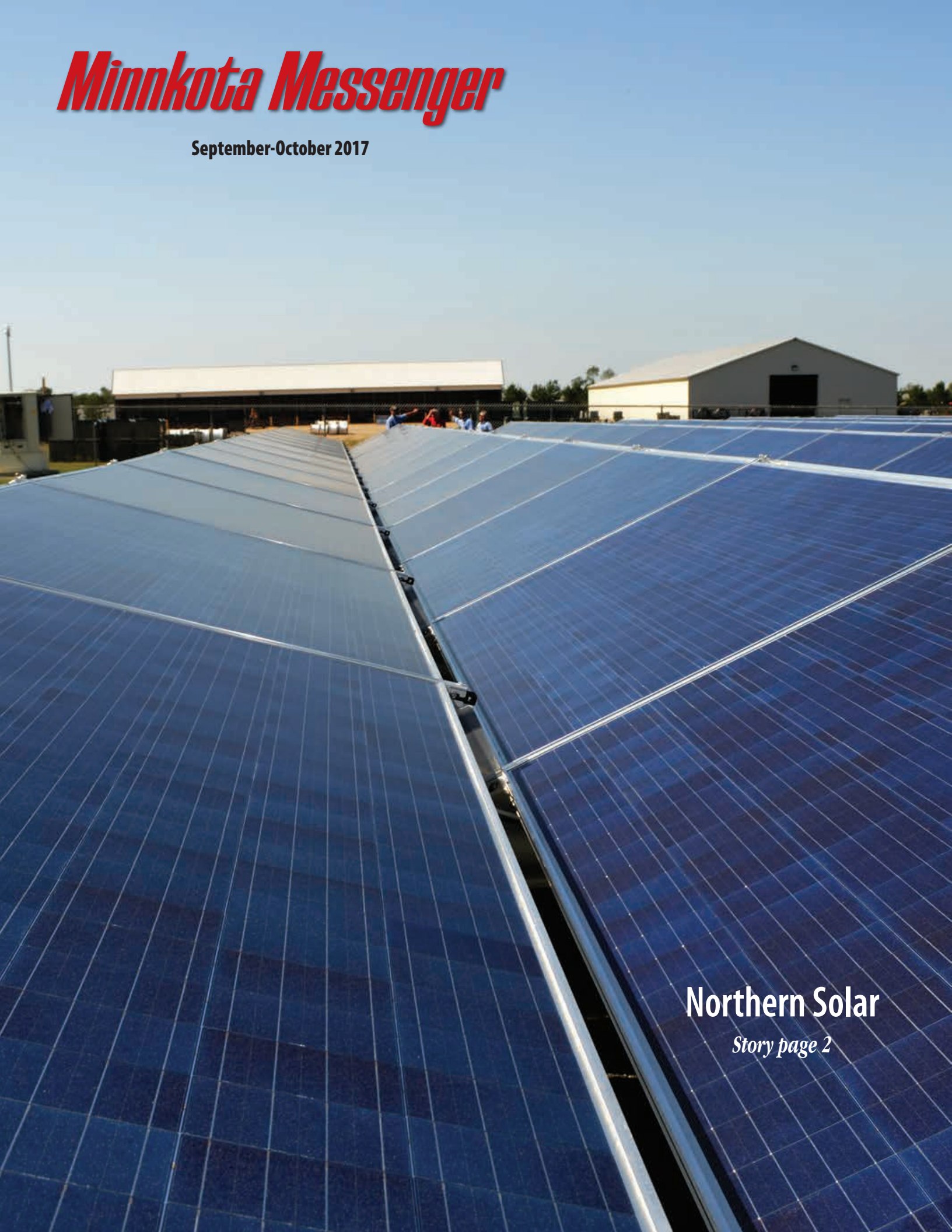
Minnkota Messenger

September-October 2017



Northern Solar

Story page 2

Northern Solar shines

Cooperative difference powers community solar project

A bright and sunny afternoon was a fitting welcome for Beltrami Electric Cooperative members who gathered Aug. 29 to energize their new community solar array.

While the sunshine was good for production, CEO Jared Echternach made sure attendees knew the real power source for the project was member support.

"The members really made this a reality," Echternach told the member-subscribers at the ribbon-cutting ceremony. "The fact that we are a cooperative allows us to respond to our members when they have something they want and a vision for their community. This is something we were glad to respond to."

