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Powering Progress

By **AMY FISCHBACH**, Field Editor

Lineworkers nationwide are lighting up lives, one family at a time. Beyond constructing and maintaining infrastructure, they are also illuminating homes following severe storms and going above and beyond the call of duty to serve customers.

For our annual Lineworker Supplement, we are celebrating the line trade with stories about people behind the power. These hard-working men and women are inspiring future generations of lineworkers with their passion for building the grid of the future.

The following stories in this year's edition reflect lineworkers' dedication to the trade. Here's what's in store for this year's Lineworker Supplement.

Providing First-Time Electricity

For the last few years, I've heard stories about Light Up Navajo, a humanitarian effort organized by American Public Power Association (APPA) and the National Utility Tribal Authority (NTUA). This year, I decided to dive into the world of Light Up Navajo with an article about how line crews are volunteering their time and talents to provide rural electrification to Navajo families.

While *T&D World* has published stories and photo galleries about lineworkers providing first-time electricity to homeowners overseas, this story focuses on a humanitarian project in our own backyard. Seventy-five percent of all U.S. families without electricity live on the Navajo Nation, which is the size of West Virginia and spans Arizona, New Mexico and Utah.

The volunteer lineworkers travel from their utilities across America by plane and truck to the Navajo Nation. They come from utilities of different sizes in varying locations, but they all have one thing in common — their lives are forever changed by their experience volunteering. This story explores how the project began, how lineworkers make a difference and what APPA and the NTUA see in the future for Light Up Navajo.

Rebuilding Puerto Rico

Over the last few years, we have covered the hurricanes that have hit Puerto Rico and the devastation they have caused to the island's transmission and distribution system. For our 2023 supplement, I'm taking a look at how LUMA is building a more reliable and resilient grid by hardening its substations, installing infrastructure that can stand up to storms and investing in renewable energy.

Recently, LUMA partnered with the International Brotherhood of Electrical Workers to launch the island's first Department of Labor certified lineworker apprenticeship program. The utility also opened a new training campus to prepare the next generation of lineworkers for a career in the line trade.

Training Women in Line Work

Two years ago, I featured a story in our Lineman Supplement called, "Women in Line Work." I featured six women who have made their mark in the trade and discussed the opportunities and challenges women face in the utility field workforce.

Years later, I decided to revisit that topic after Olivia Wilson, a journalist for the BBC World Service, listened to an audio version of the story and interviewed me for a radio documentary about women in line work. I also heard from the son of Judi (Shepardson) Hanson, who sent me photos of his mom climbing poles for United Telephone Company of the Northwest in the 1970s in Oregon. In addition, I learned about a book called, *High Voltage Women: Breaking Barriers at Seattle City Light*, by Ellie Belew about the first class of 10 female lineworkers in 1972 at Seattle City Light. Along the way, I became connected with two women — Alice Lockridge and Joanne Ward — who both worked at the utility, as well as Susan Blaser, the first woman to top out at Kansas City Power & Light, now Evergy, and her daughter, Randi, who just topped out at Ameren Illinois.

After featuring these women in my "Women on the Line" series for the Line Life Podcast, which is sponsored by Huskie Tools, I'm sharing their stories with our Lineman Supplement readers in an article focused on training past and future women in the line trade.

Honoring Rodeo Champs

To round out the supplement, we are including an article about past champions of the International Lineman's Rodeo. For lineworkers nationwide, this event is a time for their families to come together and to enjoy the camaraderie of the trade, but most of all to compete.

Many journeyman teams give it their all, but only one team is crowned the best of the best each year. With the 40th anniversary of the Rodeo around the corner, I am highlighting a few of the past winning teams, who share their secrets and strategies to crossing the podium on the awards night.

Thank you for reading these stories in the 2023 Lineman Supplement, and don't forget to listen to the upcoming Line Life podcast episodes featuring some of these topics. Subscribe on your favorite podcasting app, listen to all the episodes at tdworld.com/podcasts and reach out to me at *amyfischbach@gmail.com* with ideas about future podcast guests. I look forward to seeing all of you and your families in my hometown of Kansas City this October. TDW

AMY FISCHBACH (*amyfischbach@gmail.com*) is the Field Editor for *T&D World* magazine.

Mutual Aid

SRP dedicated a total of 14 employees to assist on the project, joining line workers from 26 utilities and 16 states to bring power to people who have lived without it.

Without a Storm

Volunteer lineworkers bring first-time electricity to American homeowners through the Light Up Navajo project.

By **AMY FISCHBACH**

When the lights go out in communities nationwide, crews join forces to rebuild infrastructure and restore power. Through the Light Up Navajo project, volunteer lineworkers provide mutual assistance — but without a storm.

The humanitarian project, which launched in 2019, brings the line trade together to illuminate the 13,500 homes without electricity on Navajo Nation. About 75% of all U.S. households without power live in this 27,000-square-mile region, which spans parts of Arizona, New Mexico and Utah, has 300,000 residents and a total of 55,000 homes.

With Monument Valley as a backdrop, Greenville Utilities crews worked to extend a power line that will serve 24 Navajo families.

In 2022, 69 utilities from 14 utilities in 10 states volunteered to provide electricity to 137 homes on Navajo Nation, reducing the cost to connect each home by 25%, said Walter (Wally) Haase, the general manager of the Navajo Tribal Utility Authority (NTUA). This year, lineworkers from 26 public power utilities in 16 states volunteered for the project, including Dean Frescholtz, journeyman lineworker and section supervisor for Salt River Project (SRP), a member of the American Public Power Association (APPA).

After spending 23 years in the line trade, Frescholtz said he'll never forget the homeowners see the lightbulbs go on for the first time in their homes. "They were very excited to have power, and it made me felt great," he said. "It felt like a humanitarian effort in our own backyard. I didn't even realize before I had volunteered to do this that there were people living in the state of Arizona in 2023 who did not have electricity."

Jeff Haas, the acting president and CEO and senior vice president of membership and education for the APPA, said many APPA members aren't aware that 30% of the Navajo people don't have electricity or running water. The NTUA is a public power enterprise, and when APPA communicates the need for assistance, their members are answering the call for help. "The beautiful thing about public power is that it's community-driven to its core," Haas said. "So, when we communicate the need, we find there are many willing parties to volunteer to take their line crews, equipment and materials across the entire country to the Navajo Nation to provide support."

One of the common misconceptions about the Navajo people is that they do not want their homes wired for electricity and connected to the grid, he said. Haas recently visited the Navajo Nation to observe the volunteer line crews in action and talk to the Navajo families, and said that's simply not the case. Many of the homeowners on Navajo Nation have been waiting years to get access to electricity. Traditionally, if a home is not one mile from a connected circuit, it can take a long time to go through the federal permit process and a commitment from the utility to extend the electricity beyond that one mile.

"I think we need to get better and need federal support to reduce the time it takes for the permitting process," he said. "It's the Navajo people's land, and they want this service, and they deserve this essential service. How can their children access broadband, do their homework effectively and learn and thrive without such an essential service as electricity and running water? We, as a country, can do more, without a doubt."

Coming Together

Four years ago, the APPA partnered with the NTUA to expedite rural electrification on Navajo Nation. At that time, Haase of the NTUA was serving as the APPA board chair, and he started to bring attention to the plight of the Navajo people. When he traveled around the country to speak at conferences, Haase remembers the audience members' shock that so many Americans were without essential services and the majority were living on Navajo Nation.

"They were all under the impression that it was more of a Third World country problem, and they couldn't believe that there was that large of a population in the United States that didn't have access to these facilities," he said.

Over time, the interest in electrification of the Navajo homes escalated, and more people started asking questions about the role of the federal government in the issue and how they could help. "Many of my fellow APPA members and other members came up to me and said, you know, this is really wrong," Haase said. "Our communities solved the problems 100 years ago or more, and the co-ops solved the problems in the 1920s, 1940s and 1950s. They felt compelled to say this is an injustice, and it's a moral issue."

At that point in time, 15,000 homes on Navajo Nation had no electricity or running water. To shorten the timeline for the Navajo families to get service, Haase partnered with the NTUA and APPA to launch Light Up Navajo. The project is not only giving lineworkers the opportunity to help their fellow Americans, but also gain a new set of skills in the line trade. Back in their home service territories, the systems may be completely built-out or the power lines are mostly buried underground. On the Navajo Nation, however, the volunteer line crews have a valuable training opportunity, Haase said.

