

MICHIGAN COUNTRY LINES

Keeping Soil Healthy

Gypsum's Role In Agriculture
And Electricity

Plus!

Delo, Smith 'Top Out'

What Does An Electric Line Cost?

Parkhouse, Warchuck Tell Their
Guatemala Stories



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dwgeothermal.com



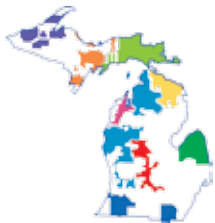
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Michigan's Electric Cooperatives
countrylines.com

February 2016
Vol. 36, No. 2

Executive Editor
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Editor
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Publisher
**Michigan Electric
Cooperative Association**

Design and Layout
Ciesa Design

Michigan Country Lines, USPS-591-710, is published monthly, except August and December, with periodicals postage paid at Lansing, MI, and additional offices. It is the official publication of the Michigan Electric Cooperative Association, 201 Townsend St., Suite 900, Lansing, MI 48933.

Subscriptions are authorized for members of Alger Delta, Cherryland, Great Lakes, HomeWorks Tri-County, Midwest Energy, Ontonagon, Presque Isle, and Thumb electric cooperatives by their boards of directors.

POSTMASTER: SEND ALL UAA TO CFS.

Association officers are **Robert Kran**, Great Lakes Energy, chairman; **Mark Kappler**, HomeWorks Tri-County Electric, vice chairman; and **Eric Baker**, Wolverine Power Cooperative, secretary-treasurer. **Craig Borr** is president and CEO.

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The appearance of advertising does not constitute an endorsement of the products or services advertised.

Change of Address:
Please notify your electric cooperative.
See page 4 for contact information.

IN THIS ISSUE

ON THE COVER*

Healthy soil is crucial for farmers, and when key nutrients like sulfur are lacking, crops won't thrive. Electric co-op member and farmer, Brian Stratton, is adopting new agricultural fertilizer technology from coal fired power plants to feed his soil with much needed sulfur made from pelletized gypsum.

**Some co-op editions have a different cover.*

IN YOUR WORDS

Question Of The Month—We Asked, You Answered.

Last month, we asked electric co-op members a question: If you could only have one meal for the rest of your life what would it be? Thank you for all the responses. Here are some answers from our members...

"The meal I would eat for the rest of my life would be pizza because it can come in many different shapes and flavors."

"Chicken, sweet potatoes/squash, vegetable salad, strawberry shortcake (biscuit) and chocolate milk."

"Two poached eggs, two strips of crisp bacon, two slices of whole wheat toast, fresh squeezed orange juice and coffee."

Our new Question of the Month is:

What is the best compliment you have ever received?

Please submit answers to countrylines.com by March 1.

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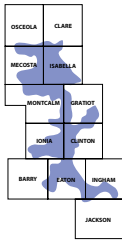
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Jeannine Taylor



Tri-County Electric Cooperative

Your Touchstone Energy® Cooperative

Blanchard office:

3681 Costabella Avenue
Blanchard MI 49310
Open 8 a.m.–5 p.m. Monday–Friday

Portland office:

7973 E. Grand River Avenue
Portland, MI 48875
Open 8 a.m.–5 p.m. Monday–Friday

Electric bill/account questions:

517-647-7554 or 1-800-562-8232

Pay by phone, anytime:

1-877-999-3395

Service questions/outages:

517-647-7554 or 1-800-848-9333
(24 hours for emergency calls)

Tri-County Propane:

1-877-574-2740

High Speed Internet

1-800-668-8413

homeworks.org

E-mail: tricoenergy@homeworks.org

Board of Directors

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5130 W. Gresham Hwy., Charlotte, MI 48813
517-726-0127
pconklin@homeworks.org

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wswiler@homeworks.org

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khansen@homeworks.org

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989-862-5590
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Editor: Jayne Graham, CCC



Join the conversation at
facebook.com/HomeWorks.org

Directors—And Your Vote— Make A Difference



Mark Kappler
General Manager

As an electric cooperative, HomeWorks Tri-County is guided by an elected board of directors who represent its members' best interest when considering decisions and policies. A director's decisions will impact issues such as service rates, rights-of-way and work plans. This position holds great responsibility and requires men and women who understand their community's needs and will serve the cooperative members' best interest.

That's why it's important for you, as our member-owners, to continue electing strong directors to our board. Experienced and trained directors help guide us into the future, keeping yesterday's lessons in mind. Fresh ideas and new perspectives help the co-op develop policies that help keep our community competitive.

Our board is a democratically elected body nominated by members of the cooperative's service territory and voted into position by any member who chooses to participate in the cooperative's open election. At HomeWorks Tri-County, we hold elections every May in two or three of our seven districts.

This year, for the first time in many years, all three incumbent directors have decided not to run for re-election. We're going to miss Phil Conklin, Cara Evans, and Dean Floria for their experience and the extras each brought to the board table. However, this is also an opportunity to bring in some of those new perspectives to help guide HomeWorks Tri-County into the future, whatever it brings.

If you are a member in one of the three districts open this year (see p. 5), and would be interested in serving or can recommend someone, please contact the district officers who serve as the nominating committees. They have a big job this year and would love to hear from you. Any co-op member (in good standing) is welcome to run for an open position on the board.

