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Guest Column

Powerful Safety Starts With You

On an average day, our linemen work with high voltage power lines carrying between 7,620 and 14,400 volts. Working with such high currents of electricity means our employees must keep safety a top priority and be aware of the electrical dangers around them. But do you know how much of this same electricity is around you at this very moment?

From the outlets and appliances within an arm's reach, to the poles, lines and transformers just outside your door, electricity surrounds us all, so much so that we often forget it's there and that we must remain attentive in regard to safety. With May being Electrical Safety Month, it's a great time to remind ourselves that safety is no accident.

Each month, your cooperative reviews safety incidents that have occurred and discusses how they could have been avoided and what practices we need to implement to avoid them in the future. We follow the same protocol for cases that nearly result in an accident, but were avoided—we call these instances “near misses.”

At times, we rely on you—the member—to help us avoid accidents and near misses. A few months ago, a member alerted us to a piece of equipment that re-



This damaged underground transformer cabinet created a potentially dangerous situation.

ceived damage from being hit by a car. After dispatching a crew to evaluate the scene, it was quickly determined that this was a much more dangerous situation than first reported. As you can see in the photo, an underground transformer cabinet was knocked completely loose, revealing live wires carrying 14,400 volts. Our crews were able to safely remedy the situation, but had an observant member not alerted us of this damaged equipment, the circumstance could have escalated from a near miss to a serious, possibly fatal, situation.

You can also avoid near-miss accidents at your own home by being observant. For example, if you're doing yard work and need to use a ladder, do you know where the service drop (the wire connecting CAEC's electrical system to your home) is located? Each year it's estimated that ladders coming into contact with power lines cause 9 percent of electrocutions in the United States. Just by looking up and around, you can help avoid a potentially hazardous accident whenever working with items such as ladders (even those made of wood), antennas or satellite dishes.

Eliminating electrical hazards begins with both education and awareness. Please take time during Electrical Safety Month to learn more about electricity and how to be safe around it by taking our Electrical Safety Quiz on page 42. And as always, report any equipment that may be malfunctioning or damaged to us immediately. ■



*Darren Maddox
Manager of
Training & Safety*

Youth Tour 2014 – Leadership Up Close and Personal

Learning how historic places and people have shaped our world, gaining valuable leadership skills and establishing close and personal relationships with leaders are just some of the beneficial aspects of Alabama Rural Electric Association's (AREA) Youth Tour. The 2014 delegates gained a new awareness of the world around them and were able to meet and discuss issues with Representative Kurt Wallace and various elected officials during the Montgomery Youth Tour, held March 4-6.

Seven extraordinary high school juniors, sponsored by CAEC, participated in this year's Montgomery Youth Tour. Participants were Kyle Chandler, Autauga Academy; MacKenzie Grace, Victory Baptist; Blake Hudson, Chilton County High School; Anna Grace Parnell, Autauga Academy; Karragan Ratliff, Chilton

County High School; Raegan Shackelford, Autauga Academy; and Marisa Withers, Thorsby High School.

The students were in agreement that this program gave them the opportunity to develop team building, social and leadership skills while interacting with area students sharing similar goals.

"The leadership and motivational speakers and activities will remain with me," said Withers.

Montgomery Youth Tour/Alabama Cooperative Youth Leadership Conference

Joined by more than 140 other students from across the state, the participants toured the State House, the Civil Rights Memorial, the First White House of the Confederacy, the Dexter Avenue Church, the Judicial Building and the newly remodeled State Archives.

All students will be invited to participate in the Alabama Cooperative Youth Conference held at the 4-H Youth Development Center in Columbiana, Ala., July 8-10, where they and students from across the state will learn about different kinds of cooperatives and the unique role they play in our everyday lives. They will also take advantage of additional leadership development exercises and activities.

Washington D.C. Youth Tour

Another part of the Youth Tour Program is the Washington D.C. Youth Tour, scheduled for June 13-19. After interviewing with a panel of CAEC Trustees, Chandler, Parnell, Ratliff and Shackelford were selected to attend this upcoming conference and Hudson was named as first alternate. These representatives will join approximately 1,500 high-school juniors from other electric co-ops across the country.

This tour provides young leaders a life-impacting opportunity to increase their understanding of the value of rural electrification and become more familiar with the historical and political environment of the nation's capital with visits to monuments, government buildings and cooperative organizations. They will also be able to visit with elected officials and increase their knowledge of how the federal government works.

