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LANE-SCOTT ELECTRIC COOPERATIVE

Connections

ENERGY EFFICIENCY TIPS

The Science of Conduction

BY DOUG RYE

Doug Rye

Recently, I was driving to St. Louis to conduct seminars. With plenty of windshield-time, I thought about the great opportunity I've been given to help folks across this country enjoy more comfortable homes with lower utility bills.

As I looked at hundreds of houses over the six-hour drive, a recurring thought came to my mind. How can building science and energy efficiency become important action items for all Americans? How do we generate the interest or motivation for Americans to build or make their existing homes more energy efficient? That thought never ceases to overwhelm me. What a gigantic, almost unbelievable, opportunity we have.

Notice that I said we, not I. There was a time only about 35 years ago when a handful of energy efficiency pioneers were among the industry vanguard. Over time, nationwide interest in building science and energy efficiency began to grow.

Now, there are hundreds who have the experience and training to help you test your house and provide you with a list of needed improvements. Your local electric co-op, may have an employee on staff or can recommend a local auditor. Because you are a co-op member, your co-op wants to help you. It's one of the cooperatives' primary purposes.

In my article "It's All About the Sun," Lesson No. 1 reminded us that all energy as we know it comes from the sun. So, for Lesson No. 2, let's discuss basic energy as it relates to heat in some form or fashion. The sun is a really big blob of heat. I expect that you already knew that, but let's look at how that heat affects practically every aspect of our life.

First, I think that it is neat, and not by coincidence, that our earth seems to be the only planet that is just about the right distance from the sun to support life as we know it. If we were much closer to the source of all energy, it might be too hot. If we were farther away, it might be too cold.

The sun always shines and affects the earth every second of every day. It is estimated that about half of the heat from the sun is absorbed by something on earth. It is not possible for us to list all of the things that absorb and benefit from the sun's heat, but it is possible to explain how that heat affects our daily lives.

Heat travels three ways–by conduction, convection and radiation. The better that we understand these principles, the better we can understand how a house uses energy. I am going to do my very best to explain these to you with examples that are easy to understand, but remember that the only reason that I am known as the "doctor" of energy efficiency is because my initials are D.R.

According to Webster's dictionary, conduction is the passing of heat from particle to particle. That means that conduction will occur anytime that one substance of a certain temperature touches another substance of a different temperature. Your foot touching a cold floor

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Essays from Lane-Scott's 2012

Lane-Scott Electric has selected four local youth to attend leadership trips through our annual youth competition for area high school juniors.

This year, students were asked to write an essay that answers the question: "How have the services from Lane-Scott Electric Cooperative make our lives better?"

Below you will find the essays from the winners of this year's competition.

Each year, Lane-Scott sends two students to the "Govenment in Action" Youth Tour in Washington, D.C. The 2012 winners are **LIZ HEATH** and **MATTHEW MULVILLE**.

They will join 31 Kansas youth and travel to Washington, D.C., June 14-21. They will join about 1,500 other youth seeing

Liz Heath

We would not be where we are today without electricity. Many things that have come to shape our culture and our world would have never happened. Electricity has opened many doors for society. All those open doors have led to countless opportunities for young people of rural America that before electricity had been strictly limited.

One of the most important things electricity gives us is time. Before there was electricity, working at home was a full-time job. The simplest of things were hard to do, such as retrieving water from the fields. This was a task that the kids would often tackle for their mothers before leaving for school, pumping the water by hand from the well and then walking the full pales back to the house. Washday really took up the entire day and was done completely by hand. It's seems crazy how easy things are these days in comparison. We can not only get the wash done in an hour's time, but we can also dry the laundry in the clothes dryer, clean dishes in the dish washer and still have time to do other things thanks to electricity.

With all that time, you can do other things, such a school-work, socializing with friends and family, or reading and watching television. Before electricity, these tasks were limited to short amounts of time under the light from a kerosene lamp. Then along came the light bulb, and suddenly people could extend their reading and office work late into the night.

There was time for family, friends, fellowship, fun, and most importantly, time for innovation. Innovation led to the radio, the television, computers, and eventually the internet. These innovations made it so rural Americans could connect with the rest of the country and the world. All it takes is the click of a mouse or the press of a key and we can have a face to face conversation with friends from across the country. We can learn what's going on around the globe as it's happening, and thousands of pages of information on every subject we could ever dream of is right at our fingertips. Electricity has helped give us this important tool that we can use to make our own legacy.

Thanks to electricity, our opportunities are endless. There are no limits to what we can achieve, even out here in rural America. Electricity allows us the time to chase the American dream and gives us the opportunity to achieve it.

Matthew Mulville

Lane-Scott Electric Cooperative makes our life better in a lot of ways. Electricity is one of the most essential elements that powers our homes and businesses. Everything we do involves electricity in some way or another. We would literally be in the dark without it, but with Lane-Scott we don't have to be.

Lane-Scott provides us with electricity. Without electricity most of the everyday things we do would not be possible. All of the operations that we do on the farm need electricity, we absolutely have to have it. We would not be able to fuel up our machinery without the electric pump. Our pickups would not make it out of the shed because the doors require electricity to open. Basically without electricity, life would be a lot tougher.

If a storm hits, and we are left without power, Lane-Scott will be doing everything they can to get everything back up and running. I can remember when we lost power in a big ice storm. I couldn't do many of the things that I usually would do. Sure we had a generator, we needed it so we could keep going. The generator used a lot of effort and expensive fuel. During this time, Lane-Scott was doing what they could to get things back into working order, and soon enough we were back to school and back into the swing of things.

