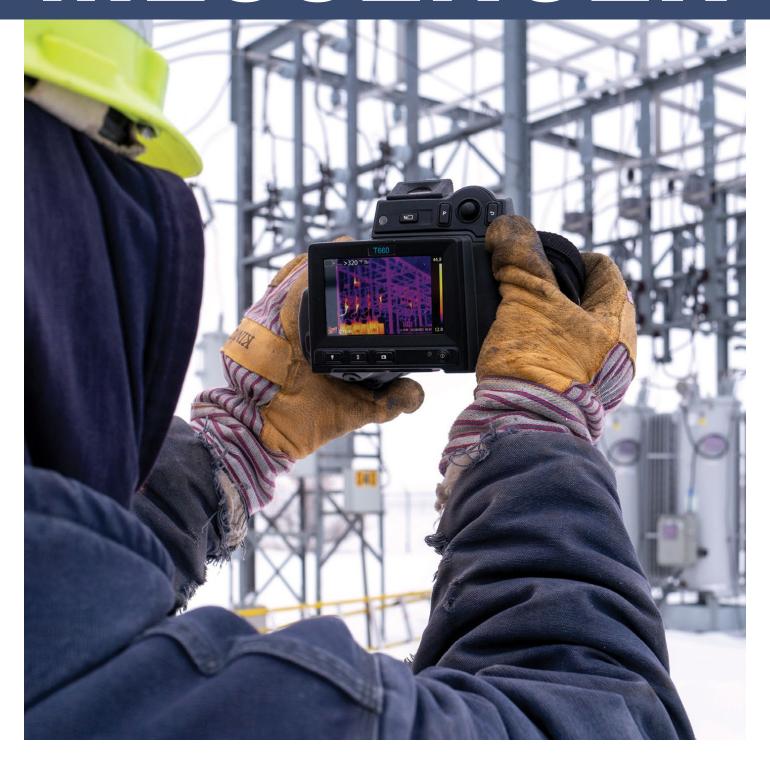
# MESSENGER





### THE FULL PICTURE OF RELIABILITY

Thermal imaging is just one of the many ways Minnkota ensures vital infrastructure is proactively maintained. We take a look behind the lens of this hot technology.

On the cover: Minnkota electrician Mike Howard composes an infrared photo of a substation west of Grand Forks, N.D.

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 162,500 consumers.

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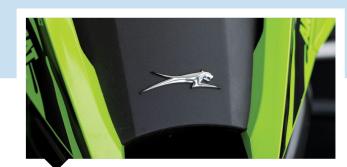
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### MINNESOTA ADOPTS CARBON-FREE MANDATE

While Minnkota supports efforts to decarbonize the electric sector, the state of Minnesota's new mandate requiring 100% carbon-free electricity by 2040 has the potential to threaten grid reliability and affordability.



### 10 PUTTING THE POWER IN POWERSPORTS

Every dog has its day but, right now, the "cat" is where it's at in Thief River Falls, Minn. The home of Arctic Cat is celebrating partnerships that have brought the snowmobile brand to the next level.



### 14 ALL-OF-THE-ABOVE STRATEGY ENSURES THE BEST ENERGY VALUE

A reliable and responsible electric grid embraces the use of all resources, each of which comes with its own set of pros and cons.



## MILTON R. YOUNG STATION PROVIDES RESILIENCY TO MINNKOTA MEMBERS

The Milton R. Young Station has many attributes that make it the most reliable and resilient resource in Minnkota's power supply mix.

Also featured in this issue: 18 News Briefs /// 20 Co-op, employees donate to Giving Hearts Day charities

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# MINNESOTA ADOPTS CARBON-FREE MANDATE

New law raises concerns about grid reliability and affordability

By Ben Fladhammer /// Photography Michael Hoeft

innesota has adopted a mandate that requires 100% carbon-free electricity in the state by 2040. The rule, signed into law on Feb. 7, sets an aggressive timeline that creates the potential for electric grid reliability and affordability issues that would be extraordinarily difficult to reverse.

Under the mandate, the Minnkota Power Cooperative members and Northern Municipal Power Agency (NMPA) participants in Minnesota will be required to reach the following targets:

- 60% carbon-free energy by 2030
- 90% carbon-free energy by 2035
- 100% carbon-free energy by 2040
- Additionally, 55% of the electricity used in the state must come from wind, solar or hydro by 2030.

