Minnkota
MESSENGER

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July-August 2019

Contents

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On the cover: Matt Setter, Minnkota apprentice lineworker, installs a poletop helmet on a 69-kV structure while Zach Gion, Minnkota lineworker, prepares for the next task. The poletop helmet is used to deter birds from landing on the structure and is one component of Minnkota's blink outage mitigation efforts.

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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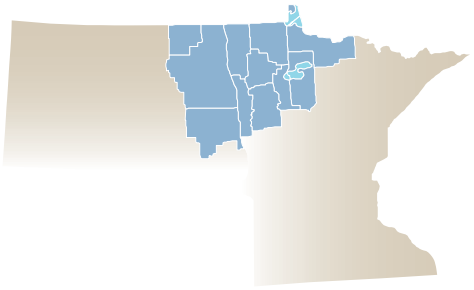


Minnkota Power Cooperative is a generation and transmission cooperative headquartered in Grand Forks, N.D. It supplies wholesale electricity to 11 member-owner distribution cooperatives, three in eastern North Dakota and eight in northwestern Minnesota. Minnkota also serves as operating agent for the Northern Municipal Power Agency, an association of 12 municipal utilities in the same service region. Together, the Joint System serves more than 153,000 customers.

From the editor

Improving reliability for our members

During the first half of the decade, Minnkota's power delivery budget featured some of the largest projects in the cooperative's history. The construction of the 250-mile, 345-kilovolt (kV) Center to Grand Forks line and the 70-mile, 230-kV Bemidji to Grand Rapids line marked long-term investments in strengthening the region's high-voltage electric grid.

Following the completion of those major projects, Minnkota has seen its power delivery budgets stabilize – but that doesn't mean efforts to improve service to the membership have slowed. In fact, projects to address aging infrastructure and enhance reliability have been accelerated in recent years. The primary focus has been on enhancing the performance of our subtransmission system – the 2,100-mile network of power lines that deliver energy locally to our member cooperatives and the associated municipals. Much of this system was constructed during the early decades of the electric cooperative movement, meaning the poles, wire and engineering design are older than even the most seasoned Minnkota employee who may be working on the projects.

The cost of deconstructing the existing system and building a new system overnight would be astronomical. With support from the membership, Minnkota has taken a strategic approach to improving the performance of existing line sections through the installation of technology, while still pursuing the rebuild of line sections and substations that are nearing the end of their useful life.

In this issue of Messenger, we look at progress to date on Minnkota's multiyear blink outage mitigation project. More than 1,000 miles of the subtransmission system is equipped with technologies that help reduce the impacts of blink outages – those momentary losses of power often caused by a disturbance on a transmission line. As that project winds down, the focus has shifted toward full-scale rebuilds of certain line sections. This summer, a 69-kV line section in northern Minnesota near Roseau is being replaced with a new line that features more capacity and an enhanced design that limits its susceptibility to blink outages.

Distribution substations are also the target of these improvement efforts. In the last issue of Messenger we highlighted the implementation of advanced communication technology at many of the cooperative's older substation sites – a multiyear project referred to as distribution automation. Minnkota also has plans to rebuild an average of two aging substations annually.

Through the first half of 2019, Minnkota's power delivery metrics – outage time, outages per delivery point and blink outages per delivery point – have all been well below levels targeted in the cooperative's Business Plan. Cooperation from Mother Nature has certainly helped, but it's also likely that the efforts of our power delivery crews are paying off in better reliability for our membership.

Ben Fladhammer
Editor

Blink outage mitigation a success

Now that Minnkota is five years into its accelerated plan to address blink outage issues on its power delivery system, the impact of the mitigation strategy is becoming clearer.

The member cooperatives and Northern Municipal Power Agency participants are seeing blink outages reduced by an average of 50% on treated lines.

"We have seen some circuits that have been reduced by as much as 75%," said Evan Edwards, Minnkota engineer. "Circuits that are located in open prairie terrain have seen the largest positive impact so far."

Minnkota's open prairie line sections tend to have a higher exposure to lightning and wildlife, along with insulator contamination due to dust and blowing conditions. Technologies have been installed on structures across Minnkota's 2,100-mile subtransmission system to address these issues. By 2020, Minnkota will have performed blink mitigation on more than 1,200 miles of those 69-kilovolt (kV) structures.

