

This Could Be the Year the Sun Turned Your Lights Off



MESSAGE FROM GENERAL MANAGER AND CEO JERRY D. WILLIAMS

Many scientists have predicted that 2013 could be the year for a massive solar storm. Solar storms aimed at Earth come in three stages. We may only have the first two stages, but if we get hit by the third stage, it could be really interesting. Not every stage will occur in any given storm. First, high energy sunlight, mostly x-rays and ultraviolet light, ionizes Earth's upper atmosphere, interfering with radio communications. This if followed by a radiation storm, potentially dangerous to unprotected astronauts. Finally comes a coronal mass ejection, or CME, a slower moving cloud of charged particles that can take from several hours to several days to reach Earth's atmosphere. When a CME hits, the solar particles can interact with Earth's magnetic field to produce powerful electromagnetic fluctuations.

Today's electric grid in the US is interconnected for efficient transmission of large quantities of power over a large distributed network. However, that same interconnectedness that makes an electric power grid efficient for distribution also makes it extremely vulnerable to catastrophic failures. Our electric grid in Texas is independent from the rest of the US, which could help us some. These high voltage electric lines connect generating plants to other generating plants and substations, in order to provide electric current to each customer. Many transmission lines are operated at high voltages (as much as 345,000 or 500,000 volts) to reduce the amount of energy lost over the long distances.

Two main transmission lines of different voltage may be connected

together using a Step Up/ Step Down transformer. In our area Sub-transmission lines are typically 138,000 volts that are interconnected with the higher voltage transmission lines on one end and our Sub Station on the other end. We have five Substations at Lamar Electric with one or more large transformers in each substation which reduces the 138,000 volts to 14,000 volts, called Distribution Voltage. This is the voltage for the Distribution Lines you see along the side of the road that connects to a transformer near your house.

Our Distribution Substations all have an elaborate grid of cables installed in the ground under the equipment. This is called a ground grid and helps insure a good connection between the substation transformer and the Earth. Having all the equipment in the station grounded together, helps make sure there is no voltage difference between the equipment and the Earth.

But, a CME solar flare could cause a change in the earth's conductivity and create a voltage differential between the grounding points of the large transformers and the Earth. This anomaly leads to transformer saturation and possible overheating or even destruction of the equipment. The directional orientation of transmission grid lines (east/west or north/south) as well as their lengths and type of conductor may increase the risk. Power lines oriented east-west will be more susceptible than north-south lines. Power lines crossing rocky areas with high electrical resistance in the soil are at an increased risk. The higher northern areas will be more vulnerable than Texas.

When charged particles in a CME collide with Earth, they energize aurora electrojets. The earth's normally stable

magnetic field is altered. These electrojets are electro/magnetic currents that follow high altitude circular paths around the earth's geomagnetic poles, about 50,000 miles above the earth. These high altitude currents induce mirror currents near the earth's surface. These mirror currents can flow into man-made conductors, like electric transmission lines.

When a conductor is moved about inside a magnetic field (like a generator) an electric current is created. During a solar storm, we could have the same thing occur on a large scale basis as magnetic fields move around.

According to a study by Metatech Corporation, a solar storm with the strength of one in 1921 would destroy more than 300 large transformers. The National Academy of Sciences has agreed with this finding.

Utilities generally have some spare large transformers as spares; a large scale failure would present a serious challenge for the availability and replacement of damaged transformers. The very high voltage lines that carry a lot of power have transformers that cost over \$5 million each, weigh over 400,000 pounds and take over a year to build. These transformers are typically moved by rail. The large transformers in Lamar's substations cost about \$700,000 each, weigh around 100,000 pounds and normally take over 10 months to construct. Of course all these estimates assume the metal refineries and construction plants have normal electric power for their processes.

A major portion of the nation without electric power for a year or more is hard to imagine, but it could happen. The northeast part of the US is heavily interconnected and would most likely

have more damage. (This area includes Washington DC and some may view it as a blessing.) In a worst case scenario, commerce would almost instantly cease. Water and fuel, which depend on electric pumps, would stop flowing in many cities within hours. Modern communications would end and the vehicles would could to a halt as they depleted their fuel supply.

There may be a way out. You may not like the solution, but it may beat the alternative. By receiving solar storm alerts, power companies could possibly minimize damage to transformers by disconnecting the transformers, till after the solar storm passes. Turning virtually all electricity off in the US for a day or two would be a tough pill to swallow. Of course, there is another problem with this solution. Our ability to predict a massive solar flare is about the same level we were at predicting the weather fifty years ago. What if all the electricity was off for a day and the expected big storm did not occur? That would be hard to explain.

The Department of Homeland Security's Science & Technology Directorate is coordinating research that could lead to another answer. Last year the agency began testing a "Recovery Transformer." They tested a "modular" transformer that can be moved into position, when an existing transformer fails. By making three or four smaller modules and attaching them at the site, the replacement transformer would be easier to transport. One module would weigh

closer to 120,000 pounds and could be transported on a lowboy truck trailer.