While the Minnkota-NMPA Joint System supports efforts to decarbonize the electric sector, the transition must be completed in a safe and responsible manner. Unfortunately, this mandate accelerates the transformation of the electric grid in a way that may create long-term instability. That's something Minnesotans can't afford. They need reliable electricity to keep homes, farms, schools, hospitals and businesses operating whether it's a 110-degree summer day or a 40-below-zero winter night.

Minnesota is not immune to the rolling blackouts and energy emergencies that have taken place in other parts of the country, like Texas and California. Grid regulators, including the North American Electric Reliability Corporation (NERC), anticipate significant electricity shortfalls over the next 10 years as coal, nuclear and natural gas generation retire faster than adequate replacement resources are connected.

Building infrastructure to accommodate this massive grid transformation will come with a cost. In a cooperative structure, the only way to pay for these items is through the rates charged to members. The timelines for compliance will require utilities to make costly investment and infrastructure decisions in the near future – at a time when inflation and supply chain challenges are still looming.

#### Already a clean energy leader

Minnkota is already on a path toward a commonsense clean energy transition. The cooperative has even been recognized by the U.S. Department of Energy as a leader in wind energy development. Approximately 42% of the power generation capacity provided to the Minnkota members in Minnesota and North Dakota is generated by carbon-free resources, including wind (34%) and hydro (8%).

Minnkota is also evaluating Project Tundra, which would equip

a reliable North Dakota power plant with one of the largest carbon capture systems in the world. If the project moves forward (a decision is anticipated within the next year), Minnkota would be one of the fastest decarbonizing utilities in the U.S. Both carbon capture and nuclear energy are expected to qualify under Minnesota's carbon-free requirements.

As society looks to advance electric vehicles and electrify many other parts of the economy, it will need a reliable, affordable electric grid. This will require an all-of-the-above energy strategy that embraces all electric generation sources to meet the demand.

Perhaps the most important component of a successful energy transition is time. Developing new technology that is sustainable and reliable takes time. Building and updating transmission lines to transport energy takes time. Transitioning to new energy generation resources without jeopardizing the reliability of the grid will take time. Sudden, extreme change to our energy systems without proper planning has the potential for severe consequences.

Minnkota will continue to work closely with its members to maintain reliable, affordable and sustainable electricity - now and in the future.

# THE FULL PICTURE OF RELIABILITY

Infrared camera technology serves important role in Minnkota's multipronged preventative maintenance

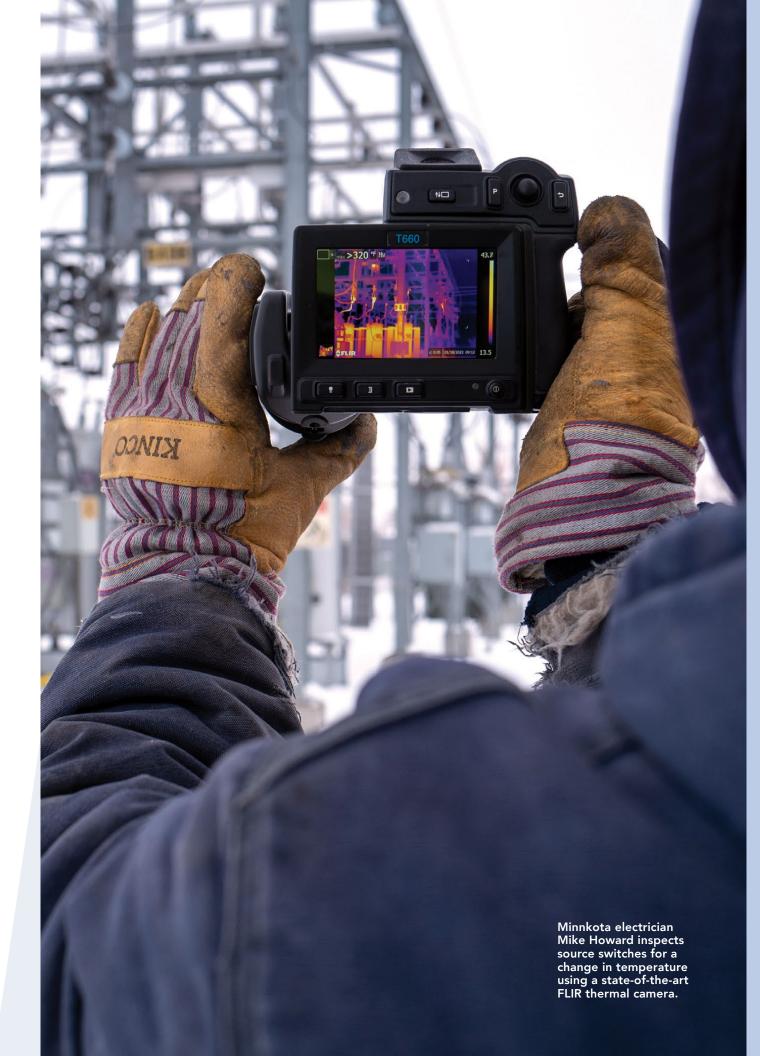
By Kaylee Cusack /// Photography Michael Hoeft