While it is virtually impossible to completely eliminate all blink outages, installing the mitigation measures has proven to be a cost-effective way for Minnkota to improve reliability and

> **"We have seen some circuits that have been reduced by as much as 75%. Circuits that are located in open prairie terrain have seen the largest positive impact so far."**
>
> – Evan Edwards, Minnkota engineer

service to the membership. Structures are being fitted with a hanging lightning arrester, a polymer post-top insulator, a raptor deterrent (pole helmet) and a climbing animal deterrent (pole wrap).

"All aspects of the blink mitigation process have contributed to the positive impacts, but the most impactful changes seem to be the new post top, pole helmet and pole wrap," Edwards said.

Minnkota crews and contractors have been working safely and efficiently as they move from pole to pole along the power delivery system. In some cases, the lines remain energized while the work is being completed so that service is not interrupted to the member-consumers. Specialized equipment is used to complete this "live line" work.

About 200 miles of lines have been treated this year. The same number of miles has been targeted for 2020, which is planned to be the final year of major blink outage mitigation efforts. The focus is beginning to shift toward a structured program to rebuild aging lines across the system.

A significant portion of Minnkota's subtransmission system has aged beyond its 50th year of service. While progress has been made to lower blink outage exposure, expectations from consumers continue to rise. This is primarily driven by the fact that today's electronics require a constant, uninterrupted supply of power to run properly.

In the past, a blink would occur and often go unnoticed to the average consumer because there were no digital displays that needed to be reset afterward. Today, each blink outage is documented by the flashing "12:00."

Structures are being fitted with the following equipment to help reduce blink outages: a hanging lightning arrester, a polymer post-top insulator, a raptor deterrent (pole helmet) and a climbing animal deterrent (pole wrap).

By **Kevin Fee** / Photography by **Kevin Jeffrey**

Minnkota lineworkers perform blink mitigation on a structure.

Rebuilding for reliability

Crews work to dead-end a conductor on a switch tower.

AS BLINK OUTAGE EFFORTS WIND DOWN, LINE REBUILD PROJECTS RAMP UP

Nearly 20,000 feet of power line conductor sped off a reel toward the sky during a sunny August morning south of Roseau, Minn.

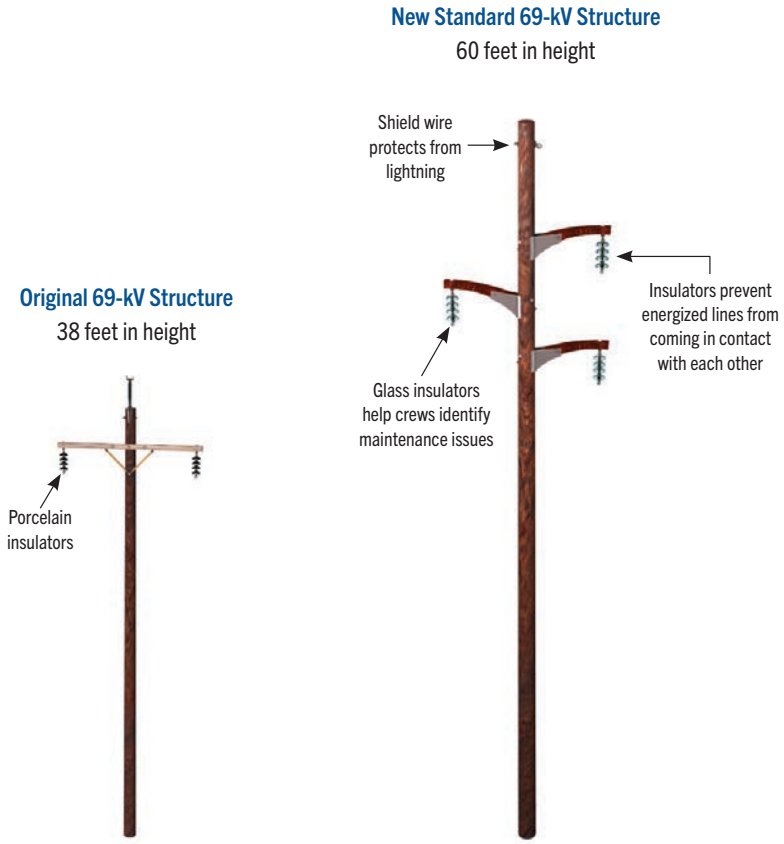
Minnkota lineworkers were stringing the aluminum wire as part of a complete rebuild of 15 miles of 69-kilovolt (kV) transmission line. Crews disassembled the aging line earlier in the summer before setting and stringing the new wooden structures placed about 350 feet apart.

