

2018 Youth Tour  
Southeastern Electric Cooperative, Inc.

Rural Electric Youth Tour - Washington, D.C. June 7 - 14, 2018

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WHAT IS THE YOUTH TOUR?

The National Rural Electric Youth Tour is an annual week-long event during which about 1,600 high school students from all over the country convene in Washington, D.C. to learn more about Government, Cooperatives, and Rural Electrification.

During the tour, delegations of students will follow State planned itineraries, which include a day on Capitol Hill, observing the House and Senate in session, and visits to members of Congress in their offices.

Southeastern Electric Cooperative, Inc. will be sponsoring **three** youth for the all expense paid trip for the Washington Youth Tour in 2018.

WHO IS ELIGIBLE?

Students must be a high school sophomore or junior this school year and whose parents or guardians are members of the Cooperative are eligible to enter the contest.

HOW DO I QUALIFY?

All applicants must fill out a "Personal Data Sheet" and take an "Open Book Test" on the history and organization of Rural Electrification. The test booklets are available from Southeastern Electric offices in Alcester, Marion, Salem, Viborg, and Parkston or can be mailed, emailed or online at [www.southeasternelectric.com](http://www.southeasternelectric.com) after you have completed and sent back the "Personal Data Sheet". Tests are to be completed and returned by **March 16, 2018**. You may email your completed test and "Personal Data Sheet" to [brett@southeastern.coop](mailto:brett@southeastern.coop). Entrants will then be placed in a drawing. Four names will be picked; the first three names will be the winners of this year's trip, the fourth name will be an alternate.

WHAT HAPPENS IF I AM CHOSEN

All three finalists will have to submit a 300-word essay (**after the trip**.) The essay will be about their experiences during the trip and "What impact Cooperatives have in your community". The essays will need to be returned by **July 6, 2018**.

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If you have any questions concerning the Youth Tour, give Brett Snyders a call at Southeastern Electric (1-800-333-2859) or email Brett at [brett@southeastern.coop](mailto:brett@southeastern.coop).

## YOUTH TOUR STUDY MATERIALS

### COOPERATIVE PRINCIPLES

**Voluntary and Open Membership** – Cooperatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political or religious discrimination.

**Democratic Member Control** – Cooperatives are democratic organizations controlled by their members, who actively participate in setting their policies and making decisions. Men and women serving as elected representatives are accountable to the membership.

**Member Economic Participation** – Members contribute equitably to, and democratically control, the capital of their cooperative. At least part of that capital is usually the common property of the cooperative. They usually receive limited compensation, if any, on capital subscribed as a condition of membership. Members allocate surpluses for any or all of the following purposes: developing the cooperative, possibly by setting up reserves, part of which at least would be indivisible; benefiting members in proportion to their transactions with the cooperative; and supporting other activities approved by the membership.

**Autonomy and Independence** – Cooperatives are autonomous, self-help organizations controlled by their members. If they enter into agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their cooperative autonomy.

**Education, Training and Information** – Cooperatives provide education and training for their members, elected representatives, managers and employees so they can contribute effectively to the development of their cooperatives. They inform the general public – particularly young people and opinion leaders – about the nature and benefits of cooperation.

**Cooperation among Cooperatives** – Cooperatives serve their members most effectively and strengthen the cooperative's movement by working together through local, national, regional and international structures.

**Concern for Community** – While focusing on members needs, cooperatives work for the sustainable development of their communities through policies accepted by the members.

### SHORT HISTORY OF COOPERATIVES

Scholars find that the cooperative way of sharing resources and risks is as old as our civilization and it has a remarkable history and evolution. Some of the earliest forms of cooperation probably occurred during group animal hunts, in united efforts to achieve mutual protection, and in community farming. In North America, the cooperative way is said to date back to the 1620 Mayflower Compact when the Pilgrims banded together on a cooperative basis.

**1752** The first successful cooperative was organized in the United States when Benjamin Franklin formed the Philadelphia Contributionship for the Insurance of Houses from Loss by Fire – the oldest continuing cooperative in the U.S.

**1844** The Rochdale Equitable Pioneers Society was established in Rochdale, England. These pioneers wrote down a set of principles to operate their food cooperative on Toad Lane, which contributed to their success and spread to other cooperatives around the world. Toad Lane is considered the birthplace of modern cooperatives because the principles and practices of the Pioneers assured the success of the cooperative model.

### ELECTRIC COOPERATIVES

If you are chosen to participate in the Rural Electric Youth Tour, you are certainly familiar with electric cooperatives. However, do you know that America's electric cooperatives are:

- Private independent electric utility businesses;
- Owned by the consumers they serve;
- Incorporated under the laws of the states in which they operate;
- Established to provide at-cost electric service;
- Governed by a board of directors elected from the membership, which sets policies and procedures that are implemented by the cooperative's professional staff?

You probably know that distribution cooperatives deliver electricity to the consumer and that generation and transmission cooperatives (G&T) generate and transmit electricity to distribution cooperatives.

In addition to electric service, many electric cooperatives are involved in community development and revitalization projects such as small business development and job creation, improvement of water and sewer systems, and assistance in delivery of health care and educational services.

### THE FIRST ELECTRIC SYSTEM

Thomas A. Edison built the first central station electric system in lower Manhattan in 1882. The cities were quick to light up. Electric service was one of the attractions of city life and the beginning of a movement of people from the countryside into the cities.

