

Use or Usage: An Electric Cooperative Guide to Style

This glossary of electric cooperative and utility terms was created by member publications of the National Electric Cooperative Statewide Editors Association. It contains key definitions, preferred wording tips, and a smattering of historical and fun facts.

(Updated August 2019)

85/15 An Internal Revenue Service requirement where an electric cooperative loses its tax-exempt status for the year when more than 15 percent of its revenue comes from non-member sources. The restriction can crimp the ability of electric cooperatives to compete in a restructured electricity marketplace. It was established under the federal Revenue Act of 1924, which considered the *di minimis* threshold for tax-exempt telephone cooperatives, and subsequently electric cooperatives, to be 15 percent. *(See Energy Policy Act of 2005.)*

100 percent borrower An electric distribution cooperative, public power district, public utility district, mutual association, electrical district or generation and transmission cooperative that meets all of its secured term financing needs through the National Rural Utilities Cooperative Finance Corporation. Through mid-2019, there were more than 240 100 percent borrowers. *(See independent borrower, National Rural Utilities Cooperative Finance Corporation.)*

A

A ampere. Abbreviation acceptable on first reference when used with a numeral.

AC alternating current. Abbreviation acceptable on second reference.

access charge A fee assessed for the right to send electricity over another utility's wires.

ACE Affordable Clean Energy Rule.

ACES A nationally recognized wholesale energy trading and risk management firm formed in February 1999. Owned and governed by 21 electric cooperatives, ACES, based in Carmel, Indiana—with regional trading centers in Carmel as well as Benson, Arizona, Maple Grove, Minnesota, and Raleigh, North Carolina—also serves other electric industry participants, such as municipal electric

systems, financial institutions, and independent power producers. ACES has become one of the nation's largest physical traders of electricity. Known as ACES Power Marketing until December 2012.

acid rain Precipitation with a high acidity level, produced when gases (notably sulfur dioxide and nitrogen oxides from coal-fired power plants) are released into the atmosphere. These gases form acidic compounds that fall back to earth in rain, snow, or sleet or as dry particles or gases. (At high altitudes and along coastlines, bits of acid suspended in clouds or fog pose an additional threat.) Acid rain has been blamed for damaging the environment, particularly aquatic life in eastern lakes. A pH of 5.6 is considered normal for rainfall. *(See Clean Air Act, nitrogen oxides, sulfur dioxide.)*

ACRE[®] Action Committee for Rural Electrification.

ACRE Co-op Owners for Political Action[®] (Co-op Owners) A program created by the National Rural Electric Cooperative Association in 2003 that allows residential electric cooperative consumers to participate in the Action Committee for Rural Electrification. Spell out and use registered trademark symbol on first reference. Avoid using the acronym "COPA." *(See Action Committee for Rural Electrification, grassroots, National Rural Electric Cooperative Association.)*

Action Committee for Rural Electrification (ACRE[®]) A bipartisan political action committee formed by the National Rural Electric Cooperative Association in 1966 that gives financial support to congressional and state legislative candidates friendly to electric cooperatives. ACRE does not get involved in presidential, gubernatorial, statewide row office, judicial, or municipal races. Forty-nine percent of all ACRE funds are returned to state ACRE committees, based on each state's contributions. All ACRE contributions are voluntary, and membership includes electric cooperative employees, directors/trustees, attorneys, chief executives, spouses, and consumers. Spell out on first reference; use registered trademark symbol with acronym on first reference. *(See ACRE Co-op Owners for Political Action[®], National Rural Electric Cooperative Association, "tougher than a boiled owl," William F. Matson Democracy Award.)*

active power *(See real power.)*

active solar energy Using pumps or fans to move energy stored from the sun's radiation to heat a home. *(See passive solar energy, photovoltaics, solar power, solar thermal energy.)*

ACZA ammoniacal copper zinc arsenate.

advanced metering infrastructure (AMI) A comprehensive set of technologies and software applications that combine two-way communications with smart meters to provide electric utilities—using frequent meter reads—with near real-time oversight of system operations. *(See automated meter reading, down-line automation, meter data management system, smart grid, smart meter.)*

adviser/advisor Use *adviser* as part of a formal title. An *adviser* gives advice, while an *advisor* has been specifically tasked to provide such advice.

