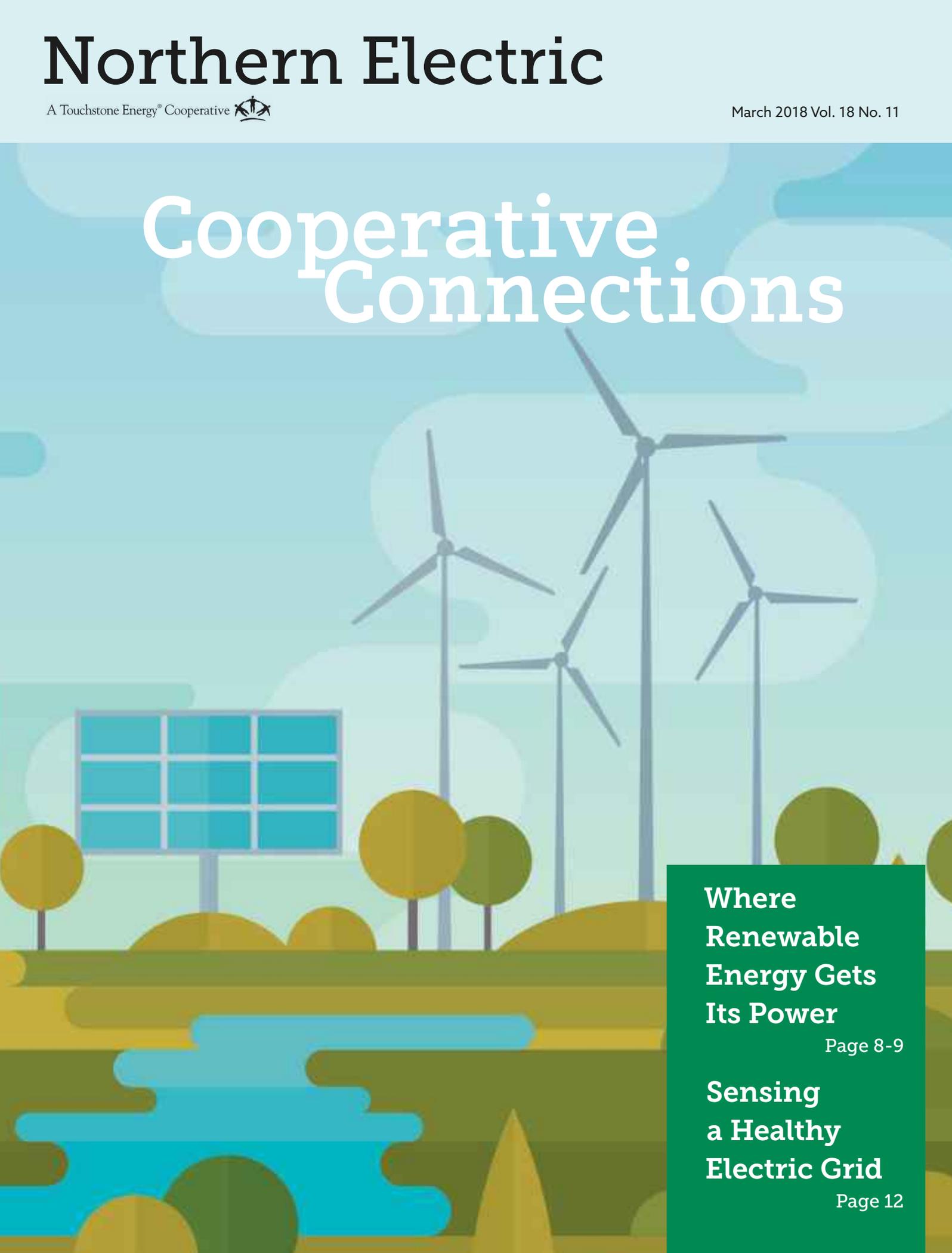


Cooperative Connections



**Where
Renewable
Energy Gets
Its Power**

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**Sensing
a Healthy
Electric Grid**

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Co-ops Are Powering Our Communities

We Are 'Re-Energizing Rural'



Ben Dunsmoor

bdunsmoor@northernelectric.coop

It's no secret that electricity is what powers our lives in the Upper Midwest. We depend on electricity to light our homes, businesses, and farmyards during the darkest days of winter. We rely on electricity to heat our homes, shops, sheds, and barns on some of the coldest days of the year. And, we don't think twice about plugging in our smartphones, tablets, or numerous devices to charge on a daily basis. Most of the time we don't realize how much we rely on electricity until we are left without it during an outage.

When electric cooperatives were first organized in the mid-1940's farmers and families in rural South Dakota did not have the luxury of electricity. Electric co-ops were formed to bring power to the people living outside the city limits and make daily life on the farm easier. The early founders of South Dakota's co-ops were responsible for energizing rural living and aiding in the development of the rural lifestyles we know today.

Today, electric co-ops in South Dakota are working to re-energize rural. 'Re-Energizing Rural' is the new campaign that is being launched by Northern Electric and the Touchstone Energy Cooperatives in South Dakota and western Minnesota to show members how co-ops are not just providing power to our rural communities, but we are providing support in many other aspects of rural living.

One way, co-ops are re-energizing our rural areas is through the Rural Electric Economic Development (REED) Fund. The REED Fund is a revolving loan fund which is governed by 23 electric cooperatives – including Northern Electric - in South Dakota and western Minnesota. The REED Fund helps finance local projects which promote economic development in our rural areas and enhance the lives of people in rural South Dakota.

Within the last year, Northern Electric has worked with the Frederick Development Corporation to use the REED Fund to finance much-needed fuel pumps along U.S. Highway 281 for travelers who are driving between Aberdeen and North Dakota. The REED Fund also provided crucial financing for the new Boys and Girls Club of the Aberdeen Area building which opened its doors in 2017.

Electric co-ops are also working to re-energize our youth through new programs to engage students to be future leaders in our communities. This year, co-ops in South Dakota and North Dakota are launching the Empower Youth program (read more on page 10-11) to help local high school students discover their strengths and leadership qualities while exposing them to potential future careers. Workforce development has been one of the top issues state leaders have focused on recently and the Empower Youth program is aimed at developing the students of today into the community leaders of tomorrow. This new program promises to offer teens great college and career development opportunities through three fun and collaborative sessions this summer. The registration deadline for Empower Youth is April 18.