n mid-January, Minnkota electrician Mike Howard was spending another quiet, cold morning at a substation just west of Grand Forks, N.D. But instead of the typical drill and pliers he'd have on hand, he was slinging a state-of-the-art thermal imaging camera. Something through his lens was not as chill as it should be - flaring bright yellow on the camera's digital screen.

"It's the bottom of the source switch that goes to the regulators. Our regulators are the most mechanical and potentially dangerous parts of the substation," explained crew foreman Dean Swatlowski, watching as Howard composed a new shot. "Yesterday it was 320 degrees. Today it was 504 degrees."

This preventative maintenance scan was the first of a full-system thermal examination of Minnkota's 257 substations across North Dakota and northwestern Minnesota. Every year, the co-op's power delivery team schedules time during the cooler months of fall and winter to view every component of each site with a FLIR (Forward Looking InfraRed) thermal camera. If a part of the substation glows more brightly than it should, it indicates a potential issue that could go unnoticed by a standard visual inspection.

In the case of the source switch and regulator, Swatlowski says catching the rise in temperature early may have prevented a failure or even a fire in the months to come. That, in turn, could



stave off an outage and keep his crew out of harm's way.

"The camera definitely helps us to take corrective actions. We can fix the problem before it turns into a catastrophe of some sort," he said, adding that the camera typically catches one or two system hot spots every year. "It's a good technology."

#### **Hot technology**

Thermal imaging has come a long way since Minnkota first started using the technology more than 20 years ago. Construction and Maintenance Superintendent Harold Narlock says Minnkota has now used four versions of infrared camera, with the latest FLIR model as the most recent addition.

"They've gotten so much better," Narlock said. "If you come from outside, I can see your footprints walk by in blue, because your shoes are cold. It dissolves right away; you can only see a couple prints as they follow you. That's how sensitive that camera is."

Narlock says earlier versions of the technology were limited in what they could see and were quite crude. Minnkota's first camera actually had a small air conditioner inside to keep it cool and unaffected by ambient temperature. The co-op would only use it to survey a few critical load stations. But as the technology improved and became more user-friendly, its role in strengthening grid reliability grew.



"It was not difficult to use. We put it in the crews' hands, and we actually started a full-blown maintenance cycle," he said. "Every year from this point on, we're going to thermal scan our substations."

A thermal scan of a substation can detect several potential component issues that generate additional heat, from loose spades to compromised riser leads. If an area appears warm, it doesn't necessarily indicate an immediate repair is needed. Minor temperature differences are often noted on a "watch list." If the temperature is trending upward on the next check, a repair is made. Often, watch

up on a follow-up scan. Since many of a substation's components are made of steel that can contract or move in cold, it's not uncommon in one season to have a warm spot that disappears the following season.

Thermal scans are only one aspect of a multi-department docket of preventative maintenance to minimize outage events. Every one of Minnkota's power delivery teams is responsible for a different method of annual checks. As electricians run thermal imaging scans, technical maintenance crews test the relays that protect sub-

station equipment, while yet another group completes transformer oil sampling and testing. This is all done to get ahead of any problems that could lead to sudden grid equipment loss, an issue made more complicated with current extensive lead times on industry components.

"If there is a major failure, it can take so much other equipment out at the same time. Plus, you have the risk of there being personnel in the area. That's a huge safety risk. So, it's very important to be as proactive as we can," Narlock said.



