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Right Fuel Mix

Old man winter was relentless this past year, often bringing us temperatures at or below freezing and breaking records that in some cases had stood for many years. We all had to dig out winter coats, hats and gloves that are almost never used.

As the frigid winter ultimately came to an end, there was already a debate about next winter's natural gas reserves and prices. The nation's effort to stay warm during the harsh, prolonged winter left natural-gas supplies at their lowest level in more than a decade and increased the cost to a five-year high as the extremely low temperatures drove record demand.

Questions now center on current storage levels, drilling prices and whether those prices will lead to a sufficient supply in storage come next winter. Can we drill and store enough to replenish supplies before next winter's onset? According to the U.S. Energy Information Administration (EIA), natural gas storage reserves have fallen—to about half the amount of gas that was in storage at the same time last year and less than half the average amount over the last five years. The agency also predicts natural gas production will not fully erase the deficit in storage volumes that was caused by heavy gas use this past winter.

The prospect of more expensive natural gas disputes this fuel resource being the cheap "bridge" to a sustainable energy future. In his State of the Union address, the President credited natural gas as a top factor in bringing the U.S. closer to energy independence—a "bridge fuel" until zero-carbon-producing renewables can take over. But it appears the low cost natural gas bridge may be on the verge of its own crisis.

In contrast, electricity generation from coal continues to be the fastest growing energy source in the world. A combination of higher prices for natural gas and increased demand for electricity during the past winter led electric systems across the country to increase their use of coal-fired units. But future growth will be constrained by tough federal emissions standards on new coal plants.

The future of our energy depends on the right fuel mix and not one fuel source. With natural gas, like any commodity, the price can fluctuate quickly, so maintaining the right fuel mix is critical to meeting future energy demands.

How can you, as a member, secure our future? Visit Action.coop and tell the Environmental Protection Agency we need coal as part of America's fuel mix. Thank you for continuing to stay engaged on energy issues. ■



Tom Stackhouse
President/CEO



Co-op Strength at Legislative Conference

Alabama cooperative board members and staff from 19 organizations, including Alabama Rural Electric Association (AREA) and PowerSouth, totaling 125 attendees, traveled to Washington, D.C., for the Legislative Conference hosted by the National Rural Electric Cooperative Association (NRECA), May 5-7. The annual event offers co-ops from all over the country the opportunity to discuss issues and concerns affecting cooperative members with the nation's elected officials.

On May 7, the Alabama delegation heard comments from Senators Shelby and Sessions at a breakfast meeting and then visited with each of the seven Representatives in their respective offices to relay messages on several key issues. This year's topics included a thank you to House members for recent legislation allowing the use of large-capacity electric resistance water heaters in demand response programs. An issue of much discussion from cooperatives in 2013, members of Congress heard the outcry and in response, drafted consensus language to allow an exemption to the Department of Energy's standards.



From left: CAEC ACRE committee members Randy Morgan and Kristy Seamon with daughter Kalee, Congresswoman Martha Roby (District 2), CAEC ACRE committee members Brannan Rucker, Buster Bishop and Rebecca Little



*From left: Congressman Spencer Bachus (District 6), CAEC Trustees Terry Mitchell and Mark Presnell, CAEC President and CEO Tom Stackhouse
Background: CAEC Trustee David Kelley*

Another important topic addressed by the group included a request for Congress to support an adequate period for public comments to the Environmental Protection Agency (EPA) regarding the proposed rules for existing power plants. Because the new regulations will be complex, utilities will need more time than the standard 60-day comment period. And while cooperatives are sensitive to the environment, they also know that there are costly effects to consumers when regulations demand results from technology that is not yet viable on the open market.

Members of the employee-led Action Committee for Rural Electrification (ACRE) were able to participate in the legislative meetings. As committee co-chair Rebecca Little noted, "This trip gave us an opportunity to voice concerns with our members of Congress by offering them a way to look at the issues and their ultimate effect on our members. We care about our cooperative and members, and we hope that we were able to shed light on what we see as some very pressing matters." ■

Coal: Your Main Source of Power

In a world with increasingly volatile energy costs, coal is an affordable and reliable source of electricity. Nearly 43 percent of the electricity used in the United States is coal-generated, and given the vast resource the U.S. has of this fuel type, there is enough known supply to last more than 230 years—even used at the same rate as today.

Costs associated with using coal include the mining, transportation, power generation and emissions-control, yet coal-fueled electric power remains one of the lowest-cost sources of energy for consumers.

So how does coal power your home? Let's start in the mines.