Offering advice and energy efficiency tips on using electricity wisely at your home and business are also a few of the many other ways your local cooperative is working to improve service in our rural areas. Just like when the lights came on more than 70 years ago, electric co-ops continue to work every day to energize and re-energize our rural communities.

Just like when the lights came on more than 70 years ago, electric co-ops continue to work every day to energize and re-energize our rural communities.



(USPS 396-040)

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NORTHERN ELECTRIC COOPERATIVE CONNECTIONS is the monthly publication for the members of Northern Electric Cooperative, PO Box 457, Bath, SD 57427. Families subscribe to Cooperative Connections as part of their electric cooperative membership. The purpose of Northern Electric Cooperative Connections is to provide reliable, helpful information to electric cooperative members on electric cooperative matters and better rural living.

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Northern Electric Cooperative's regular board meeting was held January 23 at the headquarters in Bath with all directors present. As the first order of business, the board approved the December 20, 2017, minutes and December expenditures. The board then reviewed and accepted monthly reports by management including details on financial, operations, member services, safety, communications and IT.

Directors viewed the East River Electric Power Cooperative video report. East River Director Mark Sumption reported on actions taken by the East River Board at its January 4, 2018, meeting. General Manager Char Hager reported on the January 2, 2018, East River MAC meeting. South Dakota Rural Electric Association Director Nolan Wipf reported on the SDREA January 10 board meeting. Directors Mark Sumption, Nolan Wipf, General Manager Char Hager and Communications Director Ben Dunsmoor reported on the SDREA Annual Meeting which was held January 11-12, 2018, in Pierre.

Manager's Report

General Manager Char Hager's report to the board included the following items:

- Reminder that the National Rural Electric Cooperative Association Annual Meeting will be February 22-28, 2018, in Nashville, TN.
- Informed the board of the CFC Forum,

June 10-13, 2018, in Indianapolis, IN.
 ■ Calendar review of upcoming meetings and events.

Board Report

The board considered and/or acted upon the following:

1. Approved the date and time of the next regular board meeting for 9:00 A.M. on Friday, March 2, 2018.
2. Approved payment of legal fees for Harvey Oliver in the amount of \$543.15.
3. Approved payment of legal fees for LERMAN SENTER PLLC in the amount of \$1,708.40.
4. Approved Work Order Inventory #17-12 for \$49,298.30 to be submitted to Rural Utilities Service (RUS) for reimbursement from loan funds for electric plant construction already completed.
5. Authorized attendance to the 2018 NRECA Legislative Conference, April 8-10, in Washington, D.C.
6. Authorized the CFC Capital Term Certificate Termination Agreement.
7. Approved Northern Electric's 2018 operating budget.

Questions or more details on any of these matters? Please ask your cooperative manager, staff or director.

Financial Report		December 2017	December 2016
kWh Sales		32,660,199 kWh	34,545,551 kWh
Electric Revenues		\$2,749,871	\$2,400,781
Total Cost of Service		\$2,697,105	\$2,613,747
Operating Margins		\$52,766	(-\$212,966)
Year To Date Margins		\$545,578	\$1,648,744

Residential Average Monthly Usage and Bill			
December 2017	3,476 kWh	\$289.76	.0834 per kWh
December 2016	3,830 kWh	\$293.52	.0766 per kWh

Wholesale power cost, taxes, interest, and depreciation accounted for 84.4% of NEC's total cost of service.

Generator Safety

Portable or permanently installed standby generators can come in handy during long-term power outages. However, if you do not know how to use them properly, they can be dangerous. Contact a qualified



vendor or electrician to help you determine what generator is best suited to your needs. Before using, be sure to read and follow manufacturer's instructions.

If you are installing a permanent generator, it must have a transfer switch. The transfer switch prevents energy from leaving your generator and going back onto the utility electrical equipment when it could be dangerous to a lineman or others near downed power lines, a process known as "back feed." A qualified electrician should install your generator and transfer switch.

Safe Electricity has the following tips to use portable generators safely:

- Operate it outdoors in an area with plenty of ventilation. Never run a generator in a home or garage. Generators give off deadly carbon monoxide.
- Do not plug a generator into the wall to avoid back feed. Use heavy-duty extension cords to connect appliances to the outlets on the generator itself.
- Turn the generator on before plugging appliances to it. Once the generator is running, turn your appliances and lights on one at a time to avoid overloading the unit. Remember, generators are for temporary usage, prioritize your needs.
- Generators pose electrical risks especially when operated in wet conditions. Use a generator only when necessary when the weather creates wet or moist conditions. Protect the generator by operating it under an open, canopy-like structure on a dry surface where water cannot form puddles or drain under it. Always ensure that your hands are dry before touching the generator.
- Be sure the generator is turned off and cool before fueling it.
- Keep children and pets away from portable generators at all times. Many generator components are hot enough to burn you during operation.

Safe Electricity suggests that these safety guidelines as well as basic operating instructions be posted in the home and with the generator.

Source: safeelectricity.org

March 18-24, 2018

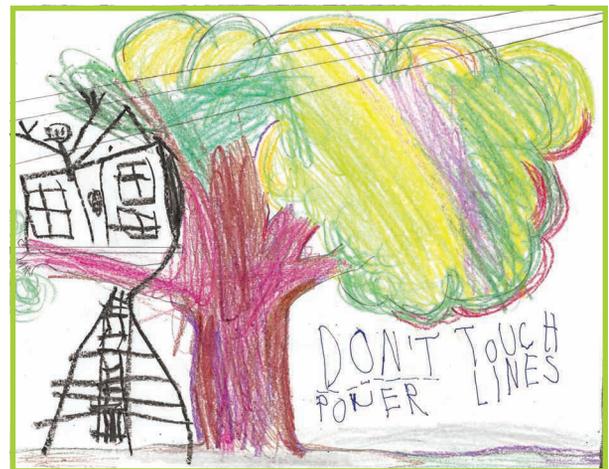
National Ag Week



In 2016, \$135.5 billion worth of American agricultural products were exported around the world.

