, and prevent future failure. The sensors accurately detected faults 99.9% of the time without interrupting motor functions.

Focusing on customer solutions

The small town of Hudson, Ohio, sits between two larger cities — Cleveland and Akron — and it plays easily with bigger kids on the innovation ballfield. In 2019, Hudson was named one of the world's top seven intelligent communities by the Intelligent Community Forum, a global network of cities with a think tank at its center. The town is served by Hudson Public Power, which serves some 6,964 electric customers and provides water to the community.

"Innovation for the purpose of innovation is not what we're trying to do," said Frank Cormeriatto, assistant city manager of operations. "Our focus has always been on improving the quality of life for the community."

"Innovation doesn't mean that you're using the latest or best technologies," he added. "It goes deeper than that. It reflects how you look at things and how you solve problems."

Faced with a problem of slow, unreliable and overpriced internet service, Hudson leaders considered three potential solutions. First, Cormeriatto recalled, the city leadership asked the town's internet service providers to implement system improvements. "Those needed improvements were not implemented," he said. Next, the town considered leasing dark fiber to those ISPs. Providers were not responsive to this proposal. Finally, Hudson designed and built its own broadband network, which was completed in 2016. Four years later, the town supplies internet service to nearly 42% of local businesses.

would send it down tunnels to buildings in a downtown area or campus to heat buildings. That's what we were trying to do with a community geothermal system."

In studying the project, MPS engineers realized that this early-20th-century approach was more complicated than it first appeared, so utility staff decided to focus on a one-building project. "You have to be flexible," Eisenbraun said when asked what lessons were learned from this project.

Committed to working with the developer on the one-building geothermal proposal, MPS went back to the drawing board multiple times to come up with a system and costs for the heating and cooling service that worked for the customer. In the end, the cost didn't wow this builder, even though the utility was offering the service at a nearly break-even price.

"You have to look for a good partner on a project like this," said Travis Schmidt, interim general manager and electrical engineering

manager. While the first developer didn't commit to the project, Schmidt said discussions are underway with another who might bring geothermal power to town.

The utility's company culture helps bring innovations like this to fruition. "Like most municipal utilities, we're a very technical organization. There are a lot of smart people who come up with great ideas here," Schmidt said. "You have to have a workforce that is willing to try doing things differently, to achieving something better. You also need a city council or board willing to do things that are better for the environment and the customers you serve."

That's a point of pride for MPS, which has won numerous awards for its renewable energy efforts and is considered an early leader among municipalities nationwide. "We definitely hit above our weight class," said Eisenbraun.

INNOVATION AT ANY SIZE: THREE PUBLIC POWER STORIES

In addition to solving problems creatively, the Hudson team seeks to gain as much value out of innovations as possible. For instance, the town has a 16.6-kilowatt photovoltaic solar system that powers a local community center and serves as an educational facility. Hudson received a DEED grant in 2015 to support the educational components of the facility.

“We teach firemen what they’re going to see when at a home with a solar array and how they should deal with it,” said Kevin Powell, who oversees the utility as assistant director of public works. “We also have some of the schools in the area bring their students to [the facility] to learn about the benefits of solar energy and how the systems work.”

Another innovation that has multiple benefits is a recently drilled brine well that taps salt deposits some 3,000 feet underground to regenerate water softeners for the city water. This effort will save the water utility some \$200,000 annually, which means the investment will be fully paid off in about eight years. It also will shave approximately 10% off snow and ice mitigation costs for the town because the brine can be used to pre-treat roads.

Along with looking for multiple benefits for each innovation, Hudson also seeks novel ways to get projects done. When looking to do a smart lighting project, the town partnered with a technology company and became “kind of a sandbox for them,” Powell said. Now, new LED street lights cost about 25% of what the old,

high-pressure sodium fixtures cost to run, plus engineers can customize lighting down to each individual lamp post.

Hudson Public Power is now looking at mobile applications that highlight available parking spaces for residents and visitors and call attention to Wi-Fi hotspots in the town. “We’ve been looking at the impact of COVID-19, and we see more people working from home, so we’ve seen a huge uptick on the number of people coming downtown with their computers to work,” Cormeriatto said.

“It’s all about the experience residents and customers have in our community,” Powell added. “If you keep that in focus and discuss innovations publicly, you’ll probably succeed.”



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YEARS OF DEED

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1980 2000 2020

... Supported more than

600 R&D projects

400 students with scholarships

... Explored a wide range of topics

The most popular topics explored in grants & scholarships:



Customer service: **141**



Renewable energy: **128**



Energy efficiency: **112**



Distributed energy resources: **112**

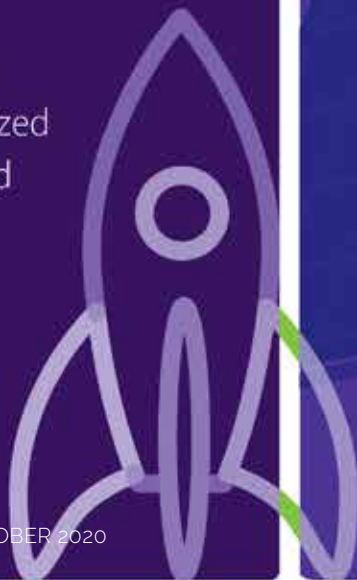


Reliability: **104**

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million
in funding

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series to an 🧰EV Toolkit.

Other topics of note:

Demand response: **66**

Energy storage: **35**

Safety: **33**

Grid modernization: **30**

Economic development: **28**

Electric vehicles: **24**

... Grown from

120

to

950
members

An isometric illustration of a sustainable building with solar panels on its roof, set against a backdrop of wind turbines and greenery. In the foreground, there are three recycling bins (yellow, green, and blue) with recycling symbols. The word "EFFICIENT" is written in a stylized, italicized font across the middle of the image.

EFFICIENT



CY IS SMART FOR PUBLIC POWER

BY TAELORE BENTLEY, INTEGRATED MEDIA AND COMMUNICATIONS
ASSISTANT, AMERICAN PUBLIC POWER ASSOCIATION

Energy efficiency is about using less energy to get the same job done. Public power utilities take pride in offering their communities affordable electricity. The commonality between the two means it's no surprise that efficiency is a central aim for many public power utilities' endeavors.

To explore how central efficiency is for public power, we spoke with a few of the utilities that received the American Public Power Association's Smart Energy Provider designation in 2019, the first year it was awarded, about what energy efficiency means to them. Utilities with this designation show a dedication to best practices and programs in energy efficiency, among other areas.

WHAT DOES EFFICIENCY MEAN IN A UTILITY?

The Energy Information Administration describes energy efficiency as using technology that requires less energy to perform the same function, and energy conservation as any behavior that results in the use of less energy. Utilities' definitions of efficiency incorporate both of these concepts.

"If we can help customers use energy more efficiently, especially on the business side, it makes them more profitable, and therefore they are more likely to remain in business in our service territory," stated Mary Medeiros McEnroe, public benefits program manager at Silicon Valley Power in California. "Helping our customers be energy efficient benefits both them and the utility. They are more likely to thrive and, in difficult times like this, survive."