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# **PUTTING THE POWER IN POWERSPORTS**



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**Arctic Cat strengthens** legacy in Thief River Falls, Minn., with diverse opportunities and product innovation

By Kaylee Cusack /// Photography Michael Hoeft and Arctic Cat

t took Heidi McNary only a year and a half of living in Thief River Falls to capture the full Minnesota winter experience. She and her family had tried cross-country skiing, slapped on skates, tackled ice fishing - and she was about to slide into her next venture.

"I'm curling. Next week is finally my time!" she said with wide, anticipatory eyes. "I'm excited."

The thrill of winter is what brought McNary to Thief River Falls in 2021, following the 2017 acquisition of Arctic Cat by a Fortune 500 industrial conglomerate, Textron Inc. As the Arctic Cat team found its footing with the new parent company, McNary joined Arctic Cat leadership as Senior

Vice President and General Manager of Powersports.

> "When Textron was looking to get into the powersports business, we really needed an iconic brand. We needed something that really

Arctic Cat has been a business staple in the community since 1960. Its current assembly facility on the south side of Thief River Falls employs more than 750 people, from assemblers to engineers to product strategists. Between the site's employees and the families of those employees, approximately onethird of the town is affiliated with the company.

When Textron agreed to acquire Arctic Cat, the company did not take the new opportunity lightly.

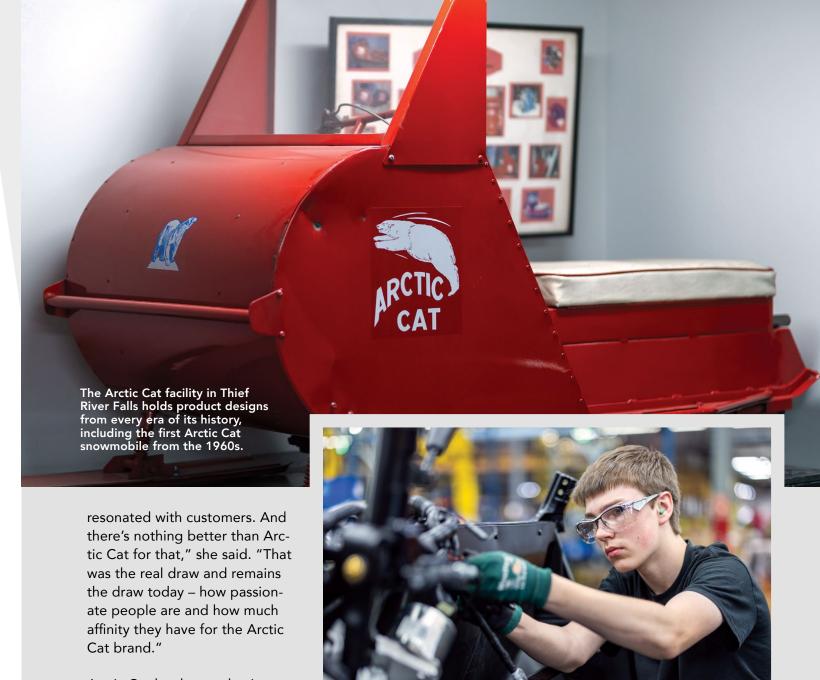
"Our best customers are right here, so Textron continues to invest in the community," Mc-Nary said, offering examples of event sponsorships and support of local sports teams. "It's as important to us to be integral in terms of communicating and participating in the community as it is getting more customers."

Textron's investment includes heavy investment in its employees. As a part of Textron, Arctic Cat employees were introduced to a suite of new benefits, including a 401(k) plan with company match, pay-for-performance incentive programs and educational support. Textron offers a unique tuition assistance

**Every Arctic Cat employee plays** 

an important role in ensuring

the quality of each machine.





program for employees to pursue any undergraduate or master's degree.

Textron also invested in new products, advancing innovation in the Arctic Cat brand. The team was thrilled to unveil its newest snowmobile family, Catalyst, in fall 2022. The machines, available for preorder this spring, are built on a completely new platform from the ground up, boasting a lightweight, highly maneuverable ride that meets the power needs of snow veterans and comfort needs of those new to riding. McNary hopes the springboard sled – part of what she calls a "generational investment" - will attract an entirely new following to the brand.