Each American farmer feeds about 144 people! America needs agriculture...and we need our farmers, who provide Food for Life. This is why we're celebrating all things Ag on National Ag Day, March 20. Find out more: <https://www.agday.org/>

KIDS CORNER SAFETY POSTER

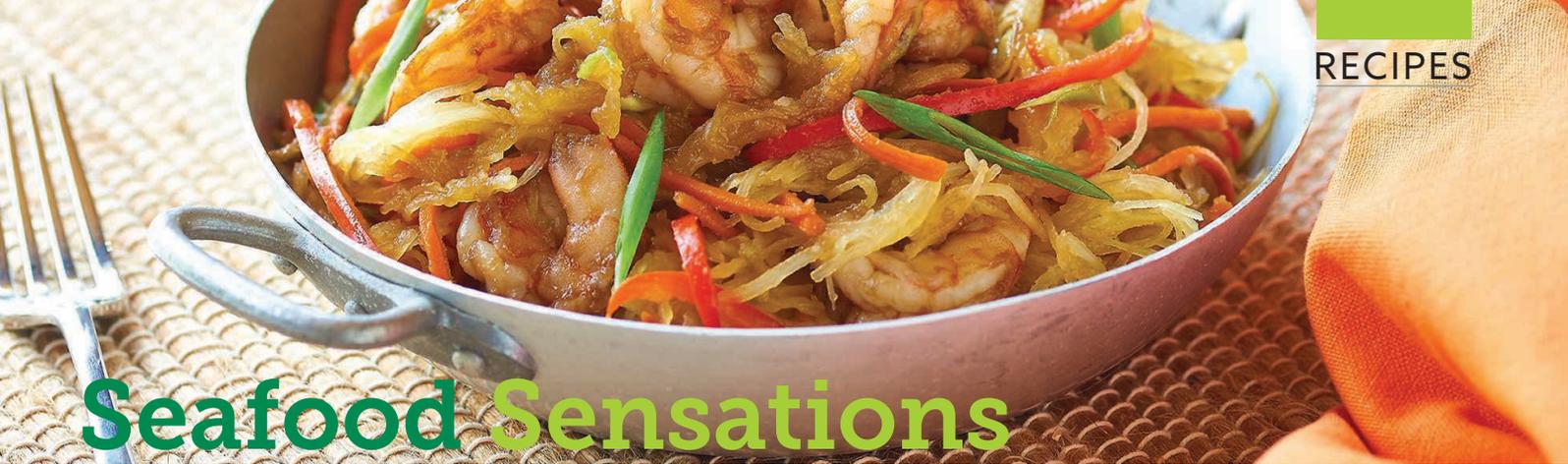


"Don't touch power lines."

Christopher Barranco, 5 years old

Christopher is the son of David and Catherine Barranco, Brandon, S.D. They are members of Sioux Valley Energy, Colman.

Kids, send your drawing with an electrical safety tip to your local electric cooperative (address found on Page 3). If your poster is published, you'll receive a prize. All entries must include your name, age, mailing address and the names of your parents. Colored drawings are encouraged.



Seafood Sensations

Seafood Quiche

1 (6 oz.) can crab, salmon or tuna, drained	1 cup milk
1 cup shredded Cheddar cheese	1/2 tsp. salt
Onions	Pepper to taste
4 eggs	Fresh chives, optional
	Paprika

Spray a 10-inch pie plate with vegetable cooking spray. Combine seafood, cheese and onions. Press into bottom and up sides of pie plate. Beat eggs, milk, salt and pepper; pour over all. Sprinkle with paprika, if desired. Bake at 350°F. for about 30 minutes or until eggs are set. Let set a few minutes before cutting.

Elaine Rowett, Sturgis

Broiled Salmon with Lemon

1 T. extra-virgin olive oil	4 (6 oz.) center-cut salmon fillets (about 1-inch thick)
1 tsp. grated lemon rind plus 1 T. fresh juice (from 1 lemon)	1/4 tsp. kosher salt
1 tsp. Worcestershire sauce	1/4 tsp. black pepper

Combine oil, rind, juice and Worcestershire sauce in a shallow dish. Place fillets, skin side up, in dish. Let stand 15 minutes. Preheat broiler with oven rack 6 inches from heat. Place fillets, skin side down, on a foil-lined baking sheet. Sprinkle with salt and pepper. Broil to desired degree of doneness, 8 to 10 minutes. Remove fillets from foil using a metal spatula.

Tina Haug, Pierre

Freeze Ahead Crab Appetizers

1 jar Old English cheese spread	1/2 tsp. seasoned salt
1/2 c. soft butter	1 T. mayonnaise
1/4 tsp. garlic salt/powder	1 (7 oz.) can crab meat
	6 English muffins, separated

Mix first 5 ingredients together well; stir in crab. Spread on each half muffin. Cut each half muffin into 6 wedges. Place in ziplock bag and freeze. When ready to serve, don't thaw. Bake at 400°F. for 10 minutes.

Ginny Jensen, Volga

Spaghetti Squash Shrimp Lo Mein

1 spaghetti squash, (about 2-1/2 lbs.)	2 tsp. vegetable oil, divided
1/4 cup reduced sodium soy sauce	1-1/2 cups matchstick carrots
2 T. honey	1 medium red bell pepper, thinly sliced
2 tsp. McCormick® Garlic Powder, divided	1 lb. shrimp, peeled and deveined
1-1/4 tsp. McCormick® Ginger, Ground, divided	1/4 cup thinly sliced green onions