Lane-Scott doesn't only provide us with electricity. Lane-Scott sponsors many activities from 4-H, to our local sports teams. They are an important business that pays taxes that fund schools, hospitals, and other important local services. Lane-Scott also provides scholarships to kids who are wanting to work in the electric utility field. They are also a great job provider. By providing jobs to people, our struggling community gets that much stronger.

Without Lane-Scott I really don't know how my family could do the things we do today. Without their contributions to our small community we would not have many of the luxuries we have today. They provide us with electricity and important services that we need to keep our lives going and whenever a problem arises, they fix it. That's how Lane-Scott has made my life and other's lives better.

Youth Competition Winners

the United States "Government in Action". They will visit their Congressmen, various government agencies and sites of historical significance.

The cooperative also sends two students to the Cooperative Youth Leadership Camp in Steamboat Springs, Colorado.

This year's winners are **RUTH HAIR** and **MICHAEL WEHKAMP.** They will join approximately 100 youth from a four-state area participating in the Cooperative Youth Leadership Camp July 14-20.

During their stay, the youth will form their own mock cooperative, become acquainted with energy challenges, visit sites around Steamboat Springs, Mt. Werner, and tour one of the largest electrical generating plants in the Rockies.

Ruth Hair

How have the services from Lane-Scott Electric Cooperative, Inc. made my life better? As I pondered this question several things came to mind. There are many uses for electricity such as the use of curling irons, hair dryers and television. To my family electricity means so much more. It is the difference whether things run smoothly on our farm or go awry.

One of the things we use Lane-Scott electricity for is to run the lights in our calving barn. In some cases, calves need to be pulled at night and the light is very helpful in having a successful birth. It also lights up our farmyard making it easier to see. Also, we use it to charge the spotlights we use to check the cows for calving at night.

Also, to keep the cows in we use electric fence, and without the electricity they wouldn't stay in. We also need battery chargers at times to keep the tractor running. We use the tractor mainly for feeding the cows and since there are times when it won't start chargers are a necessity so the tractor will be ready to go when needed.

I have had a bucket calf in the past, then I used electricity to pump the water and auger the pellets from the bin into a bucket which makes the chores of having a bucket calf easier.

Another major use of electricity on our farm is when our grain is too wet at harvest to put in the elevator, we will put it in the bins and turns fans on which are hooked up to Lane-Scott electricity to dry it down so it does not spoil while it is in storage. When it is dried we then have the option of selling it for a higher price, which benefits our farm profits.

While there are still many other ways our farm uses electricity these are some of the major ways the electricity Lane-Scott provides makes our lives easier and helps them run smoother. Thank you for the service you provide.

Michael Wehkamp

From the time my eyes close, till they open again I should be thanking Lane-Scott. The uses for electricity on a farm in southwest Kansas are countless, simply put, our small farm could not operate without electricity.

The power Lane-Scott provides impacts my life further by providing safe, reliable food to eat from nearby packing plants. Right away, when I wake up I switch on the lights, walking into the kitchen I can hear coffee brewing and the TV in the background. I pull my cell phone off the charger, and put a load of laundry in the washer. Every one of those items is electric powered.

I can even make a finer point. Most Kansans couldn't survive without the power to run their house wells, including myself. From a business point, our livestock couldn't survive either. I must personally thank Lane-Scott for providing the electricity to keep the cattle waters from turning to ice which gives a chance me to sleep in.

Further into my work day, if equipment breaks down I could repair a broken hitch with a welder, or have the luxury of airing up the tire on a tractor with an electric air compressor. Reality is that over half of the tools, mostly power tools, are electric powered or the power for the tool is created with electricity.

Lane-Scott doesn't stop helping farmers there, how about the electric irrigation? This is an answer to many farms problems, such consisting of unreliable gas engines or expensive diesel motors. The biggest advantage of this power for sprinklers is the cost effectiveness, it just cannot be beat.

So, finally when my work day is over I can walk through my yard at night, not having to worry where I step because my yard is lit by a light provided by Lane-Scott. Perhaps when I go to bed my room is chilly, and I can plug in an electric heater. I am lucky that I can sleep in peace, only because the oil wells near my house are quiet and electric powered.

Its really mind boggling how many ways life without electricity would be different and I believe that life in Kansas would be impossible. Every Lane-Scott member should thank the staff there. Without them a reliable power source would just be a dream.

The Science of Conduction

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or stepping into a hot tub of water is conduction. Your hand touching a cold windowpane or a hot pan in the oven is conduction. Generally speaking, conduction does not occur in gases such as air. That would be convection and will be covered in the next issue.

The speed of the conduction can be very fast or very slow. If the water in the shower is 105 degrees, you say, "Aaahhh that feels great."

If the first blast is 140 degrees, like some motels, you may scream instead.

Remember that a good conductor of heat is not a good insulator and vice versa. Insulation slows the rate of conduction. A rug or a piece of carpet on that cold floor will make that bare foot feel a lot warmer. Heat always moves toward cold, and, in this case, the heat simply does not leave your foot as fast as before.

Not all conduction is a bad thing. Take for instance an electric water heater. The electric element touches the colder water within the storage tank and heats it by conduction. That is a useful form of conduction.

Other useful examples are a coffee maker, a frying pan cooking an egg and a waffle iron. Bet you didn't know building science could whet your appetite!

In future articles, I'll describe how conductive heat often changes to convective heat. The springtime warmth provides us many examples. Stay tuned for the next lesson.

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