In May, read *Country Lines* to learn more about this year's director candidates, and learn when and where your district meeting will be held. Then, come out to vote and show your support for the director candidate of your choice.

Even if it's not a board election year in your district, you will be asked to vote for district officers. Each district's officers serve as that district's nominating committee, looking for the leadership and willingness to serve that the co-op needs. You can see how important that job is!

The leaders who serve our co-op, and your votes, make a big difference to how the cooperative is guided in its policies and operations. Make your vote count. ■

Are You Interested In Serving On The Board?

Three Incumbent Directors Retire in 2016

Philip Conklin, Cara Evans, and Dean Floria have announced they will not seek re-election to the HomeWorks Tri-County Electric board of directors this year.

Conklin, who represents Eaton, Ingham, and Jackson counties in District 1, was first elected to the board in 1989. Evans was first elected in 1986 to represent District 5, which includes Gratiot and Saginaw counties, along with parts of Clinton and Montcalm counties. Floria was appointed to the board in 1996, to fill the District 7 seat serving Mecosta and Osceola counties after the sudden death of director Bill Chapin, and has won re-election each term since then.

The nominating committee in each district consists of the district's officers (listed on this page), elected by members at the district meeting in May. Each committee is required by the co-op's bylaws to nominate at least one candidate on or before *March 15*. Candidates may also be nominated with a petition signed by at least 25 members from within the district. Petitions must be turned in by *April 5*.

Names of nominees will be posted at the cooperative's offices by *April 10*.

Interested In Seeking A Board Seat?

If you're interested in running for a HomeWorks board seat yourself, Article VII, Section 2, of the cooperative's bylaws states you must be an individual member of the cooperative in good standing, at least 21 years old, residing in the district which you are to represent, and a U.S. citizen.

To become or remain a director, the candidate must have the capacity to enter into legally binding contracts; comply with standards of conduct as laid out in the bylaws; and meet all reasonable conflict of interest qualifications found in Article VII, Section 3.

Also, within the 10 years immediately prior to becoming a director, a candidate shall not have been convicted of or pled guilty to a felony or misdemeanor crime involving issues of moral character.

For a copy of the bylaws, please visit our website at homeworks.org.

If you meet these qualifications and would like to be nominated, contact your district nominating committee, listed on this page, or call HomeWorks Tri-County Electric at 517-647-1211 for a nominating petition.

Information about all candidates and district meeting dates, along with an absentee ballot request form, will be published in the May issue of *Country Lines*. ■

Who Makes Up District Nominating Committees?

Nominating committees are comprised of the district officers, elected by members at the previous year's district meeting.

District 1: Eaton, Ingham, and Jackson counties

Patricia Zimmerman, *Chair*

1885 Flanders Rd.

Charlotte, MI 48813

517-543-6736

email: pattyiez@1a4u.net

Miner Roth (Grand Ledge), *Vice Chair*

Drouscella Halsey (Charlotte), *Secretary*

District 5: Gratiot and Saginaw counties, plus Bingham, Duplain and Greenbush townships in Clinton County, and Bloomer, Crystal and Evergreen townships in Montcalm County

Carl Bornemann, *Chair*

7560 Woodbridge Rd.

Ashley, MI 48806

989-862-5139

Reginald Stevens (St. Johns), *Vice Chair*

Corinna Batora (Elsie), *Secretary*

District 7: Mecosta and Osceola counties

Jean Chapin, *Chair*

6240 5 Mile Rd.

Blanchard, MI 49310

231-972-8623

Don Passolt (Hersey), *Vice Chair*

Connie Gibson (Evart), *Secretary*



People Fund Director Retires After 19 Years Of Service

Mary Ellen Heffron, recently retired from the Tri-County Electric People Fund, is thanked for her service by Luke Pohl, District 3 director for HomeWorks Tri-County Electric Cooperative.



Keeping Your Pets, Energy Budget Comfortable!

By Patrick Keegan

Pet owners often assume their indoor pets want the same level of cooling and heating as the rest of the family. However, most dogs and cats can be comfortable with a wider range of temperatures.

Those with unique pets, like birds or lizards, may need to keep them in warmer environments. Consider moving these pets to a room that can be kept warm easily, but note that this may change over the course of a year.

Pet doors are popular, but they can also be a major air leak that drives up your energy use. When purchasing a pet door, make sure it has energy-efficient features, such as thick construction, weather sealing and the ability to be closed off when not in use. Some newer models have magnet or battery locks: a small magnet or sensor on your pet's collar opens the door, and the rest of the time, the door is shut tight, keeping out other critters—as well as blowing wind and snow!

Some people also leave the TV or radio on while they're away, thinking that the voices will keep their pets from being bored (and destroying their shoes!). However, there are other ways to keep your pooches and kitties entertained. Exercising your pet when you're home and giving them a variety of toys or a nice perch to see out a window when you leave will be more entertaining and less energy

intensive than a TV. If you must leave something on when you're away, try soothing, calm music instead of a blaring TV.