Cut spaghetti squash crosswise into 1-inch thick rings. Remove seeds. Place rings on microwavable plate. Pour 1/4 cup water in the plate. Cover with plastic wrap. Microwave on HIGH 7 minutes or until tender. Let stand in microwave 10 minutes. Carefully remove from microwave. Peel the skin off the squash, then shred the flesh, using fingers or a fork, into long thin strands. Place squash noodles in large bowl. Discard the skin. (Should yield about 5 cups of squash noodles.) Meanwhile, mix soy sauce, honey, 1-1/2 tsp. of the garlic powder and 1 tsp. of the ginger in small bowl until well blended. Set aside. Heat 1 T. of the oil in large skillet on medium-high heat. Add carrots and pepper; stir-fry 3 minutes. Add shrimp and sauce mixture; stir-fry 2 minutes or just until shrimp turn pink. Remove shrimp mixture from skillet. Heat remaining 1 T. oil in skillet on medium-high heat. Add squash noodles, remaining 1/2 tsp. garlic powder and 1/4 tsp. ginger; cook and stir gently 1 minute to heat through. Return shrimp mixture to skillet; toss gently with squash noodles. Remove from heat. Sprinkle with green onions. Makes 7 (1 cup) servings

Nutritional Information Per Serving: Calories 165, Total Fat 5g, Saturated Fat 1g, Sodium 479mg, Cholesterol 96mg, Carbohydrates 18g, Protein 12g, Dietary Fiber 3g,

Pictured, Cooperative Connections

Please send your favorite appetizer, beverage and casserole recipes to your local electric cooperative (address found on Page 3).

Each recipe printed will be entered into a drawing for a prize in June 2018.

All entries must include your name, mailing address, telephone number and cooperative name.

Building A Culture of Safety

Northern Electric Recognized For Safety Program

Ben Dunsmoor

bdunsmoor@northernelectric.coop

Northern Electric Line Foreman Jerry Weber has worked as a lineman for the cooperative for nearly 35 years, but he knows safety is one job ticket he will never close during his career. At an electric cooperative, employee and member safety programs are never finished and are always evolving and improving.

In January, however, Northern Electric received recognition for working toward enhancing its safety program by participating in the Rural Electric Safety Achievement Program (RESAP).

“Overall, it’s a good review to have someone come into your co-op and look at your facility,” Weber said.



Northern Electric Line Foreman Jerry Weber participates in a pole rescue training exercise in 2015. Weber also served as an observer with the Rural Electric Safety Achievement Program (RESAP) in 2017.

“Safety has to be a priority. This is one way to measure if our safety is at a high level and if our safety program is remaining at a high level.”

Northern Electric received the recognition following an unannounced assessment of its facilities by safety professionals from the South Dakota Rural Electric Association (SDREA) and peers from neighboring cooperatives. The RESAP observation at Northern Electric was conducted

in July and involved an assessment of the facilities and equipment in both Bath and Redfield along with observations of crews working in the field. It is the first time Northern Electric has participated in RESAP which is supported by the National Rural Electric Cooperative Association and SDREA.

“Safety has to be a priority. This is one way to measure if our safety is at a high level and if our safety program is remaining at a high level,” SDREA Manager of Loss Control Services Mark Patterson said.

The RESAP observation teams include statewide safety professionals - like Patterson - and employees from other co-ops - like Weber - so electric cooperatives can learn from each other and share best practices. Following the unannounced observation at Northern Electric,



SDREA Loss Control Professional Travis Denison (left) presents Northern Electric CEO/General Manager Char Hager (right) with a certificate during the 2018 SDREA Annual Meeting for participating in RESAP.



Northern Electric lineman Darwin Dickhaut works on changing out a pole using the proper protective and safety equipment.

Weber was a member of a five-person RESAP team which performed an observation at Lake Region Electric Association in Webster.

“With five of us there were five sets of eyes and everyone saw something different,” Weber said. “It’s a good experience for other co-op employees to go to other co-ops and bring ideas back to your co-op.”

Lake Region, Northern Electric, and Oahe Electric Cooperative in Blunt, South Dakota, were the three new cooperatives to enroll in RESAP in 2017. There are now 22 electric cooperatives across South Dakota participating in the safety program.

“Due to the industry we are in we focus on safety and we determined RESAP was something we should participate in,” Northern Electric CEO and General Manager Char Hager said.

The combination of safety professionals and cooperative peers who make up the observation teams was one of the main reasons Northern Electric joined RESAP.

“They see things differently and have suggestions for changes or improvements,” Hager said. “You’ve got people who are doing those jobs day in and day out and know what to look at.”

Northern Electric regularly conducts safety assessments and trainings and holds monthly safety meetings for all employees, however, RESAP aims to take a co-op’s

safety program to the next level. RESAP not only includes on-site observations by industry professionals and peers every three years but it also requires co-ops to submit annual safety improvement plans and self-assessments.

“RESAP does a much better job of continuing to keep safety at the forefront in the daily operation because there are requirements that need to happen before and after the on-site observations,” Patterson said.

RESAP is not a requirement for electric cooperatives but it is a voluntary program to give co-ops feedback on the status of their current safety programs and ideas on how to improve those programs.

“It gives each co-op something to shoot for as far as safety issues,” Weber said.

The 200-point checklist that is reviewed during an on-site RESAP observation also looks at the co-op’s infrastructure by performing field inspections to make sure it is safe for members and local residents.

“It’s not just for the employees, it’s for the members too to make sure our facilities are safe,” Weber said.

Because co-op employees and managers across the state know building a culture of safety is crucial at an electric cooperative.

“We work in an unforgiving industry,” Hager said. “At the end of the day we want everybody to come home to their families.”

**“At the end of the day
we want everybody
to come home to
their families.”**





Solar energy generates about 1 percent of the nation's electricity.

WHERE RENEWABLE ENERGY GETS ITS POWER

Here are the basics of a small but fast-growing source of your electricity.

Paul Wesslund

NRECA Contributing Writer

Solar energy and wind power may not seem like a big deal. Unless you're talking about the future. Or maybe even the present.

For all today's talk about renewable energy, it still makes up a pretty small portion of the energy sources that generate our electricity. But it's coming on fast, and it's picking up speed.

Here's your crash course in how wind, the sun and water generate electricity.

Solar energy

Solar energy generates only about 1 percent of the nation's electricity, but that's a stunning increase from just five years ago, when the number was too small to report for the U.S. Department of Energy. Solar growth will continue as costs fall, technology improves and people figure out better ways to use solar energy.