The Northern Solar project is an 80-kilowatt (kW) array located at Beltrami Electric's headquarters facility in Bemidji, Minn. The project provides cooperative members with an opportunity to purchase the electrical output from a solar panel at a guaranteed rate for 20 years. A payment for the output of the panel appears as a credit on the member's electric bill based on retail rates.

As the members began asking more questions about locally produced renewable energy in recent years, Echternach said the cooperative did what cooperatives do: they listened.

"This project is a great example of how local control and decision making is much better than legislative or regulatory mandates," Echternach said. "Members who want to participate in this project are able to do so. It will be interesting to watch the production of our array over the next 20 years."

Each of the 180 blue, photovoltaic panels will produce a projected 450 kilowatt-hours (kWh) annually. Current and historical production can be viewed by visiting the cooperative's website at **www.beltramielectric.com**.

Northern Solar is the second community solar project completed by a Minnkota member distribution cooperative. In 2016, Cass County Electric Cooperative of Fargo completed the Prairie Sun community solar garden. Three other Minnkota members have small, educational solar arrays located at their headquarters facilities.

Learning experience

Beltrami Electric started hearing from

The 80-kilowatt community solar array is located near Beltrami Electric Cooperative's headquarters in Bemidji, Minn.

members requesting a community solar option in early 2014.

"At that time, the cooperative began researching the financial models and technology options available," said Sam Mason, Beltrami Electric's manager of energy services and facilities, who served as Northern Solar project manager. "This project has been a learning process for all involved."

After an initial rush of subscriptions, demand for the project slowed. The cooperative's goal was to have 50 percent of the solar array subscribed before beginning construction, which was reached during the summer of 2017. Currently, about 60 percent of the panels have been reserved by cooperative members.

Members may subscribe to as many panels as they wish, up to the equivalent of their annual average energy usage. They can provide a one-time payment for a full panel ($1,295) or half panel ($647.50), there are 12-, 24- and 36-month payment plans, or a "pay as you go" option that places an additional charge on the participant's per kWh rate.

Construction of the array was completed by Beltrami Electric staff over the course of a week in August. Enough room is available to expand the array if demand from co-op members grows.

Board support

Charlie Parson was elected to the Beltrami Electric board in 2015 when Northern Solar was officially unveiled at the cooperative's annual meeting. Not long after, the Puposky resident subscribed to the production from one panel. Fast forward two and a half years and Parson had the honor of cutting the ribbon for the project.

"I'm glad we got the project done and it has been received pretty well by the community," he said.

With his home surrounded by evergreens, Parson was happy to have the community solar option versus a rooftop installation. Other advantages for subscribers include cost certainty, no ongoing maintenance and insurance expenses and no structural assessment or issues in relation to installing the panels.

Parson hopes the cooperative will continue to position itself to meet member needs as it relates to solar.

"We promote ourselves as being the go-to source for your electrical needs," Parson said. "People are certainly looking to solar, and we need to be positioned to provide that option." ☐

Sam Mason, manager of energy services and facilities; Charlie Parson, board member and subscriber; and Jared Echternach, CEO; cut the ribbon Aug. 29 for Beltrami Electric Cooperative's Northern Solar project.

Superior in more ways than one

Grain equipment company has come a long way under Rauser

Owner Claire Rauser steps out of one of his durable grain bins.

Claire Rauser is one of the best in the business at building grain bins capable of standing up to the harshest weather and lasting for generations.

The Superior Grain Equipment owner has received several patents along the way.

He takes no credit for the company name or logo.

"There was a company called Superior Equipment Manufacturing out of Illinois. We sold their bins. I like the name Superior. I liked the logo. After they were out of business, I acquired the name." said Rauser, whose Kindred, N.D.-based business receives its power from Cass County Electric Cooperative.

Many would believe the name came out of Rauser's obsession of having the most superior grain storage, handling and conditioning in the world. He makes quality grain bins, and he isn't bashful about telling as much.

Rauser has a lifetime roof warranty on his unstiffened farm bins. He says nobody has ever used it.

"We've been at sites where our bins are perfectly fine after a windstorm and the one right beside it is gone," Rauser said. "And that's happened time and time again."

Rauser learned all about agriculture and how to build a solid grain bin foundation before he left college. After three years working for a farmer near Hillsboro, N.D., during and after high school, he went to North Dakota State University to pursue an engineering degree.

After his second year at NDSU, he decided to remain in Fargo for the summer.