Power plants and electric lines were expensive items to build, but in cities the cry for electric service quickly went from a murmur to a clamor. In cities, people lived close together and it was easy to hook up lots of customers. Revenue from electric bills made it possible for even more power plants and electric lines to be built. Farmhouse and rural residences, however, were widely scattered across the countryside and the electric companies could see little prospect that electric service in rural areas could be profitable, thus rural America labored and lived in the dark.

In 1923, a group of forward-looking men from farm groups, government bureaus and equipment manufacturers, formed a Committee on the Relation of Electricity to Agriculture - CREA for short - to study the potential use of electricity on the farm. No one had talked about agriculture as an industry, because all the work had to be done either by horse or manpower.

CREA decided to test electricity on the farm. They wanted answers about the costs, production records, etc. A test project was set up near Red Wing, Minnesota. Twenty farms linked by a six-mile electric distribution line made up the test. Half the farms were equipped with all the latest electric appliances and equipment then in existence. The other 10 farms just had electric lights.

The 10 farm families with laborsaving appliances soon found their household and farm chores eased. They learned that while electric consumption increased, so did their agricultural production. At the same time, overall operating expenses dropped. The comparison of these farms with those which used the electricity for lights only was so striking that none of the participants wanted to give up any of the electric appliances or equipment at the end of the test period. Electricity on the farm was on its way.

### WE WERE NOT FIRST

The United States was very slow in adapting electricity to use on the farm. In 1935, only 10 percent of the nation's rural families were receiving central station electric service. By comparison, in 1935, 60 percent of the farms in New Zealand were electrified, 90 percent in France and Germany, 85 percent in Denmark, 65 percent in Sweden, 55 percent in Norway and 100 percent in the Netherlands.

The notion that electricity generated at a central station could be distributed to every farm in the United States took hold of men's mind slowly. Engineers knew how to do the job as early as 1915, when they learned to transmit power as far as 100 miles. Since most U.S. farmers were then living within 100 miles of a generating station, rural electrification for lighting at least was technically possible.

### REA IS THE NAME

The 1930's were times of drought and depression and, as a result, on May 11, 1935 President Franklin D. Roosevelt, by executive order, established the Rural Electrification Administration (REA). REA was begun as part of a general program of providing jobs for the unemployed under the authority of the new Emergency Relief Appropriation Act, with \$100 million in funds for either loans or grants. REA would fund and supervise programs that would generate, transmit and distribute electricity in rural areas.

Just nine days later on May 20, 1935 Morris L. Cooke was appointed the first REA administrator. The following day he opened an office in a three story house in which George Washington, Jr. had lived. Within a week he had assembled a small staff.

Cooke insisted, sometimes with shirtsleeves rolled up as though he would fight for it, that REA would be a loan agency and that it must use skilled as well as unskilled people if it were to be successful. He didn't think employment should be limited to those out of work. He won.

On August 7, 1935 REA was established as a lending agency, freeing it from many relief program regulations. REA was established to provide low interest loans to any company willing to build the lines necessary to serve rural areas. It was originally thought that investor-owned utilities would take advantage of this money and get electrification of rural America going. To nearly everyone's surprise, the investor-owned companies avoided the program. There was no way to make a profit by serving rural areas, they said. This left rural residents with no alternative but to form and operate their own power supply corporations. It wasn't long before boards of directors were elected and rural electric cooperatives were born.

The Rural Electrification Act of 1936 authorized a 10-year electrification program. In 1944, with enactment of the Pace Act, the program was extended indefinitely and interest rates were set at two percent with 35-year loans. The job of electrifying rural America began in earnest. By June, 1949, more than 78 percent of the farms in this country were receiving central station electric service. Its success eventually prompted the establishment of a rural telephone program in 1949.

The clear intent of the legislation was to electrify all of rural America and since 1950, all loan contracts have contained an "area coverage" agreement requiring the borrower to serve all consumers within its area, no matter how sparsely settled.

In October 1994 the Rural Electrification Administration changed its name to Rural Utilities Service.

### WHAT REA DOES

The Rural Electrification Act empowered the Rural Electrification Administration to make loans to qualified borrowers, with preference to non-profit and cooperative associations and to public bodies. Electric loans were at first made to finance the construction of electric distribution lines to persons in rural areas. Later, funds were provided for transmission lines and generating plants. Most of the loans have been made to cooperatives, but a few private power companies borrowed from REA. REA money was available to all borrowers willing to serve rural areas.

REA engineers were faced with several problems in expanding rural electrification after 1935. First, there was a need for maximum economy in construction. Rural people were in no position to pay the bill for constructing lines that were as expensive as those built in town. Secondly, there was little money available to conduct elaborate surveys. In more than one instance, early REA builders picked up road maps from the corner gas station, jumped in the car and started to lay-out electric systems. By developing simple but sturdy construction methods, REA builders found they could string electric lines across the countryside cheaper than private power firms were doing it in the city.

The cost of building rural lines before REA had been between \$1,500 and \$2,000 per mile of line. By the end of 1936, nine projects had been built in as many states at an average cost of only \$941 per mile of line. By 1939, REA was building lines for an average of less than \$825 per mile.

Some critics of the REA program say the rural electrics are unfair competition. A look at just a few statistics shows that rural electrics are not unfair competition with private power companies. Rural electric systems nationwide have only 4.7 consumers per mile of line, compared to 60 for the investor-owned and municipal power systems serving the cities. Southeastern Electric only has 2.8 consumers per mile of line.