The Navajo Nation line crews also perform distribution work and work in challenging conditions, which prepares them for storm response. Volunteers string wire, install poles, set transformers and install meters on a distribution system from start to finish — all while working with knowledgeable peers, learning best practices and gaining experience.

"When you get called out on mutual aid, you're going to be working in areas where there is a natural disaster — tornadoes, windstorms, hurricanes or freezing rain — that brings down lines," Haas said. "Working on the Navajo Nation gives line crews an opportunity to really test their mettle in a situation where the lines aren't energized."

This valuable opportunity to train line crews is often a motivating factor and a justification for APPA's member utilities to send crews to the Navajo Nation. It also allows the lineworkers to create a network within the trade. "Lineworkers are a very tight-knit community," he said. "To see these individuals working literally arm and arm for a purpose as noble as bringing electricity and essential service to the Navajo people is one of the most rewarding work-related and personal experiences I've had in my lifetime."

Expediting Electrification

Before the launch of the Light Up Navajo initiative, the NTUA relied on state and federal funding to extend electricity on an annual basis to Navajo homes while maintaining its own vast distribution system. The Navajo Nation, however, is the size of West Virginia, and it has rugged terrain, slowing the rural electrification. In 2018, Demonstration of Energy and Efficiency Developments, a research and development program, funded an analysis of what it would take to get line crews from across APPA's membership to participate in efforts to bring electricity to Navajo homes.

"We looked at how to create efficiencies and apply best practices as it relates to creation of the distribution system on the Navajo Nation and use APPA's resources," Haas said.

For the pilot project in 2019, lineworkers from 12 states and 25 utilities connected 233 homes to electricity in six weeks, reducing the total number of U.S. homes without electricity by 1%. "We learned very quickly that there was some inertia, and that the utilities that participated got a lot out of it," Haas said.

The next year, dozens of utilities signed up to participate in Light Up Navajo II, but the volunteer mission was canceled due to the COVID-19 pandemic. That didn't stop the NTUA, however, which was able to leverage the Coronavirus Aid, Relief, and Economic Security Act to extend electricity to several hundred homes that year.

The following year, the APPA brought volunteers back on Navajo Nation, and for 2023, the open volunteer slots filled up quickly for Light Up Navajo IV, which started in April 2023 and was extended from June to July to accommodate the number of available line crews.

Going Above and Beyond

The line crews who volunteer for Light Up Navajo are paired with NTUA foremen who know the system, the local Navajo language and how to navigate the desert landscape and mountainous terrain. "They work in tandem with NTUA line crews, so there are limitations as to how many crews can be sent at any one time," Haas said. "Having someone who knows

Grand River Dam Authority worked near the Utah border, working against dust storms.

where they're going and how the system operates is important."

The lineworkers often work 12-hour days, but they are proud and extremely happy to be volunteering their time, Haas said. Case in point: One of the line crews worked well past 9 p.m., and by the time they got back to their motel, none of the restaurants or food service facilities were open. "They worked so long that they missed their dinner," he said. "The sense of purpose is extremely strong on this project."

Because the Navajo Nation encompasses such a large region, the NTUA dispatches the volunteer crews to different districts to work in the small communities. That way, they can focus on electrifying a certain portion rather than overlapping during the multi-week project. "We have four crews at a time, because we need to balance our workforce, our materials and our own equipment," Haase said.

During one Light Up Navajo project, however, the NTUA scheduled five crews to come in, and three of the crews from the previous week called their bosses back home and asked to stay an extra week to get their work done. They received permission to continue volunteering, and as a result, eight crews were on site simultaneously.

"That's quite an endeavor to manage all that manpower, materials and equipment, but it's a fantastic story where they just felt in their body, heart and mind that they didn't want to leave," Haase said. "They wanted to finish helping their community members get power for the first time."

Haas said public power utilities of all sizes have sent line crew volunteers to the Navajo Nation, but they all have one thing in common — they know it's the right thing to do. "They have to juggle their interests at home because there's limitations locally with regards to local assets, lineworkers, materials and equipment," he said. "Sending a truck or line crew across the country may be difficult, but we are finding that our members are really good about figuring out how to get it done."

Constructing Lines

Like mutual aid following a storm, the project organizers sent line crews to different regions to perform line work. The crews stayed in local hotels, sometimes an hour or more from the work sites, and the NTUA provided lunch to the volunteers.

Frescholtz said during the volunteer project, he worked with lineworkers from SRP's distribution line maintenance department. SRP sent 14 employees including a supervisor, working foreman, lineworkers, an operator and a mechanic to Navajo Nation in 2023.

The lineworkers construct power lines to homes that have already been wired for electricity by the NTUA and its outside contractors. The homeowners must first file a request for electrification, and then once their home is ready to accept electricity, the volunteer line crews travel to their location to build a

Step by Step: Electrifying Homes on Navajo Nation

Before the volunteer line crews even step foot on Navajo Nation, a lot of work has already been done to set up the homes for electrification. Here's a glimpse at the process.

1. A NTUA customer fills out an application to be part of the program. The applications are taken on a first-come, first serve basis, says Walter Haase, general manager of NTUA.

2. The NTUA creates a design for the line and figures out how to connect it to the electrical system.

3. The federal government owns the land on Navajo Nation, so the NTUA must secure right-of-way (ROW) permission. Haase estimated that it takes about $13,000 to complete the paperwork and use the land to get the ROW for each home.

4. The utility hires outside experts to perform environmental, biological and zoological surveys of the project site. If the power line will be less than a mile long, it takes six to nine months, but if it's more than a mile, it can take a year-and-a-half. This process can take even longer if the experts discover a cultural artifact, rare plant or protected animal species.

5. Using grant funds, the NTUA hires an outside contractor to install the 200A service to the home.

6. The field workforce for the NTUA or outside contractor installs the meter pole and socket.

7. The NTUA inspects the inside wiring of the home.

8. The staff orders the bill of materials and has it available for the crews that are coming out to volunteer for Light Up Navajo.

9. The line crews arrive on Navajo Nation to perform the line work for anywhere from one to three weeks at a time.

10. After the line has been energized, the lineworkers experience the joy of the homeowners when their lights come on in their homes for the first time.

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Light Up Navajo IV crews connected more than 10 homes to a project that spanned more than 10 miles. Photos courtesy of NTUA.

power line and set up a meter to get the power flowing.

In his day-to-day job, Frescholtz supervises crews on distribution pole replacement projects, but on the Light Up Navajo volunteer project, he was installing poles and stringing lines to provide first-time power for the Navajo Nation. "There's no storm that knocked all the poles down that we're going to put back up," he said. "It's mutual assistance because other utilities are coming to help to build power lines for the first time."

Over the course of three weeks, his team of volunteers built six miles of power line, set 104 poles and strung more than 63,000 ft of wire. Last year, when the SRP crews volunteered for the project, they energized a few homes in one day, but this year, they brought electricity to 10 homes. He said that it was more remote than last year's volunteer project.

Frescholtz said he enjoyed the work because it was much different than what he's used to in Arizona. In his service territory, his crews often work in congested metropolitan areas, where they must contend with lane closures and traffic control plans. "Light Up Navajo was really nice because it was in the wide-open countryside on dirt roads," he said. "It was nice to just go out there and get back to the grassroots of building a straight power line without running angles or installing buck arms and three pot banks."

One challenge the crews faced, however, was working in difficult terrain. To overcome this obstacle, the crews used a bulldozer to pull line trucks with trailers. He said his team learned lessons from their first year on the volunteer project. This time, they only took six-by-six trucks, which are four-wheel-drive boom and bucket trucks. They also brought a hole digger, wire trailer and pole trailer to transport materials.

"We have very few trucks at SRP that are actually four-wheel drive because we work in the city most of the time, but all the trucks we took up there had four-wheel drive applications," he said. "We knew we were going to have some difficult conditions, and they did quite well up there."

While constructing about 40 of the poles, however, the trucks couldn't navigate the sandy terrain. To help the SRP crews, NTUA supplied a bulldozer so the lineworkers could hook pulling ropes from their trucks and move them through the sand with pulling trailers.

Beyond the access issues, the lineworkers were also challenged by the weather conditions. "Working in Phoenix, Arizona, we're used to heat — that's what we deal with on a day-to-day basis," he said. "But up on the Navajo Nation, there's more of a four-season atmosphere up there. A few of the days, the lows were in the 20s, and high was 30 degrees. We're not used to working in cold temperatures like that."