Medeiros McEnroe serves as a member of the Smart Energy Provider program review panel, which consists of a diverse set of public power representatives with substantial industry expertise who determine which applicants show commitment to and proficiency in energy efficiency, distributed generation, renewable energy, and environmental initiatives.

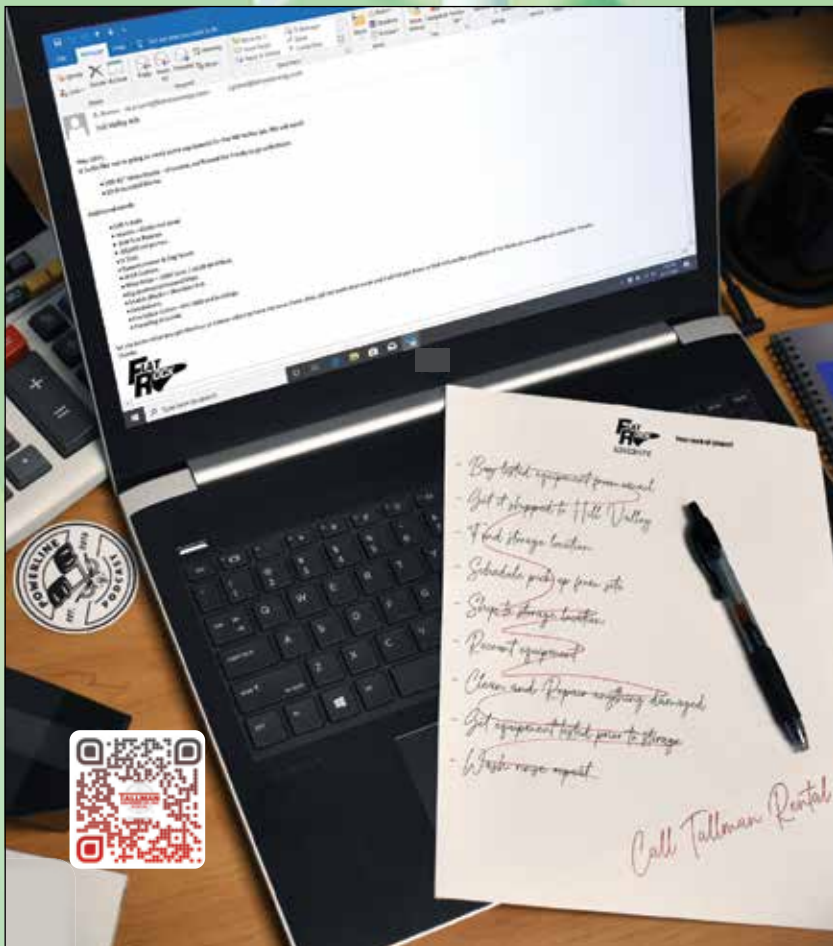
"Efficiency is using something wisely; regardless if it is energy, time, or materials required to do business," said Melanie Krause, utility manager at Menasha Utilities in Wisconsin. "It is using a resource with no or minimal waste."

WHAT MAKES A UTILITY A SMART ENERGY PROVIDER?

"We strive to run the utility efficiently in our day-to-day business, and it is one of our key strategic initiatives," said Krause. "We understand people and businesses need power to live and prosper, so we want everyone to use it as wisely as possible. For our customer base, our focus is helping them use the power they purchase from us as wisely as possible."

"We define efficiency as a way to provide our service and achieve our operations in a sustainable manner," said Connor Reardon, energy efficiency engineer at Littleton Electric Light and Water Departments in Massachusetts. "Beyond just energy, we aim to operate efficiently and to be a leader in environmental stewardship for the communities that we serve."

The American Public Power Association's Smart Energy Provider program is a best practices designation for utilities that show commitment to and proficiency in energy efficiency, distributed generation, renewable energy, and environmental initiatives. In its first year, 67 public power utilities attained an SEP designation.



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PROGRAMS THAT SAVE

Public power utilities don't just talk the talk about efficiency — they focus on how to maximize it.

The Department of Energy characterizes energy efficiency as “one of the easiest and most cost-effective ways to combat climate change, clean the air we breathe, improve the competitiveness of our businesses, and reduce energy costs for consumers.”

Menasha Utilities participates in Wisconsin's Focus on Energy program to offer financial and technical assistance to all its customer classes. The program is funded through customers of participating utilities. A statute enacted near

the turn of the 21st century requires investor-owned utilities in the state to participate to the program, although all 81 public power utilities in Wisconsin, and most of the cooperative utilities in the state, have also opted into the program.. Since 2011, Focus on Energy has delivered more than \$1 billion in net economic benefits to Wisconsin.

Besides the state programs, MU has residential rebates for Energy Star appliances and central air conditioner tune-ups and offers incentives for customers to plant shade trees. For its business customers, the utility offers additional incentives as well as a “Shared Savings” program to help cover the upfront cost of an efficiency project and pay it back over time.

“We consider energy efficiency to be our lowest-cost resource,” said Krause. “By utilizing efficiency first, we don't have to generate that

energy, which saves on our costs to either buy power in the market or build generation plants. Using energy efficiency helps the individual who does a project, but also all customers in the long run.”

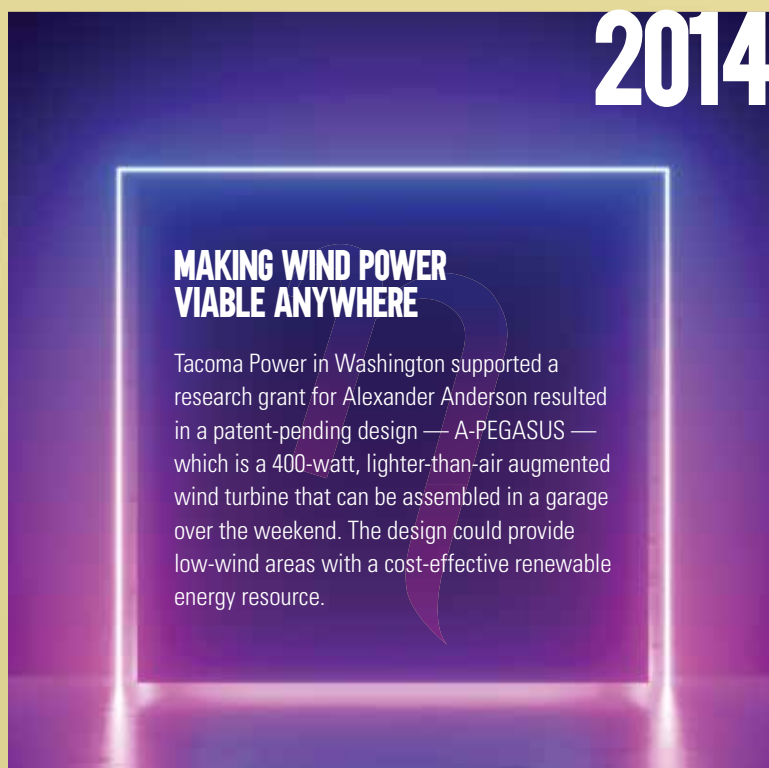
In 2019, the City of Westerville, Ohio, renewed its strategic priority on sustainability, which charges the Westerville Electric Division with expanding residential energy efficiency programs and rebates, according to Chris Monacelli, electric utility manager for the City of Westerville.

