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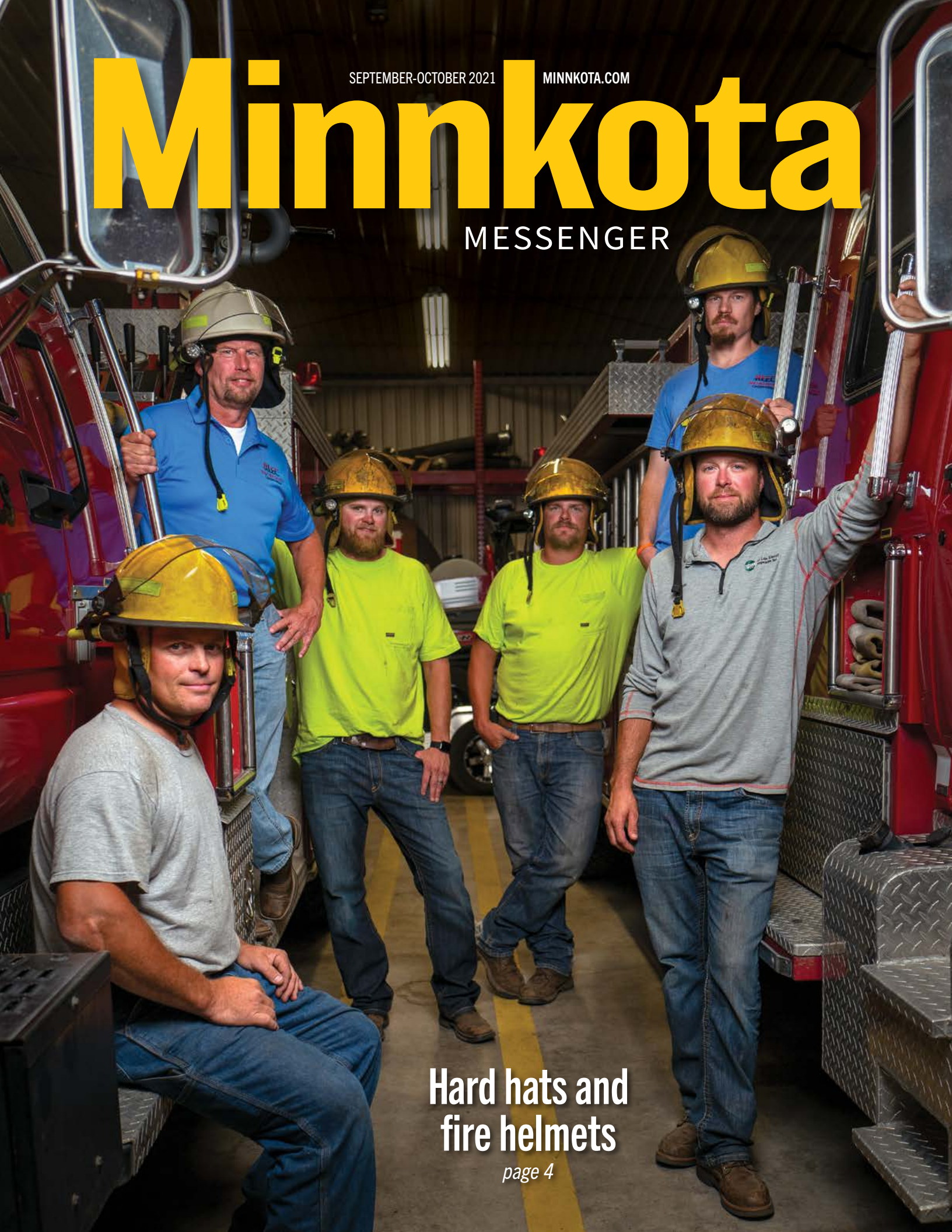
Minnkota

MESSENGER



Hard hats and fire helmets

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Minnkota
MESSENGER

September-October 2021

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On the cover: A day's work is never done when you're on call for both the electric cooperative and the volunteer fire department. A group of six Red Lake Electric Cooperative employees feels a sense of duty to serve the community in more ways than one. Pictured (left to right): Darcy Cardinal, Steve Conely, Brett Knott, Jordon Gervais, Chris Knott and Sam Pahlen.

Minnkota Messenger is published six times a year by Minnkota Power Cooperative. Its mission is to communicate Minnkota's perspectives and concerns to its members, elected officials, employees and other business audiences. For editorial inquiries, call (701) 795-4282 or email bfladhammer@minnkota.com.

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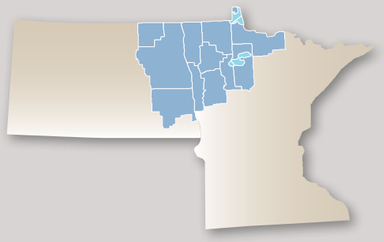


Minnkota Power Cooperative is a generation and transmission cooperative headquartered in Grand Forks, N.D. It supplies wholesale electricity to 11 member-owner distribution cooperatives, three in eastern North Dakota and eight in northwestern Minnesota. Minnkota also serves as operating agent for the Northern Municipal Power Agency, an association of 12 municipal utilities in the same service region. Together, the Joint System serves more than 159,000 customers.

Legislators illuminated during Young Station tour

Thirty lawmakers and other industry partners traveled to the Milton R. Young Station on Sept. 28 to learn about North Dakota's lignite industry and plans to advance carbon capture technology in the state.

The tour, which included both Minnesota and North Dakota legislators, started at the Center Mine, where attendees went step by step through the coal mining process. They were able to see the enormous equipment that is used to safely extract coal, including 240-ton coal haulers and a dragline with a 330-foot boom and bucket big enough to fit a school bus. Mine operator BNI Coal also showcased its reclamation process, which requires that every acre mined is restored to original condition or better.