Congratulations to all of our students who participated in this valuable and unique process.

Application information for the 2015 Youth Tour will be available in the September 2014 issue of *Alabama Living* magazine and on our website, caec.coop. For more information, call 1-800-545-5735 ext. 2125. ■



Representative Kurt Wallace meets with CAEC's Youth Tour students in Montgomery.





Powering Lives

Generation: Providing the Energy to Power our Lives

In most cases, when you simply turn on the television or start a microwave, somewhere a turbine spins faster to produce the power you are using at that exact moment. With power all around us and the luxuries it provides, we hardly give a second thought to the complex process of producing the energy needed for everyday activities.

Since 1882, electricity has been generated at central stations and distributed to consumers, running first on water power or coal. Today we still rely heavily on coal in addition to nuclear, natural gas and hydroelectric to meet our energy needs. Although these fuel sources may differ, they basically produce power

the same way—by causing a turbine to turn. This process is also known as electromagnetic induction.

Electromagnetic induction is the most commonly used form of generating electricity today. It happens when a generator transforms energy of motion (kinetic energy) into electricity by rotating a magnet within closed loops of a conducting material such as copper. Below is the process of creating the kinetic energy needed to create the electricity we use in every aspect of our lives. With approximately half of the country's power production coming from steam-powered generation, that will be the primary focus of this detailed look at power generation.

Fuel

It all starts with a fuel or generation source. In the United States, the most widely used fuel is coal (37 percent), followed by natural gas (30 percent), nuclear (19 percent), hydropower (7 percent) and renewables (5 percent).

Sources such as coal and oil are burned in large furnaces to heat water to create steam while nuclear produces steam when the splitting of neutrons creates heat to boil water.



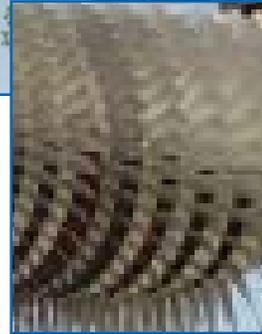
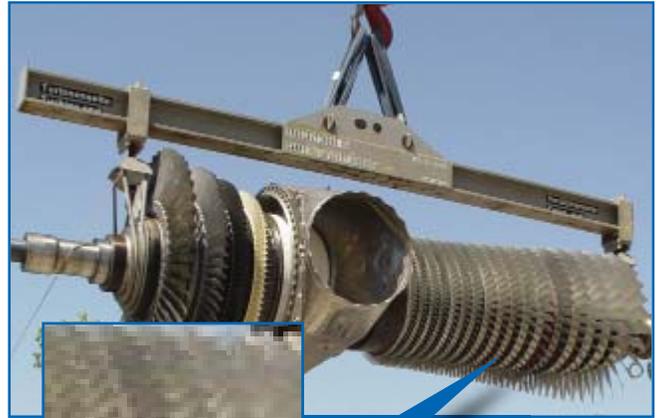
The boilers for this combined-cycle natural gas plant are surrounded by a system of pipes and tubes and the exhaust towers.

Boiler

The boiler's walls contain tubes carrying water. When the heat produced by the fuel source is applied to these water-filled tubes, the water's temperature increases until it is transformed into steam. The steam, under high pressure and temperatures, is then piped into the turbine. The water for this process often comes from a nearby water source, such as a river or lake, and must be processed to be virtually free of dissolved minerals as they can leave deposits and harm equipment. Some systems may also use the same water repeatedly in a closed cycle process where captured exhaust steam is cooled and then returned to the boiler.

Turbine

It is here in the turbine where kinetic energy is produced as the steam from the boiler is brought in and spins the blades of the turbine, creating mechanical energy. High pressure steam hits the turbine's blades which are connected to a long turbine shaft causing it to spin. In the case of natural gas, it is burned in an engine, causing the blades of the turbine to spin. Hydropower and renewables, such as wind, use the mechanical energy of moving water and wind to turn the blades.



A natural gas turbine with a close-up of the blades. The connection to the shaft is on the left.