Mining Coal

There are two basic ways to mine coal: surface mining and underground mining. Miners extract coal from deposits at or near ground level using the surface mining method. Surface crews remove earth covering the coal and gradually extract this fossil fuel. Miners are then required by law to return the land to its original or improved condition – known as reclamation.

In areas where coal deposits are deep underground, miners dig tunnels into the earth and use one of three methods: conventional, continuous or longwall mining.

With the conventional method the miner uses a long electric chain saw to slice a strip under the coal deposit and the area is blasted. After the explosion loosens the coal, miners use a loading machine and conveyor belt to transfer the coal to the earth's surface for further processing.

In contrast, continuous and longwall mining do not use drilling or blasting. With these processes the coal is torn or cut out respectively, then sent on to the preparation plant.

At the preparation plant, workers operate machinery to remove rocks and debris prior to washing, sorting and blending the coal before it is shipped.

Coal miners are highly skilled and well trained in the use of complex, state-of-the-art equipment. On average coal miners work a 40-hour week in cold, noisy, damp and dark environments, while earning average annual wages and salaries of \$81,258 based on Bureau of Labor Statistics (BLS) data, and accounting for 205,000 direct U.S. jobs



Transporting Coal

Coal is cleaned, sorted and crushed to different sizes before it is transported by railroad, barge, truck or conveyor. Rail transportation accounts for 60 percent of coal shipments to power plants and barges are used to move coal along the nation's 25,000 miles of waterways. PowerSouth's (our power supplier) Charles R. Lowman Power Plant, located near Leroy, Ala., receives golf ball-sized coal by barge on



the Tombigbee River and by rail. As it is unloaded onto a conveyor, the coal is transferred to a large storage pile, big enough to sustain two months of demand.

The Lowman plant can store up to 250,000 tons of coal. Based on high demand, the plant can burn as much as 5,000 tons on a day when members consume a lot of power.

The next step in the process is converting coal into electricity.

Converting Coal into Electricity

Coal-fired electricity generation is the process of making electric power from the energy stored in coal. The process of converting coal into electricity has multiple steps:

1. A machine called a **pulverizer** (shown in the center) grinds coal into a fine powder.
2. The coal powder mixes with hot air, which helps it burn more efficiently. Primary air fans blow the mixture through coal pipes into the **furnace**.
3. The burning coal heats water in a **boiler**, creating steam.
4. Steam from the boiler spins the blades of a **turbine**, transforming heat energy from the burning coal into mechanical energy which spins the turbine.
5. The spinning turbine is used to power a **generator**, a machine that turns mechanical energy



- into electrical energy. This happens when magnets spin inside a copper coil in the generator.
6. A **condenser** cools the steam after it exits the turbine. As the steam is condensed, it turns back into water.
7. The water is pumped back into the boiler, and the cycle begins once again.

The generated electricity then begins its journey to your home through the transmission system, as explained in April's issue of *Alabama Living*, on pages 6 & 7.

While the basic process of converting coal to electricity has not changed in 60 years, advancements in the technology have led to reduced emissions from coal generation.

"Clean Coal" Technology

Clean coal technologies fall into four main categories: coal washing, pollution controls for existing plants, efficient combustion technologies and experimental carbon capture and storage. Research and development in the last two decades have resulted in more than 20 new, lower-cost and environmentally compatible technologies.

In fact, PowerSouth has invested approximately \$400 million in equipment upgrades at the Lowman Plant for



the reduction of sulfur dioxide, nitrogen oxide and mercury emissions. Lowman's three coal-fired generating units can produce 556 megawatts (enough to power 300,000 homes and businesses) by burning approximately 1.5 million tons of coal annually.

Through the integration of scrubber enhancements, sulfur dioxide emissions have been reduced approximately 92.5 percent (200,000 tons total) and nitrogen oxide emissions reduced by about 80 percent (18,000 tons), while achieving the co-benefit of mercury reduction when used in combination with scrubbers.

Although not all countries monitor their emissions from coal, cleaner coal technology is helping alleviate the output of pollutants here in the U.S.

While the U. S. Environmental Protection Agency (EPA) debates which fuel sources should be used to supply the bulk of our nation's electricity needs, coal continues to generate about 43 percent of all the power produced as compared to natural gas (22 percent), nuclear (22 percent), hydro (7 percent), renewables (5 percent) and petroleum (1 percent). Although the U.S. accommodates only five percent of the earth's population, we consume 25 percent of our world's energy production—for the relatively low cost of 11¢/kWh on average nationally.



Safely Use Portable Generators

Portable generators can be dangerous not only to you, but to linemen working to restore power to your home. Learn how to keep everyone safe when using a generator.