### "GOT FIVE BUCKS, FRIEND?"

All across the land, enthusiastic rural electric cooperative supporters drove up and down dusty country roads asking friends and neighbors for the \$5 fee required from each prospective user to help launch rural electric cooperatives in their area. Many cooperatives today no longer require a membership fee.

When cooperatives were first organized, many directors wondered how farmers were going to use all the electricity that the lines were built to carry. Some of the first farm families only had one light bulb in the house and one in the barn. But their apprehensions were short-lived. Within 12 months after one project was energized, a survey disclosed the following purchases of appliance by members: electric irons, radios, washing machines, refrigerators, vacuum cleaners, toasters, electric motors and electric water pumps.

Amid the golden grain fields and lush pasture land of southeastern South Dakota, farmers first got electricity from Clay-Union Electric Corporation, Burbank (now located in Vermillion), that was energized on October 3, 1937.

## CONSOLIDATION

Southeastern Electric Cooperative had its beginning when Lincoln-Union Electric Company of Alcester and Turner-Hutchinson Electric Cooperative of Marion consolidated on January 1, 2000. The nine directors of Lincoln-Union and the nine directors of Turner-Hutchinson served as the Board of Directors of Southeastern until the 2001 Annual Meeting, when an eight person board as selected.

On January, 1 2006 Southeastern Electric and McCook Electric were merged. An organizational board of fifteen directors was established. At the June 2006 annual meeting this organizational Board of Directors was reduced to a ten person board.

Today, Southeastern Electric serves members over a network of approximately 2800 square miles of territory and serves 15,000 accounts over 3150 miles of overhead line and 980 miles of underground line miles of distribution lines reaching into ten counties. Each day (on the average) these consumers use 800,000 kilowatt-hours of electricity. That is enough electricity to keep a 100-watt bulb burning for more than 900 years. Or you could say (on the average) each consumer uses an average of 60 kilowatt-hours per household per day at an average cost of \$5.10 per day.

### JUST A NICKEL'S WORTH

The following chart shows how much you can get for a nickel's worth of electricity based on an average of seven cents per kilowatt-hour.

Toaster.....	24 pieces of toast	Mixer.....	73 cakes
Electric razor.....	98 shaves	Broiler Oven.....	65 muffins
100-watt light bulb.....	7 hours	Range top .....	20 hard-boiled
Washing machine.....	19 minutes		eggs
(incl. hot water)		Food processor .....	98 minutes
Vacuum cleaner.....	24 minutes	Oven.....	40 minutes
Can opener .....	268 uses	Microwave oven.....	82 minutes
Clothes dryer .....	19 minutes	Color television.....	4 hours
Dishwasher.....	14 minutes	Video game/monitor .....	4 hours

## SOUTHEASTERN ELECTRIC

Southeastern Electric is owned by the people who receive electricity from the cooperative. The headquarters is located at 501 South Broadway in Marion, South Dakota. We have five other offices as well; Alcester, Parkston, Sioux Falls Area, Salem and Viborg. A board of directors is elected by the membership. The board in turn hires a general manager, who is Brad Schardin. He and the other employees are charged with the responsibility of doing the cooperative's work.

Policy matters are reserved for the board. President of the board is Don Heeren of District 3. All directors must be members of the cooperative; thus those individuals setting policies for the cooperative pay electric bills just like all other members. Some of these policies are reflected in three basic principles of all cooperatives. The first is open membership. The second is limited return on invested capital. The third is that in the cooperative form of business, net earnings are returned to those who use the service.

This principle is realized through the patronage capital refund. After all costs have been paid and reserves set aside, the "margins" of the cooperative are assigned to the member. Capital credits are assigned according to the member's usage during a specified period. Money retained in a revolving fund for use by the cooperative is paid to the member at a later date.

It takes more money per consumer to provide electric service in rural areas. Southeastern Electric is committed to keeping costs as low as possible while providing reliable service to its member-owners. Southeastern Electric rates for various categories of service reflect actual costs associated with that particular kind of service - rural residential, seasonal, large or small commercial, irrigation, etc.

Southeastern is a full service cooperative. Some of the programs offered by Southeastern Electric include:

Advice and Assistance: Available at no cost - Members may obtain electrical planning services for new construction or remodeling.

Dual Fuel: When members have two heating systems, say an oil furnace and electric heat, an off-peak rate is available to members using electricity for heating providing it is controlled so that it can be turned off during "peak demand" times.

Loan Program: Southeastern Electric has low interest loans available to members for installing new electric heating systems.

Water Heating Rebates: A rebate program is available to members for new electric "lifetime warranty" water heaters. Water heaters must be under load control to qualify.

## COOPERATIVE FINANCES

The cost of capital is especially important to the member-owned rural electrics because of their commitment to rural coverage. Rural electric cooperative's (REC's) deliver electricity to 36 million people, thinly distributed over 2,600 counties in 48 states.

Cooperative lines in South Dakota stretch across 90 percent of the South Dakota's landmass. Each mile averages only 1.8 consumers. This low density produces annual gross revenue of \$2,245 per mile, compared to \$42,471 per mile of line for investor-owned utilities. These extensive systems required to serve fewer users over wide areas compel rural electrics to invest an average of \$3,152 per consumer. The comparable figure for investor-owned utilities is \$1,393 and for municipal utilities is \$1,478.