There are lots of ways to use energy from the sun. You can hang your washed clothes outside to dry, and you can open curtains to warm your home on a sunny day. More ambitious projects use the sun to warm pipes full of water that is pumped around a building for heat.

But what most people mean when they talk about solar energy is photovoltaic electricity. When certain materials get hit by sunlight, their atoms spit out an electron, and electricity is just

DID YOU KNOW?

Approximately 15 percent of the nation's electricity is generated from renewable energy sources, like hydro, wind and solar power. That percentage may seem low, but renewable energy generation is gaining momentum and continues to play an important role in reducing greenhouse gas emissions.



6.5%
generated by
hydropower.



5.6%
generated by
wind.



0.9%
generated by
solar.

*Additional sources, like geothermal and biomass, contribute to the 15 percent of renewable energy generation.

Source: Energy Information Administration

a stream of electrons. Over the decades, scientists and engineers experimented with solar-sensitive materials to make them into lighter, longer-lasting and more affordable wafers called photovoltaic cells, which are combined and integrated into solar photovoltaic modules. One of their first uses was space travel, and continued improvements are allowing solar to become a more down-to-earth kind of energy.

One of those improvements is cost. Solar panel prices dropped 85 percent in the past seven years with improvements in materials and larger-scale production methods.

Another technological advance is about to give the industry an

extra boost, says Dale Bradshaw, a technical consultant with the National Rural Electric Cooperative Association (NRECA). He says solar panels can now track the sun as it moves across the sky rather than sitting fixed in place, raising their productivity by collecting more sunlight throughout the day. This year, the U.S. Department of Energy's Energy Information Administration reported that half the large solar installations in the country already use some kind of sun-tracking technology.

It's also worth knowing that the solar industry is maturing with different forms of ownership: utility, industrial, commercial and residential scale, and community solar installations.

Utility scale is what you might expect – large banks of solar panels owned and operated by an electric utility or other large organization, producing many megawatts of solar energy. Industrial and commercial solar installations can range from kilowatts up to multi-megawatts and be placed on rooftops, over parking lots or on land near industrial and commercial enterprises. Industrial and commercial installations are beginning to increase as the price for solar continues to drop. Residential solar installations are also being installed primarily on rooftops, especially in the southwestern United States.

NRECA's Bradshaw says community solar can ease the higher expense of self-owned rooftop solar. With community solar, a utility builds a large solar installation and sells shares in the project to customers interested in an investment in renewable energy. That style of ownership and development is especially suited to consumer-owned electric co-ops, and many are offering solar shares to their members.

“Co-ops are doing a great job of building community-scale solar,” says Bradshaw. “They're going full blast on that.”

Bradshaw also notes that community solar allows a homeowner to avoid both maintenance of their own system, and the hassle of sorting out different offers from rooftop solar vendors.

Wind power

Wind power has increased significantly as costs continue to decrease. Wind power generates nearly 6 percent of the nation's electricity, and it is growing at a pretty good clip, with an increase of about 35 percent during the past four years.

In a way, wind generates electricity the same way as coal, natural gas and nuclear – by spinning a turbine that creates an electricity-producing magnetic field. The huge difference is that the turbine is turned by enormous propeller-like blades designed to catch the wind.

It's the size of those blades, and the height of the turbine towers (as much as 300 feet in the air) that makes the difference, says NRECA's Bradshaw.

“Wind is a really useful renewable, but it has to be utility scale,” he says.

A tall utility-scale tower can capture as much as 50 percent of the wind, but there's not a practical, personal alternative to compare with rooftop solar. A rural residential customer or a rural commercial customer with a 50 to 100-foot tower will probably generate electricity only about 25 percent of the time. “It's really

not cost-effective for small-scale home use when compared to utility scale wind turbines,” says Bradshaw.

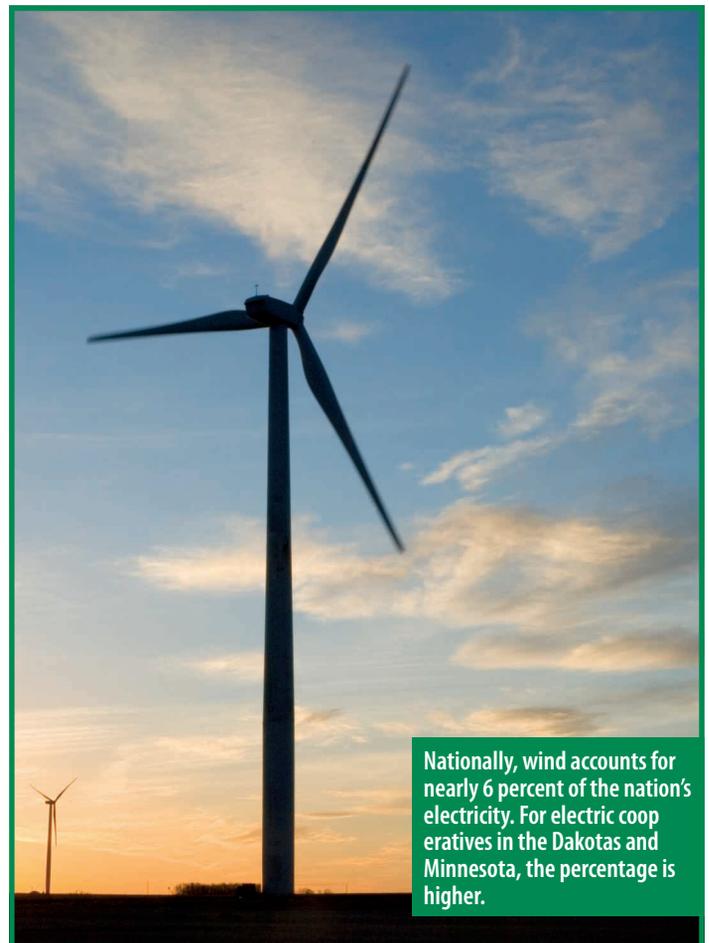
Hydroelectric power

Another way to turn an electricity-generating turbine is to store water behind a dam then harness its power as it flows from the reservoir to the river below.