The chill combined with the strong winds provided a unique work environment for the Arizona crews. The SRP team traveled about three-and-a-half hours north of their service territory for the volunteer project.

"The weather changes quite rapidly, and when you're out in 28-degree temperatures, and the wind is blowing 50 miles per hour, it adds wind chill that we are not used to," he said.

Haas agreed, saying while the landscape is beautiful, the terrain and weather conditions can be inhospitable at times. "Even when I was there in April, there were windstorms that made it very difficult to see a few feet in front of you," he said.

Providing First-Time Electricity

During the Light Up Navajo project, Frescholtz said his favorite memory was just being with the people — both those who live on Navajo Nation as well as the other volunteer line crews.

"I not only got to work with journeyman linemen from Utah, but also people who work for other utilities," he said. "We were able to work side by side with them and their supervisors and managers."

Frescholtz also had the opportunity to interact with the community members and help illuminate their homes for the first time, which was life-changing for them and their families. "A good percentage of them were at home when we were able to plug in the meter and turn on the lights for the first time."

This time around, his team remembered to bring a very important item with them — cases of lightbulbs. That way, after the lineworkers built the power line and set the meter, they could screw in the bulbs and demonstrate the glow of electricity. Before their homes were wired with electricity, the homes were illuminated by generators or kerosene lamps.

Without access to electricity, the homes faced other challenges. Navajo families didn't have access to running water, modern forms of heating and cooling or appliances like refrigerators and microwaves, according to the APPA. Every week, they had to drive one or 1.5 hours to watering spots just to fill 250-gallon plastic tanks with water for drinking, cleaning and cooking. Without the ability to use modern appliances like refrigerators, they had to fill coolers with ice to keep their food from perishing.


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Austin Energy worked west of Flagstaff, Arizona, with the San Francisco peak in clear sight. The peak is considered one of four sacred mountains to the Navajo people.

"You can imagine, if you are living on the nation, at times you could be from 45 minutes to an hour from the nearest point to get groceries," Haas said. "Then you have to bring them back to your home and and essentially pack anything that's perishable in ice, and it will last anywhere from two to four days. I've also heard stories of families either renting refrigerators or keeping a refrigerator of their own at a relative's house that in some instances was 40 minutes away one way."

Family members have ended up leaving Navajo Nation due to the lack of access to essential services, but the electrification of the homes allows them to return once again. "They now have essential services they need to raise a family and to thrive," he said. "They'll join the generations of their family that live in these homesteads."

The program not only gives the Navajo families a better life, but it also helps to create trust and bonds between the community members and the volunteer line crews, Haase said.

"This gives an opportunity for a very diverse group of Americans to gain respect for each other," he said. "Anytime you can help one family to have a better life and give them the opportunity to become part of society and be productive, you're helping all of society. It's a tremendously positive experience for everyone, and that's the thing that makes this program so great."

Planning for Future Growth

Through the Light Up Navajo project, utilities are also working together to continue to provide electrification to the homes on Navajo Nation. Frescholtz said that SRP's goal is to continue supporting the project. "There's no plans in the future for this to stop," said. "Every year, we'll continue to put out the request for volunteers, and we'll load up with the same or different personnel to go back up there."

JD Munoz, a working foreman for SRP, said the Navajo families are very grateful for the work of the volunteer line crews. "It's humbling and gratifying to bring these folks electricity for the first time," Munoz said. "To provide power to someone who has never had it is a good feeling. This is my first time working on Light Up Navajo and it won't be my last."

Haas said APPA is committed to continuing the Light Up Navajo project until all the homes requiring electricity have been energized. "These people have, in some instances, literally waited generations — in some cases more than 50 years — to get electricity, and we want to accelerate the number of homes that are connected on an annual basis. We need to do better."

Haase said when he first started at NTUA 16 years ago, about 18,000 families didn't have electricity, and thanks to the efforts of the volunteer line crews, that number has dropped to about 13,500, which is about 52,000 U.S. citizens.

"At the pace we were going by ourselves 50 years from now,

Week in the Life of a Volunteer Line Crew on Navajo Nation

Line crews from across America have volunteered for the Light Up Navajo project. After they fly to the area or arrive after a multi-day drive, they travel to the designated location using their vehicles or rental trucks from the NTUA. Here's a look at what a typical week looks like for a line crew on the Navajo Nation.

Saturday or Sunday: The crews attend a three- or four-hour orientation program, which covers an introduction to the program and cultural sensitivity and awareness. A large focus of the training is on safety because not all utility companies have the same construction standards, says Walter Haase, general manager of NTUA.

Next, the crews are dispatched to different areas on Navajo Nation and teamed up with a foreman from NTUA. They also travel to one of the yards to see a mockup of how things are built, and if possible, they start a job to help get as many families connected as possible during their stay.

Monday and Tuesday. The crews meet at 7 a.m. at the district office to load the material. They then drive about an hour or more to focus on short-line extensions, which are single-family homes less than a mile from the existing distribution line. About two or three families are often connected at one time.

Wednesday. To give the crews maximum time in the field, the NTUA stages the material and brings it out to the work site. Lineworkers then work on community power line projects and build miles and miles of single-phase line and then connect customers off that line. Haase says this is the best training exercise for the crews, but the connection of the individual family members is equally important. "We try to make sure that every crew that comes out has experience in doing that," he says.

Thursday. The line crews stop work early and enjoy an appreciation dinner in the local community that has gotten connected. Navajo family members are invited to talk to the outside crews about what the program means to them and how it has helped them.

Friday. The crew resumes work.

Saturday and Sunday. If the crew plans to stay two weeks in a row, they will also work all day Saturday, a partial day on Sunday, and then continue working on big projects for the rest of the following week to connect as many families as possible.

we would still have United States citizens without electricity and running water and still using outhouses," he said. "Through the additional efforts of the Biden administration and others, we've cut that down from 50 years to 30 years. It's a significant reduction if we keep going at this pace."

Currently, the project's ultimate goal is to try to get to about 500 families a year, which hits the 30-year pace. From there, the project organizers hope to provide power to 1,000 families annually, which will increase it to a 15- or 20-year pace, Haase said. The NTUA is looking to expand programs and dollars to speed electrification and lessen the time families need to wait for the essential services. "Even if I get to 1,000 families a year, it's a difficult task to tell someone that it's 15 or 20 years to get connected, but it's better than 50 years," he said. "This is a big problem, but you have to be happy with taking small victories and moving the ball forward to help more and more people."

Haase would love to have the Light Up Navajo project finished in his career, or at least in his lifetime, but that's going to take more outside help with materials and equipment. "So far, more than 600 families or more than 2,000 United States citizens got electricity for the first time. That's positive for all our partners to recognize, but it also drives them to say how can we help to improve this and get it done faster."

Over the years, not only public power utilities, but also investor-owned utilities and electric cooperatives, have sent volunteer line crews to the Navajo Nation to provide assistance. In the future, Haase said he would like to see more cooperatives and investor-owned utilities join the municipal-owned utilities to expand the program. For 2023, the program length has also been extended a few extra weeks, which he said is a step in the right direction. As of June 25, 2023, the volunteer line crews built more than 40 miles of line and connected 131 families.

In 2021, the NTUA also added a new program — Mutual Aid Training — which further expands the mission of Light Up Navajo. The six-week training initiative, which takes place in the fall rather than the spring and summer, focuses on projects with longer lines and involves not only lineworkers, but also electricians. In 2021, the Los Angeles Department of Water & Power (LADWP) helped the NTUA connect 80 homes, and last year, the lineworkers connected 62 homes.

"Having the opportunity to see firsthand what it's like in a part of America in 2023 without an essential service really did impact me in a profound way," Haas said. "I think many other Americans may be shocked — I may use the word, appalled — to see how our fellow proud Americans have been treated. We need to do more. I think it's our duty as Americans to take care of our own, and for public power's part, we're going to ensure that we continue to do that." TDW

AMY FISCHBACH (*amyfischbach@gmail.com*) is the Field Editor for *T&D World* magazine.

Training Women on the Line

As more women enter the line trade, here are four strategies to recruit, train and retain female lineworkers.

By **AMY FISCHBACH**

Randi Blaser grew up in a family of lineworkers, but it wasn't until she climbed her first pole and later worked her first storm that she discovered a passion for the line trade. She recently topped out at Ameren Illinois, and she said line work can be a rewarding career for women nationwide.