"We do things the right way here because this is our home," said Kate Kolden, BNI engineer.

Attendees then toured the adjacent Young Station and learned about the operation and maintenance practices that help ensure the coal-based power plant remains reliable and resilient. Presentations were provided on the February 2021 grid reliability event, which caused rolling blackouts across the country. Minnkota, the plant operator, avoided major issues due in large part to the dependable operation of the Young Station.

"The Young Station has been the backbone of our system for decades," said Stacey Dahl, Minnkota senior manager of external affairs. "It continues to serve our members well and it has truly shined during extreme weather events that have severely limited production from wind, solar and other facilities."

Minnkota leaders also outlined Project Tundra – a carbon capture initiative that would remove 90% of CO_2 emissions from either generator at the Young Station. The CO_2 would then be safely and permanently stored approximately a mile underground in geologic formations. If the project moves forward, construction would begin sometime in 2023.

The tour, which was coordinated by the Lignite Energy Council, included many attendees who had never visited a power plant before, while others have lived in North Dakota's energy-producing areas their entire lives. It was a new experience for Rep. Jordan Rasmusson from Fergus Falls, Minn., who finished his first legislative session in 2021.

"The tour was an eye-opening experience on the future of the energy industry in North Dakota," Rasmusson said. "The advancements in energy research and development just across our border are truly remarkable and I came away with a whole new appreciation for North Dakota's role as a worldwide leader on this subject."

Dahl said that an up-close look at the industry can change perspectives and provide greater context around the complexity of providing power 24 hours per day.

"We're grateful to this group of legislators for taking the time to learn more about our industry and see firsthand the innovative and ambitious projects that are being pursued to provide low-cost, reliable electricity with enhanced environmental stewardship," Dahl said.

Minnkota and BNI Coal combine to employ about 400 people at the Young Station and Center Mine. The facilities contribute to about $1 billion in annual economic activity in Oliver County.

Legislators and industry partners gathered for a photo in the bucket of Liberty dragline at the Center Mine, which provides coal to the Minnkota-operated Milton R. Young Station.

Hard hats and fire helmets

RED LAKE ELECTRIC COOPERATIVE BOASTS SIX EMPLOYEES ON THE LOCAL VOLUNTEER FIRE DEPARTMENT

At the tail end of a hot and crispy summer, a small group of Red Lake Electric Cooperative (RLEC) lineworkers was hitting the dusty fields southwest of Red Lake Falls, Minn. The task of the day was to move a line of power poles farther from a farmer's crops and closer to the rural road ditch.

For that particular crew, ditch work was becoming a recurring theme – from moving wires to cigarette fires.

"This year it seems like those calls happen a lot," said RLEC journeyman lineworker Jordon Gervais.

"It's just so dry," RLEC operations manager Steve Conely responded. "We typically get about 25 total fire calls per year."

Conely leads the RLEC crew in more ways than one. In addition to his role as operations manager, he also serves as the assistant fire chief of the Red Lake Falls Volunteer Fire Department, which includes a total of six RLEC employees on the volunteer roster.

That's right. The co-op makes up a quarter of the local fire team.

"What I've heard is linemen and people in this industry are good at being on call, and they're good at making difficult choices," Conely said. "That makes them good firemen."

Whether it be inferno or power flow, the Red Lake Electric Cooperative team is ready to respond. Left to right: Darcy Cardinal, Sam Pahlen, Steve Conely, Chris Knott, Jordon Gervais and Brett Knott.

Teamwork is important in both the bucket truck and the fire truck. Left to right: Jordon Gervais, Darcy Cardinal, Sam Pahlen and Brett Knott.

Conely and Gervais are joined on the fire team by journeyman lineworkers Darcy Cardinal, Sam Pahlen and Brett Knott, as well as RLEC engineering technician Chris Knott. The six were led to the fire department by different paths, at different times in their lives. But the same idea brought them to the fire hall.

"I see it as, it's a small community. We're not just one thing. Sam, he assists with youth hockey," Cardinal said, gesturing to Pahlen in the bucket truck, "and I'm a hockey coach. We don't have the numbers for a lot of people to do just one thing."

History of heroism

This isn't RLEC's first cohort of community caretakers. When Conely was hired in 2001, there were already three co-op employees on the fire squad. He began volunteering soon after.

In the Red Lake Falls fire hall, chatting with his fellow firefighters, he glanced over his shoulder at the photo gallery of bygone fire crews. "The generation before us, it was the line foremen, in that first go-around, back in the '40s," he said.

"One of the initial Red Lake board directors was my great-grandpa, and he was on the fire department in the '30s, I think," Chris Knott added.

The tradition of service bridges eras and connects families in Red Lake Falls. Cardinal's father and brother, as well as Gervais' grandfather and uncle, were also involved in the fire department, and three of the current co-op volunteers are cousins.

"It goes along with how you've grown up and how you're taught," Conely said, noting that all six grew up in or near Red Lake Falls. "If your parents stopped and helped somebody alongside the road back in the day, you probably still do that today."

"I just wanted to do it, and you pretty much know everyone in the department," Pahlen said. "They had an opening, and I asked to join."

Pahlen joined the fire department the same day as Gervais eight years ago – two years after they started at the co-op together. Between the six men, there are approximately 60 years of collective service to the fire department. When you add that to the time they've spent with each other at work over the years, you would think they'd grow tired of one other.

Not the case.