South Dakota REC's employ about 1,900 persons. Southeastern Electric has 58 employees. The rural electrics in the state represent one of South Dakota's largest industries.

Use of electricity from RUS - financed lines has increased to a far greater extent than was expected when the original lines were built. In South Dakota the average residential and farm electric usage per member in 2004 was 1,300 Kwh. On the farm alone, more than 400 uses of electricity are known with at least 250 of them helping to increase production and making farming more profitable.

Today, there are 28 distribution cooperatives and three power supply (G&T) cooperatives that serve members in South Dakota. They serve 108,300 members. The average system has 2,217 miles of line with 1.70 consumers per mile. Sioux Valley Energy, with headquarters a mile east of Colman, is the largest distribution cooperative in South Dakota, serving over 19,000 active accounts. The smallest system, Douglas Electric at Armour, serves 632 members.

## NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION (NRECA)

The National Rural Electric Cooperative Association (NRECA) headquartered in Arlington, Virginia was formed in 1942 to represent the national interests of rural electric systems. NRECA directs legislative and other programs for the benefit of all rural electric cooperatives in the nation. The general manger of NRECA is Glenn English.

More than 1,000 rural electric systems form a countrywide rural electric network. Most are distribution systems that deliver electricity to residential and other consumers. Some cooperatives are called G&Ts because they both generate and transmit electricity to meet the power needs of distribution cooperatives.

During the early years of NRECA, its legislative interests were largely focused on REA loan funds. Today, however, the politics of energy is all encompassing. Literally hundreds of measures, which directly affect energy supplies and use, are under consideration at any given moment.

### OF DOLLARS AND TAXES

At the close of 1972, the announcement was made that the REA two-percent loan program to rural electric cooperatives was being discontinued. The Administration of then President Richard Nixon said they would be switching to a guaranteed-type of loan program at a higher interest rate under the Rural Development Act. Thousands of rural electric leaders objected, circulated petitions and urged Congress to reconsider. Legislation reinstated the two-percent interest rate for cooperatives with low density per mile of line. For others the rate was fixed at five percent. Those cooperatives that could afford to borrow on the open money market would have their loans guaranteed by REA.

Because the rural electric systems need more capital than the government was willing to continue to provide in REA loans, in 1969 the cooperatives organized their own private financing institution. This is the National Rural Utilities Cooperative Finance Corporation (CFC), which will borrow money in the commercial money market to furnish supplemental financing to rural electrics. The rate of interest of these loans varies. This cannot replace REA long-term, low-interest loans, but will supply additional short-term and long-term capital. CFC's first loans were made in February, 1971.

Rural electric cooperatives pay state and local taxes. Southeastern Electric paid \$1.5 million in gross revenue taxes for 2011. Gross revenue taxes are paid in lieu of an "ad valorem" or property tax and are earmarked for school districts throughout the cooperative's service area.

Rural electric systems also pay real estate, gasoline, withholding, social security, sales and various other taxes. Rural electrics pay every tax that any other corporation pays with the exception of the Federal tax on corporation profits. Rural electrics do not pay a federal corporation profit tax because, as cooperative, they operate at cost and do not have a profit on which to pay a tax. Any profit is returned to the consumers.

As an organization representing the view of rural electric systems and their consumers, the NRECA still shapes its legislative stance in response to a question repeatedly posed by one of its former directors: "How will this affect the little guy at the end of the line?"

That question was paramount in late 1981 when a national panel of prominent rural electric leaders, including three former REA administrators, launched a major study of "Rural Electric Financing for the Future." Out of the year long effort came a set of recommendations, unanimously endorsed by the

NRECA membership at their 41st annual meeting in February 1983, which was incorporated in legislation introduced in the U.S. Congress in May 1983. The major objective of the legislation was to insure the continuation of adequate, affordable, long-term financing for the nation's rural electric systems. Its chief provisions contained measures to protect the REA Revolving Fund, the primary source of capital for rural electric distribution systems, as well as to help ensure a strong guaranteed loan program. The House of Representatives on March 1, 1984 passed the legislation, H.R. 3050, by a vote of 283-111 in face of strong opposition by the Reagan Administration. A companion bill in the Senate, however, died on October when it was brought to the floor under a parliamentary procedure that prevented its passage.

The REA was targeted as an agency to be eliminated or, at least, to have its budget drastically cut as the Reagan Administration attempted to deal with the federal budget deficit. Rural electric loans come from the REA Rural Electric and Telephone Revolving Fund and are non-budget items. So cutting those loan levels would have absolutely no effect on the nation's budget deficit.

### TOUCHSTONE ENERGY COOPERATIVES

Southeastern Electric Cooperative is one of hundreds of electric cooperatives across the nation that is Touchstone Energy Cooperatives. Touchstone Energy is an alliance of local, consumer-owned utilities across the country committed to providing superior service at affordable rates to all customers, large and small.

Touchstone Energy is the brand identity program for electric co-ops around the country. It is designed to:

- Help co-op customers distinguish cooperatives from other electric providers.
- Offer a promise to the members of reliable energy and superior service.