"Women aren't as strong as men, but women are definitely capable of doing what men can do — they just have to do it differently," she said. "With the way things are going with the power tools and all the advances that have been made, it's leveling the playing field for women, and I think that is fantastic. You don't have to be the biggest dude or the biggest girl to do stuff now. If you're interested in the trade, you're mechanically inclined and you can pick it up, you can do exactly what they can do."

Joanne Ward started in the trade as an electrical helper for Seattle City Light in 1978.

Joanne Ward, who retired from Seattle City Light after four decades in the trade, said the opportunities for female line workers in today's utility industry are just as important and even greater today than four decades ago in their offer of skilled work and stable careers. Ward first started as a line crew helper at Seattle City Light in 1978, and later worked as a high-voltage electrician and crew chief before retiring and publishing the book, *Utility*, about life in the trade.

"The current workforce is aging out and job openings are, and will, become extremely plentiful," Ward said. "These jobs will afford a high standard of living, good healthcare coverage, excellent retirement plans and even some defined benefit retirement plans. Women should be educated about them and urged to come get them."

In the 1970s, women started working in the line trade in different parts of the country. One of those women was Ward, who joined her utility as part of the second wave of an affirmative action program in 1978. She searched for a non-traditional job as an avenue to a higher salary and standard of living. After interviewing with a phone company for an installer's position, she learned that Seattle City Light was actively hiring electrical helpers. "I liked the idea of working with my hands and working outdoors in a more physically active job," Ward said. "Those jobs opening up were really a question of equal opportunity for women."

Currently in the United States, the number of women in line work is still a slim percentage of the overall field workforce. Utilities nationwide, however, are working to increase the diversity of their line crews, and many are hiring their first female lineworkers. As more women work in the line trade, here are four strategies to attract, train and retain female line employees.

1. Take a new approach to training.

Susan Blaser, the lead line technician program coordinator at Metropolitan Community College in Kansas City, is training the next generation of both men and women lineworkers. She said back in 1989, when she started out in the trade, she learned the skill of rigging, which helped her immensely during her career.

"If I couldn't do something, I would ask everybody, and then I'd take two different ways and figure out what worked for me," she said. "There's a lot of technology that has come along, but at some point, there are limits, and that's when rigging is going to play a critical role."

About 85% of the students' time is spent outside on the poles, and the program focuses on how to do things correctly and repetitively to ensure safety. So far, nine women have come through the program, and five of them have become lineworkers, including her daughter, Randi.

When Randi attended the summer climbing portion of the program, she opted to pursue line work as a career. Now that she's a lineworker, Randi is often in her hooks and on a pole for hours at a time. At 5 ft tall, she said she has had to learn different ways of doing the work. "As far as women, they're just as equal as men, in my eyes," Randi said. "Just because we don't do it your way doesn't mean we can't do it at all.

We just must figure out a way that we can do it safely. It just might look a little bit different."

For example, when she's working on a pole with a taller coworker, they need to learn different ways to work together. "When you're on the wood pole, and you got someone who is between 6 ft and I'm 5 ft, I can stand up a little higher, and then we can be at eye level with each other, which works out because our feet aren't hitting together," she said. "It can be a challenge, but you can still get the work done by the end of the day."

Alice Lockridge, who was training aspiring lineworkers at Seattle City Light when Randi's mom, Susan, was starting out in the trade at Kansas City Power & Light (now Evergy), agreed. Many women have told her that when they worked with a taller man, they fit better on the pole. She said there are many ways to scurry into a job position. "If I'm shorter, my feet are up closer to the work and out of the way of those great big feet of the guy that's doing the work with me," said Lockridge, who worked as an exercise physiologist at her utility. "My hand goes into little places that they can't. There's a need for both size people. Diversity in experience and body size are all of value."

Another way that women can succeed in the line trade in the early part of their career is to learn one of the basic skills of line work — rope tying. Lockridge founded a group called "Knotty Women," and she has a booth at high school career days to teach girls how to tie different types of knots and pique their interest in the trades at the same time.

"I think the first day you get on a crew, at least you could run over to the truck and tie a load down and not get yelled at," she said. "Being able to tie not just a knot — but a real knot — is a great way for an entry-level worker to get into the job."

Lockridge also said it's important for women to learn how to use their own body weight to perform line work efficiently and effectively. During her time with her company's pre-apprenticeship program, she focused on helping people get and keep physically demanding jobs, with an emphasis on helping women get into the trades. She first prepared the pre-apprentices for the physical entrance-level test and then trained them in the gym for three hours three times a week for the graduation test.

"We wanted to make sure they could actually do it and had the physical capacity to learn the skills," Lockridge said. "The job is hard, and things are heavy, especially in 1988 when I started. Lots of those things have been improved and made lighter, but you still have to get yourself up the pole to work while carrying tools. There's a lot of physical demands on the body."

Oftentimes, the physical evaluations may drive off aspiring female lineworkers, but Lockridge asserted that some can do a chin-up with the right physical training.

"There's strength and skill to doing a chin-up, just like cutting wire or tying a knot," she said. "The reason we use chin-ups is because it shows us that you can manage your body weight. If your feet slip off a pole, you could save yourself until help arrives, or you get your feet back on the pole. It's a fundamental view of whether you are in the physical condition to be able to start learning in a risky climbing environment."

Susan Blaser was the first lineworker to top out at Kansas City Power & Light (now Evergy) before training the next generation of lineworkers at Metropolitan Community College in Kansas City.

Through the training sessions, Lockridge taught the pre-apprentices how to perform the work without getting worn out or injured on the job. "If I had to hoist a bucket of tools up to you on a pole, if I had to do it with just my wrist strength and my grip strengths and biceps, it wouldn't make it up 40 ft," she said. "But if I know how to sit down and use the weight of my behind to make that load go up, I'm a better worker, a longer worker and a less hurt worker."

Beyond the physical training, utilities also need to consider the different ways in which women learn. No two people are exactly like, and if the lesson planned isn't working, it may not be the learner's fault. The instructors may need to find a different way to present that information. "Stereotypically, women are better readers, and don't always need just a visual picture of it," Lockridge said. "Also, we respond really well to positive feedback and not very well to being yelled at and cursed at."

2. Safeguard women with workwear and PPE that fits.

Beyond work methods and the physical demands of the job, women must also have the proper garments to stay safe and comfortable on the job. Back when Ward started in the trade, she remembers rolling up coveralls at the bottom of her legs.

"I would adjust the shoulder straps as much as I could, but they would still hang low on me," Ward recalled.

Finding gloves back then was a challenge. Ward said she has a size-7 hand, which she found was to her advantage when she

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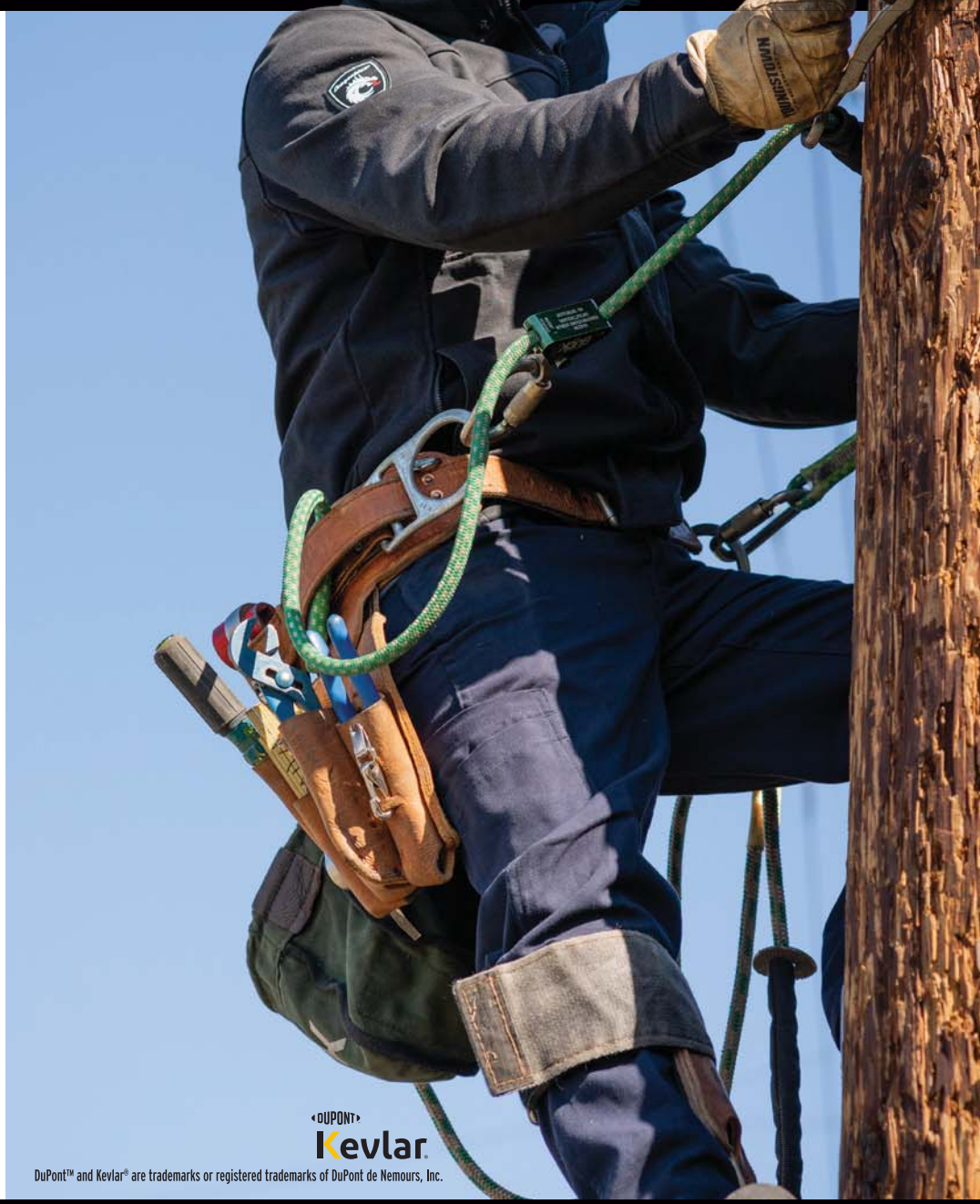