"It's kind of funny – we actually do things AFTER this all together," Gervais said. In fact, five of them were hitting the golf course later that night. "We're kind of a family at work, so when you come here to the fire hall, you know who you're dealing with. You get to learn each other so well that we kind of know what each other is thinking."

"They really understand each other," Conely said. "This group recently responded to a fatal car accident, and our fire chief commented on how well these guys worked together through that, through a terrible situation."

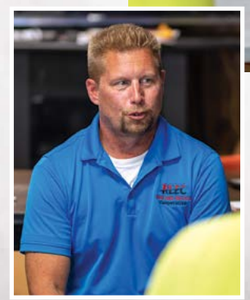
Other members of the fire department recognize that lineworkers come equipped with additional skills and insight. They're the first ones to disconnect power during a house fire and they're familiar with the adrenaline rush of having limited time to fix a dangerous problem. The urge to serve isn't reserved to Red Lake Falls. Nearly every co-op in the Minnkota Power Cooperative system contains at least one firefighter or first responder, and many have multiple.

RLEC leaders see what their team is capable of. Conely says management has always been supportive of his crew's dual role, and none of the current volunteers plan on returning their fire helmets anytime soon.

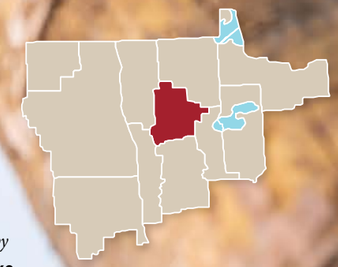
"If you want a good, strong community, you have to be a part of it," he said. "That may not be the reason we all started, but as you do it, you see more community benefits."

By **Kaylee Cusack** / Photography **Michael Hoeft**

RLEC's Sam Pahlen (middle) relives some experiences with his co-op crew back at the fire hall.



RLEC's Steve Conely chats with his fire team



Served by

Red Lake Electric Cooperative

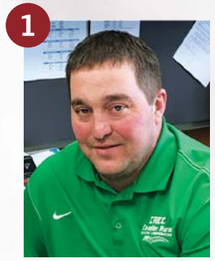
Red Lake Falls, Minn.

- Incorporated – July 30, 1938
- Year energized – 1941
- Board members – 9
- General manager – Stephanie Johnson
- Members – 5,686
- Miles of line – 2,637

Cooperatives on call

The Minnkota family of cooperatives and municipal utilities is chock-full of employees who have stepped up to serve their local fire departments. The following is a sampling of the community volunteers spread throughout the service territory – and thank you to the many more we were unable to list!

1



CAVALIER RURAL ELECTRIC COOPERATIVE

Marty Tetrault, Operations Manager
Langdon Fire Department – Fire Chief

"The thing I enjoy the most about volunteering is being around people who want to make our community a better place, and being able to help people in general is very rewarding."

2

NODAK ELECTRIC COOPERATIVE

Max Stromsodt, Apprentice Lineworker
Finley Volunteer Fire Department

"Finley is a small town, and any help around the community is nice. I enjoy going out on fire calls and being part of parades and community events."

3

WILD RICE ELECTRIC COOPERATIVE

Nathan Pazdernik, Power Quality Coordinator
Mahnomen Volunteer Fire Department – Secretary

"My dad had a fire a long time ago and, at the drop of a hat, all of those guys came out to try to help us save our shed. When they all did that and didn't think twice about it, right then I said, I have to do that."

4

PKM ELECTRIC COOPERATIVE

Scott Slusar, Line Crew Foreman
Hallock Volunteer Fire Department – Assistant Fire Chief

"The most enjoyable thing is seeing the relief on people's faces when we show up. Very similar to being at work during a storm, everybody's happy to see you. A close second is the crew – it really is a brotherhood, again very similar to being a co-op lineman."

5

ROSEAU ELECTRIC COOPERATIVE

Neal Vatnsdal, Lineworker
Roseau Volunteer Fire Department – First Lieutenant

"Our community is so supportive of our fire department – it's unbelievable how much support we get. It's a nice way to give back and help with different things around the community. It's not just fires and accidents – there are many other functions we're involved with."

6

BELTRAMI ELECTRIC COOPERATIVE

Kasey Kampfer, Journeyman Lineworker
Lakeport Fire Department (Laporte, Minn.)

"I joined the military when I was 17 – I was in the National Guard for nine years. It was just a lifelong path of doing things like that. When I got out of the military, I wanted something else to do, so I joined the fire department."

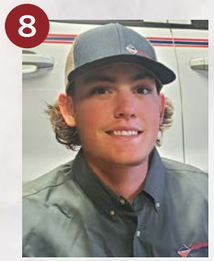
7

CASS COUNTY ELECTRIC COOPERATIVE

Joey Strauss, Journeyman Lineworker
Arthur Volunteer Fire Department

"I'm originally from Arthur – I was born there and never left. I just wanted to help out the community and do my part."

8



RED RIVER VALLEY CO-OP POWER

Justin Nord, Apprentice Lineworker
Halstad Volunteer Fire Department

"I grew up in the small community of Halstad. I enjoy helping people within the community that helped me grow up and become the person I am today."

Halstad heroes

Volunteer firefighters make up the majority of full-time employees at Halstad Municipal Utilities

While many utilities around the region can point to one or two employees who volunteer with the fire department, Halstad Municipal Utilities can say 75% of its workforce is comprised of firefighters. Three out of the four full-time employees are signed up to serve.

"The city promotes their fire department really well," said superintendent Lucas Spaeth, who is also president of Northern Municipal Power Agency. "All of us found it as a way, when we first moved to Halstad, to serve the community and meet more people with service goals."