"There was a lot of concrete work being done for grain bins," Rauser said. "I knew just a little bit about it. I had poured a couple of slabs; I didn't have a lot of experience. But I had a pickup and about $500. I hired a couple of college friends and that first summer we poured 77 foundations in two months.

"The next summer we poured 235 foundations for grain bins. I hired a few more people and bought a couple of vehicles. I was always interested in construction and I was always interested in agriculture. That was the combination of the two of them."

After college he took jobs with some of the companies that are now his competitors and became a dealer of others' grain bins.

That was until 2007, when he decided to start manufacturing his own grain bins. Nestled along the Sheyenne River, Superior's buildings bustle with activity. Superior is the only grain bin manufacturer in the state of North Dakota. Rauser also has a manufacturing plant in Beresford, S.D.

In Kindred, everything starts with the Trumpfs – computerized punch machines that can make 1,200 hits a minute or 20 hits a second. Parts go from there to a computerized break machine, which bends steel into desired shapes.

One of his patents is an unload system that can use a specially designed auger section to break up a plugged gate or plugged sump in a grain bin.

"We can run a section of the sweep auger in reverse, to chew up that matted area, al-

"We use a lot of it. All of our customers use a lot of it, for unloads, for fans. And we've had real good service. It's a rare occasion when we are out of power. . . . In our country we can be very grateful because energy is not terribly expensive – not like it is overseas."

– Claire Rauser, *Superior owner, on the value of electricity from Cass County Electric Cooperative*

lowing it to start flowing again," Rauser said.

He brought his invention to the south wing of the National Farm Machinery Show in February in Louisville, Ky.

"It's a hot item. There's nothing like it, anywhere," said Rauser. "We have a centrifugal clutch and the new unloads have a double-throw gearbox. In other words, it can run forward or it can run backward."

"If you plug it up, even if it's under load, you can run it backwards. The sump is open. If you run it forward, then that clutch engages and it operates the way it's supposed to, the whole sweep."

A stack of sidewall sheets are ready to be transported and assembled.

While he's reaching retirement age, Rauser has no plans to retire. His son Joshua Rauser is his sales manager.

What motivates Dad?

"We have the opportunity to do some things, provide a basic need, food – not just here in North Dakota and South Dakota, but around the world," Claire said. "We like to say that we partner with farmers and partner with producers to feed the world. We do a small part."

Superior is working on grain dryers for third world countries and storage facilities for countries such as Mexico and East Africa.

"They need to eat and we're able to provide for that." ☐

Workers make various parts in the manufacturing area of Superior Grain Equipment near Kindred, N.D. The TruPunch 5000, a computerized punch machine, can make 20 hits a second. *(Bottom)* **Workers assemble an unload system.**

Electrify everything

Beneficial electrification concept gaining traction

With the rapid increase of renewable resources on the grid and environmental controls at power plants, electrification of end-use sources creates fewer emissions than technologies that use fuel oil, propane, natural gas or gasoline. Trend lines show the benefit gap will continue to widen over the next 25 years, making electricity the undisputed energy source of choice.

Keith Dennis, Senior Director at the National Rural Electric Cooperative Association, is the lead author of an *Electricity Journal* article titled, "Environmentally beneficial electrification: The dawn of emissions efficiency." He recognizes the concept of beneficial electrification is a significant departure from previous philosophies that view any increase in electricity usage as a negative. While energy efficiency efforts are still important, they are only one piece of the puzzle, he says.

"It is timely to consider whether reduced electricity consumption is the optimal compass with which to navigate the path to a low-carbon future when, in fact, substitution of electricity for fossil fuels may in some cases increase electricity consumption," Dennis concludes in the article.

In addition to changes on the electric grid, the study finds that electric appliances are becoming more efficient due to technological improvements, while gas and propane appliances aren't keeping up. For example, the availability and performance of heat pump technology, which is 200 to 300 percent efficient at converting electricity into heat, offers significant benefits for consumers versus other options.

Using more electricity may be good for your pocketbook and the environment.

No, seriously.

Mounting research suggests that electrifying everything – from transportation to heating and water heating – provides long-term economic benefits for consumers and lowers emissions levels. The concept is called "beneficial electrification," and it is gaining traction among electric cooperatives and others across the nation.

Managing intermittency

For widespread beneficial electrification to be successful, utilities will have to manage an increased demand for electricity while continuing to incorporate intermittent resources, like wind and solar. Because of the limited opportunities for electricity to be economically stored at grid scale, demand response will be essential.