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What You Need to Succeed as a Woman in the Line Trade

After gaining experience either working in the trade and/or training lineworkers, the four women featured in the "Women on the Line" series for the Line Life Podcast share 10 tips for women considering careers in the line trade.

1. Have a thick skin. When she first started out in the trade, Susan Blaser spent a lot of time, energy and frustration trying to prove to people that she was just as good as some of the other guys in the field. She eventually learned to not worry about other's opinions and not underestimate her own abilities as a lineworker.

2. Find a mentor. Learning can be frustrating for anyone, male or female, Blaser added. Try not to get discouraged and find others who want to train you and make you the best lineworker you can be. Joanne Ward agreed, saying throughout her career, she found crew members who were willing to train and mentor her.

3. Get a support team. "These should be folks you can call at any hour, in any mood and talk truthfully (not just sunny day friends, but instead bad-day friends who want to hear the truth and can listen if you cry or curse!," Alice Lockridge said.

4. Secure dependable transportation. If you want to be a considered a valuable worker, you must find a way to get to work, Lockridge added.

5. Trust in your own skills and abilities and practice positive self-talk. Be as kind to yourself as you are to your friends, Lockridge said.

6. Focus on physical fitness. To succeed in the line trade, aspiring lineworkers must be able to be in shape and ready to perform the duties of the job. A pre-apprenticeship program may be a good place for women to start in the trade, Ward said. Randi Blaser agreed, saying her mom's line technician training program provides women with the support they need to succeed in the trade.

7. Learn how to climb. At Metropolitan Community College-Kansas City, one of three semesters is just focused on climbing.

"We have the students come in, and they'll decide whether this is what they want to do or not," Susan said. "Sometimes they self-select out when it's not really what they expected, and they'll decide on a different career path."

8. Show respect for the experience of your veteran lineworkers. "You need to be as friendly as you can, and be ready to help, be useful, and do the dirty work, which will be asked of you—believe me," Ward said.

9. Learn leadership skills. During her career, Ward served as a crew chief on three different crews, and she said she learned a lot about leadership that she wanted to pass on to the women coming up in the trade. She said it's important to make it clear from the beginning that you're not interested in the my-way-or-the-highway methods. "Also, if you're a quiet person, learn to speak up loudly enough to attract attention in a crew meeting," she said. "You have to let your voice be heard."

10. Connect on social. Join social media groups where you can find a place to talk about your day. Within these groups, the other women can understand your perspective and provide support. For example, Lockridge administers a Facebook page titled, "Women in Linework," and women in the trade are welcome to join.

had to work in tight spaces. In certain situations, however, she needed heavy leather gloves. "The first day I came on the job, I had a lovely pair of pig-skin gloves, and they were completely burned through by the end of the day. I learned pretty quickly to get better, thicker, gloves, and I was able to find those that would fit my hand."

Lockridge, who now serves as an advocate for women in the trades, said female lineworkers often reach out to her for advice and assistance. She said women in the line trade today are still challenged by what clothes to wear, how to find clothes that fit and how to get safety gear that's made for their shape and size.

"Sometimes their hands are smaller than the gloves," she said. "I once got a phone call from a woman lineworker apprentice on the East Coast, and she sent me a picture of her doing line work, and I could see her red fingernail polish. She had a guy take a picture of her work, and he didn't know what he was showing me, but she had no gloves. Her company said they didn't' make gloves smaller than a size 8 hot glove, so I went to our stock, pulled out a pair and mailed them to her."

Randi said it's a challenge working as a petite woman in the line trade. "I'm like the 1% of the 1% because I'm very petite for my size, and I'm also a woman in a male-dominated field."

Her utility pays to have her garments altered, which has been a big help, but she said she wants clothes that fit well when she's out on the job. "I'm not here to make a statement and look pretty, but I'm in these clothes all day," Randi said. "I want clothes that are comfortable and look good. I don't want clothes that are baggy and made for men."

Over the years, as more women have entered the line trade and construction industry, more manufacturers have started making FR garments and workwear tailored to women. These companies understand that women's workwear is not just smaller sizes of men's clothing, but specific garments made for women's shapes and sizes. A few of these companies include Ariat, Bulwark, Carhartt, Dovetail Workwear, Fastenal, DragonWear, Lakeland, Lapco, MWG Apparel, National Safety Apparel, Radians, Rasco, Tyndale and Wrangler.

For women in line work, however, finding boots is also difficult, especially with the current material shortages. "For me to find boots right now is probably slim to none," Randi said. "I can get a pair of boots that are 16 in. tall that go to the bottom of my knee, but to move around in those all day is not ideal. I'm struggling with just finding an everyday pair of boots. The pair I have right now are worn down."

Some shoe manufacturers, however, now custom-make boots, Susan added. For example, West Coast Boot Company (Wesco) sizes boots for women lineworkers. Ameren Illinois' safety department has also been able to order extra-extra small gloves from a company called Kunz. The cut-resistant gloves don't come into her size back in the storeroom, but her company custom-ordered her a pair as well to keep her safe. Other vendors are also offering gloves in different sizes to

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INVENTING WHAT'S NEXT

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In 2009, Alice Lockridge organized an all-women lineworker crew to perform the flag raising inside the defunded Satsop Nuclear Plant Cooling tower as the starting session of the Energy Conference. These women were from around the Puget Sound Area and represented a full spectrum of skill levels from a new apprentice to journey-level workers and a retired line worker. Matt Hins

fit workers. Youngstown Glove Company offers certain glove styles in sizes ranging from XX-small to 3X-large.

Other essential items for women starting out in the trade are a proper-fitting belt and hooks, Randi added. While many companies may just ask a woman for her height and hand her a belt, Randi said her mom fitted her for her belt and hooks properly, which has made a significant difference in her day-to-day job. "My mom wants that equipment to fit, which is awesome because you're in that equipment and may be on a pole for six hours," Randi said. "You have no idea how long you're going to be on that pole."

Lockridge said it's common for women to be proportionally longer in their legs than a man their same height, and as such, the harnesses must fit properly. "Her body harness should be shorter than the guy her same height, but not always," she said. "Everyone needs their gear to fit their specific body."

3. Build a support network.

When hiring women in the line trade, Lockridge said there's a golden rule: Never hire one woman at a time. "That's a sure way to drown her and virtually 'prove' that women can't do it," she said. "In the first class at Seattle City Light, there were 10 women hired, and 10 women made it through all their difficulties together and pulled with each other."

She can't say two is a magic number, but she said she prefers the hiring of three women at any one time. The same goes for other minority groups, she said. "Don't put a token out by themselves to represent all of their gender or group," Lockridge said.