Monacelli said that having efficiency defined as a central part of the city's priority “means that Westerville's 15,000-plus households and more than 2,000 businesses have access to programs that facilitate and support energy reduction and conservation.” The utility offers a variety of rebates for energy efficiency practices, efficient appliances, HVAC systems, solar panels, and more.

On the commercial customer side, Westerville's BusinessWISE program has led to big savings for customers and the utility. The energy efficiency and conservation incentive program has awarded 99 projects, which has collectively helped the utility to save more than 14.4 million kilowatt-hours per year in energy and achieve more than 2,000 kilowatts per month in demand reduction.

Silicon Valley Power offers a large variety of programs that support energy efficiency, including rebate programs, free energy audits, and energy efficiency grant programs.

In Massachusetts, Littleton's Green Rewards Program includes all of the utility's energy efficiency opportunities for customers. Customers can take advantage of heating and cooling rebates, appliance rebates, free home energy assessments, a free shade tree program, and discounts on LEDs. The program also includes incentives for distributed energy resources, including a solar rebate program, a renewable



2014

MAKING WIND POWER VIABLE ANYWHERE

Tacoma Power in Washington supported a research grant for Alexander Anderson resulted in a patent-pending design — A-PEGASUS — which is a 400-watt, lighter-than-air augmented wind turbine that can be assembled in a garage over the weekend. The design could provide low-wind areas with a cost-effective renewable energy resource.

energy credit, off-peak charging for electric vehicles, and rebates on charging equipment.

“Offering energy efficiency solutions helps our customers save money and adapt to new technologies like electric vehicles and heat pumps,” said Reardon. “All of our rebates, discounted LEDs sold, and direct install measures from home energy assessments are tracked and calculated to a kilowatt-hour savings based on the Massachusetts Technical Resource Manual.”

Reardon noted that Littleton is in the process of replacing its meters with advanced metering infrastructure, which he expects will enable the utility to more precisely quantify savings from these programs.

QUIET REVOLUTIONS

Utility programs like these make a big difference. In a 2017 report, The Light Bulb Revolution, the Department of Energy noted that the share of LEDs in the U.S. market went from less than 2% of sales in 2012 to between 20% and 30% of sales in 2016 and 2017. During the same timeframe, sales of incandescent bulbs dropped from more than two-thirds of the market share to about 10%. The report cited a wide range of LED sales share from state to state, with “notably higher percentages where utility programs have been promoting LED bulbs.”

Data from the EIA shows that per-household residential electricity demand has declined since 2010, with more efficient lighting and other efficiency improvements driving this change.

Another significant leap is how efficiency and energy consumption are increasingly considered as part of the investment decision for new technology. For example, organizations are beginning to quantify “emissions efficiency” — essentially, the degree to which energy-consuming activities create emissions — as another means to measure the potential benefits of technologies. The idea not only expands upon what efficiency entails, it also offers another measure for beneficial electrification.



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BUILDING A UTILITY CULTURE OF INNOVATION:

**Sharing ideas,
data & risk**

BY STEVE ERNST, CONTRIBUTING WRITER



From **climate change** to rapidly changing new technologies, **public power** utilities are **creating road maps** for how to **optimize** and implement systems to achieve myriad goals, including **emissions reductions**, safety, and operational efficiency. Driving this **change** ultimately **requires** developing **highly collaborative teams** of public power utility staff who are supported to **innovate**.

Collaboration fosters innovation

When the Burlington Electric Department, the public power utility that serves Burlington, Vermont, set the goal of having net zero fossil fuel emissions by 2030, it also unleashed the brainpower and creativity of its 118 employees.

Darren Springer, general manager at BED, said the net zero initiative wasn't just an ambitious strategic plan to address climate change. The utility commission also wanted it to be a platform for new perspectives and fresh ideas.

"We wanted to know what our frontline employees were seeing and wanted to give them

the opportunity to guide the net zero goal," he said. "We tried to make it a very bottom-up approach."

The utility tapped into that internal brainpower in 2018 with its inaugural Innovation Cup, an employee-driven competition to come up with actionable ideas to bolster safety, achieve net zero emissions in the city, and strengthen productivity.

"Honestly, I was skeptical about how many people would participate and what results we might get," Springer said. "I thought people would participate and there would be some ideas, but the results far exceeded our expectations. The ideas were very, very thoughtful. You could tell people put a lot of work and thought into them. It fostered an interdisciplinary work that produced ideas that we hadn't ever thought about."

The net zero initiative wasn't just an ambitious strategic plan to address climate change. The utility commission also wanted it to be a platform for new perspectives and fresh ideas.



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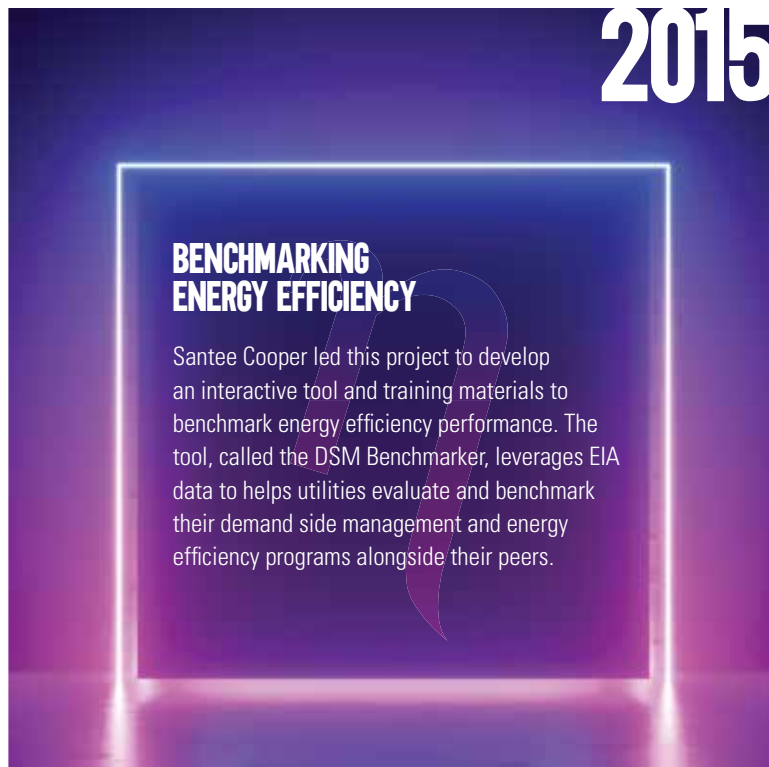
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Data seeds innovation

To optimize adoption of new technologies, and best harness the massive amount of data that comes with them, public power utilities are tearing down the cubicle walls that once divided departments and are bringing together a diverse set of in-house experts from a variety of departments.

Sandi Joralemon, manager of the newly formed Data Strategy Group at New Braunfels Utilities in Texas, has assembled a multidisciplinary team to manage the tsunami of data that is coming at the utility. The public power utility serves about 45,000 electric customers in the city, which is about 30 miles northeast of San Antonio.