Line rebuild projects will become a summer routine in upcoming years as Minnkota begins to wind down its blink outage mitigation projects. A multiyear effort, blink mitigation included adding technologies to 1,000 miles of existing lines to limit exposure to momentary outages. While reliability and performance could be improved on some existing lines through blink mitigation, others were identified as needing a full rebuild.

The rebuilds started in 2018 with improvements in the Fargo and Lakota, N.D., areas.

Lineworker Shawn Reimers and Heath James, apprentice lineworker, work on the wire end of the stringing operation.

Minnkota employees work on the Malung to Stafford line section.




Mike Howard, Minnkota electrician, hooks up conductor on the Malung switch.

Nearly 100 miles of line is scheduled to be rebuilt by 2022.

At a cost of about $5.5 million, the Roseau-area project will provide a large region with better reliability, said John Thompson, project lead. It includes the replacement of a three-mile stretch of 69-kV line from the Malung switch to the Stafford switch and a 12-mile stretch of 69-kV line from Stafford to the Badger substation.

Crews hook up conductor on the Malung switch.

"We've been doing a lot of blink mitigation," Thompson said. "Now these are some of the early projects for total rebuild. It will increase the capacity and reduce the blinks because of the added overhead shield wire for lightning protection."

Better design

At an average height of 60 feet, the new standard 69-kV transmission structure in the Minnkota system is about 20 feet taller than the original structures. In addition to an improved structure design and new conductor, the project will include static wire to protect from lightning strikes.

The line's original copper wire is being replaced with aluminum wire, which meets Minnkota standards. Overhead copper lines are among the oldest on the Minnkota system and have increased maintenance requirements. All copper conductor on the Minnkota system will be replaced by 2022.

"The copper wire is going to be stored for security as it comes down," Thompson said. "It will be salvaged based on the weight."

Minnkota is taking on a large share of the project itself in the Roseau area, with contractors helping with such items as framing of the structures and material handling and kitting. The Minnkota Transmission Department set and installed wire on all the structures.

"We've had a few outages up there," said Braden Nelson, project planner. "It's time for an upgrade. As blink mitigation winds down and our maintenance is starting to get

caught up, we're hoping to get a few more of these big projects done with our own crews."

Minnkota also is resetting the Stafford switch during construction, moving it several feet to the west and adding height to the structure to make room for the static wire.

The new conductor was strung with a four-drum puller, which has its own engine that drives the drum. It is equipped with rope used as the pulling line. The line was pulled through the travelers in the sag section and attached to the conductor. The conductor was then pulled in by winding the pulling line back onto the drum.