We all love our furry family members, but remember, keeping them comfortable doesn't mean you have to pay more on your monthly bill. ■

Here are a few tips to keep your pet comfortable without cranking up the thermostat:

- A cozy, insulated doghouse might be all your outdoor dog needs, except on the very coldest days.
- Make sure that your indoor pet has a warm place to sleep, like a pet bed with a blanket. Consider giving him a few sleeping options throughout your home in different temperature zones, so your pet can adjust his comfort as needed.
- If you have a very drafty home or an older pet who may appreciate more warmth, a heated pet bed or bed warmer will use far less energy than running your central heating higher all day. This solution can also be good for those who keep their pets in the garage and worry about them staying warm enough. Instead of heating a large, uninsulated space, provide a nice warm bed!



DANGER! Outlet Overload

Every year, U.S. fire departments respond to an estimated **25,900 home electrical fires**. These fires cause an estimated **280 deaths, 1,125 injuries** and **\$1.1 billion in property loss**.

Thirty-nine percent of home electrical fires involve outlets and receptacles, and other electrical wiring.

To ensure safety, you should only use about 80 percent of the available current for each electrical outlet in your home.

Are you overloading outlets?
Use this formula to find out:

WATTAGE/VOLTS=AMPS

Example:

Let's say you are using 2,000 watts of power (for one outlet). Divide the watts by the volts in your home (typically 120), and you come up with 16.6 amps of current being used. With a 20 amp electrical outlet, you are using about 80 percent of the available current.

Energy Savings For Farmers, Agribusinesses

Farmers: Are you tired of high energy bills eating up your budget? Reducing the amount of electricity used to power your equipment is a smart way to eliminate energy waste and unnecessary costs. HomeWorks Tri-County Electric Cooperative's Energy Optimization program offers rebates toward a wide range of energy efficiency improvements which could add up to big savings.

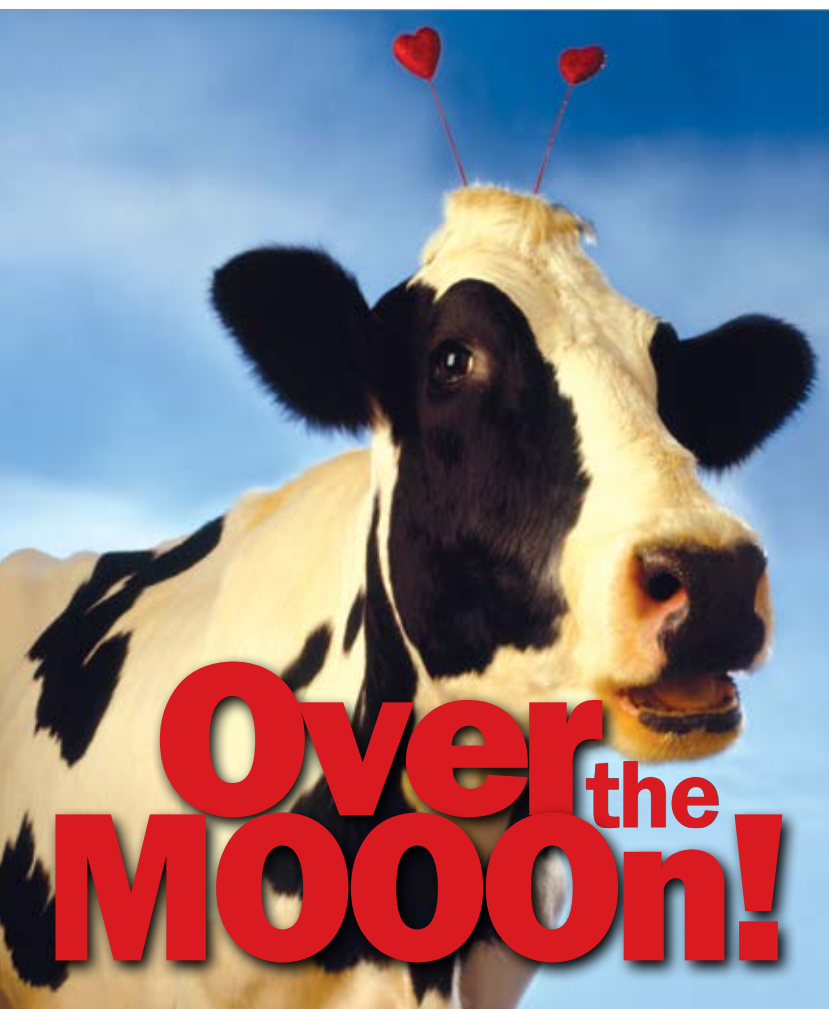
Farm Energy Audit: The Energy Optimization program has partnered with the Michigan Farm Energy Program (in conjunction with Michigan State University Extension) to offer a **\$500 rebate** toward the cost of a farm energy audit. The audit will help you identify where and how to implement practical, energy-saving alternatives to outdated, inefficient equipment.

Rebates for Energy Efficient Products and Equipment: Receive cash back when you purchase and install energy efficient measures such as low-energy livestock waterers, fans and controls, milk-handling equipment, variable speed pumps and controllers, dairy refrigeration tune-ups, lighting upgrades, variable frequency drives, and more.



Rebates for Custom Projects: Have an energy efficiency project in mind, but don't see it on our list? The Energy Optimization program provides rebates for innovative and unique energy efficiency projects designed to meet specific needs, such as long-day lighting systems, milk harvesting and cooling equipment, controlled atmosphere storage room upgrades, and more.