NBU gathers data from a host of sensors deployed across its electric, water and sewer

The 2018 Innovation Cup winner came from a team of four employees who hatched the idea for a new ridesharing partnership between CarShare Vermont and Greenride Bikeshare.

BED customers who purchase an electric vehicle with a utility incentive are eligible to receive a free Greenride Bikeshare membership, and customers who purchase a new electric bike using the utility's e-bike rebate are eligible to receive a free membership in CarShare Vermont's "Share-a-Little" plan or financial support to offset the cost of membership in the plan.

BED's focus on innovation started before the inaugural Innovation Cup.

In 2015, the utility formed the Burlington Electric Center for Innovation, a clearinghouse to cross-pollinate ideas with teams from the utility's finance, information technology, policy and planning, and sustainability departments.

"We really want to make everyone responsible for tackling innovation and getting us to net zero," Springer said. "Whether it's a line crewman or someone working in a facility, we want everyone to connect and do their part."

"We foster innovation by talking about it ... a lot. We talk about it in meetings, in the hallway – every chance we get. I am bringing it up any time that I see an opportunity."

SANDI JORALEMON

MANAGER, DATA STRATEGY GROUP, NEW BRAUNFELS UTILITIES, TEXAS



networks. It also collects customer usage data from its advanced metering infrastructure as well as internal work orders, financial records, and just about any piece of information recorded by the utility.

Joralemon's team develops visual platforms that provide an analytical window into what's happening in the organization.

"The whole point of doing this is to provide information for better decision-making," she said. "Our preference is to have a lot of minds in the room and to talk to a lot of our 'internal customers,'" — that is, employees from different departments.

Joralemon's team operates in a kind of perpetual feedback loop. A department manager will present the team with a problem, and NBU's analytical team will pull data from around the organization to help solve that problem. With data in hand, the analytics team goes back to the manager to tweak and sharpen the data.

The team then puts that information into a visual platform, such as a dashboard on a laptop or a simple PDF, that works for a department manager or executive.

And then the process starts all over again with more questions: Is it working for you? What else do you need? How can the data be presented more effectively?

NBU is working toward allowing an employee from any department to review and analyze relevant data and present ideas to Joralemon and her team.

Joralemon says innovation is on the minds of every employee at NBU.

"We foster innovation by talking about it ... a lot," she said with a laugh. "We talk about it in meetings, in the hallway — every chance we get. I am bringing it up any time that I see an opportunity."



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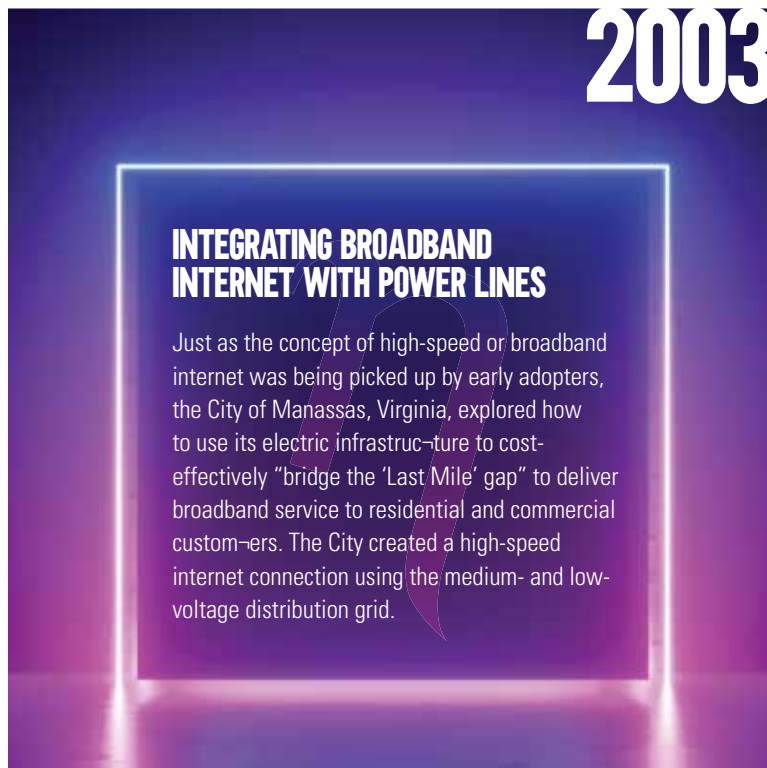
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Trust leads to innovation

A culture of innovation starts with trust, said Steve Wright, general manager of Chelan County Public Utility District, which serves 52,146 customers in central Washington state.

“When you are taking on innovation, you are also taking on risk, so there needs to be a high level of trust within the community, because sometimes things may not work out so well,” Wright said.

Wright has been GM at Chelan since 2013. He joined after working more than three decades at the Bonneville Power Administration, including 12 years as administrator of the 2,700 employees at the federal power marketing agency.

Other than having the trust of the community the utility serves, its employees also have

to know that they can take a risk, and that if an idea fails, it won’t reflect negatively on their careers.

“If a person is going to step out on a limb with an idea, they have to know that management isn’t going to saw that limb off if the idea doesn’t work,” Wright said.

Chelan’s service territory covers the eastern slope of the Cascade Mountains in eastern Washington. It’s dry, high desert country that stretches from the Columbia River through the dense forests of the Cascade Range. The danger of sparking a wildfire is ever-present, especially in the summer months, when daytime temperatures can routinely hover near triple digits.

In 2014, the utility changed the way it recharges sections of its transmission system if a line automatically trips off after contacting a tree or tree limb. To help prevent sparking a wildfire, utility lineworkers now remotely control and monitor the automatic reclosure feature of the line. This gives operators a greater awareness of the line’s condition and lowers the risk of igniting a fire.

“That idea came from an employee,” Wright said. “Nobody asked; it wasn’t a top-down decision.”

After the utility deployed an array of sensors at its Rocky Reach, Rock Island, and Lake Chelan dams, engineers were inundated with data, some of which dam operators had never seen before.

It was John Yale, a hydro plant manager with Chelan PUD, who saw the value in comparing the data Chelan gathers with other hydro projects around the country.

“[Yale] said if we could compare the data with other projects, it could make a big difference,” Wright said.

The utility responded in 2016 by partnering with the Southern Company to form the Hydropower Research Institute, a data bank of standardized operational data to help manufacturers, researchers and utilities digitally enable the hydro industry.

“HRI was really important on our journey, because it was our first step in really trying something innovative and taking a risk,” Wright said. “It was a way to test the level of trust we had with our board and the community. We had to put some money into it, so the support we got really gave us confidence to take further risks.”

In July, the U.S. Bureau of Reclamation and the U.S. Department of Energy joined HRI. The institute’s partners now own more than 40% of the country’s hydroelectric capacity.

Wright said “ideas die in bureaucracies,” which is why he set aside \$50,000 from Chelan’s budget for an innovation fund. “If you have a creative idea, send it to me — no bureaucracy — and we’ll see if can get done.”

But a culture of innovation doesn’t form overnight, he warned.