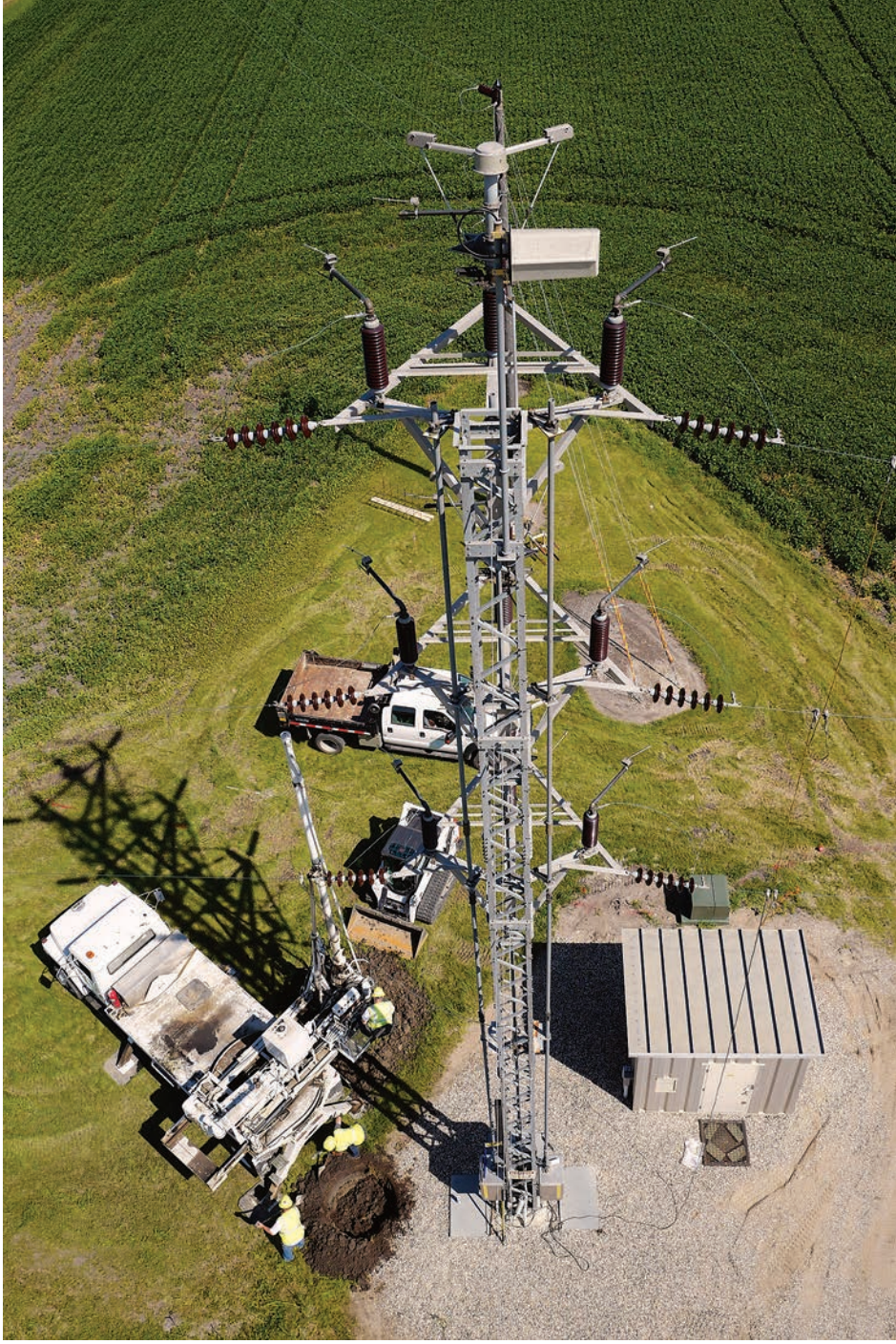
"We're putting in larger conductor for more capacity," Nelson said. "It was an old line that was in pretty tough shape."

Minnkota's 69-kV rebuild program utilizes the 69-kV Transmission System Study, which is completed by the Transmission Planning Department every five years.

The study reviews several factors, including the capacity, performance, condition and age of every 69-kV transmission line in Minnkota's system. The 69-kV rebuild program team annually reviews the proposed projects from the study to recommend the priority order.

Minnkota hopes to rebuild about 20-30 miles of line per year at an annual cost of $6-7 million.

By **Kevin Fee** / Photography by **Michael Hoeft and Kevin Jeffrey**



As part of the line rebuild efforts near Roseau, Minn., crews also had to make modifications to the Stafford switch to accommodate the new, taller structures.

Nick Bye, Minnkota lineworker, holds a piece of conductor during line-stringing activities south of Roseau, Minn.