Spaeth and his city colleagues Tony Wolff and Isaac Spaeth (Lucas' brother) began volunteering at different times (2010, 1987 and 2014, respectively). However, they all do it for similar reasons – to protect their neighbors on their worst days and add satisfaction and fulfillment to their own lives.

"Municipals and cooperatives have the priority for community," Lucas said. "Making it allowable for their employees to train in a separate field adds to the overall quality of their staff. The fire department's local presence is a win-win for every business and home in their respective communities."

Lucas Spaeth, Superintendent
Halstad Fire Department
Safety Officer

Isaac Spaeth, Lineworker
Halstad Fire Department
Firefighter

Tony Wolff, Water/ Wastewater Operator
Halstad Fire Department
Assistant Fire Chief

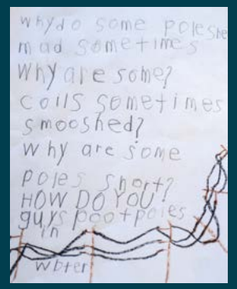
Six-year-old Lakai Rivera stands amid the poles that have powered his imagination since infancy.

The lineworker treatment

CLEARWATER-POLK ELECTRIC CREATES DREAM EXPERIENCE FOR YOUNG POWER ENTHUSIAST DIAGNOSED WITH LEUKEMIA

On Sept. 24, a pint-sized visitor walked through the doors of Clearwater-Polk Electric Cooperative (CPEC) in Bagley, Minn. The temporarily timid 6-year-old was quiet and stuck close to his entourage of family members.

However, when CPEC general manager Deanna Lefebvre asked about the paper Lakai Rivera clutched in his hand, shy time was over.



"These are the questions you want to ask? Awesome – I love it!" Lefebvre said as she knelt down next to Lakai. "Can you tell me what you drew here?"

"Poles," Lakai answered.

"And what are these?"

"Wires."

"That's right!" Deanna said.

Lakai's questions stepped up in voltage and speed. "Why do some poles look mad? Where do you tell them to build the poles? Did you guys build the poles in Fargo, too?"

In five minutes, the curious guest had the entire co-op office giggling in amazement. And this was only the start of Lakai's full afternoon tour of bucket trucks, territory maps and pole yard excitement. He was living his dream – becoming a lineworker for a day.

A wish granted

Lakai's grandmother, Nana Lee, reached out to Lefebvre in late summer of 2021. She described the day CPEC crews had been changing out a pole on her property near Leonard, Minn., while Lakai was outside – and the current of questions that flowed from Lakai to the lineworkers.

"He became obsessed – why are there different poles, and different sizes, and different wires?" Lefebvre recalled of the conversation. "It sounded like he wanted to be a lineman someday, so Nana was wondering if he could visit the co-op. Then she told me that he has leukemia."

Lakai was diagnosed with cancer in June 2021 after a fall from the monkey bars left him with excruciating wrist pain. There were no signs of fracture, and x-rays only showed a smoky outline around the bone. Doctors ran blood tests, which confirmed the family's fears. Their kindergartner had leukemia.

After weeks of treatment in Fargo, Lakai is currently in remission and thriving. However, he still has a long road of health maintenance ahead, and he will be living locally with Nana and his grandfather Daryll Lee for homeschooling and treatment travel.

The revelation of Lakai's diagnosis struck Lefebvre with force. She remembers Nana asking if her grandson could come to the co-op and peek at the trucks.

"I said, 'Oh, I think we can do better than that,'" Lefebvre repeated with a warm grin. "When it comes to anything we're asked to do at the co-op, our initial reaction is always above and beyond. It's our being – it's who we are. This was no different."

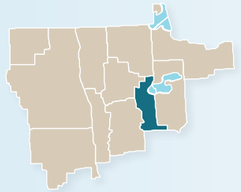
Geared up

Before Lakai continued on his tour, Lefebvre helped him try on his new lineworker gear – miniature work gloves, safety glasses and a co-op hard hat with LAKAI affixed to the back (a crafty addition by Lefebvre herself). "When you're up working with electricity and poles, you have to make sure that you're safe," she said.

Veronica Lee, Lakai's mother, says power poles have fascinated him since he was an infant. "He would point them out and baby talk at them. As soon as he was forming words, he was starting to talk about them," she said.

CPEC general manager Lefebvre presents Lakai with his own replica Clearwater-Polk digger truck. When she said he could take it home, he answered with an appreciative waver in his voice: "Thank you."

Lakai stops for a photo opportunity with his new line crew.



Served by

Clearwater-Polk Electric Cooperative

Bagley, Minn.

- Incorporated – November 11, 1939
- Year energized – 1947
- Board members – 7
- General manager – Deanna Lefebvre
- Members – 4,427
- Miles of line – 1,510

"And he loves maps," Nana added. "Now he follows the poles on the maps, and he'll tell you where particular poles are on highways and in townships."

"He'll be a lineman," grandpa Daryll chimed in, beaming as he watched Lakai interact with CPEC line superintendent Todd Waggoner.

"We just got a fresh load of poles into the yard this morning," Waggoner said as he led Lakai through the cooperative and out to the shop. With some help from his team, the new lineworker hopped into the cab of a bucket truck. It was time to head out to the field for some extra training.

Getting to work

Lakai restarted his questions as soon as his shoes hit the dirt in the pole yard, where a crew of Clearwater-Polk lineworkers was waiting. "Are you the guys who build all of the poles?" Lakai asked as he approached them confidently.

Lineman Travis Huot took a moment to show Lakai how to attach an insulator to a pole. "Put your bolt through there," he directed, then walked Lakai through the process of fastening the equipment.

Lakai assists a lineworker with fastening an insulator to one of the freshly delivered power poles.