These are just a few of the energy-saving offers currently available for Michigan agribusinesses. View all farm service incentives at michigan-energy.org or call **877.296.4319** for details. ■



Fall In Love With Energy Efficiency

We know how hard Michigan farmers work just to keep the lights on. That's why the Energy Optimization program offers rebates for energy-saving upgrades—for everything from lighting, to pumps, compressors, irrigation, fans, and more. You'll be hooked when you see how saving energy improves your bottom line!

ENERGY TIP: Discover the most effective ways to start saving with a farm energy audit. Act now to receive a \$500 rebate!

ONLINE: michigan-energy.org
PHONE: 877.296.4319



Energy Optimization programs and incentives are applicable to Michigan service locations only. Other restrictions may apply. For a complete list of participating utilities, visit michigan-energy.org.

SnapSHOT

Cute Pets



Capture Your Favorite Moments And Share

1. Richard Perry of Troy (a member at Lake Isabella), took this photo of granddaughter Sophie Perry, and Max, her partner-in-crime.
2. Sharon Holzhausen of Weidman sent in this photo of Nena, an Australian shepherd that loves to play Frisbee. "In this pic, she picked up her Frisbee as we were about to head outside to throw it a bit and all I could see was my dog with big lips. That is the actual color of the Frisbee," Sharon says.
3. Ezekiel McMillan of Stanwood shared this photo he captioned "You'd Better Watch It," of Johnny, at about 18 months old.
4. Denise Williams of Canadian Lakes captured a moment when Jackson, her golden retriever, was dreaming.

See more amazing photos at facebook.com/HomeWorks.org

Submit Your Photo!

Contributors whose photos we publish in 2016 will be entered into a drawing and *Country Lines* will choose two winners for a bill credit of up to \$100 each on their December electric bill, due in January 2017!

Upcoming Snap Shot Contests

Upcoming topics for 2016 include **"Beautiful Birds,"** due **Feb. 15** for the April issue; **"Saluting Our Armed Forces,"** due **March 15** for the May issue; and **"Fishing,"** due **April 15** for the June issue.

Go to homeworks.org/content/snapshots to submit your high resolution digital photos and see additional themes. It's fast and easy. To send by mail: Include your name, address, phone number, photographer's name, and details about your photo. Mail to Attn: *Country Lines* Snap Shots, 7973 E. Grand River, Portland, MI 48875. Photos will not be returned. Do not send color laser prints or professional studio photos.

SIMPLY...GLUTEN-FREE

These recipes show how delicious and easy a gluten-free diet can be.

Chocolate Devil's Food Cupcakes

Laura Harrand, Traverse City

- 1 c. boiling water
- 1 c. gluten-free unsweetened cocoa powder
- 1 c. brown rice flour
- ½ c. sweet sorghum flour
- ½ c. potato flour
- 2 t. baking soda
- 1 t. guar gum
- ½ t. salt
- 2 c. granulated sugar
- 8 T. (1 stick) salted butter, at room temp
- 2 eggs, at room temp
- 1 t. gluten-free vanilla extract
- 1 c. low-fat buttermilk
- icing of your choice

Preheat oven to 400°. Line a 12-cup muffin tin with cupcake liners. In a large bowl, whisk the hot water and cocoa powder together. In another large bowl, stir together the brown rice flour, sorghum flour, potato flour, baking soda, guar gum and salt. Add the sugar and butter to the cocoa mixture. With an electric mixer on high speed, beat until a smooth shiny mixture forms, about 30 seconds. Then beat in the eggs and vanilla on low speed until incorporated. Add half of the flour mixture and beat on low speed just until combined; there may be dry spots. Add ½ c. of the buttermilk, mixing on low speed just until incorporated. Repeat with the remaining flour mixture and the remaining buttermilk.

Fill each muffin cup $\frac{3}{4}$ full with the batter. Reserve the remaining batter and fill four more cupcake liners; set aside. Bake for 15–20 minutes, until the centers of the cupcakes are firm to the touch. Remove the cupcakes from the muffin tin and let cool completely on wire rack. Repeat with the remaining batter. Once the cupcakes are cooled, use a small spatula or butter knife to ice them with your choice of icing. Store in an airtight container in the refrigerator for up to five days.

Almond Butter Quinoa Blondies (pictured)

Jan Anglebrandt, Gaylord

- ¼ c. unsalted butter, softened
- ¾ c. smooth or crunchy natural almond butter
- 2 lg. eggs
- ¾ c. packed light brown sugar
- 1 t. vanilla extract
- ¾ c. quinoa flour (see tip below*)
- 1 t. baking powder
- ¼ t. salt
- 1 c. semisweet chocolate chips

Preheat oven to 350°. Line an 8-inch-square baking pan with parchment paper (or foil), allowing it to overhang the opposite ends slightly. Coat with cooking spray. *To make your own quinoa flour, grind raw quinoa into a powder in a coffee grinder or blender.

Beat butter and almond butter in a mixing bowl with an electric mixer until creamy. Beat in eggs, brown sugar and vanilla. Whisk quinoa flour, baking powder and salt in a small bowl. Mix the flour mixture into the wet ingredients until just combined. Stir in chocolate chips. Spread the batter evenly into the prepared pan. Bake until a toothpick inserted into the center comes out with just a few moist crumbs on it, 25 to 35 minutes. Do not overbake. Let cool in the pan for 45 minutes. Using the parchment (or foil), lift the whole panful out and transfer to a cutting board. Cut into 24 squares. Let cool completely before storing. Makes 24 blondies.