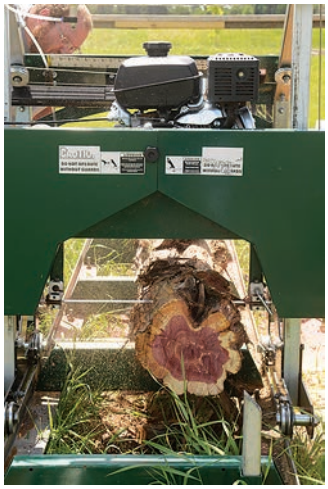
69-kV Rebuild Timeline

2018 – West Fargo-Warren – 2.7 miles
2018 – Lakota-Stump Lake Rebuild – 7.2 miles
2019 – Badger-Stafford-Malung Rebuild – 15 miles
2020 – Hensel-Glasston-Lincoln Rebuild – 21.5 miles
2021 – Mandt-Park River – 5.7 miles
2021 – Williams-Lund – 20.4 miles
2022 – Moranville-Williams – 19.9 miles
2022 – Thief River-Northland – 2.2 miles

Jared Johnson checks out a slab of red cedar in his shop.

Repurposing wood

BUFFALO COULEE BRINGS LUMBER TO LIFE



Jared Johnson is a self-proclaimed scavenger. He says business partner Matt Weaver is cut from the same cloth.

Instead of drywall, hiding some of the insulation inside their shop at Buffalo Coulee Wood Products near Cummings, N.D., are gymnasium bleacher benches discarded from an area school. They were offered to those who wanted to pick them up, complete with gum in tow.

Attached to one of the benches-turned-wallboard is a poster of a scene of Jules and Vincent from the movie "Pulp Fiction." Johnson snagged that off a berm during spring cleanup in Grand Forks.

Johnson and Weaver have a way of repurposing just about anything. Both arborists, their specialty reclamation projects involve wood and trees. They collect and

cut a large variety of wood for their sawmill, including walnut, box elder, spruce and ash, white oak, red cedar, sycamore, pecan, sassafras and Osage orange.

From it, Buffalo Coulee makes live edge slabs and rough and reclaimed lumber.

The company receives its electricity to run its sawmill from Nodak Electric Cooperative, one of the 11 member-owners in the Minnkota Power Cooperative system.

While some wood comes from North Dakota and Minnesota, Buffalo Coulee travels to such states as Kansas, Nebraska and North Carolina for products not common in the Red River Valley. Johnson used to live in Kansas and North Carolina.

In addition to having contacts in other states, the business has a strong Facebook presence. It has helped the company meet people who have wood for sale or are searching for wood.

"We meet people all over the Valley," Johnson said.

Buffalo Coulee offers professional woodworkers and hobbyists willing to craft their own furniture a place to buy their wood supplies. The business is located on Weaver's farmstead a mile west of Cummings and just off I-29 in Traill County.

Buffalo Coulee uses several different types of tools to perform its work, including a band saw, drum sander and planer. The sander and planer are in the shop, while the large band saw is outside the east side of the shop.

Before they recently bought a used skid-steer loader, Buffalo Coulee would manually move logs for cutting on the band saw with a cant hook. A cant hook is a traditional logging tool consisting of a wooden lever handle with a movable metal hook called a dog at one end.

Several yards from the band saw on the farm is a solar kiln Buffalo Coulee uses to dry the wood. Thanks to its thriftiness, Buffalo Coulee didn't pay a lot for the kiln. The company acquired a carport and some greenhouse plastic for free and paid about $20 for other kiln materials.

Clocks and other decorative items can be made from pieces of red cedar.

Two solar fans were the biggest cost, at about $100 apiece.

The kiln, which will leave about 6 to 8 percent of moisture content in 1-inch wood after 30 days, allows the different varieties to dry a lot faster than the 10-12% moisture content left through an air-dry process. On this day, it was 136 degrees inside the kiln.

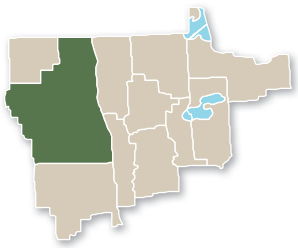
Johnson and Weaver, who have three and five children, respectively, and work full time, don't do a lot of custom woodworking. Most of their time is spent milling wood for others' projects, including a Grand Forks man who built a beautiful bar out of red cedar. One of the recent exceptions was building a bar to auction off at the Crawl 4 the Cure fundraiser.

While the partners continue to cut wood, some projects have been placed on the back burner. They still haven't been able to fire up a Howell & Co. circular sawmill they bought a few years ago. The sawmill was built in the early 1900s in the Twin Cities.