Specialists disagree on whether to count hydroelectric power as renewable energy. On the one hand, it doesn't create greenhouse gas or other chemical pollutants by burning fossil fuel. On the other hand, large-scale hydro typically calls for building a permanent dam across a river valley and flooding the area behind it. Another option is to put hydroelectric generators directly in rapidly flowing rivers to capture power, but this is a significantly more expensive option than using hydroelectric power from water stored behind a permanent dam. Then there's the question of whether you consider flowing water renewable, or something that can be used up.

Hydroelectric power generates nearly 7 percent of the electricity in the United States. Although that number changes a bit during times of drought or heavy rain, the amount of electricity produced by hydro power has been relatively stable during the past several years.

Paul Wesslund writes on cooperative issues for the National Rural Electric Cooperative Association, the Arlington, Va.-based service arm of the nation's 900-plus consumer-owned, not-for-profit electric cooperatives.



Nationally, wind accounts for nearly 6 percent of the nation's electricity. For electric cooperatives in the Dakotas and Minnesota, the percentage is higher.



Students stop for a group photo during the four-day Youth Excursion in Bismarck, ND, in July 2017. The Youth Excursion trip will be part of the new Empower Youth program.

EMPOWER YOUTH

New Youth Leadership Program Begins May 31

Ben Dunsmoor

bdunsmoor@northernelectric.coop

A chance to earn scholarships.

An opportunity to learn about her strengths.

Fun and engaging sessions aimed at developing leadership and career skills.

Pipestone (MN) High School junior Lauren Laphorn said those were all reasons she got involved in the EmPOWER Youth program sponsored by Sioux Valley Energy a few years ago.

“I was looking for all of those things and so I joined,” Laphorn said.

Laphorn signed up for Sioux Valley’s EmPOWER Youth program in 2016. After attending the sessions and completing the program during the 2016-2017 school year, Laphorn is now serving on the EmPOWER Youth advisory committee and planning sessions for this year’s participants in the program.

EmPOWER Youth was launched by Sioux Valley Energy in 2014. Sioux Valley Energy is headquartered in Colman, South Dakota, and is the largest electric cooperative in the state. The co-op serves members in southeastern South Dakota and



Lauren Laphorn is a junior at Pipestone (MN) High School and serves on the Sioux Valley Energy EmPOWER Youth advisory committee after completing the program during the 2016-2017 school year.



southwest Minnesota. Sioux Valley started the program as a way to engage local high school students with their communities.

“The Board of Directors wanted to have an active role in developing students into leaders that will hopefully someday be tomorrow’s co-op employees or board members,” Sioux Valley’s General Manager/CEO Tim McCarthy said.

The program aims to introduce teens to leadership and communications training as well as giving them an outlet to discover their strengths and explore future careers.

“We have students blossom from this program,” McCarthy said. “They have gone from the shy kid in the corner to the young adult leading and mentoring other students. Their transition has been truly amazing.”

Sioux Valley’s EmPOWER Youth program has been so successful that it is now being expanded to co-ops throughout North Dakota and South Dakota. Basin Electric Power Cooperative, which operates the power plants and generating resources used by electric cooperatives in the region, is taking the lead to bring the program to co-ops like Northern Electric.

“It will be truly focused on students learning about themselves,” Empower Youth Coordinator Kristie Ching said.

The new Empower Youth program is sponsored by the electric co-ops in North Dakota and South Dakota and is free to students who apply. The program is open to any high school student within Northern Electric Cooperative’s service territory.

Empower Youth will consist of three separate sessions throughout the summer. The first session will be a one-day leadership training session at Central Electric Cooperative in Mitchell, South Dakota, on May 31. Teens participating in Empower Youth will also attend the four-day Youth Excursion trip to Bismarck, North Dakota, from July 23-26. Participants will stay at Bismarck State College and learn about energy careers, tour power generation facilities, and take part in networking and team-building activities with other co-op youth from across the region. The third

Empower Youth session will be scheduled in August before local school activities start for the year.

“The program is going to be designed to focus a lot more on professionalism and what teens need to know as they move on to college and careers and to be the best that they can be,” Ching said.

Sioux Valley started the EmPOWER Youth program with the vision that it would one day expand to more students in the state.

“They have gone from the shy kid in the corner to the young adult leading and mentoring other students. Their transition has been truly amazing.”

“We have seen this program open opportunities to students they never thought were possible,” McCarthy said. “We hope EmPOWER Youth will spread to other cooperatives and continue to make a huge impact on our students who will be leaders tomorrow.”

The new Empower Youth program that is being offered to students across the state will also provide scholarship opportunities for teens who participate in various program and co-op activities. Students need to register for the summer sessions at www.empoweryouth.coop by **April 18**.

Laphorn says the program has already helped her with job prospects in her community and she would encourage other teens to apply.

“Leadership is not always leading the group but most of the time listening to others and taking in their points of view,” Laphorn said. “I’d say definitely do it. You gain a lot of skills, knowledge, and friendships.”

Empower Youth Facts

Empower Youth is a summer leadership program sponsored by the Touchstone Energy Cooperatives in South Dakota and North Dakota. It is designed to help high school students discover their strengths and learn about leadership and future careers.

The program is open to students who will be in grades 9-12 during the 2018-2019 school year.

The program will consist of three sessions throughout the summer. Empower Youth is a free program, however, students will have to pay for transportation to the one-day sessions in May and August.

Scholarship opportunities ranging from \$250-\$1,000 will be available for Empower Youth participants.

May 31

- One-day leadership training session
- Session held at Central Electric Cooperative in Mitchell, SD
- Youth speaker Craig Hillier featured during session

July 23-26

- Four-day excursion to Bismarck, North Dakota
- Stay at Bismarck State College
- Tour power plants
- Learn about energy careers
- Participate in various career and team-building activities

August 2018

- Final one-day session
- Date and location TBA

Register at
www.empoweryouth.coop
The deadline to register is
APRIL 18.

Robots and Sensors

Electric co-ops use innovative technologies for real-time feedback on the health of the grid.