Susan also encourages the women who are hired by a utility to seek out other women in the line trade. She said it's essential for women to create a network and have support. "I picked out a small group of individuals that if they told me I was having a good day and I did a good job, I knew in my heart that I had done well to get a compliment from them," she said.

Today, the women in the line trade can connect online through social media groups with other females in the trade. Susan, who is a member of a Facebook group called Line Ladies, said she didn't have that option back when she was a lineworker. "Social media wasn't around," she said. "I was one female at one location in Missouri, and there was no way of networking or getting that mentoring."

Randi said she follows a few groups on social media, but she focuses more on connecting with local female lineworkers in her area, including those women who have gone through her mom's training program. Having a support network will also help tremendously when it comes to storm season. As a freshly topped out lineworker, she said she's often at the top of the list

Randi Blaser, the daughter of two lineworkers, recently topped out at Ameren Illinois and enjoys her job in the line trade.

Looking Back: Working as a Linewoman in the 1970s

In the early 1970s, the Equal Employment Opportunity Commission provided money to hire women and minorities into vocational work. At that time, Todd Cheng said his mom, Judy (Shepardson) Hanson was recently divorced with two kids and no child support, and as a secretary, she was paid $2 an hour.

"The government was maintaining a program to make sure all rural areas were connected with phone lines, and the United States needed more lineworkers and capacity to surge up and run these rural lines," Cheng said. "One day, a manager walked into the secretary bullpen and jokingly said, "Do any of you girls want to be a lineman?" My mom raised her hand and asked, 'How much an hour?'

His mom had the potential to earn a dollar more per hour than she earned typing 90 words a minute, and she got the job.

"She spent the weekend bloodying her calves learning how to turn high heels into climbing spikes and scurry up telephone poles," Cheng recalled.

His mom became the first linewoman at United Telephone Company of the Northwest with its OJT/apprenticeship program. Cheng remembers growing up with the stories about her job and the task lists.

"She climbed poles, dug holes, managed contractors, and projects," he said in a Women's History Month tribute to his mom and her grit on LinkedIn. "She has always overcome barriers and used her persistence to step forward, climbing up, digging out and overcoming."

As an apprentice lineman and grunt on the line crew, Hanson said she learned how to climb 45 ft to 90 ft poles, string cable and hand dig holes 6 ft deep when the auger couldn't break through the rock. At 5 ft tall and 100 pounds, she was able to maneuver into tight spaces and had more manual dexterity than some of her coworkers.

"I was muscular for a little gal," she said. "I was also a tough nut and was like the Unsinkable Molly Brown."

She said she faced challenges as the first woman to work an outside plant job, and she advises current and future women in the line trade to not tolerate discrimination, have a tough shell, be fit and get proper training for the job.

"At that time in central Oregon, women were expected to milk cows, put food on the table and make babies," she said. "The women didn't work in the outside plant. The men didn't know what to do with me, but I learned how to talk like a lineman, and I loved the work and being able to be outside."

She eventually got remarried and had another child and worked as an installer for about four-and-a-half years for her company in Oregon. She said she's proud of the legacy and example she set for her children.

"They learned to not put up with anything, do the best you can and finish strong," Hanson said.

Three women lineworkers at Seattle City Light.

when it comes to callouts for storm work. Her mom lives four hours away and can help with her one-and-half-year-old twins, and she's also found friends who can provide childcare in the Illinois area, including a sitter whose husband works for Ameren and a family who "adopted" her and her son and daughter.

4. Create awareness of job opportunities for women in line work.

To encourage more women to consider careers in line work, Susan said there needs to be more education and awareness about opportunities in the trades. "Parents don't raise their kids to say, 'when you grow up, you're going to be a lineman,' she said. "Schools also don't promote that."

> *"There's open jobs, and lots of opportunity for a woman"*

For example, she was just at a career fair for school counselors, and she set up a table for MCC's lineman training program. Most of the counselors flocked to the fire, police and nursing tables, but few came over to visit with her and learn about the opportunities in line work. By attending her 12-month program, however, her students can earn a high salary even starting out as an apprentice.

"I just don't think women understand that it's something they can do, and they can be supported in, and they can be successful at," Susan said.

Ward agrees, saying there needs to be a culture change at the high school level to advertise the need for young women to participate in technical training. Beyond that, she said the entire culture of the country needs to shift. "This country has traditionally disregarded women as capable of, or sees them as uninterested in, non-traditional trade work," she said. "I think we now need a concerted effort from the federal to the local level to reframe the societal need for lineworkers that shows the need to be great enough to require both women and men as lineworkers for utilities."

When companies approach Lockridge to ask her how they can hire more women, she asks them to send her the documents to see their advertisements and graphics. "It all said, 'we only want boys' in vague words, but women can read that in the wording. Put women in the picture on your graphic, take the word, 'man' off the advertisement and logo and hold recruiting sessions that are selectively geared toward women."

She advises companies to invite women to come in first by themselves or with a group of women and give them insider tips from people who are experienced.

Lockridge said in today's utility industry, the jobs are still available — for the right women who are willing to put in the work. "There's open jobs, and lots of opportunity for a woman," she said. "The door isn't open very wide, but the right women pioneers will still be kicking the doors in." TDW

AMY FISCHBACH (*amyfischbach@gmail.com*) is the Field Editor for *T&D World* magazine.

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LUMA lineworkers are trained through LUMA College's Utility Lineworker Program, certified by the U.S. Dept. of Labor.

Powering Puerto Rico

Lineworkers are building a next generation electrical system to increase grid resiliency and reliability.

By **AMY FISCHBACH**

Three hurricanes inflicted widespread power outages and significant infrastructure damage to Puerto Rico over the last six years. To keep the lights and power on to the communities, the 3,000 men and women of LUMA have focused on a more resilient, customer-focused and clean-energy system for the people of Puerto Rico.

When LUMA assumed operations in June 2021, the grid had suffered decades of neglect and lack of maintenance, said Dr. Shay Bahramirad, senior vice president, engineering, asset management and capital programs. Compounding the challenges, Hurricane Fiona caused $4 billion of damages and outages across the island less than a year later. Even so, the utility has made historic and lasting progress in just two years, she said.

"We have replaced over 5,000 poles, and by replacing them, we have brought them to industry best practices," Bahramirad said. "These assets are going to withstand 169 mph winds. We have installed over 480 automatic outage reduction devices, and they are going to help us find where the outages are so we can restore customers in a timelier way. We've also cleared 1300 miles of hazardous vegetation."

Due to these efforts from LUMA's field workforce, the utility is seeing a 25 percent reduction in frequency and a 35 percent decline in the duration of outages. Over the last year, the utility has also connected 54,000 customers to rooftop solar, making Puerto Rico seventh among all U.S. states and territories in residential solar energy adoptions per capita.

"We are strengthening the entire system and improving overall resiliency and service for our customers, both now in the long term, for the generations to come," Bahramirad said. "We want it to stand the test of time."

The following is a glimpse into the progress Puerto Rico has made in its grid modernization projects and how its field workforce is helping to pave the way to reliability and resiliency.

Improving Reliability

After Hurricane Fiona flooded parts of Puerto Rico and left the island with a widespread blackout, LUMA's field workforce has been focusing on clearing vegetation and restoring and rebuilding infrastructure. The utility is also continuing to partner with FEMA and the federal government to fund upcoming projects addressing generation shortfalls on the island. Case in point:

the utility recently connected the first land-based generator funded by FEMA, which will add about 150 MW of generation and minimize the impact of generation-caused outages.

"We're thinking holistically and methodically about how a modern grid should be built," Bahramirad said. "This includes deploying a modern energy management system, deploying accurate system models and system planning, which never existed on the distribution level in Puerto Rico, and executing basic maintenance. That will lead to a stronger and more resilient electric system that delivers the safe and reliable energy that all Puerto Ricans deserve now and for the years to come."

LUMA has made it its mission to not only improve the reliability of the service, but also build a better energy system for its 1.5 million customers. To do this, the utility is looking simultaneously at the broader industry to see what is possible and focus on the specific areas of the grid in need. For example, the utility has developed the first network microgrid projects leveraging undersea cables in two islands with resiliency challenges. LUMA is collaborating with the Department of Energy and scientists and engineers from labs nationwide on the project.

"Our customers are the core of everything we do," Bahramirad said.

LUMA is a Puerto Rican company that, since June 1, 2021, operates and manages the electric power transmission and distribution system in Puerto Rico.

Clearing Vegetation

Another key focus of LUMA's grid modernization plan is removing hazardous vegetation. Crews have removed vegetation surrounding more than 400 substations throughout the system to improve reliability.