When they get it running, they will have another tool to help others create custom woodworking magic. Benches, tables, floating shelves, poker tables, you name it – Buffalo Coulee can scrounge up the materials for you to make it happen.

"And if we don't have it we'll try to get it, no matter where it is," Weaver said.

By **Kevin Fee** / 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
- 2018 members: 20,095
- Miles of line – 8,183

Electric transportation celebration

MINNKOTA AND NODAK ELECTRIC COOPERATIVE HOST TWO DAYS OF ELECTRIC VEHICLES, EATS AND EDUCATION

Minnkota's Grand Forks campus was charged up Aug. 7-8 with two events aiming to introduce local leaders and the public to the present and future potential of driving electric. The events revolved around a two-day visit from the West Fargo Public Schools (WFPS) all-electric Blue Bird school bus, purchased by the school district earlier this year with support from Cass County Electric Cooperative, Minnkota and other partners.

The West Fargo Public Schools 100% electric school bus will begin carrying students later this month. The bus was unveiled June 3 and also made an appearance at TEDxFargo in July.

Grand Forks Mayor Michael Brown (right) and North Dakota Sen. Curt Kreun take the front seat for a quick trip around the city.

Electric bus or bust

The morning of Aug. 7, Minnkota invited its employees and visiting cooperative and municipal representatives to tour the electric bus, ask the mechanic questions about its capabilities and take a short ride around town. Passengers experienced the surprisingly quiet and zippy ride of the 70-seat bus, which boasts a 120-mile range and zero emissions.

That afternoon, Minnkota welcomed city leaders, economic development groups, universities and public schools, transportation officials, lawmakers and others to check out the bus themselves. They came with many insightful questions about what it takes to incorporate an electric bus into a standard fleet and walked away with new transportation ideas for their organizations and neighborhoods.

Plugged In to the Future

On Aug 8., during what may have been the most picture-perfect evening of the summer, Minnkota's visitor parking lot was packed with powerful plug-in cars, a battery-boosted bus and

bikes, special guests and giveaways, and food trucks serving up brisket, street tacos, gyros and more.

More than 275 people popped by the cooperative for "Plugged In to the Future" – a "Back to the Future"-inspired celebration of electric transportation. The event was the first of its kind in the Greater Grand Forks community and drew more than a dozen electric vehicle (EV) owners from around North Dakota and Minnesota, all of them thrilled to showcase their cars and answer questions for those interested in Teslas, Chevy Bolts, plug-in hybrids and other models.

One driver from Dickinson, N.D., traveled more than 350 miles in his Tesla Model S to take part and offered rides to curious attendees.

"Plugged In to the Future" featured the WFPS all-electric school bus, electric bike demonstrations provided by Scheels and an EV ride-along experience courtesy of Cass County Electric Cooperative.

For prospective EV owners, Rydell Cars was on-site with a couple of hybrids from their sales lot and details on what additional EV models are available. The Nodak Electric and Border States teams provided information on home charging incentives and the easy steps involved in getting a garage EV-ready.

A Drive Electric North Dakota representative drove the Lignite Energy Council's Tesla Model X – aptly named WATTS – from Bismarck and chatted with event-goers about the public charging stations in the state, as well as the opportunities for growing EV adoption in the next few years.

When the food and fun of the main event wrapped up at 8 p.m., guests were invited to grab some popcorn and candy, pull up a car or a lawn chair and enjoy a big-screen showing of "Back to the Future" under the stars.

Organizers urged attendees to fill out a survey after the event to assess what they learned about electric vehicles. Nearly 99% of respondents said they felt more knowledgeable about EVs after the event and 91% said they were now more open to owning an EV of their own.

By **Kaylee Cusack** / Photography **Kevin Jeffrey**

Three local food trucks from Grand Forks and Crookston dished up dinner for attendees. Thanks to New Flavors, Skip's Gourmet Grub and Drafts for joining the fun.

Whether it was buckling into a Bolt for a ride-along or strapping on a helmet for a cruise on an electric bike, "Plugged In" had a demonstration for everyone.

The 16-foot LED screen was a perfect canvas for the 1985 hit, "Back to the Future."