Minnkota is well-positioned with a robust demand response system, which can control up to 35 percent, or 350 megawatts (MW), of the cooperative's peak load in the winter. This includes temporarily controlling storage heating systems, large-capacity water heaters, home vehicle chargers and large industrial consumers with backup generators. These loads can be temporarily controlled with little to no impact on the consumer.

Policy priorities

Another study released by the Brattle Group in January 2017 draws similar findings as Dennis' study. Brattle Group shows the potential for U.S. electric sales to nearly double by 2050 while energy sector carbon dioxide (CO_2) emissions could decrease by 70 percent or more through the electrification of transportation and heating.

From an economics perspective, the study shows that beneficial electrification would increase electricity bills, but would likely decrease the amount of dollars consumers spend overall on energy.

Working with regulators and policymakers to understand the complexities and benefits of electrification is an important next step, the study suggests.

"Utilities likely need to engage regulators early on in ways that allow broadening the tools regulators use to assess investments and programs proposed by utilities to foster electrification," the Brattle Group concludes. ☐

Minnkota programs

Through its Value of Electricity campaign, the Minnkota member cooperatives and Northern Municipal Power Agency participants support the electrification of heating, water heating and transportation. A broad array of incentive programs are provided to help consumers with the initial cost of new systems. All systems, except heat pump technologies, must be controlled under the demand response program. In return for participating in the program, the consumer receives a money-saving electric rate, which is 40 to 50 percent lower than the standard electric rate.

Sugar beet boost

Kringstad Ironworks receives bump from big industry

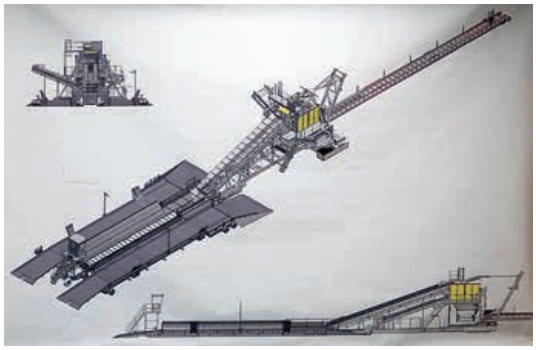
Bernie Kringstad says the Safe-T-Pull™ Crop Shuttle behind him is the largest cart or shuttle in the industry.

Bernie Kringstad has a picture of concept design for a sugar beet piler he sold to a Russian company a few years back on his office wall.

On his office desk, he has a Russian magazine.

This isn't by accident. He has Russia on his mind.

"Russia is a very big sugar industry," Kringstad said. "Over here in the U.S. we are farming about 1 million acres of sugar beets. Over there you have some of the companies who are 1 million acres apiece."



A concept design of a piler Kringstad sold to a Russian company.

No wonder the Park River, N.D., businessman sees a lot of opportunities for his sugar beet pilers – both in the U.S. and in places such as world sugar beet production leader Russia.

Kringstad Ironworks, which is served by Park River Municipal Utilities, manufactures pilers and parts for companies such as American Crystal Sugar, Minn-Dak Farmers Cooperative and others around the country and the world. It also repairs pilers and other farm equipment in the shop and has 24-7 in-the-field service during the sugar beet harvest.

A welder by trade, Kringstad launched the business in 1996 on a farm between Hoople and Park River. At that time, the three employees focused on farm repairs. All that changed when Kringstad Ironworks started to work on projects for American Crystal Sugar and other sugar companies.

The company now has 40 to 50 employees.

The relationship with Crystal Sugar expanded when in 2006 Kringstad Ironworks built its first piler, a machine that transfers beets from trucks to temporary storage piles where they remain until taken for processing, for the company.

Kringstad Ironworks has built as many as seven pilers in a year. The goal is to average about three pilers annually. When the sugar beet campaigns are productive with high yields in the region, Kringstad Ironworks receives an uptick in manufacturing.

The 2017 campaign has been a solid

one, which should provide a boost for next spring.

Kringstad Ironworks is more than just sugar beets, however. It has worked with LM Wind Power of Grand Forks on things such as blade reinforcement and a lift system to roll blades from the production area to outside of the building.

The company also would like to do more work with the federal government. Kringstad Ironworks landed a $500,000 Department of Defense contract to build a prototype of a launching system for drone rockets in 2005.

Kringstad also owns Safe-T-Pull™, a hydraulically operated hitch and towing system that makes assisting and pulling tracks, tractors and other equipment through tough conditions easy and safe. The company sells SlingShot Kinetic Ropes and Soft Shackles that hook up to the Safe-T-Pull Truck hitch.