“I’m not a fan of big structured programs: ‘Everyone with an idea submit it by this date,’” Wright said. “It takes a couple of years of work to build a culture of innovation. You don’t just say ‘We’ve changed; we felt this way yesterday and today we feel this way.’ ... It takes time and trust to build a culture of innovation.”

The DEED program essentially reflects the fundamental philosophy of public power, namely that the public sector has a special obligation to meet the interests of consumers by promoting innovation and efficiencies to improve service

Larry Hobart, Executive Director,
American Public Power
Association, 1986-1995,
remarking on DEED's
15th Anniversary in 1995

The DEED program continues to support the future of the power industry through scholarship opportunities. I was fortunate enough to be a recipient of one of those awards early in my career. EPRI continues to value our ongoing relationships with APPA.

Arshad Mansoor, President,
Electric Power Research Institute

The DEED program was not just a help, but a critical player in the early stages of several programs. One was the study of wind energy, leading to the first public power wind turbine in the Midwest (1992 in Waverly, IA). The other was the development of vegetable-based dielectric fluid that was eventually acquired by Cargill, Inc. DEED grants provided the catalyst. Funding like this for a small utility made the difference in allowing the projects to move forward. Both were very successful and have left a footprint on electric utility operations worldwide.

Glenn Cannon, former general manager,
Waverly Utilities, Iowa

The DEED program is so much more than the support of research. It is the demonstration of public power always reaching to the future, lighting the way for its customers. The program shows that public power is a valuable source of data, information and intelligence in the utility world.

Liz Jambor, Manager Data Analytics
and Business Intelligence, Austin Energy
and DEED Board Chair

As our industry continues to change, and resources grow scarce, DEED is ever more valuable for its ability to pool the resources of public power utilities.

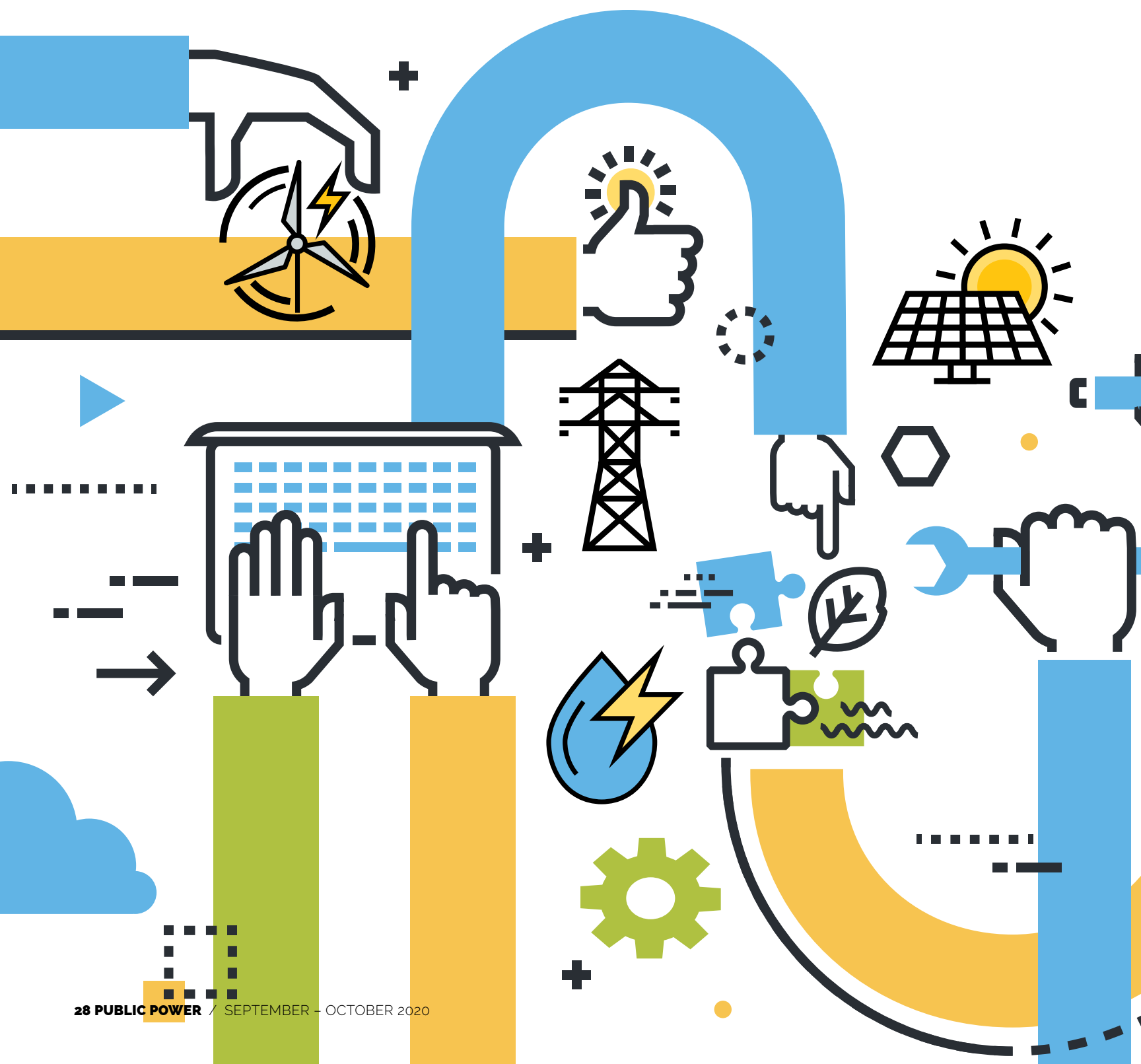
Alan Richardson, Executive Director,
American Public Power Association, 1995-2007,
remarking on DEED's 20th Anniversary in 2000

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POSSIBILITIES:

EXPANDING PUBLIC POWER'S INFLUENCE IN ENERGY INNOVATION

BY **DAVID BLAYLOCK**, CONTRACTOR TO THE
AMERICAN PUBLIC POWER ASSOCIATION



For public power utilities with small staffs, taking on research and development projects may seem impossible.

For the past 40 years, the American Public Power Association's Demonstration of Energy & Efficiency Developments, or DEED, program has allowed public power to pool its resources to support utilities with a great idea to make strides toward testing and deployment. The program is designed to be "right-sized" for public power and can either support smaller projects for incremental improvement or be a jumping off point for ongoing research and development.

For the latter, a wealth of prospective partners are interested in sharing their resources, staff, and capabilities to find the next great revolution in the world of power delivery. These partners, which include private businesses, higher education, and the national laboratories, are often looking not just for ideas from utilities that they can help move forward, but also are often ready with ideas of their own and looking for utilities that can help them test their ideas.



DSTAR: PARTNERING WITH PRIVATE INDUSTRY

In 1986, General Electric recognized an apparent gap in electric utility R&D. While generation and transmission featured a wealth of projects looking at new and emerging technologies, the distribution side of the house remained largely untouched.

Plus, a cable testing project where Northeast Utilities made use of GE's labs proved to the company's power system engineering depart-

ment that partnerships could be mutually rewarding. Working with six utilities and one utility organization, GE created the Distribution Systems Testing, Application, and Research group, or DSTAR. The consortium is funded and led by utilities looking to make headway on distribution projects that otherwise might not be possible.