Minnkota Power Cooperative and Nodak Electric Cooperative would like to thank the generous sponsors that helped make "Plugged In to the Future" possible:

BSE BORDER STATES Supply Chain Solutions™

Lignite Energy Council

DRIVE ELECTRIC NORTH DAKOTA

Rydell

SCHEELS

Minnkota sponsors teacher for Lignite Education Seminar

MINNKOTA CONTINUES TRADITION OF HELPING A LOCAL TEACHER ATTEND A FOUR-DAY SUMMIT ON LIGNITE COAL'S PLACE IN OUR REGION'S ECONOMY

Jim Johnson from Roosevelt and Goodridge, Minn, was sponsored by Minnkota to attend the 2019 Lignite Energy Council's teachers seminar. Johnson toured the Milton R. Young Station and the Center Mine.

Minnesota teacher Jim Johnson returned home from Bismarck State College in June with a heavy load – a camera full of snapshots, a list of new contacts and a knowledge bank of electrical power and North Dakota geography. The lesson plan of his June 10-13 educational getaway revolved around one thing: the value of the state's underground resources.

"I was amazed at the amount of lignite coal coming out of North Dakota and the impact that it has on our electricity in the Midwest," he said. "It's incredible what it does in providing our baseload electricity and lessening our rates per kilowatt compared to other parts of the country."

Johnson, a special education teacher at Goodridge Public School, was one of more than 100 attendees of the 2019 Lignite Education Seminar titled "Energy, Economics and Environment."

The annual Lignite Energy Council (LEC) summit equips teachers with information and resources to build lessons on how coal is mined and how it moves from the power plant to the plug. This year organizers focused on communicating the role lignite plays in North Dakota's economy and how the industry is shaped by environmental issues.

LEC's Kay LaCoe says another aim of the seminar is supporting lignite coal's future workforce needs.

"Teachers learn what types of jobs are available in the industry and the skills and types of people that the industry wants and needs," she said. "We need educators to take that information back to the classrooms so that we continue to have a well-rounded workforce coming out of school."

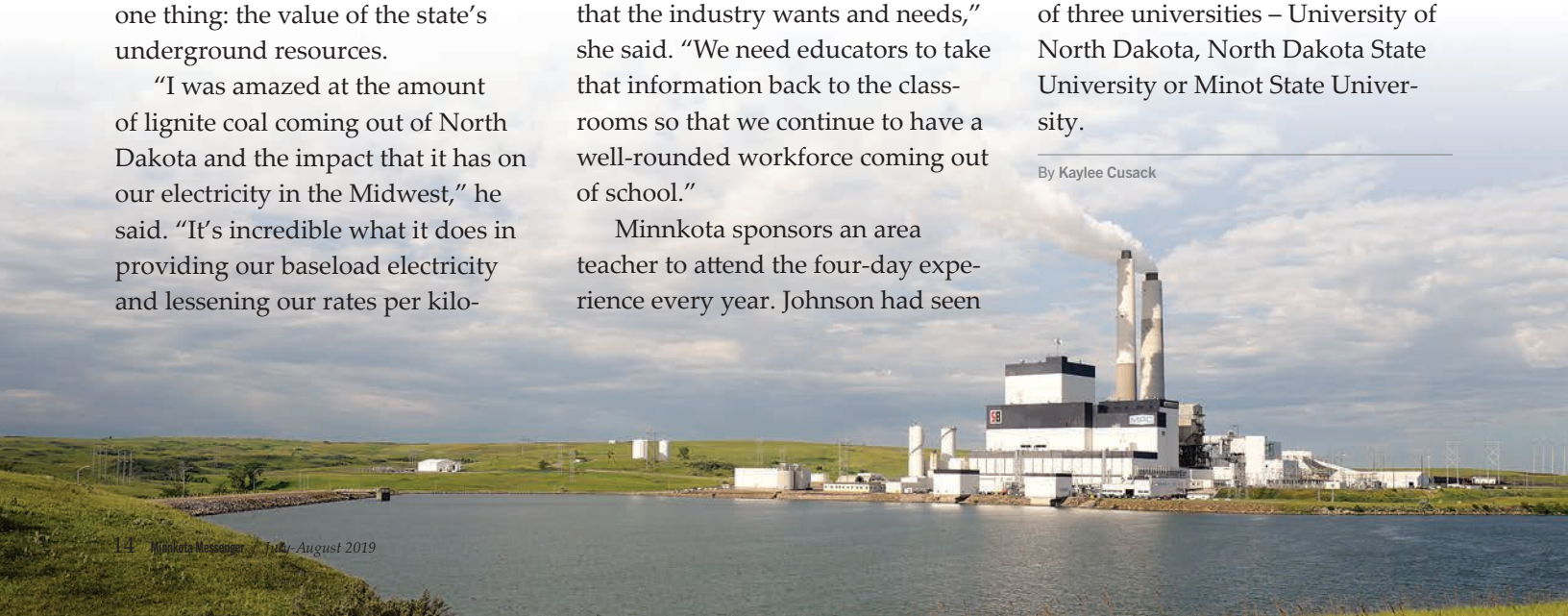
Minnkota sponsors an area teacher to attend the four-day experience every year. Johnson had seen the call for applications in his North Star Electric Cooperative newsletter for the past few years and decided it was finally time to sign up and dig in.