Touchstone Energy cooperatives have four values they promote:

**Accountability** – means being responsible for delivering superior service.

**Integrity** – means being honest, following through, living up to the Touchstone Energy promise.

**Innovation** – means finding new solutions for old or new problems.

**Commitment to Community** – means understanding the needs of your community and adding to its development

### SOUTH DAKOTA RURAL ELECTRIC ASSOCIATION (SDREA)

Early in their development, South Dakota's rural electric cooperatives realized they were going to have to work together and speak with one unified voice if they hoped to accomplish their goals. The first step was to form a Statewide Association. In 1942, the state's first eight distribution cooperatives joined together to form the South Dakota Rural Electric Association (SDREA). SDREA is a service organization formed by and for the rural electric cooperatives in South Dakota. The Executive Manager of SDREA is Ed Anderson. SDREA's office is in Pierre. Don Heeren represents Southeastern Electric on the SDREA board.

SDREA's purposes include: to support consumer owned distribution cooperatives; to provide information to both members and the general public about rural electrification in the state; and to provide the means by which all electric cooperatives of the state can help enact needed legislation.

SDREA presents to state and national officials and lawmakers the laws and policies necessary for the success of rural electrification. A number of committees, made up of members of individual

cooperatives from throughout the state, direct legislation and other programs for the benefit of all the rural electrics in South Dakota. In addition, programs are held for cooperative employees across the state in safety, public relations and various other topics.

### EAST RIVER ELECTRIC POWER COOPERATIVE

East River Electric Power Cooperative was formed in 1949 by 21 member rural electric distribution cooperatives in Eastern South Dakota and Western Minnesota. After the consolidation of seven cooperatives, East River, with its headquarters in Madison, SD, has 23 member systems. Its general manager is Jeff Nelson. Their board of directors is made up of one director from each of its member system cooperatives. Leslie Mehlhaff represents Southeastern Electric on the East River board.

East River is a transmission cooperative that provides wholesale power to Southeastern Electric and the other member systems. While not actually generating any electricity itself, East River has invested more than \$110 million in nearly 2,520 miles of transmission line and 202 substations and related power facilities. These facilities provide a connection between lines of the local rural electric and the federal hydropower and Basin Electric transmission systems. More than 80,000 service accounts in eastern South Dakota and a portion of western Minnesota are served through East River and its member systems.

As a power supply cooperative, East River's first goal is to see that member systems have an adequate supply of power when and where they need it. East River purchases about 38 percent of its power requirements from the United States Department of Energy (Western Area Power Administration) and other portion from Basin Electric Power Cooperative in North Dakota.

### BASIN ELECTRIC POWER COOPERATIVE

Basin Electric Power Cooperative, headquartered in Bismarck, ND is a regional wholesale power production and transmission cooperative. Ron Harper is the general manager. Basin Electric generates electricity for 118 member rural electric cooperatives located in eight states (North Dakota, South Dakota, Wyoming, Montana, Colorado, Nebraska, Minnesota and Iowa). Together these consumer-owned cooperatives provide electricity to more than 440,000 rural homes, farms, ranches, irrigation installations and businesses, about 1.2 million people, encompassing a geographic service area of over 400,000 square miles. Southeastern Electric get approximately 60 percent of its wholesale power from Basin Electric and the remainder comes from the Missouri River dams.

Basin Electric was organized in 1961. In September 1966 the first generating unit was dedicated and named for Leland Olds, a leader in the effort to develop a regional approach to electric power supply. Today, Basin Electric owns and operates generating and transmission resources with a power supply capacity of 2.3 million kilowatts. Basin Electric is also operations manager for the Laramie River Station near Wheatland, Wyoming. The Laramie Station is a joint power supply venture by six consumer-owned utilities serving some two million people in eight states. In addition, Basin operates nearly one million kilowatts of generating capacity on behalf of participants in the Missouri Basin Power Project, giving the Cooperative a total management responsibility of 3.2 million kilowatts. These resources include power-generating plants located at Stanton, Beulah and Velva, ND and a peaking plant near Vermillion, SD. All of the power plants utilize the vast low-cost coal reserves found in that area, except the Vermillion peaking plant that is oil-fired.

Another source of electric energy for Basin Electric is wind-powered turbines. These turbines have a potential generating capacity of up to 730 megawatts (730,000,000 watts). These wind projects produce enough energy to serve more than 200,000 typical homes. This effort is reducing our dependence on traditional fossil fuels and helping to keep our environment clean.

In 1980, Basin Electric received an award from the President's Council on Environmental Quality. Basin was cited for pioneering technology used to clean up emissions from power plant smokestacks. In fact, national standards now required by the federal government are based, in part, from standards established by Basin Electric. Smokestack emissions from Basin Electric's power plants in North Dakota are the same as required by utilities and industries operating in the Yellowstone National Park area.

Dakota Coal Company, a subsidiary of Basin Electric, was formed to provide lignite to Basin Electric and its subsidiaries. In 1990 Dakota Coal Company entered into the Coteau Lignite Sales Agreement with Coteau Properties. The agreement provides Dakota Coal Company with exclusive rights to the Freedom Mine's dedicated lignite reserves. Dakota Coal also provides lignite to Basin Electric's Leland Olds Station and United Power Association's Stanton Station.

Fuel costs associated with the Leland Olds Power Station near Stanton, ND have gone up 350 percent since 1975. The percentage increase in the price of coal alone is 3½ times. Severance taxes, which were four cents a ton in 1975, are now 77 cents a ton, a 1,925 percent increase.