"And that's how you build poles," Lakai said matter-of-factly.

"Yep," Huot replied.

"I am trained and know how to build poles," Lakai uttered as he moved to his next stop. He had a pole to examine from the heights of a line bucket.

The crew harnessed their visitor and let him ride shotgun as they drove the truck to the line-free pole used for pole-top rescue training. Lakai's arm rested casually in the window frame as he made the short trip.

"He looks like he belongs there," his mom whispered to those who were watching from afar. "He will never forget this."

After overcoming some initial fear, Lakai gathered his courage and joined lineworker Josh Hendricks in the bucket. As the mechanical arm climbed higher and higher, he began pointing to items around the yard and waving to his family and new friends dozens of feet below.

From the driver's seat of the bucket truck, Lakai exclaims, "I feel big!"

CPEC lineworker Josh Hendricks joins Lakai in the bucket for a high-rise ride.

"He will end up doing this for a living," Nana said with her eyes lifted skyward. "I'm so glad he got brave and decided to do it."

When Josh and Lakai finished their pole report, they carefully descended back to the world below. Shoulders unharnessed and imagination unleashed, the boy waved his arms wildly as he explained what he wanted to do next.

"We wanted to give him something fun and positive – he's going through a lot right now," Lefebvre said. "And for us to be able to do that for him is just awesome."

Lakai expressed a slight pout and whimper when the family told him it was time to head back home. He didn't want this experience to come to a close. After a few final questions and a round of goodbyes, he thanked the Clearwater-Polk team for letting him join the crew for a day. But as he walked away, he left his short-term coworkers with a hopeful inquiry:

"When can I go on my next tour?"

By **Kaylee Cusack** / Photography **Michael Hoeft**

Looking beyond the digital walls

GRID SECURITY REQUIRES NEW COLLABORATIVE STRATEGIES

Phil Kroetsch knows the digital walls that protect Minnkota's data inside and out. He's helped construct the layers of security that keep hackers and other wrongdoers from causing chaos on the electric grid.

But as virtual attack attempts become more prevalent – and much more sophisticated – Kroetsch and the cooperative's other cyber architects are moving beyond barriers and instead building new communication pathways to securely share information with others across the energy sector.

This fall, Minnkota is planning to implement Essence 2.0 in partnership with the National Rural Electric Cooperative Association (NRECA) and the Department of Energy (DOE). System information flows through a "black box" sensing technology that has been installed in Minnkota's data center. The program continuously monitors incoming and outgoing data for anything out of the ordinary.

"This will provide us with visibility and confirm what we're seeing in the system is actually what's happening in the field," said Kroetsch, Energy Management System (EMS) programmer analyst III. "Anything that falls out of our baseline will be treated as an event of interest and we'll investigate."

When anomalies are detected, the technology provides real-time alerts, which allow for Minnkota staff to examine the potential threat. Because the electric grid is incredibly complex, the cooperative's power system operators remain on site 24 hours a day to continuously monitor the bulk electric system and respond to events large and small.

Phil Kroestch, EMS programmer analyst III, and Justin Haar, cybersecurity specialist, are responsible on the team for maintaining Minnkota's digital defense systems.

Looking out over a digital display of Minnkota's power delivery system, Justin Haar points out a substation to Phil Kroetsch.

In addition to identifying irregularities locally, the larger benefit of Essence 2.0 is being able to see beyond Minnkota's walls of security and recognize trends across the country. NRECA currently has about 100 electric cooperatives and other utilities using the program, with the potential to add more participants in the future. The program was validated through real-world testing by the U.S. National Guard's cybersecurity threat hunters.

"From Minnkota's standpoint, this level of collaboration is pretty new," Kroetsch said. "The big value is that we gain information on our system and we're able to securely share data trends with the DOE."

According to NRECA, Essence 2.0 can accelerate the detection of malicious cyberthreats on systems from months to seconds. This is increasingly important as hackers can spend substantial amounts of time inside a system before striking. Identifying these activities helps ensure they are immediately isolated and information from other utilities can help determine if there may be a larger coordinated attack.

"The software can cross-check and see if multiple utilities are experiencing unusual traffic," Kroetsch said. "We should know right away if something is going on."

Building on partnerships

Participation in Essence 2.0 builds on Minnkota's existing partnership with DOE through its Cyber Risk Information Sharing Program (CRISP). Minnkota joined CRISP in late 2019 and has DOE equipment installed to monitor incoming and outgoing information from the cooperative with a specific focus on internet traffic. Information is shared with DOE's Pacific Northwest National Laboratory (PNNL), where security analysts look for leading indicators of suspicious activity.

"The real benefit is that PNNL has the capability to do large dataset analysis that we're just not going to be able to do on our own," said Justin Haar, Minnkota cybersecurity specialist. "By receiving data from other energy partners throughout the U.S., we're aware of what's going on in the energy sector and we can proactively prevent issues before they get to the point where they would affect us."

> **"Our job is to maintain reliability for our members and we need to remain vigilant in deploying the right tools to accomplish that important job."**
>
> – Dan Inman, Vice President and Chief Information Security Officer, Minnkota Power Cooperative

CRISP participants currently provide power to more than 75% of continental U.S. electricity customers, and participation in the program continues to grow. The modern electric grid leaves no utility as an island, which means cyberthreats on other utilities' systems can trickle back to affect Minnkota.

"CRISP has absolutely fed us relevant information that has helped protect us," Haar said. "We're getting reports that benefit from classified federal information we otherwise wouldn't be able to access."

Real risks

With Essence and CRISP working in unison, Minnkota will have a heightened state of cyber awareness. It comes at a critical time, as cyberthreats on the energy sector are increasing. In spring 2021, the network systems for the largest pipeline in the United States were accessed by hackers, who wanted millions of dollars to return the files.