"Vegetation is the number one cause of outages in Puerto Rico, and to date, we have cleared more than 1300 miles of power lines," Bahramirad said. "We have prioritized clearing in areas where they are most needed, and where it will have the greatest impact on reliability and resiliency."

To support its vegetation management efforts, the crews have been using a variety of technologies including drones, LiDAR and various cameras and sensors. To date, LUMA has patrolled and inspected 100 percent of its 115 kV and two 30 kV transmission lines across Puerto Rico using thermal imaging technology.

Through the grid modernization program, LUMA is working toward a brighter future for Puerto Rico.

LUMA lineworkers maintain the electrical grid in Puerto Rico.

"We continue to use the data collected from these imaging systems to make better, data-driven decisions to make improvement in the system," Bahramirad said.

For example, in one neighborhood, by clearing vegetation, the crews were able to identify half of an older pole dangling in front of an elementary school.

"The state of vegetation in Puerto Rico has given us a lot of opportunity for improvement," Bahramirad said. "In other areas, the vegetation clearing we are doing is making it possible for us to execute the repairs and see more of the island. That way, we can avoid the outages and blackouts that have historically affected Puerto Rico."

Upgrading Substations

To further improve reliability, LUMA is transitioning from stray bus, double ring or break-and-a-half to fully digitized substations through the $101 million FEMA-funded substation modernization initiative. The utility is focusing on modernizing 11 of its substations, and work is already underway on five of them. In the future, LUMA plans to bring in partners from across the United States and partner with local contractors to support the projects.

"We are working to not only restore, but fully rebuild and modernize each and every substation through the island, which will increase the safety of our operation," Bahramirad said. "It will also reduce outages and improve energy reliability across the system for all our customers."

Specifically, the crews are upgrading the oil circuit breakers with gas circuit breakers and elevating portions of the substations in the 10-year flood zone. In addition, LUMA is adding fiber optic technology for communication and deploying advanced sensors like phaser measurement units to improve situational awareness and wide area protection to provide enhanced resiliency.

"We are also looking at the system holistically to think about how we can plan the system in a matter that can improve the

By the Numbers: Training Lineworkers in Puerto Rico

With grid modernization projects underway across the island of Puerto Rico, LUMA is investing in the future of its field workforce through LUMA College, the island's first U.S. Department of Labor's certified lineworker apprenticeship program. By partnering with the International Brotherhood of Electrical Workers, LUMA is training the employees necessary to modernize the grid.

To further increase the skilled labor talent in its pipeline, the utility recently opened doors to LUMA College's new campus in Canóvanas. The utility also hired the first two female lineworkers in its history in 2022.

"The education we provide to our students and future lineworkers is based on industry-leading best practices," said Juan Vargas, president of LUMA College. "The programs offered by LUMA College for Technical Training empowers a diverse and highly trained workforce to rebuild Puerto Rico's electrical system."

Here are some fast facts about the new campus, which offers classes in skilled labor, technical safety and line crew leadership.

- 24 acres with 18,000 sq ft of facilities
- 10-acre skills and competency yard
- Only transmission and distribution laboratory in the Caribbean and the fifth of its kind in the United States
- More than 3,000 utility workers have been trained through programs and training courses at LUMA College since 2021.
- 44 students have already graduated from a training program at the new campus.
- $12.5 million was donated by LUMA's parent companies, Quanta and Atco, to build and construct the campus.

A LUMA College instructor showcases the first and only transmission and distribution laboratory in the Caribbean.

resiliency and sustainability of the whole system and enable more renewable energy on the island," Bahramirad said. "When rebuilding the grid, we need to take the opportunity to use the best proven technology that meets the particular needs for each substation."

This is particularly significant due to climate change, which is making the challenges LUMA and Puerto Rico are facing even more severe, she said.

"We are located in a country in a hurricane zone, and what used to be a 500-year flood zone is now a 100-year or even a 50-year flood zone, and it requires the appropriate responses," Bahramirad said.

In addition, LUMA is zoning in on the security and safety of its substations by clearing hazardous vegetation and conducting critical repair assessments of all the equipment. The utility is also working with local and federal law enforcement agencies to prevent the tampering of electrical equipment to protect the employees, contractors, customers and communities.

The field workforce at LUMA has 3,000 men and women. The utility hired its first two female lineworkers in 2022.

Spotlight on Streelights and Solar

Beyond substation modernization, LUMA is focusing on replacing tens of thousands of streetlights through the $1 billion FEMA-funded initiative. Workers are installing more than 300,000 streetlights across the island's 78 municipalities. LUMA's crews, along with contractors, have replaced or repaired more than 37,000 streetlights so far.

Every new streetlight features LED technology, which uses about 65 percent less energy and lasts four times longer than conventional street light bulbs.

"This is an important energy efficiency effort that will have a long-term benefit for Puerto Rico," she said.

LUMA is working toward powering the communities with 100 percent clean energy, and as part of the initiative, the utility is focusing on rooftop solar. The utility has recently added 330 MW of clean energy to the grid.

"No one has done more on the ground to accelerate the clean energy transformation in Puerto Rico than LUMA," she said. "All of this progress is thanks to the hard work of our 3,000 LUMA women and men who continue helping to connect more than3,400 additional rooftop solar customers to the grid each month as we build a cleaner and more resilient energy system for Puerto Rico."

Through the modernization projects, LUMA is focusing on the future of a grid that is reliable and resilient.

"Climate change means we need to expect more, and not fewer, disruptive events," she said. "Everything we do is focused on ensuring the grid has the capabilities to withstand severe storms—from deploying poles that can withstand 160 mph wind to enhancing situational awareness with sensors and improving grid flexibility. Additionally, we are clearing vegetation to mitigate hazards and installing automated devices to restore power more quickly."

By doing the projects the right way, LUMA can integrate the clean energy generation that can improve service for customers across Puerto Rico.

"Building the grid in Puerto Rico is an opportunity to demonstration how LUMA — and the industry as a whole — can make communities more reliable to drive economic activity and more sustainability and mitigate climate change and be more resilient in the face of a natural disaster."

LUMA has already seen the results in Puerto Rico, which has historic reductions in customer interruptions in less than two years of activity.

"These successes have not only come from hard work at LUMA, but also close collaborations with stakeholders, and the local and federal government from FEMA and the Department of Energy to the leadership of various parts of the Puerto Rico government," she said. "We have made incredible progress in just two years, but we know there is more work to be done. We are excited for what's to come and the progress to be made in Puerto Rico in the years ahead."

Juan Saca, the new president and CEO of LUMA, lived and worked in Puerto Rico from 2012 to 2019 during the period of Hurricane Maria and said he has a very special relationship to Puerto Rico and its people. Going forward, he plans to focus on three key priorities — communication, projects and stakeholder collaboration.

"The good news is that we have qualified personnel and federal and state funding to improve service," he stated in a video message outlining his vision to LUMA's customers. "Fortunately, several collaborators have joined us to replace more streetlights, install stronger poles, modernize substations and reduce the risk vegetation poses to power lines. Going forward, we will continue to be transparent about the opportunities and challenges we face. Together we will build a new era of progress for Puerto Rico." TDW

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Editor's Note: Listen to the Line Life podcast to hear an interview with Dr. Shay Bahramirad from LUMA about the progress in grid modernization projects in Puerto Rico. You can also watch a video message from LUMA's new president and CEO, Juan Saca, at *https://youtu.be/zjLGvj_psPY*.

Rodeo Flashback

Three top journeyman teams share their tips, techniques and memories from years of competition.

By **AMY FISCHBACH**

Nearly 40 years ago, the first Lineman's Rodeo took flight in Manhattan, Kansas. A dozen journeyman lineman teams showcased their safe work practices, demonstrated their skills and enjoyed the camaraderie of the line trade. Fast forward to last year, and the event soared to 242 journeyman teams and 366 apprentices.

For this year's Lineman's Supplement, we are taking a trip back in time to talk to a few of the Lineman's Rodeo champions over the last 39 years. These journeyman lineworkers hail from different parts of the country, but they all have one thing in common: They were crowned as the best of the best in the International Lineman's Rodeo competition.

The Duke Energy journeyman team of Sandy Barnhill, Jay Tipton and Keith Griffin won the journeyman division in 2021. They're headed back to Kansas City again this October to compete at the 2023 International Lineman's Rodeo, but this time, they'll be in the senior division. "We've competed in the company Rodeo for 16 years and at the international level for eight years," said Sandy Barnhill, a journeyman lineworker for Duke Energy in North Carolina. "This year, we're entering into a new era for our team, and we're looking forward to it."