Generator

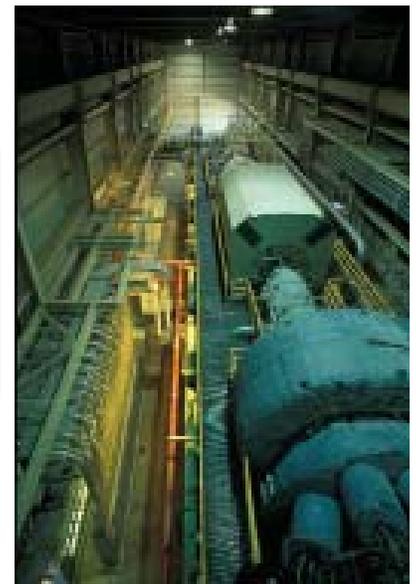
The now spinning turbine shaft is connected to a generator. Within this generator, loops of copper wire are wound around stacks of magnetic steel and attached to a rotor which is attached to the turbine shaft. As the rotor turns, it causes the electromagnets to move past conductors mounted on a stationary housing called the stator. As the rotor revolves around the stator, it creates a flow of electrons and voltage to develop, thereby creating electricity.



An inside look at a stator with the turbine shaft coming in which connects to a rotor.

From the generator, the electricity begins its seamless journey on the transmission system (which we covered in last month's *Alabama Living*), through CAEC's distribution system and finally, to your home. ■

Coming together: a turbine connected to a generator.

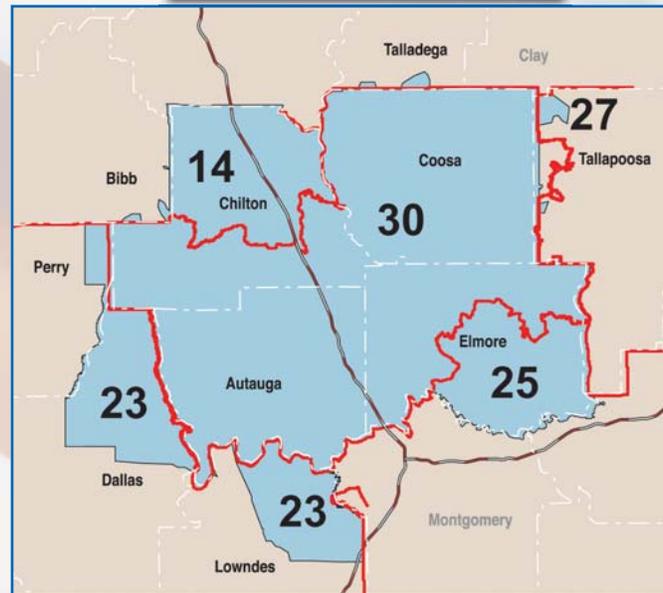


New District Maps for Elected Officials

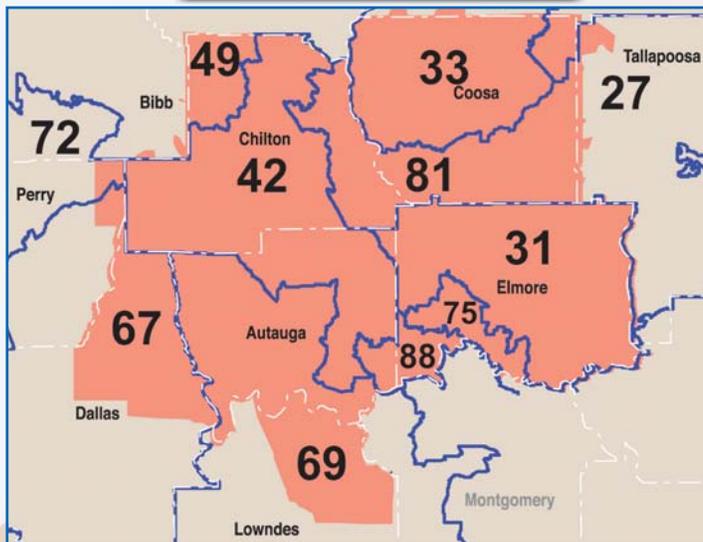
The redistricting of both Alabama House and Senate districts will be in effect for the June 3 primary elections.

We are providing these new district maps for your convenience. In some cases there are multiple candidates running for an office. To gain more information on who is running in your district, visit legislature.state.al.us. In the event of a runoff election, it will be held July 15.

Senate



House



**Don't Forget
to Vote!
Primary
Elections are
June 3rd**

**CAEC Offices will be Closed Monday,
May 26, for Memorial Day**

Electrical Safety Quiz

With May being National Electrical Safety Month, it's a great time to test your knowledge on safety and electricity. Take the short quiz below and test your electrical safety knowledge.