Safety is a top priority at CAEC, not only for our employees, but with our members and the public as well. When storms hit, our employees are dispatched to your aid as soon as possible to make repairs, taking all necessary precautions before they work on power lines.

But no matter how many steps we take to keep everyone safe, you can unknowingly put the lives of our crews and your own in danger.

Portable generators, widely utilized when power lines are down, can prove fatal when used improperly. Generators can be temporarily or permanently installed. If you're wiring your generator into a house, it should be done by a qualified, licensed electrician using a transfer switch. This protects you, your neighbors and repair crews from electricity backfeeding onto power lines—which can seriously injure anyone near them, especially crews working to restore power. A temporary generator fired by gasoline or diesel fuel should not be attached to a circuit breaker, fuse or outlet; instead, appliances should be connected directly to the generator with the appropriate extension cord. Always setup your temporary generator outside for proper ventilation.

Follow these tips to keep you and your family safe when using a generator:

- Read and follow all manufacturer operating instructions on how to properly ground the generator.
- Standby generators should have a transfer safety switch installed by a professional. Portable generators should never be plugged directly into a home outlet or electrical system—use an extension cord to plug appliances into an outlet on the generator.

- Never operate a generator in a confined area, such as a garage. Generators produce gases, including deadly carbon monoxide, and require proper ventilation.
- 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. Always ensure that your hands are dry before touching the generator.
- When you refuel the generator, make sure the engine is off and cool to prevent a fire, should the tank overflow. Never attempt to start the generator immediately after fueling if there has been a fuel spillage.
- There should be nothing plugged into the generator when you turn it on.
- Be sure to keep children and pets away from the generator while it is in use.

Follow these tips to enjoy the convenience they bring without compromising the safety of your family, your neighbors and CAEC workers. ■



CAEC Offices will be closed July 4th



Recipe for *Efficiency* from CAEC

Insulation

Have you looked in your attic lately? Insulation in your attic is an essential component to help keep your home cool in the summer and warm in the winter.

There are numerous types of insulation to choose from, and each has a different method of installation. The example below uses cellulose--an easy "do it yourself" process.

Ingredients (supplies):

Cellulose Insulation

Utensils (tools):

Insulation Blower Machine

Breathing Masks

Gloves

Goggles

Directions:

Purchase the cellulose insulation at your local home improvement store where you should also be able to rent an insulation blower. The amount you need will depend on the square footage of your home and the thickness of the existing insulation. Make sure the thickness of your insulation (including any existing insulation) is between 12 and 15 inches, which should give you an R-value of 38.

You will need at least one person to assist you in applying the insulation.

Installing Cellulose Attic Insulation

1. Place the insulation and the blower machine outdoors. DO NOT operate the machine indoors.

2. Take the blower's tube into the attic (through a window or door in the house). Make sure you are outfitted with gloves, goggles and breathing mask.



3. Have the person (also outfitted with gloves, goggles and a breathing mask) stationed near the blower machine and begin to feed it with the loose, cellulose insulation, one bale at a time. When ready, this person will also control the flow of the insulation by using an on/off switch or a lever that allows insulation to pass through.



4. In the attic, sweep the blower's tube in the locations where you desire the insulation, avoiding vents so they do not become clogged with insulation. When finished, have the person stationed with the blower turn the machine off.



On average, an 1,800 square foot house will take approximately four hours to complete at a cost of \$500. Prices and times may vary due to retailers, square footage and depth of existing insulation. On a house with little or no pre-existing insulation, adding more—and doing it yourself—can help make your home more comfortable and provide some cost savings on your power bill.

Have an idea to make your home more energy efficient, but not the finances?

Let CAEC help you with a loan for efficiency improvements!

Does your home need better insulation? New windows and exterior doors? A more efficient heat pump?

interest rates – ensuring you can get the efficiency improvements you need at a fair cost.

If the answer is yes, but you're wondering how to pay for these improvements, CAEC, in conjunction with PowerSouth and Regions Bank, has developed a loan program for financing weatherization in your home with low annual

Contact CAEC today for more details on energy efficiency for your home. Call us at (800) 545-5735 ext. 2118.

"I felt drafts throughout my home and decided to have a CAEC Energy Services Representative (ESR) come out and perform an audit," said retired Air Force Lt. Colonel John Anderson in Wetumpka.

"The audit was priceless and it gave me a baseline of what I needed to improve the comfort of living in my home and reduce my energy cost. It was at that point I learned about the loan program which includes a checklist with step-by-step instructions to make the process easy," said Anderson.