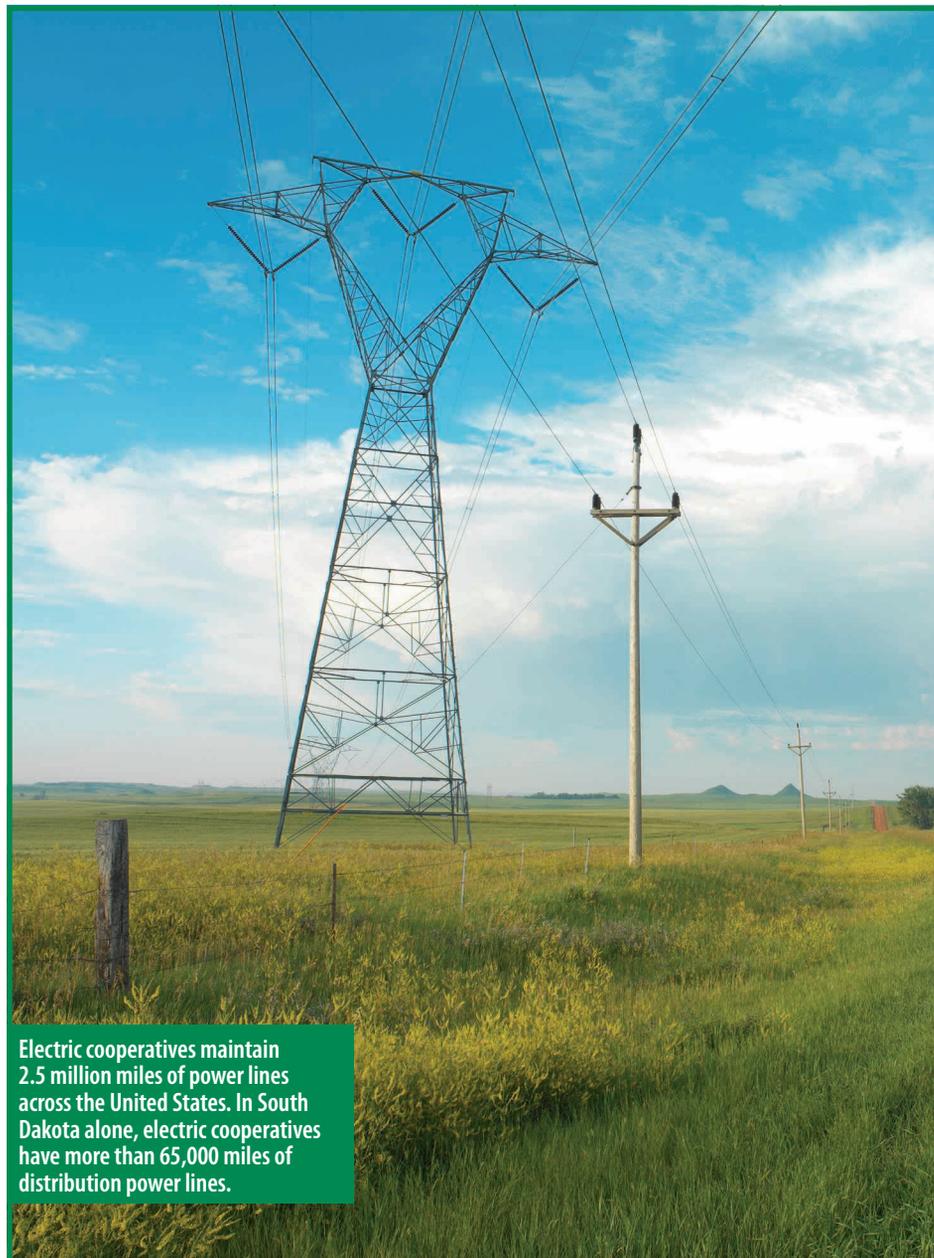
Thomas Kirk

NRECA Associate Analyst

Today, electric cooperatives may choose from a wide array of technologies that give them near real-time feedback on the health of the grid.

Electric grids are immense machines that span counties, and often entire states, bringing power to many homes and businesses. So how do the electric companies know what's happening on their lines? How much power is being delivered? What equipment needs to be replaced? These are important questions that electric cooperatives spend a lot of time and money to answer.

For many years, electric co-ops relied entirely on in-person inspections to determine asset conditions and calls from members to discover power outages. During and after storms, this could mean lengthy recovery times as supervisors evaluated the available information and decided where to send line crews, who then searched for damaged lines in order to make repairs and restore electric service. Even normal operations required personnel to be sent into the field constantly to perform manual inspections. Today, electric co-ops may choose from a wide array of technologies that give them near real-time feedback on the health of the grid. Monitoring and automation tech-



Electric cooperatives maintain 2.5 million miles of power lines across the United States. In South Dakota alone, electric cooperatives have more than 65,000 miles of distribution power lines.

nologies are becoming more affordable and gaining more functionality leading to greater use in the field.

Two of the most common technologies in this space are Supervisory Control and Data Acquisition (SCADA) and

Automated Meter Infrastructure (AMI).

SCADA systems have greatly evolved since their original development in the 1920s. Modern systems take advantage of communication, monitoring and automation technologies to give utilities a



Electric cooperatives are exploring a host of innovative technologies, such as smart meters and special sensors placed on power lines for niche applications, including fault location, power theft detection and asset management.

real-time picture of how substations are performing and make changes as needed. At the end of the line, AMI, also known as smart meters, report back to the utility how much energy consumers use, often on a 15-minute basis. Utilities can “ping” these meters to determine if they’re still receiving power during storms or other types of outages.

Beyond AMI and SCADA, utilities are exploring a host of other sensor technologies for niche applications including fault location, power theft detection and asset management. These applications are being enabled by a new wave of inexpensive sensors that cost one-tenth of what they did a decade ago. When a fault occurs on a transmission line (the large power lines that carry power from plants to substations), they create transient waves on the lines. By placing special sensors on transmission lines and measuring the time that a wave reaches two of these sensors, the location of a fault can be accurately and quickly determined. This lets the utility know exactly where to send repair crews.