In an effort to contain the attack, Colonial Pipeline voluntarily shut down 5,500 miles of pipeline for six days, which resulted in fuel shortages throughout the East Coast. They also paid the ransom of $4.4 million in Bitcoin. Officials later determined that the cyberattack was the result of a single compromised password.

"Some of these attacks are government sponsored trying to impact critical infrastructure within the U.S., and some are from U.S.-based extremists attempting to disrupt utility operations," said Dan Inman, Minnkota vice president and chief information security officer. "Our job is to maintain reliability for our members and we need to remain vigilant in deploying the right tools to accomplish that important job."

Just days after the Colonial Pipeline incident, President Joe Biden signed an executive order calling for electric utilities and federal agencies to work together to strengthen cybersecurity practices and deploy technologies to enhance digital defense systems.

Technology is only one piece of the puzzle. Minnkota is also collaborating with utilities and across the country to prepare employees to respond to worst-case scenarios. In November 2021, Minnkota and hundreds of other utilities and partners will participate in GridEx VI – a nationwide event to test the industry's response to simulated physical attacks and cyberthreats. The two-day exercise is coordinated through the North American Electric Reliability Corporation (NERC), which is the regulatory agency responsible for the security of the nation's electric grid. Minnkota employees will go through realistic simulations to determine how they would respond to cyberattacks, communication failures, misinformation campaigns and other security-related incidents.

"In many cases, the people and processes behind the technology are more important than the technology itself," Inman said. "That's why we have active awareness programs and training events to make sure our staff remains focused as our cyber risks continue to evolve."

Editor's note: October is National Cybersecurity Awareness Month.

By **Ben Fladhammer** / Photography **Michael Hoeft**

Fresh power in the old power plant

NEW GRAND FORKS RESEARCH FACILITY IS UNEARTHING AN ENERGY FUTURE IN MINNKOTA'S ENERGY PAST

Top: Eight filter presses take in a slurry (a liquid/solid combination) and separate it into solid and liquid components. The process is key in much of the facility's research. Inset: Harry Feilen explains how he helped create a slurry loop with a UND Ph.D. student for a new level of testing.

Harry Feilen, director of DRACOLA, stands before the centerpiece of the facility, a rare full-scale training rig that drills at real-world conditions.

Harry Feilen has swapped a lot with the folks at Minnkota Power Cooperative from his office in the former 1822 Mill Road power plant. After moving in a year and a half ago, the site of the University of North Dakota's (UND) Drilling & Completion Labs (DRACOLA)/Research Facility is almost fully finished within the walls of Minnkota's old home. Feilen, DRACOLA's director, has reached out to the prior residents for electrical wiring insight, boiler advice and – to find his mail.

"I've had a package or two delivered over there for me, and they've had a package or two delivered here," said Feilen, explaining that mail carriers were accustomed to Minnkota's long history there before the cooperative moved across town.

Beyond expertise and expedited parcels, UND and Minnkota have been sharing something else – the drive to enhance and fortify the energy industry in North Dakota.

The creation of the DRACOLA/Research Facility allows students, energy researchers and industry to work together to find solutions to challenges in the oil fields and coal mines, while also discovering new opportunities in emerging fields like rare earth elements processing, carbon capture and storage, and wind power.

The centerpiece of the research and training facility is DRACOLA's full-scale drilling rig, donated to UND's Petroleum Engineering Department by TerraTek founder Sidney Green. The massive rig (one of the world's largest of its kind) and its accessories were shipped to Grand Forks from Salt Lake City on 11 separate semis in 2019. When running a full test, the setup can consume a significant amount of electricity from provider Nodak Electric Cooperative.

DRACOLA found its home in the retired power plant because of a concurrent search for a facility to house UND's blooming rare earth elements pilot plant. Minnkota's old building had the space, location and infrastructure needed for the two large projects and more.

"I saw the space and thought, it's perfect for this drill rig, and we can part the building out and share rent with others so not all the burden fell on one entity," Feilen said.

The 33-foot-tall DRACOLA rig was reassembled by Feilen and his team in a 50-foot high-bay corner of the building. There were no blueprints to follow – only a series of printed photos of the completed project. Now that the system is assembled, it has become a valuable tool for learners of all levels.

"We're working with a couple of industry partners who are willing to send their first-time employees here for a month. They want their new hires to work with DRACOLA, get their hands on some of the equipment, get the terminology down and see where the safety aspects are," Feilen explained. "And when students leave here and go out to the real world, I want them to have seen the same things."

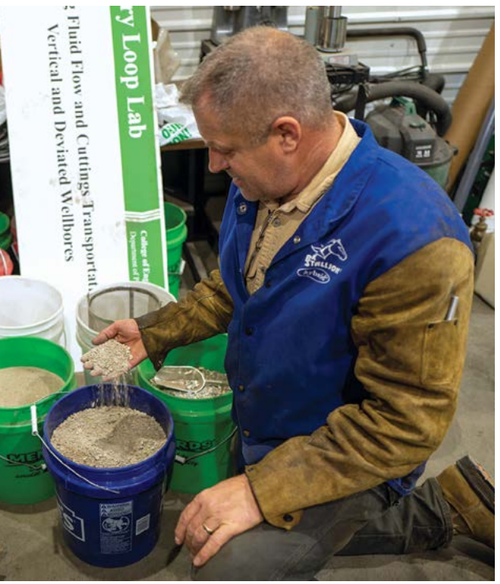
Parts and equipment are prepared for the next area of energy research. The facility will continue to evolve to meet the changing needs of the industry.