Red Lobster Style Cheese Biscuits

Christine Server, Afton

- ⅓ c. shortening
- ½ c. potato starch
- ¾ c. cornstarch
- 1 ¾ t. xanthan gum
- 1 T. baking powder
- ¼ t. baking soda
- ¾ c. milk
- ½ t. salt
- 1 T. sugar
- ½ c. shredded cheddar cheese
- ¼ c. softened butter
- ¼ c. melted butter
- ½ t. garlic powder

Preheat oven to 375°. In a large bowl, mix together the shortening, potato starch, cornstarch, xanthan gum, baking powder, baking soda, milk, salt and sugar. Add shredded cheddar cheese and softened butter. Pat into ½" thickness on cornstarch covered board. Cut into round shapes. Bake on lightly greased sheet for 12–15 min. As soon as baking is completed, brush with a mix of melted butter and garlic powder.



Roasted Cabbage Steaks

Barbara Olson, Middleville

- 1 head of organic green cabbage, cut into 1" thick slices
- 1½ T. olive oil
- 2–3 lg. garlic cloves, smashed
- kosher salt
- freshly ground black pepper
- spray olive oil or non-stick cooking spray

Preheat oven to 400° and spray a baking sheet with non-stick cooking spray. Pull outer leaf off cabbage, and cut cabbage from top to bottom (bottom being root) into 1" thick slices. Rub both sides of cabbage with smashed garlic. Use a pastry brush to evenly spread the olive oil over both sides of the cabbage slices. Sprinkle each side with a bit of kosher salt and freshly cracked black pepper.

Roast on the middle rack for 30 minutes. Carefully flip the cabbage steaks and roast for an additional 30 minutes until edges are brown and crispy. Serve hot and enjoy! *"I usually serve this with potatoes and carrots sautéed in vegetable broth with some caraway seed sprinkled in. This is a simple side dish worthy of a dinner party, and couldn't be easier to make."*

SUBMIT YOUR RECIPE!

Thanks to all our readers who send in recipes. Please send in your favorite "Snacks and Appetizers" recipes by **March 1** and "Quick and Easy" recipes by **April 1**.

Enter your recipe online at countrylines.com or send to (handprint or type on one side, please): *Country Lines* Recipes, 201 Townsend St., Suite 900, Lansing, MI 48933. Please note the co-op from which you receive your electric service.

A RECIPE WINNER EVERY MONTH!

Contributors whose recipes we print each month will be entered in a drawing and *Country Lines* will pay the winner's electric bill with a \$50 bill credit! A winner will be selected every month.

People Fund Tops \$2 Million Grant Mark, Thanks To You

Meeting Dec. 17, the Tri-County Electric People Fund board thanked Mary Ellen Heffron for her years of service. Heffron retired as of Dec. 1 after 19 years as a People Fund director.

In addition, the People Fund board made 11 grants totaling \$16,610.15, including:

- \$1,000 to Positive Solutions Informed Choices, Ionia, for their practical fatherhood course;
- \$500 to Mt. Pleasant Discovery Museum, to purchase supplies for the Paint Time program;
- \$1,200 to Gratiot-Isabella RESD, Ithaca, to support the Dolly Parton Imagination Library program;
- \$1,000 to Ionia County YMCA, for their child swim safety program;
- \$1,000 to a Montcalm County family for housing expenses;
- \$1,200 to a Montcalm County family for housing expenses;
- \$2,860.15 to a Montcalm County family for housing expenses;
- \$2,500 to an Isabella County family for home repairs;
- \$2,500 to an Ionia County family for housing expenses;
- \$450 to a Mecosta County family to replace a damaged meter pole; and
- \$2,400 to an Isabella County family for a new furnace.

Your Board in Action

Meeting at Blanchard Dec. 17, your board of directors:

- Recognized Blanchard lineman Allen Delo and Portland lineman Jeremy Smith for completing their apprenticeships.
- Met with lineman Rick Warchuck, one of two HomeWorks Tri-County Electric linemen who traveled to Buena Vista, Guatemala, recently to help bring electricity to the remote mountain village.
- Read and discussed Board Policy 112 – “Strategic Planning,” approving it as read.
- Approved 2016 insurance coverage at the same levels and roughly the same costs as 2015.
- Reviewed the cooperative’s strategic plan summary and tactical plans for 2016, developed with input from the board and employees.
- Named voting delegates to the NRECA Annual Meeting, and related meetings, in March 2016.
- Learned there were 114 new members in November.
- Acknowledged the November-December safety report, listing employee training and several employee and public incidents.



Allen Delo, left, and Jeremy Smith were congratulated by board chairman Ed Oplinger in December on “topping out,” or completing their line apprenticeship. Delo, who works out of Blanchard, and Smith, working out of Portland, each had to complete 7,000 hours of on-the-job training, along with four years of classroom and fieldwork at the Great Lakes Joint Apprenticeship & Training program.