Since DSTAR's creation, 34 utilities have taken part in the 16 completed funding cycles. This has accounted for more than 300 projects, including recent work on transformer repair software, the changing nature of loads, power control devices on distribution feeders, and temporary fault mitigation.

"This is all done in collaboration with the member utilities, with them suggesting the projects based on issues they're seeing or solu-

tions they are working on," said Bill Jabour, GE Energy senior product marketing manager, who manages the DSTAR program. "GE is then able to supply the administrative component and some of the technical requirements to get the projects done."

Importantly, the DEED program has been a DSTAR member since 2010. Since cycle 13, DEED has had a seat at the table, helping to fund and choose projects for DSTAR while also gaining access to all the software solutions and research reports on projects developed through the program for existing DEED members.

Two public power representatives — Paul Jakubczak from Fort Pierce Utilities in Florida and Darryl Strother from Rocky Mount Public Utilities in North Carolina — currently serve as engineering leads, which means they participate

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“WE’VE CONSISTENTLY FOUND THAT THE DATA WE ARE GENERATING AND POSSESS IS OF EXTRAORDINARY VALUE TO THE RESEARCH COMMUNITY.”

JOHN PHELAN

SENIOR MANAGER OF ENERGY SERVICES
FORT COLLINS UTILITIES

in planning meetings and help to ensure that projects yield results that apply to public power utilities.

The DSTAR process starts with an idea generation phase where all members discuss the driving issues and challenges affecting the industry and pitch specific projects that might be beneficial. GE Energy Consulting scopes out what is possible and comes up with a ballpark cost for each idea, then gives members an overview of options for the next phase.

“We take these ideas and develop full proposals that really go into depth of what this would mean and require,” Jabour said. “We evaluate the background for the idea, what has been done before, what is the scope that can be done, what the schedule and budget look like, and who would be needed to work on the project.”

Members then rank each project based on the assumed value of the end product. From that ranking, as many projects as possible are moved forward, using pooled funds collected from the membership. The original member who sponsored the project becomes the technical leader, guiding the progress of the deliverable, becoming a sounding board for those working on the project, and reviewing results to keep it applicable for all DSTAR members.

“One thing that is really important for the member is that once the project is done — whether it’s software or a report — the DSTAR member behind it owns the exclusive right to it outright,” Jabour added.

In the current cycle, 17 projects are under consideration. Jabour estimates that six to eight will move forward, and members can set aside the remaining ideas to be considered in the next funding cycle or seek other R&D resources. One project, which is sponsored by DEED, would explore how 5G systems on distribution poles might create interference for utility devices or limit access for crews to maintain distribution components.

“We’re not really making a lot of money off of DSTAR, but we’re able to get so much out of it,” Jabour said. “By being involved in DSTAR, GE can understand exactly what is driving the utility industry, can recognize what some of the research and equipment needs are out there, and can translate that into business opportunities that will serve the industry as a whole.”

“We want to be an extension of each member utility’s R&D activities,” he added. “We appreciate that they can leverage GE while GE gets to build these relationships and do great work.”

BACK TO SCHOOL

For Fort Collins Utilities in Colorado, R&D is a key activity for being able to meet the public power utility's — and its community's — ambitious goals.

John Phelan, senior manager of energy services, noted that Fort Collins Utilities has set targets in energy efficiency, local renewables, and demand response in some form since 2004, and that the city council has set goals to use 100% renewable energy by 2030, reduce carbon emissions communitywide by 80% by 2030, and be carbon neutral by 2050.

"Some of those targets are 20 years ahead of what's generally out there, so that's caused us to recognize the importance of understanding what's possible in partnerships for research and development since we need to be on a very accelerated path to reach those goals," he said.

Phelan said the utility takes a "triple-helix approach" — connecting private sector, public sector, and academia to find ways to work together on projects and solutions.

For the third helix, a great partner is already in its backyard: Fort Collins is home to a premier research institution, Colorado State University, and its Energy Institute.

"We're extremely fortunate to have access to the amazing researchers there," Phelan said. "The Energy Institute means there is a foundation of leading researchers and students at all levels, all focused on the same issues we are."

Phelan noted that a grant from the Department of Energy a few years back to create a zero-energy district — called the FortZED initiative — involved collaborating with CSU, the city, private partners, and the state, and has since led to additional partnerships. "It opened our eyes to what can be done with these

partnerships and some of the challenges that can come with different coalitions and their requirements."

Central to Fort Collins Utilities' recent work with CSU has been a multi-beneficial data exchange project. In that project, Fort Collins' advanced metering infrastructure data is fed back to CSU.

"They were able to build a model of our entire distribution system based on the AMI data and system topology, resulting in a model we can use for scenario planning," he said.

This has directly helped both partners to understand a wide range of topics, including transformer failures, solar hosting capacity, and electric vehicle adoption.

The data sharing extends beyond CSU and Fort Collins. The two recently expanded their data-sharing agreement to include the Department of Energy's National Renewable

Energy Laboratory in Golden, Colorado, and they anticipate even more high-quality R&D to come out of that relationship.

"Across all this, we've consistently found that the data we are generating and possess is of extraordinary value to the research community," Phelan said. "It's kind of surprising sometimes how real-world information is typically not available, so we're glad to build these connections."

Meanwhile, the city has offered itself as a place for R&D, in what it calls the "City as a Platform Initiative," where partners can test demonstration projects on city systems, including the electric utility. This has helped elevate the community's reputation as a place for innovation, Phelan said. In 2015, the city was highlighted in a "Places of Innovation" exhibit at the Smithsonian Institution's National Museum of American History for its clean energy efforts.



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ROBERT BECTEL

SENIOR PROGRAM ANALYST FOR
DATA MANAGEMENT AND DIGITAL
COMMUNICATIONS
DOE OFFICE OF TECHNOLOGY
TRANSITIONS



THE NATIONAL LABS: MATCHING WITH THE EXPERTS

Perhaps the most recognizable utility R&D partners have been the Department of Energy's 17 national laboratories. Many of the labs already conduct federally funded R&D in partnership with public power utilities across the country.

Sometimes utilities develop a project and then find a lab to partner with; other times a project might fall into a utility's lap.

In Fort Collins, Phelan noted that the utility got involved in one of its current projects — a smart community initiative that uses artificial intelligence controls in buildings — after the project was first planned out by a green builder in partnership with the NREL. "It was a given that we would have to be a partner on a project that involves our distribution system."

However, a utility with innovative ideas doesn't need to wait for a lab partner to come forward.

"The [DOE Office of Technology Transitions], from its creation five years ago, has centrally been focused on following what the customer is looking for and meeting those needs," said Marcos Gonzales Harsha, principal deputy director. "We heard, 'You've got great programs and activities, but I don't know where to start — how do I navigate this massive enterprise of tens of thousands of researchers and 17 national labs?'"

The office established the Lab Partnering Service in 2016 to match organizations with innovative ideas with the right facilities and experts. Users can search from a constantly updated database of labs, facilities, and experts to move their ideas forward.