Across the whole U.S. electric industry, roughly \$6 billion worth of electricity is stolen annually, which leads to higher prices for everyone. Traditionally, one of the best tools for identifying power theft

For members, these technologies provide three primary benefits: increased reliability, reduced outage times and lower prices.

is visual inspection of meters for signs of tampering, but with AMI systems, utility personnel aren’t visiting meters in-person as often. Load-monitoring sensors – often called current transformers (CTs) or current sensors – can be placed on distri-

bution power lines to help catch significant losses along a line, from theft or for other reasons. Data gathered by CTs can be reconciled with meter readings to investigate discrepancies between the electricity passed through the line and the electricity measured by the meters. CT devices are also valuable for diagnosing excessive line loss due to other problems, such as conductor damage or aging transformers.

For members, these technologies provide three primary benefits: increased reliability, reduced outage times and lower prices as the utility manages employee time and resources more efficiently. As sensors continue to improve and drop in price, expect to see more real-time grid monitoring.

Thomas Kirk is an associate analyst of distributed energy resources for the Arlington, Va.-based National Rural Electric Cooperative Association’s Business & Technology Strategies (BTS) division.



Rate Changes Are Coming March 1

Letters Detailing Rates Were Sent To All Members In January

Members with questions about the rate change, or members who did not receive a letter or any communication about the rates in January or February, should contact the co-op directly by calling 605-225-0310.

A new rate structure approved by the Northern Electric Cooperative Board of Directors in 2017 will go into effect on March 1, 2018. The rate structure changes are being made following a rate study which was conducted by Northern Electric Cooperative's independent engineering firm in 2017.

Letters detailing each rate were sent to all members in January to make them aware of the upcoming changes.

This rate change is necessary to ensure that the cooperative can continue to meet its financial obligations every month and consistently provide the members of the cooperative with safe and reliable power.

It is important to remember that Northern Electric is a not-for-profit cooperative and any margins will be allocated to the

membership as capital credits. The co-op typically returns a portion of the allocated capital credits to members in the form of a bill credit in the fall.

Members with questions about the rate change, or members who did not receive a letter or any communication about the rates in January or February, should contact the co-op directly by calling 605-225-0310. Co-op employees are ready to assist any member who has a question about the upcoming changes.

The new rates will be implemented for all accounts - except irrigation - on March 1. The first statements reflecting the changes will be sent out in April. Irrigation rate changes will take effect on April 1 with the first statement reflecting the changes being sent out in May.

INSPIRING LIFE OUTSIDE THE CITY LIMITS

We're committed to bringing our local farmers, manufacturers, communities and families the tools, technology and economic support to realize our region's full potential.

Together we are

RE-ENERGIZING RURAL



Northern
Electric
Cooperative

A Touchstone Energy® Cooperative 

March 3-6

2018 Summit League Basketball Championship, Sioux Falls, SD, 605-367-7288

March 9-10

Holiday Arts Spring Craft Show, Masonic Temple, Mitchell, SD, 605-359-2049

March 10

Farm and Home Show, 10 a.m. to 5 p.m., Auditorium, Gregory, SD, 605-830-9778

March 10-11

2018 Gun Show, American Legion Hall, Saturday 9 a.m. to 5 p.m., Sunday 9 a.m. to 3 p.m. MST, Philip, SD, 605-859-2280 or 605-441-8466

March 15-17

South Dakota High School State B Boys Basketball Tournament, Barnett Center, Aberdeen, SD

March 15-17

South Dakota High School State A Boys Basketball Tournament, Rushmore Plaza Civic Center, Rapid City, SD

March 15-17

South Dakota High School State AA Boys Basketball Tournament, Premier Center, Sioux Falls, SD

March 16-17, 23-24

60th Annual Schmeckfest, Freeman, SD, 605-925-4237

March 17

Annual Ag Day at the Washington Pavilion, Sioux Falls, SD, 605-367-6000

March 24

Spring Craft Fair/Flea Market, American Legion Hall, Wagner, SD, 605-384-3543



February 24: Annual Outhouse Races and Chili Cook off Contest, Nemo, SD, 605-578-2708

Photo courtesy: travelid.com

March 24

Milltoness Spring Show, 7 p.m., High School Theatre, Milbank, SD

April 5

McCrossan's Wildest Banquet Auction in the Midwest featuring A Night Out with the PBR, 5:30 p.m., Arena, Sioux Falls, SD, Tickets: \$75 each, 605-339-1203, www.mccrossan.org

April 6

SPURS Spring Dance, Dakota Events Center, Aberdeen, SD, Tickets available at the Hitch 'N Post or by calling 605-226-1099

April 6-7

Forks, Corks and Kegs Food, Wine and Beer Festival, Deadwood, SD, 605-578-1876

April 6-8

Professional Bull Riders Built Ford Tough Series, Sioux Falls, SD, 605-367-7288

April 7-8

Hats Off to the Artists Art Show, Faulkton, SD, 605-598-4160

April 25-29

Black Hills Film Festival, Hill City, SD, 605-574-9454

April 28-29

Bike Show, Ramkota Convention Center, Aberdeen, SD, 605-290-0908

May 10

Chris Young, Don Barnett Arena, Rushmore Plaza Civic Center, Rapid City, SD, 605-394-4115

May 13

1880 Train Mother's Day Express, Hill City, SD, 605-574-2222

May 18

Turkey Races, Huron, SD, 605-352-0000

May 18-19

Sioux Empire Film Festival, Sioux Falls, SD, 605-367-6000

May 18-20

State Parks Open House and Free Fishing Weekend, Pierre, SD, 605-773-3391

May 18-20

Tesla Road Trip Rally, Custer, SD, 605-673-2244

July 7

Hedahls Auto Value Car Show, Hav-A-Rest Campground, Redfield, SD, 605-380-9985

July 10-15

4th Annual 3 Wheeler Rally, Deadwood, SD, 605-717-7174, www.d3wr.com

To have your event listed on this page, send complete information, including date, event, place and contact to your local electric cooperative. Include your name, address and daytime telephone number. Information must be submitted at least eight weeks prior to your event. Please call ahead to confirm date, time and location of event.