High Voltage lines are the highways which transport electric power. Like the interstate transportation network, high-voltage transmission lines are designed to carry heavy loads. Basin Electric owns and maintains about 1,000 miles of transmission lines and numerous substations to transmit electric power to its member systems. Basin's transmission lines are connected into the 8,000 mile regional Joint Transmission System (JTS). The backbone of the JTS is the transmission system operated by the Western Area Power Administration to market hydroelectric power from the dams on the Missouri River.

## HERE'S HOW ELECTRICITY IS CREATED

### COAL SYSTEM

Lignite, the fuel for Basin's Antelope Valley Station (AVS) is provided from the Freedom Mine adjacent to the plant site. Coteau Properties, Inc. operates the mine and provides up to 5.2 million tons of lignite annually for both generating units and a nearby gasification plant.

Each boiler consumes 375 tons of lignite per hour. The coal-handling system (1) conveys lignite from the mine unloading area to storage areas or directly to the plant. The plant has about 21,000 feet of conveyor belts, capable of delivering 1,300 tons per hour.

Before lignite is burned in the boiler, it is crushed or pulverized to a consistency of face powder, the mixed with hot air and blown into the boiler.

There are nine pulverizers (2) for each unit. Each of two boilers has 36 burners (3). Inside the boiler, lignite ignites spontaneously (4) at temperature as high as 3,000 degrees Fahrenheit.

## AIR SYSTEM

Outside air is drawn into the plant by fans (5). As air enters the plant, it passes through an air heater which transfers heat from outgoing exhaust gases to the incoming air.

Heated incoming air is divided, with most going directly to the furnace for combustion. The remaining air is channeled through the coal pulverizers for drying and blowing the coal to the firebox.

The hot (exhaust) gases resulting from combustion are drawn up the furnace, across the superheater sections and through the air heater, then travel through the sulfur scrubber before existing through the stack. To accomplish this, four fans (6) near the stack pull the exhaust gases through this equipment.

## ELECTRICAL PROCESS

As pressurized steam hits the blades of the turbine (7), it causes them to rotate, similar to the action created by wind on a windmill. A continuous shaft connects the turbine to the generator. The generator consists of a rotor and a stator. The rotation of the rotor (8) inside the stator, at 3,600 revolutions per minute, puts electrons into motion to create a flow of electricity.

As the electricity exits the generator at 22,000 volts, it passes through the generator's step-up transformer where the voltage is increased to 345,000 volts. Power then flows through a control switchyard and is carried along a network of high voltage transmission lines.

## WATER AND STEAM SYSTEM

Water from Lake Sakakawea, located 10 miles north of the plant, is pumped to raw-water storage ponds (9) on-site through an underground pipeline.

A primary water treatment plant (10) treats up to 18,000 gallons of water per minute before water is used.

A secondary water treatment system (11) further purifies some of the water for steam generation. Water in the boiler cannot contain minerals or particulates that might build up inside the boiler tubes or damage turbine blades.

As water enters the boiler, it is preheated by hot gases exiting the boiler. Water then enters the steam drum (12) where it is pressurized and turns to steam. That steam is super heated to temperatures of 1,005 degrees. This steam enters the turbine and is exhausted to the condenser.

The condenser (13) consists of several thousand pipes carrying cold water. As the steam contacts these pipes in a vacuum, it condenses back into water that flows back to the boiler and is reheated, repeating the cycle.

About 187,000 gallons of water per minute is sent from the condenser to the cooling tower (14). Warmed cooling water is pumped to the top of the cooling tower. It cascades to the bottom against cool air being forced up by 24 22-foot diameter fans at the base of the cooling tower.

## ENVIRONMENTAL SYSTEM

The Antelope Valley Station was designed as an environmentally sound coal-fired generating station. About \$300 million was committed to sophisticated environmental equipment and controls for protecting land, air and water.

Innovative technology is used to remove sulfur dioxide and particulates from stack gases. This system, known in the electric utility as a “spray-dryer scrubber,” (15) is one of the first commercial applications of lime as an absorbent to capture and remove up to 90 percent of sulfur dioxide from stack gases.

To remove particulate matter, a “Fabric filter baghouse” (16) is used. The filtering process removes more than 99 percent of fly ash and other particulate matter.

## HERE’S HOW ELECTRICITY TRAVELS TO YOUR HOME

Electricity from the power plant is sent across the country through a system of big transmission lines that carry large amounts of electricity across long distances. To keep power flowing efficiently, transformers increase the voltage in the transmission lines. As the voltage increases, the force of the electricity pushing through the lines increases.

To route the electricity to an electric cooperative, a town or factory, the transmission line is connected to a substation. In the substation, transformers reduce the high voltage and switches send the electricity into distribution lines that deliver the electric power to consumers and businesses. From the distribution line, the voltage is reduced again by another transformer to the 120-volt and 240-volt levels required for home appliances.

From the distribution transformer, the power is channeled through a meter that measures the kilowatt hours used and then travels to the electric co-op member’s own distribution panel and home circuit breakers. At this point, the power is divided up into several circuits that serve different rooms or uses in a building.