"It's like an online dating site," said Robert Bectel, senior program analyst for data management and digital communications in the DOE Office of Technology Transitions. "The goal is for us to provide a chaperoned date with a national lab or a researcher to give individuals the ability to quickly connect, ask simple questions, and create amazing solutions."

Bectel estimates that between 25 and 50 connections are made each month between the labs and private investors, colleges and universities, and utilities. "We're happy with this rate because all it takes is one to solve a major riddle," he said.

Currently, the service allows utilities and others to search for the right connection among more than 200 facilities, nearly 1,400 technology summaries, and more than 250 experts. Users can filter results by lab location and specialization, and utilities that attempt to reach out to an expert on the service will immediately be put in contact with that expert's lab, which will make sure that the expert is the right fit for the project.

The service is updated regularly to include new and emerging topic areas. Each year, Office of Technology Transitions staff review the data on interactions and user feedback to determine improvements. These improvements are also sometimes done on the fly, such as in recent months, when it became clear that there was a need to include COVID-19 technical assistance.

"Any utility that's looking down the barrel of a very difficult problem should know that there are many experts who are already probably looking at that same issue," said Bectel, who described the labs as the R&D engine for the country. "Getting ready access to the technologies under development and the people that are creating them ... that's a big win for everyone."

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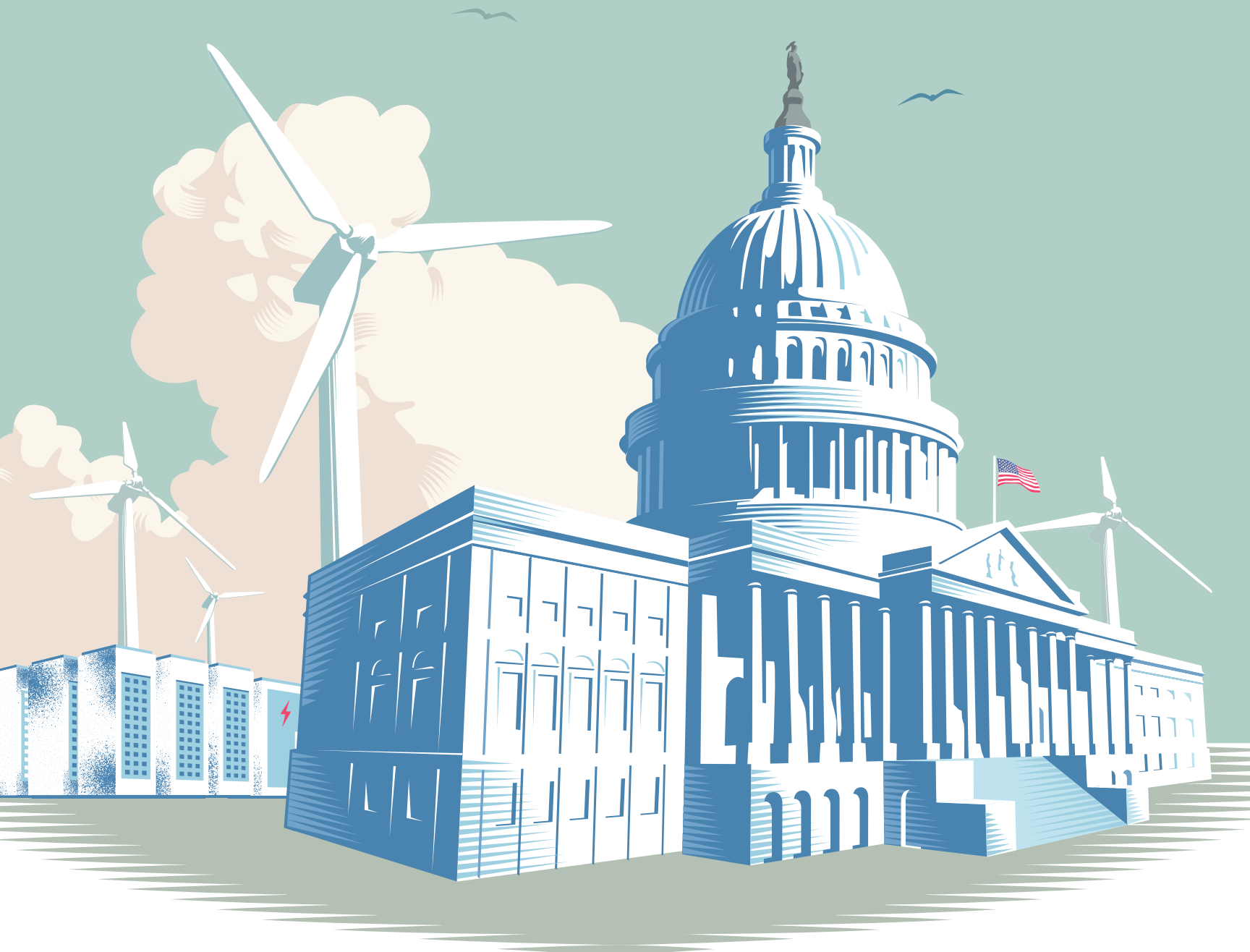
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Energy innovation is a bipartisan bright spot in Congress

BY SARAH CZUFIN, GOVERNMENT RELATIONS DIRECTOR,
AMERICAN PUBLIC POWER ASSOCIATION



In politics, buzzwords often take on lives of their own. Even the most casual observer can't avoid hearing phrases like "the establishment" or "both sides of the aisle," and it is no different in energy policy, with phrases like "green energy," "all-of-the-above strategy," or "energy innovation" feeling almost inescapable.

However, whether members of Congress are looking for ways to reduce emissions and address climate change, or to support economic recovery and create jobs, it is clear that "energy innovation" is more than just a popular buzzword — it's an area of major bipartisan, bicameral agreement that will shape policy for years to come.

While partisan disagreements persist, energy innovation continues to be a bright spot of bipartisanship. Recent examples include the Senate Environment and Public Works Committee advancing a bipartisan transportation bill in August 2019 that included federal grants for electric vehicle chargers, and Sens. Lisa Murkowski (R-Alaska) and Joe Manchin (D-W.Va.), the chair and ranking member of the Senate Energy and Natural Resources Committee, respectively, introducing the American Energy Innovation Act in March 2020. The legislation, which combined more than 50 energy-related bills into one large package, would reauthorize Department of Energy research programs on wind, solar, and geothermal energy; bolster federal support for energy efficiency; and create grant programs for energy storage, grid modernization, and workforce development for the next generation of energy jobs.

Regardless of which political party or region of the country they call home, our elected officials are seeing the transformative power of new, innovative energy technology and will continue to look to energy innovation as a way to tackle the big challenges

When the Democratic majority in the House of Representatives developed a far-reaching and comprehensive infrastructure bill, the Moving Forward Act, energy innovation was front and center. The legislation, which passed the House in July 2020, includes a grant program for electric vehicle charging infrastructure; a federal demonstration project for energy storage; and grants to improve the resilience, performance, and efficiency of the electric grid. Should these provisions become law, public power utilities would be eligible to apply for all of these energy innovation opportunities.