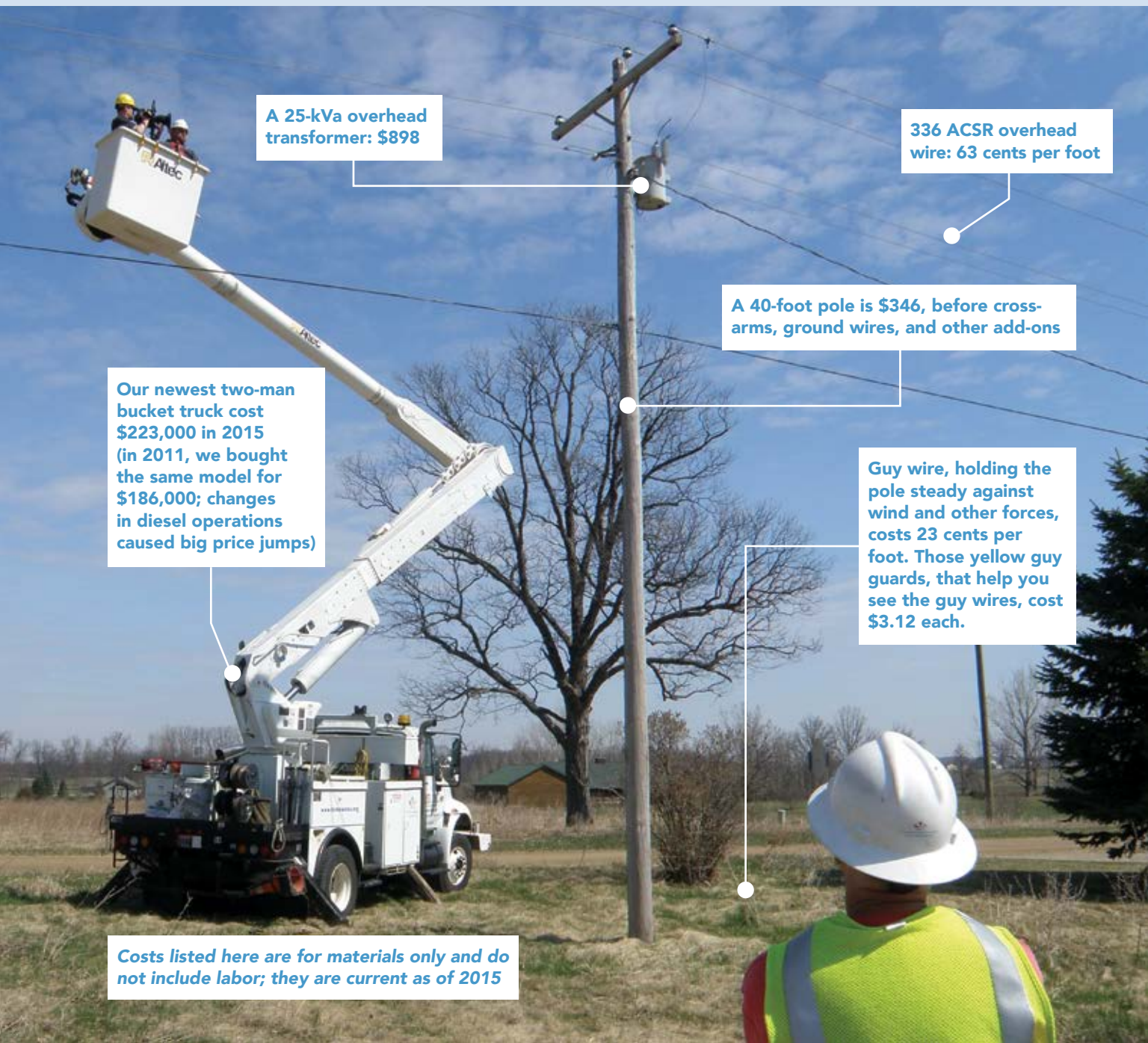
How Much Does Your Electric System Cost?

Each month, your residential energy bill from HomeWorks Tri-County lists an “Availability Charge” of \$14. If you’ve wondered why there’s a monthly fee for your electric service, this information may help.

- Availability is a flat fee designed to recover a portion of the cost of delivering electricity to all members. It reflects investments in poles, wires, transformers, and other electrical equipment that’s required to provide you with safe and reliable electric service.
- It also supports storm repairs, along with daily fleet, facility, and customer service functions,

such as line maintenance, right-of-way clearing, insurance and property taxes, and general administrative responsibilities. You pay these costs so that electricity is available to you when you turn on the lights, do laundry, or charge your cell phone.

- A member who uses only 1 kilowatt-hour of electricity incurs the same basic costs of line building and maintenance as a member who uses 1,000 kilowatt-hours. A flat fee means that one member doesn’t pay more to subsidize the costs for another. ■



A 25-kVa overhead transformer: \$898

336 ACSR overhead wire: 63 cents per foot

A 40-foot pole is \$346, before cross-arms, ground wires, and other add-ons

Our newest two-man bucket truck cost \$223,000 in 2015 (in 2011, we bought the same model for \$186,000; changes in diesel operations caused big price jumps)

Guy wire, holding the pole steady against wind and other forces, costs 23 cents per foot. Those yellow guy guards, that help you see the guy wires, cost \$3.12 each.

Costs listed here are for materials only and do not include labor; they are current as of 2015

Brian Stratton is a third generation farmer in Vestaburg, MI, and a member of HomeWorks Tri-County Electric Cooperative.