"Our customers bleed green, and they are amazing. They know every spec, they can tell you the track lug height and length on any unit," she said.
"But we need to get people who have never thought about Arctic Cat – or who have never thought about snowmobiling – on the product, and I think that's pretty revolutionary."

#### **Electrified future**

McNary knows the art of developing an exceptional machine. She's an engineer by training, spending most of her career in aviation development. She's

accustomed to being one of the few women in a male-dominated industry, but she's using her role to bring more variety to the leadership table.

A snowmobile comes

several assembly lines.

together on one of

Arctic Cat's leadership team includes women heading up sales, business, finance, human resources, sales operations and more. The group is more female than not.

"There are so many studies that say the more diverse your leadership team is, the better the company performs. Period," McNary said. "I'm excited about being a little bit of an impetus for more change and more inclusion and more diverse thought around who should be at the table for powersports."

Arctic Cat must reach beyond its internal workforce to community partners to guarantee snowmobiles and off-road vehicles continue to move through assembly lines at a rate of 250-300 units a day. Reliable electricity is essential to keeping up with demand. Losing power for even 15 minutes can be devastating. "Having that stability and knowing that it's rock solid and that no matter what, we're not going to be down, is incredibly important to us – and more important by the day," McNary said.

Northern Municipal Power Agency (NMPA) works with Thief River Falls Municipal Utilities to make sure Textron has the reliable electricity it needs for consistent operations. NMPA General Manager Jasper Schneider says he's pleased that the Minnkota-NMPA Joint System has been able to offer stable rates for more than six consecutive years, especially at a time of global economic inflation.

"The continued investments that Minnkota and NMPA make into the Joint System in substation upgrades, transmission improvement and power supply options ensure that our businesses in the system footprint will continue to receive reliable power in a time of tremendous industry change," Schneider said.

That reliability will also support Arctic Cat as it continues to invest in an electrified product line. Textron is already the world's biggest manufacturer of lithium-powered golf cars, but is investing in the development of electric ATVs, side-by-sides and even snowmobiles.

The trajectory of powersports is still full throttle in Thief River Falls, and Arctic Cat is making sure that opportunity is spread to everyone – to riders, to the city and to the families who call "Arctic Cat country" home.

"It's a great way to give the community opportunities for the next generation to do something a little different than their parents did," McNary said. "That's pretty meaningful to me, and we offer that."



# ALL-OF-THE-ABOVE STRATEGY ENSURES THE BEST ENERGY VALUE

By Ben Fladhammer

on't put all your eggs in one basket."

It's a familiar saying, and believe it or not, that age-old piece of wisdom is used by electric cooperatives to make sure you receive a reliable, affordable and environmentally responsible supply of electricity. Each of the primary generation resource options across the country has both advantages and disadvantages. This is why an all-of-the-above energy strategy is so crucial. If a

utility ties itself to one resource, it is exposed to all the risks associated with that resource. By diversifying, utilities are able to take advantage of the pros and limit their exposure to the cons.

Minnkota provides a diverse mix of coal, wind and water to meet its members' 24/7 electricity needs. Future power supply decisions take into account numerous factors, including permitting; capital, operating and maintenance costs; existing generation

mix; reliability and resiliency; and projected member demand for electricity.

Decisions to build or purchase from new generation resources are carefully considered. Building any new generation resource at grid scale can cost hundreds of millions of dollars and require decades of investment and commitment. That makes it uneconomic to switch back and forth between power supply options over short periods of time.



**NUCLEAR** 



• No air emissions

**Advantages** 

- Can reliably run 24 hours per day
- Smaller, modular reactors are in development

#### Disadvantages

- High capital cost and increasingly expensive fuel
- Radioactive waste that must be properly disposed of and monitored
- Extraordinarily difficult to permit
- Cannot ramp up and down to accommodate renewable production

#### **Advantages**

- No fuel cost
- No air emissions
- Costs are slightly higher, but competitive with other resources

#### **Disadvantages**

- Has intermittent production (produces about 15-25% of its potential on an annual basis)
- Requires investment in backup generation resources
- Grid-scale battery backup technology is still in its infancy
- Solar panels take a larger footprint to produce the same energy as other resources
- Production affected by clouds, snow and extreme cold temperatures
- Panel production degrades over time