Another major energy innovation, advanced nuclear, continues to enjoy bipartisan support in both chambers of Congress. Among other provisions, the Nuclear Energy Leadership Act authorizes the federal government to enter into long-term power purchase agreements for advanced nuclear projects and directs the DOE to develop a fast neutron-capable research facility to test next-generation reactor fuels. As of this writing, the act has more than 20 co-sponsors — Republicans and Democrats — in both the House and Senate. In June 2020, a group of senators joined together

to push for the inclusion of some provisions of the NELA in must-pass defense legislation.

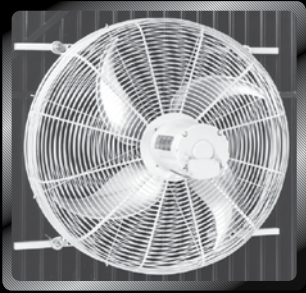
Regardless of which political party or region of the country they call home, our elected officials are seeing the transformative power of

new, innovative energy technology and will continue to look to energy innovation as a way to tackle the big challenges, like the environment and the economy, that they were elected to address.

In August 2020, we joined with 37 other groups, including other trade associations and environmental advocates, in a letter asking House leadership to move legislation related to energy innovation and technologies onto their fall agenda.

APPA will continue to be the voice for public power in the discussions and debates about advancing energy technologies. When it comes to energy innovation, our focus remains on advocating for smart, nuanced federal policy that will truly benefit public power utilities and, in so doing, the communities and customers they serve.

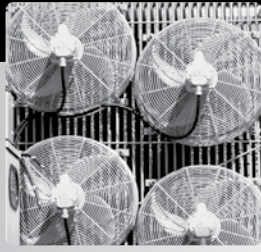
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WHY IT IS IMPORTANT FOR PUBLIC POWER TO INNOVATE

BY MICHELE FEARNLEY SUDDLESON, DEED DIRECTOR,
AMERICAN PUBLIC POWER ASSOCIATION

I've heard it time and again — some utilities don't perceive themselves to be innovative, or they don't think they have the time or budget to do "innovative" work.

True, utilities are not often grouped with technology companies that are considered "cutting edge," even as our work underpins theirs. But our industry doesn't just provide the resources needed for other companies to develop technology — we also must use technology to perform our jobs.

WE LOOK AT PROBLEMS HOLISTICALLY AND FOCUS ON FINDING THE MOST EFFICIENT, EFFECTIVE AND SMART WAYS TO WORK TO BENEFIT OUR COMMUNITIES.

Innovation is not just throwing new technology at a problem. It's about being able to adapt and think differently.

Perhaps your utility's mission statement is something such as, "to provide our community with reliable, affordable and environmentally responsible electricity." Achieving any of these goals requires trying out new ideas to truly show our communities a dedication to continuous improvement. Therefore, it is an essential part of our work to continuously explore how new technologies, ideas, and processes might help us be more efficient, safe, and reliable. In other words, we must be innovative.

From what I've seen in my nearly 20 years of managing the Demonstration of Energy & Efficiency Developments program — aka DEED — public power utilities are innovative.

The innovation we do is different. Our innovation might not be "shiny" or "splashy," because we don't often have the promotional budget to talk about our research and development efforts. But even without fanfare, our innovation is moving us forward.

We look at problems holistically and focus on finding the most

efficient, effective and smart ways to work to benefit our communities. Alongside the hundreds of projects that have allowed public power to explore implementing certain technologies — such as community solar, energy storage, and electric vehicle infrastructure — past DEED projects have focused on topics including economic development, community engagement, and STEM education. These latter projects might not typically be associated with R&D, but they demonstrate the suite of creative solutions that reinforce the local choice central to public power, promote workforce development, and ultimately boost the utility's, and therefore the city's, bottom line.

We can partner with other government entities and with community organizations and foundations to leverage our expertise for projects outside our traditional wheelhouse. For example, a project by Stoughton Utilities in Wisconsin a few years ago worked with teachers on how lighting temperature affected students' ability to learn. Another project, by the Tennessee Valley Authority, looked at the feasibility of a decentralized wastewater treatment process.

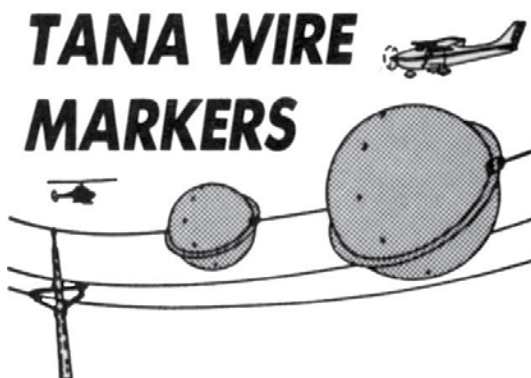
Public power provides a fundamental commodity in our communities. That is a big responsibility. Public power utilities got a meaningful reminder of the importance of electricity by participating in the Light Up Navajo initiative in 2019. DEED provided funding to conduct a feasibility study of the concept, which touches two core values that make public power R&D unique: our collaborative spirit and our dedication to quality of life. The initiative led to more than 230 homes getting electricity for the first time, and it was recognized with the American Society of Association Executives' 2020 Power of A Summit Award.

Innovation has long been important for utilities, and with the rapid transformation taking place in the power industry, it is now even more important for public

power to ensure it is taking part in R&D.

The collaboration across DEED is also important in keeping the public power community strong. By pooling research, public power utilities effectively share their R&D budgets and enable each other to advance together — understanding where we might find new efficiencies, how to implement new service offerings, and how to better serve our communities.

DEED's inception in 1980 — 40 years ago — formalized a platform for public power to support and share innovations, and the program is now more than 950 strong. That's 950 utilities, joint action agencies, and state associations that know that to best serve their communities, they must keep learning and advancing. They must innovate.



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WHAT MAKES A UTILITY INNOVATIVE?



A new idea can come from anywhere; but the right environment nurtures ideas into practice. Utilities can foster a culture of innovation in many ways. Here are some considerations.

How are problems (and thereby potential solutions) identified?

Do employees across the organization have opportunities to give input?

Is testing of new ideas/ processes encouraged?

How do you get — and analyze — qualitative feedback from customers and other stakeholders?

Are new ideas allowed to flourish and fail?



Is the utility comfortable taking chances when success isn't assured?

How are results of any pilot programs or projects shared?

How do you learn from missteps?

Does your utility collaborate — or have the potential to collaborate — with other community groups? With national R&D networks?

What opportunities are there for employees to learn from people outside the utility?



FROM IDEA TO ADOPTION



Everett Rogers' *Diffusion of Innovation* theory describes what it takes for an innovation to be adopted. The theory posits that the rate at which an innovation is adopted depends on how potential adopters perceive the following five characteristics:



RELATIVE ADVANTAGE

Is the new idea considered better?



COMPATIBILITY

Is the innovation consistent with norms, values, and past experiences?



COMPLEXITY

How much effort does it take to understand/adopt/ implement?



TRIALABILITY

Can it be tested on a limited basis?



OBSERVABILITY

Are results easily seen?

**Knowing the solution means
knowing the problem.**

**Let us help you make
data-informed choices.**



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