Keeping Soil Healthy

Gypsum's Role In Agriculture And Electricity

By Jeannine Taylor

We can grow more food, but we can't grow more land. So, how do we protect our planet and get the most out of every acre? It starts with healthy soil. Soil is everything to a farmer. It houses the nutrients, minerals and water for crops to grow. Essential nutrients like nitrogen, phosphorus, potassium, magnesium, calcium and sulfur are the life-blood of every plant and are crucial to their survival. When the soil is lacking any of these key nutrients, a farmer's crops will know it.

Brian Stratton knows this all too well. Stratton is a third generation farmer in Vestaburg, MI, and a member of HomeWorks Tri-County Electric Cooperative. His family began farming the area in 1909, and Stratton continues to cultivate the soil—over 800 acres of it. His crops, mainly white winter wheat, dry edible beans and corn, help feed people in the United States, but also in places like Italy, Spain, China and Pakistan.

Stratton leases 80 acres of farmland from Wolverine Power Cooperative near its Vestaburg Power Plant. He started farming this ground in 2010, planting his rotation crops as well as rye and switchgrass wildlife plots. After testing the soil, he found that it was low in calcium and sulfur. "With low calcium

and sulfur levels, you aren't going to be able to take advantage of the nutrients that are there," Stratton explains. "You've got to have all these things balanced as much as possible for the whole system to work efficiently."

So, why was the soil lacking sulfur? A big reason is because coal-fired power plants have greatly reduced sulfur emissions into the air. When the Clean Air Act Amendments were passed in 1990, coal-fired plants were required to reduce their sulfur dioxide emissions. Over time, new rules continued to decrease sulfur dioxide emission limits, ultimately requiring coal-fired plants to install environmental control equipment, such as scrubbers, to meet the new limits. An unintended result is that crops are no longer receiving sufficient sulfur from the atmosphere.

Coal-fired plant owners, such as the Ohio Valley Electric Corporation's (OVEC) Kyger Creek and Clifty Creek Plants, of which Wolverine is a partial owner, have spent over \$1 billion installing environmental controls to capture and remove sulfur dioxide emissions. A process known as flue gas desulfurization (FGD) scrubs the sulfur dioxide from the power plant exhaust by using a limestone slurry that contains calcium. The sulfur and calcium react to produce calcium sulfite, and then oxygen is added to create calcium sulfate, otherwise known as synthetic gypsum.

This high-quality gypsum is becoming a hot commodity for beneficial reuse in everything from wall board to soil amendment fertilizers. For a by-product like synthetic gypsum to be considered for reuse, it must provide a functional benefit to end users and meet or exceed the specifications of the virgin material that it is replacing.



OVEC's synthetic gypsum used to manufacture soil amendment fertilizer.

In fact, the Michigan Department of Environmental Quality (MDEQ) is a strong supporter of beneficial reuse programs. Duane Roskoskey, with MDEQ's Office of Waste Management and Radiological Protection, said they promote the beneficial reuse of industrial by-products such as FGD, coal ash, cement/lime kiln dust, foundry sand and paper mill sludge. "Since 2009, the amount of industrial by-products reused in Michigan has more than doubled to over 900,000 tons per year," Roskoskey explains. "The MDEQ recognizes the benefits of adding FGD to agricultural soils—FGD contains both calcium and sulfur, which are needed micronutrients, for most crops." Over 36,000 tons of FGD were reused in Michigan in 2014.

Gabe Coriell, OVEC's senior environmental specialist, and a part-time farmer, did a great deal of research on synthetic gypsum and its potential for beneficial use. He contacted professors at Ohio State University, who had performed studies on synthetic gypsum and its role as a soil amendment, to learn about their findings. He also contacted professionals that were using synthetic gypsum and learned that it was successfully conditioning the soil by adding the level of sulfur and calcium needed for better plant growth. Finally, Coriell talked to several companies who market synthetic gypsum products and found an established one which had a set of specifications required for its products.

Coriell decided to work with Charah, a company based in Louisville, KY, that provides coal combustion product management and power



OVEC's synthetic gypsum being loaded for transport to Charah to make SUL4R-PLUS Fertilizer.

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HomeWorks Tri-County Linemen Appreciate Guatemala Mission

Two HomeWorks Tri-County linemen were part of the Partners For Power project in November 2015, traveling to Guatemala with a team of eight other Michigan electric co-op linemen to help electrify the village of Buena Vista.

Brad Parkhouse, from Portland, and Rick Warchuck, from Blanchard, shared several of the many photos and memories they brought back home with them.

Why did you volunteer?



Rick: I've traveled doing storm work, and I like to travel and see different things. I wanted to see the reaction of people who had never had power, when the lights came on.

Brad: I thought it seemed kind of cool. It was kind of like going back in history.

Brad Parkhouse, center left, and others from the Michigan team surround a little girl who wanted her picture taken with "the gringos."

What was a typical day like for you?



Brad: We usually got up about 5:30 or 6 a.m., the cook had coffee on for us. We'd mingle around and get ready for breakfast, usually scrambled eggs, beans and rice. They took good care of us as far as food.