The Soft Shackle's lightweight design makes hooking up to the rope eyes and the Safe-T-Pull truck hitch system easy. In 2016 two John Deere tractors, using SlingShot Kinetic Ropes, towed a combine out of deep mud near Drayton, N.D.

Originally sold through Kringstad Ironworks, Safe-T-Pull became a sister company in 2014, moving out of the Kringstad Ironworks building into a nearby facility in Park River. Kringstad's sons, Jacob and Alek, run the company.

The companies work together to build the Safe-T-Pull Crop Shuttle. The 56-ton series is the largest such shuttle or cart in the industry. Pulled behind a tractor, the shuttle replaces trucks in running alongside crop harvesters in wet and muddy conditions.

"You load the cart out in the field alongside the harvester, and then you will take it up to the headland and fill two trucks," Kringstad said. "With the horizontal boom design in the front, you will drop a great amount of tare and dirt through the boom chain so you will have a cleaner load going into the piling station.

"And, being we have a flat-bottom floor, we use tracks instead of tire profile. With the track system, you're putting down less pounds a square inch with the tracks, reducing the compaction in the field."

Seven different crops have been used in the shuttles.

"We've seen potato harvesters sunk down in the sand and the mud and you can take a loaded cart and drive right by it and you're not going to sink a bit," Kringstad said. "Potato growers are liking our carts and we're looking for multiple orders from some of them."

With all the activity at the two businesses he owns, Kringstad said getting reliable power is necessary. Park River Municipal Utilities is a participant in the Northern Municipal Power Agency (NMPA). Minnkota is operating agent for NMPA.

"Very seldom do we ever have an outage here," Kringstad said. "Minnkota, NMPA and the city of Park River have done a great job." ☐

(Top) **Jacob Kringstad, who runs Safe-T-Pull, holds a Soft Shackle and a SlingShot rope he designed.**

(Bottom) **A pallet of Safe-T-Pull truck hitches awaits powder coating.**

A plasma cutter cuts sugar beet pile height gauges.

(Far left) **Machinist Tony Kringstad, a nephew of Bernie Kringstad, works on a piler repair.**

(Left) **Joe Salinas welds fire log turners. The company gives the log turners away for benefits.**

CarbonSAFE Project field work begins near Young Station

A team of six scientists and engineers conducted a low-impact geophysical survey near the Milton R. Young Station in late August to learn more about North Dakota's carbon dioxide (CO_2) capture and storage potential.

The data gathering near the town of Center is part of the North Dakota CarbonSAFE Project, which is investigating the feasibility of developing safe, permanent, commercial-scale geologic storage for CO_2. The Energy & Environmental Research Center (EERC) at the University of North Dakota is leading the project in partnership with Minnkota, the U.S. Department of Energy (DOE) and other North Dakota utility and mining companies.

Scientists and engineers from the Energy & Environmental Research Center complete a geophysical survey near Center, N.D., as part of the CarbonSAFE project. *(Photo credit: Annette Tait)*

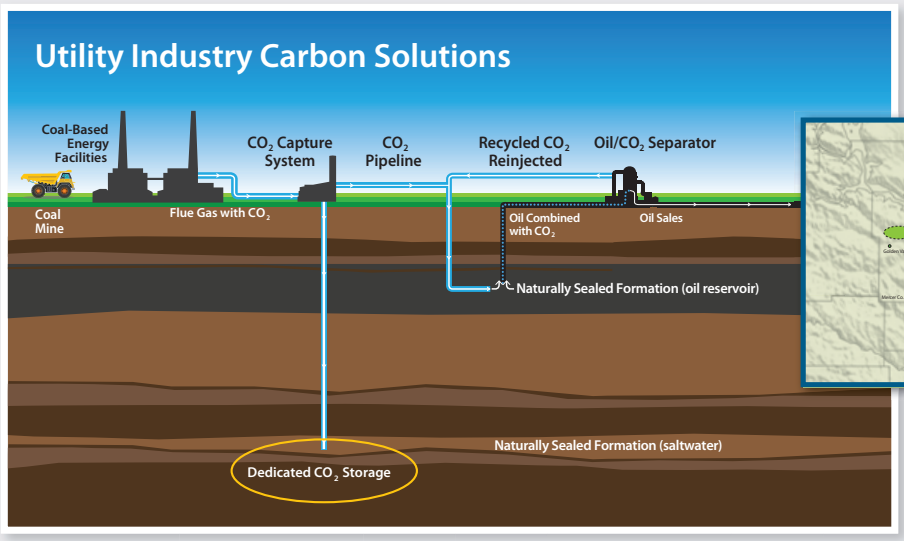
Mac McLennan, Minnkota president & CEO, believes the research being conducted as part of the CarbonSAFE Project is important to North Dakota's lignite industry.