"It seemed like a great opportunity," he said – and he soon found out just how true that was. Johnson said he appreciated how many speakers from different areas of the industry were assembled for workshops, and he couldn't stop taking photos during tours of the Center Mine and Milton R. Young Station.

"I was impressed with how clean and efficiently run the plant was and the reclamation of the land was also impressive," he said. "The whole thing was top-notch."

Since its start in 1986, the LEC seminar has drawn more than 3,900 K-12 teachers from North Dakota, South Dakota, Minnesota and Montana. Attendees can receive two professional-level credits from one of three universities – University of North Dakota, North Dakota State University or Minot State University.

By Kaylee Cusack



Minnkota, CoBank partner again on Sharing Success program

Minnkota, Square Butte Electric Cooperative, which is owned by the same 11 cooperatives that own Minnkota, and CoBank have partnered to give a combined $14,000 to community organizations this year.

CoBank's Sharing Success grant program matches the contributions of CoBank's customers, such as Minnkota, to the nonprofits of their choice.

Contributions of $3,000 were made to the Community Violence Intervention Center (CVIC) and the Empire Arts Center in Grand Forks.

"The $3,000 will go a long way here at CVIC," said Jamie Bischoff, development director of special events and donations. "We will be able to continue providing safety services, such as shelter, safe exchanges and visitations, support groups, protection orders and more."

At the Empire Arts Center, upgrades are being made to the theater as it nears its 100th birthday this fall.

"One of the biggest parts of our mission is to preserve and maintain our historic building," said Emily Montgomery, Empire Arts Center executive director. "That being said, we also value excellence in all we do. As a result, we continually strive to balance the charm and character of our historic theater with modern upgrades like LED theatrical lighting and energy-efficient windows so that we can provide world-class entertainment in our one-of-a-kind building."

CoBank is a national cooperative bank that provides financial services to agribusinesses and rural power, water and communications providers in all 50 states.

Scott Schreiner, Minnkota procurement manager, presents a $3,000 check to, from left, Jamie Bischoff, Community Violence Intervention Center development director of special events; Jill Proctor, CVIC development director of donor relations; and Kara Fosse, CVIC senior director of development. Minnkota partnered with CoBank for the Sharing Success program grant donation.

By **Kevin Fee** / Photography **Michael Hoeft and Kevin Jeffrey**

Other grant recipients

- **Farm Rescue**
  Horace, ND
  $2,500
- **Greater Grand Forks Women's Leadership Cooperative**
  Grand Forks, ND
  $2,500
- **Altru Health Foundation**
  Grand Forks, ND
  $2,000
- **Anne Carlsen Center**
  Jamestown, ND
  $1,000

Empire Arts Center executive director Emily Montgomery says the future of the Empire Arts Center is bright, with new programs and celebrations ahead.

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When the laptops need charging, Betsy's on it. When the math doesn't make sense, she shines the solution on the board. When craft time needs a beat, she picks the perfect playlist.

She has the passion.
She has the purpose.
She has the power.

ELECTRICITY
WE SHARE OUR POWER SO YOU CAN SHARE YOURS