Rick: We'd get off to a slow start, into the daylight hours, waiting for breakfast. We'd discuss the day's work amongst ourselves, with Dan and Matt, our safety guys. We all got along great—it made this experience the best. The guys would break into two or three-man crews, then there was me with 30 villagers and Jimmy the interpreter. Tony from Great Lakes Energy helped us put anchors in for the poles, then my crew would get wire and materials to each pole.

Brad: The first few days we'd work until dark, but after that we'd stop building lines at about 4 and get things ready for the next day's work.

Rick: It was clear and sunny at first, but after about three days, clouds and fog rolled in every so often. We couldn't see 30 feet at times, so we did a lot of waiting for the clouds to clear.

Brad: The 10 of us slept in a one-room tin shed, so it was kind of like deer camp. Better than deer camp—we had hot water every night. It would get damp and chilly each night, but nothing unbearable.

The crew was fed well by a chef from a nearby village, along with women from Buena Vista.

Do either of you speak or understand any Spanish?



Rick: One of the elders, Leo, helped me out tremendously. It only took a short while before I realized they understood English pretty well, even if they couldn't speak it very well.

Brad: Our interpreters were awesome. And it turned out that Dan King and Will Torrentino were both very fluent in Spanish.

Rick took this photo from atop a pole, to show how local men worked together to get wire to the poles.

How did the people of Buena Vista feel about the project?



Rick: The people of the village had to pay for their own electric meters. (The poles, wire reels, and other materials were shipped ahead.) They had to go down to the city and unload it into smaller trucks to get it up the mountain.

Brad: These people wanted this. They are the hardest working people I've been around. They told us they would do whatever we need to get this done.

Rick: The villagers made our jobs real easy for us. They had the poles set before we got there, before they were framed (with cross arms and other equipment) so we climbed up and did that from the top of each pole.

The men of Buena Vista chipped in to help, in this case stringing wire along a road to get it to the destination poles.

What happened when the project was complete?



Brad: They started cooking about 3 o'clock in the morning. I think they even slaughtered a cow for the party. They marched us into the ceremony like a little parade. The school kids were all dressed up, they even brought in a mariachi band.

Once the power lines were built and electrified, the village put on a celebration ceremony with music, a parade, speeches, a pinata, and food.

Any final thoughts?



Rick: Wherever you looked, there was a breathtaking view. You just wanted to stop and enjoy it. I told my family I would come back and do this all over again.

On one break day, the crew visited nearby Mayan ruins. Rick Warchuck is shown in front of one of the temples.

Watch the Partners For Power video at youtube.com/user/HomeWorksTriCounty. It's a story with heart, a story about people coming together for a cause bigger than themselves.

Photos courtesy of Brad Parkhouse and Rick Warchuck

Keeping Soil Healthy

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plant support services for the coal-fired electric utility industry. While Charah has been around since 1987, they just recently began manufacturing a product called SUL4R-PLUS® Fertilizer, a patent-pending pelletized calcium sulfate product made from synthetic gypsum. "Charah may be new to gypsum," Coriell says, "but they've been in business a long time and have an innovative product that is very attractive. They have a newer process in the market and it is working."

Stratton agrees. He has been using SUL4R-PLUS Fertilizer on his crops and is currently participating



Charah's pelletized SUL4R-PLUS Fertilizer.

in a yield study with Charah to gather data and measure its effectiveness on the property he leases from Wolverine. "I like the pelletized product because it's a much friendlier product to handle," Stratton says. "It spreads more evenly and you don't have the dust to contend with." Results from the first year's use are coming in and, despite a heavy dose of rain that caused root rot to his cranberry beans, the yield results look promising.

With the new products on the market today, like SUL4R-PLUS, Stratton says his crops are getting the same sulfur they used to from the atmosphere, but now it's through a different route. The key is to replenish the nutrient levels in the soil so plants can achieve maximum growth. "With farm crop plants, it's the same as with our own bodies," Stratton explains. "The more attention you pay to your own nutrition, the healthier you're going to be. It's no different for a plant." ■

Jeannine Taylor is communications and member relations director for Wolverine Power Cooperative.

Five Benefits Of Gypsum

1. Source of calcium and sulfur for plant nutrition.

Plants are becoming more sulfur-deficient, and the soil is not supplying enough of it. Gypsum is an excellent source of sulfur for plant nutrition and improving crop yield.

Meanwhile, calcium is essential for most nutrients to be absorbed by plant roots.

2. Improves acid soils and treats aluminum toxicity.

One of gypsum's main advantages is its ability to reduce aluminum toxicity, which often accompanies soil acidity, particularly in subsoils. Gypsum can improve some acid soils even beyond what lime can do for them, which makes it possible to have deeper rooting with resulting benefits to the crops.

3. Improves soil structure.

Soil needs a certain mass to give it a favorable structure for root growth and air and water movement. Gypsum has been used to improve this aggregation in soils.

Soluble calcium also enhances soil aggregation and porosity to improve water infiltration.

4. Improves water infiltration.

Gypsum also improves the ability of soil to drain and not become waterlogged due to a combination of high sodium, swelling clay, and excess water. Adding gypsum also allows water to move into the soil to stimulate plant growth.

5. Helps reduce runoff and erosion.

Agriculture is one of the major contributors to water quality, with phosphorus runoff the biggest concern. Gypsum helps to keep phosphorus and other nutrients from leaving farm fields.

Below: Charah's state-of-the-art manufacturing facility.



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