During the March 2012 test, they moved a Recovery Transformer from St. Louis to Houston, where it was put into operation. The full exercise took only 6 days, which is 10 times faster than a conventional response. This size transformer is usually found at large power generating plants, and replacing one could put the generating plant out of business for an extended time.

You may be wondering what happens now if one or two of those very high voltage transmission line transformers were to melt down. The power would be re-routed on other transmission lines, or the power may come from another generator, until a spare can be installed.

If something were to happen to one of Lamar's large substation transformers, we would move in a temporary replacement transformer which is already mounted on a lowboy trailer waiting to be moved at a moment's notice. A snake did a lot of damage to our Sherry Substation, south of Clarksville two years ago and had us concerned about transformer damage. Within 3 hours we had the trailer mounted transformer on site and ready to hook up. The hook up takes about 45 minutes. After replacing some very large cable and doing some oil test on our transformer, it was reenergized. Lamar and four other Rural Electric Cooperatives in our area, own two substation transformers, mounted on flatbed trailers.



This April Fools' Day, outsmart the energy vampires in your home by unplugging what you're not using.

Vampire energy—also known as phantom load, standby power or idle current—is the electricity that is greedily sucked from outlets by what plugs into them, even if that plugged-in device is off or on sleep mode. Today's most notorious vampires are TVs and their accessories.

Smart power strips can help you manage the power drain. The latest versions feature timers and occupancy- and current-sensing features.

Source: Alliance To Save Energy



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Operating in Lamar, Red River,
Delta and Fannin counties

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Jerry D. Williams

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Member Benefits

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Your "Local Pages"

This section of Texas Co-op Power is produced by LEC each month to provide you with information about current events, safety, special programs and other activities of the cooperative. If you have any comments or suggestions, please contact the local office.



CONTACT US

For information during office hours
and outages after hours

CALL US

(903) 784-4303 local or
1-800-782-9010 toll-free

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Country Corner Events

April 6

Lamar Electric Cooperative Annual Meeting, 10 a.m., Love Civic Center, Paris. For more information, call Laura Williams at (903) 783-4907.

Red River County BBQ Smoke Off, Langford Lake

April 10-12

Lamar County Junior Livestock Show, Red River Valley Fairgrounds, Paris

April 13

Art in the Park, 10 a.m.-6 p.m., Bywaters Park, Paris

Bogata Homecoming

Delta County Fair Second Annual Car & Truck Show, Downtown Square. For more information, call Steve Olgesby at (903) 312-4597.

Delta County Fair and Junior Livestock Show, Cooper City Park

April 20

Paris Harley Davidson's 11th Annual Chili Cook-off, 10 a.m.-4 p.m. Paris Honda Yamaha Harley-Davidson. For more information, call Tim Chapman or Laura O'Neal at (903) 784-4545.

Red River County Child Protective Service Annual Fundraiser, 11 a.m.-3 p.m., VFW Hall, Clarksville

Bogata Educational Foundation and Silent Auction, For information, call Rivercrest High School at (903) 632-5204.

April 27

Kid Safe, 10 a.m.-2 p.m. Red River Valley Fairgrounds, Paris

If you have any events that you would like listed for Delta, Lamar or Red River counties, please contact Dena Beason. We need the information two months in advance for the magazine. Email dena@lamarelectric.coop. Call (903) 783-4949.



Keeping your refrigerator clean inside and out will help it operate more efficiently.

5 Ways To Spring into Energy Efficiency

Spring is a perfect time of year to make your home more energy efficient. Here are five quick tips that will save both energy and money.

1. SEAL THE CRACKS AND GAPS.

Adding weatherstripping and caulking around windows and sealing cracks and leaks around the floor and ceiling can save you more than \$200 annually.

2. CHANGE FILTERS REGULARLY.

Changing furnace and air-conditioner filters monthly can help lower energy bills. Dirty filters can restrict airflow and reduce the overall efficiency of your system and make it work even harder.

3. CHECK YOUR REFRIGERATOR.

Clean the outside of the refrigerator as well as the inside. Gently vacuuming the outside coils and checking the seals for air leaks can improve the efficiency of your refrigerator. Also check the temperature settings on your refrigerator. Ideally, a refrigerator's temperature should be from 37 to 40 degrees. When it's time to replace that old refrigerator, be sure to buy an Energy Star-labeled appliance.

4. THINK SUN BLOCK. Closing the blinds on your windows this spring and summer keeps out ambient heat.

5. CONTROL TEMPERATURE SETTINGS. Try setting the temperature to 78 degrees or greater when you are home. A programmable thermostat will save energy by automatically adjusting the temperature based on your schedule.

Use Caution Around Utility Equipment

Electric meters, poles and lines play important roles in keeping electric systems running smoothly. Lamar EC urges everyone to stay away from and be respectful of utility equipment to keep electrical systems running safely and reliably—and to help keep you safe.