Barnhill said the International Lineman's Rodeo is not only a competition, but it gives linemen's families and the community the opportunity to see lineworkers in action. His teammate, Jay Tipton, said his son was able to come on stage with him at the awards banquet, and Barnhill remembers having his team's family members' support on the sidelines.

"For us, it's a wonderful thing because we get to get our families involved and engaged," he said. "They run a stopwatch for us, yell at us and tell us things that we're trying to pay attention to. The Rodeo really helps to solidify what gets done every day by hundreds of line techs. It heightens their awareness of the dangerous situations that everyone finds themselves in, and just how important the jobs are that linemen do to serve their communities every day."

Lineworker Robert Hess of JEA in Florida also said the Rodeo plays an important role in the line trade. He won the competition back in 2013 with his teammates, and he's now training up-and-coming apprentices to compete.

"Competitions like this one are important because they build up our skillset and help us with our day-to-day jobs, as well as with restoring power after natural disasters and during mutual aid," he said. "It also helps in the safety aspect too, especially for apprentices. The practice you get from

the Rodeo really makes you an asset to your company and your team."

Two-Time Champs

Team: ***Ramon Garcia, Jacob Lybbert and Wil Robinson***
Company: ***Southern California Edison***
Location: ***California***
Years won: ***2016 and 2019***

The 2019 World Champion Journeyman Team trophy winners (left to right), Ramon Garcia, Wil Robinson and Jacob Lybbert. Photo by Energized Edison.

Ramon Garcia has been competing at the International Lineman's Rodeo for 11 years with his teammates, Jacob Lybbert and Wil Robinson, and he said his team is the only one at his company to stay together and win twice.

He and his teammates compete in at least four to five rodeos a year. "We use them as a learning experience to prepare for the International Lineman's Rodeo event," he said.

When he and his team won the competition, he remembers three things — the nerves, the excitement and the celebration.

"In 2016, we won a few awards in different events, and as the end came, we knew we were in the running," he said. "The biggest feeling other than joy was the proudest moment in my career to do something no one had accomplished at SCE."

To succeed, competitors need teamwork, chemistry and practice. They must also stay composed and be efficient, he said. Now that the team has won twice, they are helping the next generation of lineworkers.

"We always attempt to bring new teams and hold practices with them," Garcia said.

The team will compete together at the 2023 International Lineman's Rodeo and is planning on going for the gold once again.

"We are still competing and hoping for a third championship," he said.

He said the International Lineman's Rodeo Week is very special to him and his team.

"All weekend long is awesome, and I love the Rodeo," he said. "The best part of it for me is getting to talk to all competitors from different parts of the country. We may have to stay in competition to see the 40th Rodeo."

Florida Trio

Team: ***Robert Hess, Michael Corbitt and Brian Gregg***
Company: ***JEA***
Location: ***Jacksonville, Florida***
Year won: ***2013***

Robert Hess, Michael Corbitt and Brian Gregg of JEA were the top journeyman team at the 2013 International Rodeo Competition.

Robert Hess, a lineworker for JEA in Jacksonville, Florida, has been competing in the Rodeo for about 10 years. He initially got involved because he's an extremely competitive person.

"For linemen, the Rodeo is the closest thing we have to a sport, so when I first heard about it, I had to sign up," Hess said. "It seemed like a fun opportunity."

His journeyman team, which also included Michael Corbitt and Brian Gregg, won the Rodeo in 2013, and he said his team's bond was its strategy.

"The tasks you have to perform at the International Rodeo are usually a mystery until 24 hours before the competition, so it's hard to prepare for it," he said. "What made us win was our relationship, our work ethic and our desire to succeed. We all shared the same hunger and drive. We practiced day in, day out and eventually became brothers who learned each other's strengths and weaknesses. This allowed us to be a solid team during practice, and an even stronger unit on competition day."

To train for the Rodeo, his team practiced before work, after work and during lunch. He said they trained for the Rodeo like they trained for anything else because they knew the more they practiced, the better they would get.

"We spent every second at JEA's training facility where we set up tasks that we thought they'd put in the mystery event," he said. "We practiced everything there was to practice when it came to line work, so that on competition day, we'd be prepared regardless of the task they threw at us."

The hard work paid off, and he said the most memorable experience was walking across the stage and winning the trophy.

"Winning the International Rodeo is like winning the Superbowl or World Series," he said. "It makes you top dog for the year, and it's something you never forget. It felt satisfying to know that all the hard work we put in on the training yard paid off."

Today, he is now helping other Rodeo teams to prepare for the competition by serving as a coach for JEA apprentices who compete at the Rodeo. He orders all the materials, helps to build the training yard, attends practices, points out safety infractions and runs the stopwatch.

"I'm able to coach the guys based on everything I've learned and all the mistakes I made with my team during our practices," he said.

While he is no longer competing, he plans to come to Rodeos to watch JEA's apprentices in action. He also enjoys meeting other lineworkers from all over the world.

"Being able to communicate with people with the same background but completely different views and cultures was interesting," he said. "It made me realize that we all do things differently."

To be one of the top winners at the International Lineman's Rodeo, it takes a lot of hard work and dedication, he said.

"If you're not willing to practice day in and day out, devote all your time and sacrifice your days, it's going to be hard to win top honors," he said. "You have to be stubborn and be willing to work for it."

Carolina Competitors

Rodeo Competitors: ***Sandy Barnhill, Jay Tipton and Keith Griffin***
Company: ***Duke Energy***
Location: ***North Carolina***
Year won: ***2021***

Two years ago, the Duke Energy team won the journeyman division, and they're looking to compete again this year.

Sometimes storms got in the way of competition for Duke Energy's journeyman team of Sandy Barnhill, Jay Tipton and Keith Griffin. During four of the eight years that the team has competed, however, they placed in the top five. Two years ago, the team rose to the top and won the best journeyman team title.

Tipton, lineworker for Duke Energy, in Marshall, North Carolina, said he's been competing since 2006 and feels it's a great way to perfect skills and learn from others. For his team, he said the keys to success are dedication, prayer and a good day.

"We just go out and do the best we can," he said. "We try to stay focused and in control for the competition."

To prepare, Tipton tried to keep himself in the best shape as possible, and he also spent time practicing with his teammates. The team got together after hours or on Saturday mornings, Barnhill added. "We would run through an event or two and just stay in step with each other,."

The team's strategy was to communicate effectively, stick to the plan they developed and then go at it as hard as possible on the day of the event, Barnhill said. "To succeed, you must have a commitment to the trade and a willingness to find a team that you really jell with," Barnhill said. "You have to have the same targets in mind to compete on that level."

Winning the Rodeo requires teamwork and overcoming challenges. When competitors attend the awards banquet, he said there's no guarantee they will even walk on stage.

"It's humbling when you hear your teams number called," he said. "It's the unknown of doing your best and having a good day, but you just don't know."

When the announcer did call his team's name, however, and they were invited to walk across the stage, it was a surreal and awesome moment, Barnhill said. "I realized the talent in that room was extremely high and we were fortunate and blessed."

Tipton said it was a great feeling to have the chance to be recognized in front of his peers. Griffin said he'll never forget the feeling of the hard work his team put in through the years paying off.

"I remembered how we worked really well as a team and overcame the challenges," he said. "It was humbling when they called out our number that we won."

To be the best of the best, it takes more than speed — it requires no point deductions or penalties during the events, Griffin said. "I think a lot of times the young teams get in their head that it's nothing but speed, but at the end of the day, if you can't do it right, you're never going to win the Rodeo," Griffin said. "I think a lot of it is that you have to be clean at the end of the day. You can be the fastest at every Rodeo, but if you don't have the perfect score, you're never going to win."

Now that the team has years of experience, they are now helping the next generation of competitors. "We've had a lot of good finishes in the Rodeo because other people have taken the time to help us out," Tipton said. "So now we are trying to pass that experience on to the next teams. I'm just excited for the next generation. Every year it seems to get better and stronger."

Barnhill agreed, saying that his team supports the Rodeo every chance they get by working with apprentices and teams desiring help to prepare for the competition. "Our leadership in our local area has always been there for us so we definitely want to pass it on," he said. "The Rodeo is an awesome time of year for us, and we look forward to the competition and family atmosphere that is experienced." TDW

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