## RECLAMATION OF COAL LANDS

Far ahead of the hue and cry of environmentalists, in July 1962, Basin Electric also established a policy that spoil banks created in strip mining would be leveled to rolling terrain. Basin Electric's contract with the coal supplier did not call for land reclamation until 1965. Basin Electric and Consolidation Coal Company, in cooperation with the Northern Great Plains Research Center, began a five-year research project in 1974 to determine the ability of reclaimed land to sustain different varieties of grain crops and grasses. This experiment was launched years before North Dakota law was written demanding the reclamation of coal lands back to their natural state before being mined. Thus far it has been learned that not only can former coal lands support grass and trees after the coal has been mined from it, but that it can produce crops. One of the crops is wheat. In 2009 cost to reclaim an acre of mined land was between \$12,000 and \$14,000. The cost can be as high as \$22,000 depending on the contour of the land.

## THE MISSOURI RIVER DAMS

Much of the Missouri River Basin's history has been written by water, or the lack of it. The first dam to be constructed was Fort Peck in Montana in 1940. Time and again droughts and floods brought tragedy and destruction. In 1903, spring floods claimed 100 lives and \$40 million of damage, but in April, 1952,

flooding exceeded all known records from Bismarck, ND to St. Joseph, MO. Total flood damage was estimated at \$179 million. These floods led to the construction of a number of flood control projects on the Missouri River. The dams were erected under the Flood Control Act of 1944, starting with Garrison Dam in 1954; Fort Randall and Gavins Point in 1956; Oahe Dam in 1960; and Big Ben Dam in 1966. A side benefit of these dams was the generation of electric power.

"Preference" is the principle that says that power generated by the federal power projects should be offered first to non-profit entities, such as rural electric cooperatives, public power districts, municipal governments, before it is offered to profit-making entities. The concept is reinforced in more than 30 national laws. The sale of electricity from the federal dams paid for the construction and pays for the operations of these facilities. Consumers of federal power thus actually paid for the construction of the power facilities. The "Preference Principle" has been under attack in recent years. In 1986 the Rural Defense Committee was organized by East River Electric and its member systems, including Turner-Hutchinson Electric and Lincoln-Union Electric, to ward off attempts to sell the federal power facilities to private industries.

### DID YOU KNOW

A 15-watt LED bulb will produce more light than a 100-watt incandescent bulb.  
We consume about 50% more energy in our homes than in all our cars put together.  
Every man, woman and child in the United States uses the equivalent of 60 barrels of oil each year. One farmer can grow enough food for about 50 fellow citizens

### ELECTRICAL TERMS

BTU - British Thermal Units. Heat required to raise the temperature of one pound of water one degree Fahrenheit.

Circuit breaker or fuse - A device that interrupts the circuit under excessive load.

Fluorescent - A tubular light with a coating of fluorescent material and mercury vapor, which produces more light than an incandescent bulb.

Horsepower - Rate of doing work equal to 746 watts or 550 foot-pounds per second.

Incandescent - A bulb which utilizes a heated filament to give off light.

Insulator - A nonconductor of electricity.

Kilowatt (KW) - An electrical unit of power equal to 1,000 watts.

Kilowatt-hour (Kwh) - A measure of electrical energy consumption equal to 1,000 watts for one hour.

Meter - A device to measure the amount of electricity used.

Thermostat - An automatic control switch, cutting on or off with temperature changes.

Three way bulb - A bulb with three levels of light.

Volt - A unit of electromotive force.

Watt - A unit of electric power or rate of use of energy.

## 2018 - Youth Tour Test

### Southeastern Electric Cooperative - Marion, Sioux Falls Area, Alcester, Viborg, Parkston & Salem, SD

**PLEASE USE ANSWER SHEET ONLY ... DO NOT WRITE ON THE TEST** Black out the circle which represents your answer. **DO NOT USE RED PENCIL OR PEN.** Note: Most all the answers for this test can be found in the Youth Tour Study Materials you received with this test.

#### Multiple Choice Questions

1. Which of the following is not a cooperative principle: {a. Open membership b. profit making c. concern for community}
2. What percent of rural people in 1935 lived without electric power? {a. 60% b. 75% c. 90%}
3. The Rural Electrification Administration was established in May, {a. 1930 b. 1940 c. 1935} by Franklin D. Roosevelt.
4. In the early 1920's a pioneer electrification test project was established near {a. Colman, SD b. Des Moines, IA c. Red Wing, MN}
5. Rural electric cooperatives were started with a {a. \$5 b. \$10 c. \$15} fee from each prospective user.
6. The first rural electric cooperative in South Dakota was established at {a. Colman b. Madison c. Burbank}.
7. Rural electrification came to South Dakota in {a. 1935 b. 1937 c. 1939}.
8. By {a. 1900 b. 1915 c. 1925} engineers knew how to transmit electricity as far as 100 miles.
9. Southeastern Electric is owned by {a. the Federal Government b. East River Electric Power Cooperative c. the members of the cooperative}.
10. Southeastern Electric provides low interest loans to its members to {a. build homes b. buy water heaters c. install electric heat}.
11. Policy matters are reserved for the {a. President of the board b. Board of Directors c. general manager}.
12. The South Dakota Rural Electric Association office is located in {a. Madison b. Huron c. Pierre}.
13. President {a. Johnson b. Nixon c. Carter} by executive order discontinued the 2% REA loan program which Congress later reinstated.
14. REA low interest loans were available to {a. rural electric cooperatives b. investor-owned utilities c. a and b}.
15. Power from Basin Electric plants is generated by using {a. nuclear power b. lignite coal c. water from the dams}.