#### What is considered when power supply decisions are made?

#### LIGNITE COAL



**NATURAL GAS** 

#### **Advantages**

- Abundant, domestic fuel source
- Stable pricing
- Can reliably run 24 hours per day
- Technology has been developed to address emissions (exploration of Project Tundra to capture carbon dioxide)

#### Disadvantages

- Extraordinarily difficult to permit
- Cannot economically rail lignite coal due to high moisture content
- Can be difficult to ramp up and down to accommodate renewable production
- Releases CO<sub>2</sub>. Anticipate CO<sub>2</sub> regulations, although CO<sub>2</sub> capture technology is rapidly advancing

# rppph

**HYDRO** 



#### **Advantages**

- No fuel cost
- Low-cost energy to consumer
- No air emissions
- Can respond rapidly to dispatch

#### Disadvantages

- Nearly impossible to permit
- Affects fish and wildlife habitat
- Alters the natural flow of rivers
- Virtually no resources left to develop (some dams being removed)

#### **Advantages**

- No fuel cost
- No air emissions
- Cost-competitive with other resources

#### Disadvantages

- Has intermittent production (produces about 45-50% of its potential on an annual basis)
- Requires investment in backup generation resources
- Grid-scale battery backup technology is still in its infancy
- Turbines take a larger footprint to produce the same energy as other resources and can impact bird and wildlife populations
- Cannot operate in extreme cold and ice conditions

#### **Advantages**

- Lower CO<sub>2</sub> emission levels than coal
- Can be run 24/7 or used during peak events
- Can respond rapidly to dispatch

#### Disadvantages

- Fuel costs can be volatile and impacted by events outside of the U.S.
- Pipeline infrastructure not adequate for projected demand
- Still releases CO<sub>2</sub> emissions

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# Weatherization of major components

North Dakotans know how to prepare for extreme weather. All of the Young Station's major components are covered, insulated and weatherized to ensure they can operate in extreme cold or heat.

# **Environmental** protection

Just as the Young Station must produce power reliably, it must also meet environmental compliance every step of the way. Systems needed to protect the land, air and water are all designed to withstand harsh weather conditions.

# Mine-mouth generation

The Milton R. Young Station is a mine-mouth power plant, which means that the coal mine is located adjacent to the power plant. Hauler trucks capable of carrying 240 tons of coal make the short trip to the Young Station. With no need for trains or pipelines, the plant receives fuel consistently without transportation issues.

## Prudent maintenance

The Young Station is well-maintained, which ensures it is able to operate for the majority of the hours each year and is consistently available to produce power more than 90% of the time.

# On-site fuel supply

Minnkota is able to store up to three weeks of coal supply on-site at the Young Station, which makes the facility resistant to weather-induced failure. Even in major blizzard events, the plant is able to operate dependably.

# **Commitment** of employees

The Young Station has employees on-site 24 hours per day to operate and monitor the generation of power, environmental control technologies and related cyber assets. Personnel are trained and ready to respond to numerous system issues.

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**NEWS** BRIEFS **NEWS** BRIEFS

#### **Annual meetings set for March 31**

Minnkota Power Cooperative and Square Butte Electric Cooperative will host their annual meetings on Friday, March 31, at Minnkota headquarters in Grand Forks.

The two meetings will begin at 8:30 a.m., with Minnkota Chair Les Windjue, Devils Lake, N.D., and Square Butte President Paul Aakre, Angus, Minn., presiding. Cooperative leaders will report on 2022 operations, while also providing updates on future generation and transmission projects. In addition, the meetings will include the election of directors and adoption of policy resolutions.

A Class A membership-only meeting will be held on Thursday, March 30, and will be



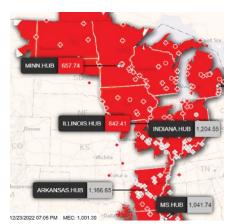
Minnkota chair Les Windjue addresses members, delegates and guests at the 2022 Minnkota annual meeting.

followed by a member social. More details on those events are forthcoming.

Minnkota's 11 member distribution cooperatives supply electricity to more than 147,000

consumers in a 35,000-squaremile area. Square Butte owns Unit 2 at the Milton R. Young Station and is governed by the cooperatives associated with Minnkota.