The hands-on rig has solidified UND's place among the top petroleum engineering programs in the country, currently boasting a nation-leading 80 Ph.D. students. Feilen says teams from Texas have toured the facility and have noted that even their oil-rich state doesn't have that caliber of experiential training. And DRACOLA's reach isn't limited to the oil and gas fields. It could be the catalyst for the leaders of an evolving energy landscape.

"When we start getting into more renewables, when we start getting into geothermal energy and CO_2 storage, we'll have to drill down and tap these holes for that. That's where we can come in and help and say, 'This would be your best practice to start, and adjust from there,'" Feilen said.

Extracting opportunity

Alongside DRACOLA, the other star of the Research Facility is the impressive rare earth elements extraction pilot plant, an IES project that has seen rapid development over the past five years. Minnkota has joined the Department of Energy and other partners in supporting the initiative, which could truly strengthen America's lignite coal industry.



Harry Feilen shows the cuttings gathered from the drill rig that are used for research projects within the facility.

Rare earth elements are found in coal and their defining feature is high-powered, permanent magnetization that is being utilized more and more in modern living – in wind turbines, electric vehicles, disc drives and more.

Right now, the U.S. produces virtually zero of its own rare earths, which could become a fairly large problem.

"For instance, fighter jets won't be able to be constructed without these," explained Nolan Theaker, IES research engineer and technical lead for rare earth and critical materials. "By trying to develop domestic supplies of these rare earths, you can significantly reduce foreign dependence, particularly in these defense-critical and energy-critical fields."


Nolan Theaker

Much of the world's rare earth processing requires a complicated extraction procedure. Theaker's team is using the pilot-scale system to test a simpler method that uses a dilute acid to strip off the rare earths in a cheaper, more environmentally friendly manner.

"When we extract the rare earths, we also extract other elements that are typically problems for power producers. For North Dakota lignite in particular, sodium is one of the big ones," he said. "So we make a cleaner-burning fuel, there are fewer fouling constituents in it and it makes it a lot easier to convert for power."

The state of North Dakota is the ideal scene for the research, and an even better launching pad for bringing the U.S. into the rare earths fold.

"One of the big benefits we have going for us is we have the mining infrastructure already in place for coal, and lignite in particular," said Director of IES Dan Laudal. "In most places, if you have to go permit a new mine, it takes years to get a permit, and you have to go through and spend all the money to build out that infrastructure."


UND researchers, students and industry partners all use the research space to gain knowledge in the field. Left to right: Eric Kolb, Microbeam Technologies; Nicholas Dyrstad-Cincotta, IES research engineer; Brittany Rew, UND chemical engineering graduate student.

The initial 2016 Department of Energy award to examine this process turned into Laudal's Ph.D. dissertation, and he started the research in 60-gram batches in beakers. Five years later, the pilot plant will be processing a half a ton of lignite coal per hour. But it's only a start.

"If we can get a full-scale plant in this region that could take the North Dakota lignite and put it through the process that this team is developing, that would have great implications for Grand Forks and the entire state of North Dakota," Feilen said.

Future of energy

The facility now employs several graduate students seeking advanced degrees and Ph.D.s who understand the research's potential. Brittany Rew is pursuing her master's degree in chemical engineering and has been working with IES on the rare earths project since 2016. "I was involved when it was in the beaker scale," she said. "Now, we're moving things forward, and it's all so new and exciting."

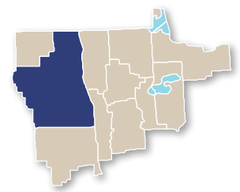
"Being able to have pilot plant experience and chemical plant experience is really in demand for recent graduates and, generally, in the chemical engineering industry," Theaker said. "It's now something we have on campus that we can leverage."

UND will hold a grand opening event for the DRACOLA/Research Facility during Homecoming Week in October. It will be a chance for industry, alumni, and current and prospective students to experience DRACOLA, the rare earths pilot plant and the building's other energy research components, including a large wind tunnel and a slurry loop to study fluid properties of drilling.

There's more space available in the old Mill Road facility, so Feilen says expansion is likely as the list of lab projects grows to meet the growing promise of the industry. When that time comes, he knows he'll have a supportive neighbor on the line.

"It's been great having Minnkota as a partner on all of this," he said. "It's just another resource we can tap into."

By **Kaylee Cusack** / Photography **Michael Hoeft**



Served by

Nodak Electric Cooperative

Grand Forks, N.D.

- Incorporated – Jan. 17, 1940
- Year energized – 1939
- Board members – 9
- General manager – Mylo Einarson
- Members: 14,961
- Miles of line – 8,082

Mikula named Co-op Rising Star

Minnkota special projects counsel Shannon Mikula has been named one of 20 "Co-op Rising Stars" by RE Magazine, and she's been included in the magazine's latest cover story released on Sept. 1.

Mikula was nominated for the honor by her Minnkota colleagues and was chosen among the top 20 of 83 national submissions. Her dynamic work as geologic storage lead for Project Tundra (Minnkota's carbon capture and storage initiative) made her a standout to the selection committee, who were impressed with her ability to absorb a highly complex and technical subject matter and communicate it to diverse audiences.

RE Magazine is the flagship publication of the National Rural Electric Cooperative Association. Visit **REMagazine.coop** to read the article.

Crews complete rebuild projects in northeast ND

Hot and dry weather made for brown lawns across the region this past summer. But for Minnkota's power delivery crews, the conditions were near perfect to grow the cooperative's power line and substation infrastructure.