1. If you're working on an outdoor project that requires digging a hole of any size, what should you do?
 - A. Dig wherever you want, your power lines are above ground, not underground.
 - B. Call 811 a few days before you dig.
 - C. Dig slowly and stop when you see a line.
2. True or False: It is safe to touch a power line with a pole, as long as the pole is made of plastic.
3. How far should ladders be from power lines?
 - A. At least 10 feet.
 - B. At least 5 feet.
 - C. It doesn't matter if it's a wooden ladder.
4. True or False: If you see a power line on the ground, the best way to know if it's energized is to look for sparks or smoke emitting from the line.
5. If you see someone who is receiving an electrical shock or is being electrocuted from an appliance, you should:
 - A. Use a piece of wood to push the appliance away.
 - B. Turn off the home's main switch at the circuit breaker.
 - C. Grab them and pull them away from the appliance.



Answers:

1. B: Call 811 a day or two before a project to help save time, money and possibly your life. Homeowners often make risky assumptions about what is and isn't underground and where utility lines are located. Every digging job requires a call, even for small projects like planting trees and shrubs.
 2. False: It is not safe to touch a power line with any object, no matter what it's made of.
 3. A: No matter what type of ladder you're using, it should be at least 10 feet from any power line. Preferably, use a clean, dry wood or fiberglass ladder, and if you're working near the service drop line (the connection from the distribution lines to your home), call and arrange for CAEC to disengage the line, allowing you to work safely.
 4. False: There is no way to tell if a power line is energized by looking at it and you should never try to investigate on your own. Call the power provider or the local authorities immediately and stay away from the downed line.
 5. B: Turn off the home's main switch at the circuit breaker. By turning off the appliance's source of power, you can safely evaluate the person. Touching them while the item still has power could conduct electricity into your body as well, and while wood may not be a conductor, if it's wet, dirty or holds any metal, it could still cause you electrical harm.
- For more safety tips, visit us at www.caec.coop or follow us on Facebook and Twitter.



Cool Down with a New Heat Pump



Cindy Browder
CAEC Energy
Advisor

As we enter the month of May, many people begin to think about the dog-days of summer and how those days will add strain to their old or inefficient air conditioning unit. If you are considering the purchase of a new unit for your home, CAEC can help offset the cost through our heat-pump rebate program.

In 2012, we began offering rebates on high efficiency air-to-air heat pumps in addition to dual fuel systems and geothermal units for standard and manufactured homes. During the last two years, some common questions have come up regarding the program. If you're thinking of purchasing a unit, the answers below should help address any of these concerns:

How do I qualify for the rebate program?

There are four qualifications: meeting specific SEER requirements (see the chart to the right), purchasing a whole unit (not just an air handler or condenser), providing an invoice for proof of purchase and a load calculation indicating the proper size unit was purchased.

If I install more than one unit, do I qualify for a rebate on both?

Yes, as long as they meet the requirements listed above.

If I just found out about the rebate program and I purchased a unit a few months ago, can I still receive a rebate?

As long as the unit was purchased within the last 12 months and meets the above qualifications, you can receive a rebate.

If I only replace the indoor or outdoor unit, do I still qualify for a rebate?

No, to insure proper efficiency, the program requires that you replace the whole unit. Additionally, for the new, high-efficiency systems to work properly and to extend

their life, it's highly recommended that the indoor and outdoor units are perfectly matched.

How long does it typically take me to receive my rebate?

The whole process typically takes 2-3 weeks, depending on all the necessary paperwork being received and an inspection of the installation being completed by CAEC.

A heat-pump is a large investment, and by purchasing an efficient model that is the right size for your home, you can help ensure the most economical use of your energy dollars. For more information about our rebate program, call 800-545-5735 ext. 2118. ■

Standard Homes:

Air Source

- 15 SEER- \$150/ton
- 16 SEER or greater- \$200/ton

Dual Fuel

- 15 SEER- \$300/ton
- 16 SEER or greater- \$350/ton

Geothermal

- 17.1 EER or greater- \$600/ton

Manufactured Homes:

Air Source

- 13 SEER – \$100/ton (if moving from a furnace to an electric heat pump)
- 15 SEER – \$150/ton
- 16 SEER or greater – \$200/ton

Dual Fuel

- 13 SEER – \$250/ton
- 15 SEER – \$300/ton
- 16 SEER or greater – \$350/ton