### MISO declares grid emergency in December



The red coloring on this map of the MISO footprint indicates extremely high energy pricing and the potential for grid reliability events.

The Midcontinent Independent System Operator (MISO) declared a Maximum Generation Event on Dec. 23. According to MISO, this emergency event was caused by forced generation outages and higher than forecasted load. Minnkota participates in the MISO market with other utilities across the Upper Midwest.

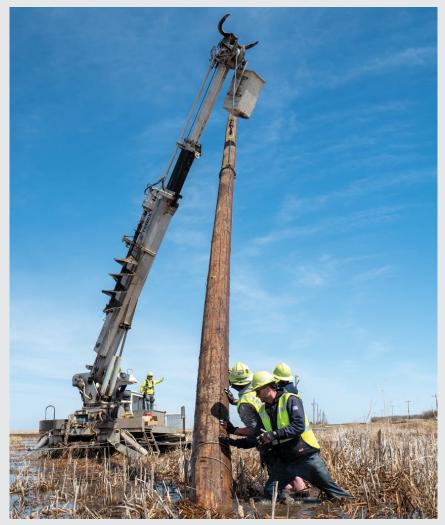
Throughout the duration of this event, Minnkota depended on its coal-based generation resources and the strategic use of its demand response system to avoid skyrocketing energy market costs. Despite significant strain on the regional electric grid, there were thankfully no power outage events or substantial financial impacts on the Minnkota members.

### **Hoeft wins RE Magazine Photo** of the Year

Michael Hoeft, Minnkota digital media specialist, won the 2022 RE Magazine Photo of the Year award.

Hoeft braved ice-cold water, wind and difficult terrain to capture a photo of Minnkota lineworkers rebuilding a section of power line to help a neighboring electric cooperative after major storms passed through western North Dakota.

RE Magazine is the flagship publication of the National Rural **Electric Cooperative Association** (NRECA). Hoeft's photo, titled "Rise Up," was one of 11 finalists selected for the competition from electric cooperative communicators across the country.



The winning photo shows Minnkota lineworkers braving tough conditions to rebuild a transmission line that had been destroyed in a spring storm.

#### Minnkota employees reach safety milestone



Zach Gion safely climbs a transmission structure while completing maintenance work. Gion is one of 385 employees who have not experienced a lost-time injury in two years.

Minnkota is committed to providing a safe and healthy working environment for its employees, members and partners. In 2022, the cooperative's 385 employees performed exceptionally well in all areas of safety and continue to meet or exceed industry standards.

As of January 2023, Grand Forks employees reached two years without a lost-time injury. Employees at the Young Station are expected to reach three years without a lost-time injury in mid-2023.

Minnkota is committed to providing consistent training and safety awareness programs to ensure the cooperative can continue to strive toward its goal of zero incidents each day.

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# CO-OP, EMPLOYEES DONATE TO GIVING HEARTS DAY CHARITIES

Minnkota and its employee-supported Minnkota Cares program took advantage of the generous giving match of Giving Hearts Day on Feb. 9 by donating to four organizations that touch families across the co-op's service territory and home communities.

Minnkota gave a \$3,000 corporate donation to the Community Violence Intervention Center (CVIC) in Grand Forks, N.D., which will be matched by Giving Hearts Day sponsors. CVIC delivers vital safety and healing to children and adults experiencing domestic or sexual violence and educates youth about how to develop healthy relationships to end future violence.

The Minnkota Cares committee chose the following causes to receive a Minnkota Cares donation, which will also be matched:

## Hospice of the Red River Valley

Hospice's mission is to provide comfort and care through life's journey. They enhance the quality of life for their patients by addressing their medical, emotional, spiritual and grief needs.

#### **BIO Girls**

BIO Girls is on a mission to improve the self-esteem of adolescent girls through empowerment of self and service to others. BIO Girls is based in North Dakota and serves five states.

#### North Dakota Veterans Cemetery Foundation

The North Dakota Veterans Cemetery Foundation provides financial support for the perpetual operation of the North Dakota Veterans Cemetery in Mandan, N.D.

Giving Hearts Day is an annual 24-hour giving event that supports charities in North Dakota and northwest Minnesota. Last year alone, Giving Hearts Day raised more than \$26 million in donations for the regional causes involved. Since the event's founding in 2008, it has raised \$138 million.