Lineworkers planted more than 70 new power line structures over a nearly 7-mile stretch between Park River and Mandt in eastern North Dakota. The new 69-kilovolt (kV) line was built to replace an existing line that had been in service since 1954. The project started in early June and was energized in late August.

The new line stands about 60 feet tall, compared to the previous line's height of about 38 feet. The taller, more robust structure includes a shield wire and other design elements that will reduce the impact of lightning strikes and other outage concerns. The shield wire also doubles as fiber-optic cable, which provides a new communication connection to help relay information from the field to Minnkota's offices in Grand Forks.

Just west of the line rebuild project, substation crews spent the summer disassembling the Adams substation and building a new substation in its place. In addition to its modern design, the new substation provides significant benefits in terms of communication and reliability. An upgraded computer system, known in the industry as SCADA, will help gather and analyze data, while also monitoring and controlling equipment processes remotely.

Garret Reineke, apprentice lineworker, positions a new pole along the Park River to Mandt 69-kV line, which was rebuilt last summer.

Construction work on the project began in late June and the new substation was energized in mid-September.

Minnkota operates and maintains about 3,350 miles of transmission line and 260 substations to meet the needs of its members. Addressing aging infrastructure through coordinated programs is key to ensuring safe, reliable and cost-effective power well into the future.

Crews use a digger derrick truck to rebuild a 69-kV line near Park River, N.D.

Minnkota celebrates Drive Electric Week with co-op partners

Two EV ride-and-drive events draw crowds to Bemidji and Roseau cooperatives

Minnkota celebrated another successful National Drive Electric Week (Sept. 25 – Oct. 3) with help from its power partners across the region. The co-op cohosted two electric vehicle (EV) events in Minnesota – one at Beltrami Electric Cooperative in Bemidji, and the other at Roseau Electric Cooperative. Both ride-and-drive gatherings were a hit, with curious attendees traveling from rural communities around northern Minnesota.

On Tuesday, Sept. 28, Beltrami Electric Cooperative invited the public to a Ride-and-Drive Electric Vehicle Event that featured a fast-charging demonstration, off-peak charging incentive information and lots of take-home goodies. Three EVs were displayed from cooperatives and utilities, but nearly 10 more came from owners around the area, who rolled into the lot with Teslas, Mustang Mach-Es, Chevy Bolts and more. But the technology didn't stop at cars – electric bikes and an all-electric Ranger were also on hand for the more than 50 people who stopped by for the experience, including Bemidji mayor Jorge Prince.

"I will never drive a gasoline car again!" said Bemidji EV driver Kathleen, whose 11-year-old daughter's first car will be the family's Chevy Bolt.

The next day up north in Roseau, several entities – including Roseau Electric, Minnkota, Northern Municipal Power Agency and the City of Roseau – teamed up for Northern Exposure: Driving Electric in Minnesota. The community EV party drew a crowd of more than 150 people to the Roseau Electric Cooperative parking lot. Attendees signed up to drive one of three EVs, including the Mustang Mach-E available for purchase at the nearby Roseau County Ford. The waitlist filled up fast, and the EVs were leaving the lot as soon as they pulled in.

Northern Exposure also brought together charging expertise from local co-ops and utilities, travel corridor information from the Minnesota Department of Transportation and the latest all-electric technology from the hometown Polaris. On top of the electric delights, the first 100 attendees were treated to free event t-shirts sponsored by Minnkota, as well as a meal voucher for one of three on-site food trucks. Roseau mayor Dan Fabian also made an appearance, showing support for the afternoon of EV education.

By the end of the warm fall day, Roseau County Ford owner Paul Blomquist had taken the passenger seat for dozens of Mach-E test drives and talked with many more attendees about the exciting upcoming release of the all-electric Ford F-150 Lightning. Wiping sweat from his brow, he couldn't contain his smile. "What a day!" he said.

To learn more about electric vehicles in the north, visit **EnergizeYourDrive.com**.

Cass County Electric Cooperative's Bob Miller (left) takes a seat in an all-electric Ford Mustang Mach-E at the Beltrami Electric ride-and-drive event.

Dozens wait patiently for their turn to test drive an EV at the Northern Exposure event in Roseau, Minn.

Through the frame of an electric bike, Beltrami Electric's Sam Mason speaks with Roseau event attendees about charging stations.

Minnkota Power COOPERATIVE
A Touchstone Energy® Cooperative
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OCTOBER IS *National Co-op Month*

Minnkota Power Cooperative will be spending the month of October celebrating with our member cooperatives and reflecting on what makes cooperative communities great. To mark National Cooperative Month, we want to supply you with some fast facts about Minnkota — and why electric cooperatives are different than other utilities.

National Cooperative Month has been celebrated every October since **1964.**

Across the nation, co-ops serve **42 million** people in **2,500+ counties**, including **92%** of persistent poverty counties.

About 42% of Minnkota's generation capacity comes from carbon-free resources.

Rural electric cooperatives differ from investor-owned utilities in two major ways:

1. Co-ops are not-for-profit organizations. Revenue is used to keep power flowing or returned to cooperative members.
2. Co-op decisions are made by co-op members. Members elect a board of their neighbors to help guide the co-op on their behalf.

Rural electric co-ops were born in 1935, when President Franklin D. Roosevelt created the Rural Electrification Administration (REA). Farmers used the support to band together and build electric systems for their rural communities.

Cooperatives electrify around 56% of the U.S. landmass – that's a lot of ground to cover!

Electric cooperatives put their members first. On average, co-ops scored higher than all other electric companies on the 2021 American Customer Satisfaction Index assessment.

Minnkota Power Cooperative provides power to a system of 11 cooperatives. We partner with our co-op family to find more efficient, reliable and affordable ways to serve the region.