16. East River was formed in {a. 1939 b. 1949 c. 1959}.
17. The filtering process at Basin's power plants remove more than {a. 99 b. 79 c. 89} percent of the fly ash and other materials before exiting the stacks.
18. There are {a. 5 b. 4 c. 6} dams on the Missouri River.
19. Basin Electric owns and maintains about {a. 1,000 b. 2,000 c. 5,000} miles of high voltage transmission lines.
20. The first dam built on the Missouri River was {a. Oahe b. Garrison c. Fort Peck}.
21. Every man, woman and child in the United States uses the equivalent of {a. 50 b. 60 c. 70} barrels of oil each year.
22. We consume about {a. 80 b. 60 c. 50} percent more energy in our homes than in all our cars put together.
23. A kilowatt-hour is {a. 10 b. 100 c. 1,000} watts per hour.

True or False questions

24. All electric cooperatives across the nation are part of Touchstone Energy.
25. The Rural Electrification Administration was begun as part of a general program of providing jobs for the unemployed.
26. REA makes loans for rural electrification only to cooperatives.
27. In a rural cooperative each member has one vote regardless of how much electric power he uses.
28. Cooperatives make it possible for people to jointly own an electric distribution system they could not afford as individuals.
29. The four Touchstone Energy values are accountability, integrity, innovation, and commitment to community.
30. The Rochdale Equitable Pioneers' Society set up a housing cooperative.
31. A cooperative is a business organization which is owned and controlled by those who use it for mutual benefit.
32. The United States was one of the first countries to adapt electricity to use on the farm.
33. Thomas A. Edison built the first central station electric system in lower Manhattan in 1882.
34. Southeastern's rates for various categories of service reflect actual costs associated to that category.
35. Peak demand is those times when the cooperative has the greatest need for electricity.
36. The Rural Electrification Administration only loans money to rural electric cooperatives.

37. Southeastern Electric does not serve any members in the City of Sioux Falls.
38. The Missouri River dams were built primarily for hydro-electric power.
39. Rural electric cooperatives pay no taxes.
40. The margins of an electric cooperative are credited back to the members
41. Any profit made by Southeastern is kept by the Cooperative.
42. The Western Area Power Administration (WAPA) markets the hydro-electric power from the Missouri River dams.
43. Basin Electric started land reclamation in 1962.
44. East River Electric's function is to provide wholesale power to rural electric cooperatives.
45. 5.2 million tons of lignite coal is mined annually for Basin's Antelope Valley Station.
46. Crops are now raised on land after the coal has been mined.
47. The number of farms is declining, but there is an increase in the amount of electricity being used because there are more than 400 uses for electricity.
48. Rural electric cooperatives are located in all 50 states in the United States.
49. A circuit breaker is a device that interrupts the circuit under an excessive load.
50. Southeastern Electric has offices in Alcester, Marion, Sioux Falls Area, Salem, Parkston and Viborg.

# 2018 Youth Tour Test Answer Sheet

Name: \_\_\_\_\_ School: \_\_\_\_\_

Parents: \_\_\_\_\_ Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Email Address: \_\_\_\_\_

Blacken the oval for the correct answer. Please do not use red pens.

	<u>A</u>	<u>B</u>	<u>C</u>		<u>A</u>	<u>B</u>	<u>C</u>		<u>T</u>	<u>F</u>
1.	0	0	0	21.	0	0	0	41.	0	0
2.	0	0	0	22.	0	0	0	42.	0	0
3.	0	0	0	23.	0	0	0	43.	0	0
					<u>T</u>	<u>F</u>				
4.	0	0	0	24.	0	0		44.	0	0
5.	0	0	0	25.	0	0		45.	0	0
6.	0	0	0	26.	0	0		46.	0	0
7.	0	0	0	27.	0	0		47.	0	0
8.	0	0	0	28.	0	0		48.	0	0
9.	0	0	0	29.	0	0		49.	0	0
10.	0	0	0	30.	0	0		50.	0	0
11.	0	0	0	31.	0	0				
12.	0	0	0	32.	0	0				
13.	0	0	0	33.	0	0				
14.	0	0	0	34.	0	0				
15.	0	0	0	35.	0	0				
16.	0	0	0	36.	0	0				
17.	0	0	0	37.	0	0				
18.	0	0	0	38.	0	0				
19.	0	0	0	39.	0	0				
20.	0	0	0	40.	0	0				

# 2018 Southeastern Electric Youth Tour

## Personal Data Sheet

**Please fill out all information and when complete send back to Southeastern Electric Cooperative Inc.** Send to; PO Box 250 Salem, SD 57058. You can also drop off at any one of our offices. If you have not received the study material and test please email [brett@southeastern.coop](mailto:brett@southeastern.coop) or go to our web page [www.southeasternelectric.com](http://www.southeasternelectric.com) and click on Youth Tour Application for a complete list of needed material. All information on this page will need to be sent with all other forms and the completed test in order to qualify for trip. **Deadline is March 16, 2018.**

Name: \_\_\_\_\_ Age: \_\_\_\_ Date of Birth: \_\_\_\_\_

Address: \_\_\_\_\_ ( \_\_\_\_\_ ) Telephone No: \_\_\_\_\_  
Street or PO Box # City State Zip

Email address \_\_\_\_\_

Parent or Guardian: \_\_\_\_\_

Name of School: \_\_\_\_\_

Please tell us about yourself below. If you are going to be a senior, please fill out future plans as well.

Activities, Offices, Honors, etc.: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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List Hobbies - Special Interests: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This is used for media purposes only. You may use the back if needed.