- ▶ Don't tamper with your electric meter for any reason. It is illegal and can cause electrocution and fire, resulting in injury and damage, even death.
- ▶ Never try to prune trees that appear to be growing into or near power lines. Contact Lamar EC. We have skilled professionals trained to safely prune and trim trees for right-of-way clearances.
- ▶ Don't post signs or posters on electric poles. Posters, nails and staples can make it dangerous or impossible for linemen to climb the poles when needed.
- ▶ Plant tall-growing trees safely away from power lines.
- ▶ Do not plant near underground utility services. Tree roots can grow and interfere with underground wire, pipes and cables. Future repairs to these facilities also could damage the health and beauty of nearby plants and trees.
- ▶ Keep areas around electric meters, transformers or other electrical equipment free of any vegetation that could limit utility service access.
- ▶ Before digging, call 811 to have the location of underground utilities marked to avoid accidental contact and injuries.

Comeback for Energy Tax Credits

Feds revive incentives for efficient home upgrades

BY MEGAN MCKOY-NOE

Ready to boost your home's energy efficiency without breaking the bank? The American Taxpayer Relief Act of 2012 revived energy-efficiency tax credits to the tune of \$500.

The credit offsets the cost of upgrades such as super-efficient water heaters and heat pumps, central air conditioners, building insulation, windows and roofs.

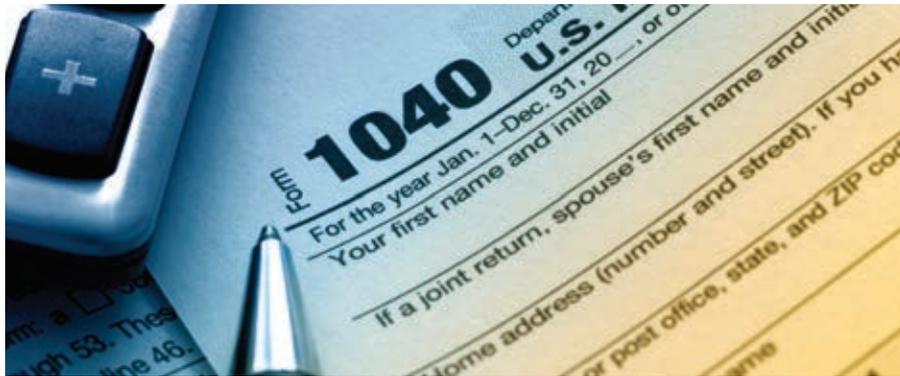
This marks the third extension of the incentive initiated by the federal Energy Policy Act of 2005. The last round expired in 2011; the new legislation covers 2012 upgrades along with projects undertaken in 2013. If you've already received an energy tax credit, you may not qualify as there's a lifetime cap of \$500.

Go to energystar.gov/taxcredits for full details on qualifying upgrades and individual caps. Here are highlights of the tax savings available:

Insulating Factors

Recoup up to 10 percent of the cost of upgrading a home's envelope. Labor costs are not covered. Eligible upgrades are:

- ▶ Insulation materials and exterior doors
- ▶ Systems designed to reduce a home's heat loss/gain
- ▶ Skylights and windows (\$200 maximum for upgrades between 2006-13)
- ▶ Qualifying metal or asphalt roofs



Heating and Cooling

Replacing your home's heating or cooling system? You could qualify for a tax credit ranging from \$50 to \$500 for units put in place between January 1, 2012, and December 31, 2013. Eligible improvements are:

- ▶ Electric heat pump water heaters with an energy factor of at least 2.0 (\$300 cap)
- ▶ Advanced main air circulating fan (\$50 cap)
- ▶ Qualifying central air conditioner (\$300 cap)

Tax Credit Basics

Energy tax credits are nonrefundable—they can increase your refund by reducing the taxes you owe and can be carried forward to reduce taxes in following years.

File for energy tax credits with IRS Form 5695. Be sure to keep a Manufacturer Certification Statement (a signed statement from the manufacturer certifying that the product or component qualifies for the tax credit) for your records. Eligible upgrades must be made to a taxpayer's primary residence by December 31, 2013.

Megan McKoy-Noe writes for the National Rural Electric Cooperative Association.



If you see any suspicious activity around a substation or other electric facilities, please call Lamar EC immediately.

Copper Theft

Gain a buck, lose a life

Copper theft has reached an epidemic level that is not only affecting the United States, but is also international and creating havoc globally. The theft of copper costs the national economy around \$1 billion per year, according to the U.S. Department of Energy. The increase in copper theft has disrupted the flow of electricity, created electrical hazards, slowed down construction projects and knocked out irrigation networks across the country.

Additionally, when thieves cut locks or chain-link fencing surrounding an electric substation, they leave a highly dangerous area exposed for children and animals.

Stealing material from an electric substation or utility pole can cause not only serious injuries and death but also extensive outages, fires and explosions—consequences that affect innocent people. The minimum damage that can occur is an outage, which may affect thousands of people.

Always alert Lamar Electric Cooperative if you see or suspect suspicious activity, or if any gate to a substation is open. Theft and tampering with electric power facilities can result in extremely dangerous situations, and we need your help to prevent them.