"As Minnkota and others work to explore innovative carbon capture technologies, we also need to understand how we may use or store the carbon dioxide in a way that is safe, environmentally responsible and economically viable," McLennan said. "We are pleased to work with the energy experts at EERC because of their in-depth understanding of our industry and North Dakota's unique geology."

The two-year project includes the collection of two deep geologic core samples – one in Oliver County and one in Mercer County – to better understand the geology in the area. Once the core holes are drilled and geologic samples are retrieved, the core holes will be filled with concrete and the land restored to its original appearance according to state and federal regulations. The formation of interest is about 6,000 feet below the surface, and one of the objectives of this project is a preliminary look at the geology to see if further study is warranted.

The project partners have been active in educating the public about the CarbonSAFE initiative. Meetings have been held with state, local and federal officials. Public open houses were conducted in Center and Beulah, N.D., in October to communicate the details of the project and gather public input.

The project is one of several under DOE's Office of Fossil Energy CarbonSAFE initiative and is scheduled for completion in the summer of 2019. More information about the project and DOE's initiative is available at **https://undeerc.org/NDCarbonSafe**. ☐



The two-year project has two study sites (shown in green) in western North Dakota near existing coal-based energy facilities.

October is Co-op Month

Minnkota Power Cooperative joined 30,000 cooperatives nationwide in October to celebrate National Co-op Month, which recognizes the many ways cooperatives are committed to strengthening the local communities they serve.

"Co-ops Commit" was the theme for this year's celebration, spotlighting the countless ways cooperatives meet the needs of their members and communities. As a cooperative, Minnkota is owned and governed by a board of directors democratically elected from the membership – not faraway investors.

Cooperatives are everywhere – helping people meet their common needs through group effort. They provide just about any good or service their members need. Cooperatives offer credit and financial services, health care, child care, housing, insurance, legal and professional services. Cooperatives sell food, farm supplies, hardware and recreational equipment. They provide utilities, such as electricity, telephone and television. Cooperatives also process and market products and goods for their members. ❐

All cooperatives share these seven principles:

Voluntary and Open Membership
Cooperatives are formed by people looking for solutions to shared problems. They are open to all who use or provide their services and are willing to accept the responsibilities of membership.

Democratic Member Control
Cooperatives are controlled by those who use or provide the co-op's goods and services. Each member gets one vote to help make the organization's policies and decisions.

Member Economic Participation
Members equally "buy in" and democratically control the cooperative's capital based on the amount of business they conduct rather than the dollars they invest.

Autonomy and Independence
Cooperatives are independent, self-help organizations. If a co-op enters into an outside agreement or raises external capital, it still retains autonomy and democratic control.

Education, Training and Information
Cooperatives train their members, directors, and employees so they can best contribute to the co-op's development. They also educate the general public about cooperatives.

Cooperation Among Cooperatives
Cooperatives work together through strong local, national, regional, and international structures to most effectively serve their members.

Concern for Community
Cooperatives focus on local development through policies and programs directed by their members.

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Minnkota is moving

Minnkota Power Cooperative will move to a new facility in Grand Forks in December.

Please change your records to reflect our new contact information and direct all future correspondence to our new address:

5301 32nd Avenue South
Grand Forks, ND 58201

Telephone and fax numbers, as well as email addresses, will remain unchanged.

The facility is the first new headquarters complex that Minnkota has built since the 1940s. Construction began in September 2015 and is scheduled to be substantially completed in November 2017. The campus will bring all of Minnkota's offices, storage and warehousing to a single location. ☐

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For subscription or editorial inquiries, call (701) 795-4282 or send email to bfladhammer@minnkota.com.

Minnkota is a generation and transmission cooperative supplying 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 150,000 customers.

Visit Minnkota's website at **www.minnkota.com.**

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On the cover: Beltrami Electric Cooperative member-subscribers gathered Aug. 29 for the ribbon-cutting ceremony of the Northern Solar community solar project. *Story on pages 2-3.*