AFCI arc fault circuit interrupter.

Affordable Clean Energy Rule (ACE) A proposed U.S. Environmental Protection Agency (EPA) regulation announced on August 21, 2018, and released on June 19, 2019, that replaces the never-implemented Clean Power Plan. As outlined, the rule provides states with a definition of “Best System of Emission Reduction”—focused on “inside the fence line” improvements, such as heat-rate enhancements—to curb greenhouse gas emissions from power plants and lets facilities make upgrades to become more efficient (to meet emissions goals) without triggering New Source Review requirements. States would have three years from the date the rule is finalized to come up with their own emissions control plans. Once a state submits a plan, EPA would have 12 months to approve it. If a state does not submit a plan, EPA would have two years to develop and impose a federal solution. Democratic state attorneys general and environmental groups are suing EPA on the grounds that the proposal fails to adequately address greenhouse gas emissions from burning coal. EPA estimates ACE could result in \$400 million in annual net benefits and reduce compliance burdens by the same amount compared to the Clean Power Plan. The agency further forecasts carbon dioxide emissions will be cut 33 percent to 34 percent below 2005 levels. *(See cap and trade, Clean Power Plan, New Source Performance Standards, New Source Review, Tailoring Rule, U.S. Environmental Protection Agency.)*

aggregate load Businesses or groups that pool purchasing power to negotiate for better electricity prices.

aggregators Brokers, utilities, or other parties that put retail consumers into buying groups to negotiate for the lowest possible electricity costs, or that sell demand response from multiple retail consumers into the wholesale market. Electric cooperatives have always acted as aggregators for their consumers. *(See demand response, power marketer.)*

agribusiness Includes all forms of enterprises involved in getting food from field to table, ranging from producing, processing, storing, and distributing commodities to manufacturing and selling farm equipment and supplies.

air-condition, air-conditioned, air conditioner, air conditioning *Air-condition* is a verb. *Air-conditioned* is an adjective. *Air conditioner* is a noun. *Air conditioning* can be a noun or an adjective; if used as an adjective, add a hyphen.

air-source heat pump (*See heat pump.*)

Alabama Living Official consumer publication of the Montgomery, Alabama-based Alabama Rural Electric Association of Cooperatives.

Alaska Power Administration A regional federal agency (established in 1967) that marketed electricity generated primarily at two federal dams. In 1995, Congress authorized sale of the two hydropower projects to private entities (including two electric cooperatives) and termination of the administration, which was officially shuttered in 1998. (*See Bureau of Reclamation, power marketing administrations, U.S. Army Corps of Engineers.*)

algae reactor A system through which algae, using photosynthesis and other biological processes, consume (and thus remove) carbon dioxide and nitrogen oxides emissions out of flue gas diverted from a coal-fired power plant. Algae can then be harvested and ultimately used for livestock feed or producing biodiesel. (*See carbon capture and storage, carbon dioxide, flue gas, nitrogen oxides.*)

all-requirements contract An agreement where an electric distribution cooperative agrees to purchase all of its wholesale power needs from a single supplier, generally a generation and transmission cooperative.

all-terrain vehicle (ATV) Three- or four-wheel vehicle with a motorcycle engine designed for off-road activities. Used sometimes by electric cooperatives for line inspection and other tasks.

alternating current (AC) A flow of electricity through a conductor that reverses direction at regularly recurring intervals, in contrast to direct current (DC). AC allows for the long-distance transport of high-voltage electricity. Nearly all of the electricity consumed in the United States arrives via

alternating current. Spell out on first reference. (*See direct current, electricity, reactive power, real power.*)

American MainStreet Publications (AMP) (*See National Country Market Sales Cooperative.*)

American Public Power Association (APPA) The Washington, D.C.-based national service organization representing municipal electric utilities. Formed in 1940.

American Wind Energy Association (AWEA) The Washington, D.C.-based trade group representing wind power project developers, equipment and service providers, manufacturers, and wind-owning utilities.

AMI advanced metering infrastructure.

ammoniacal copper zinc arsenate (ACZA) A waterborne chemical used as a preservative treatment for wood utility poles. Because of its ability to penetrate Douglas fir and other difficult-to-treat wood species, it is most widely used in the West. (*See chromated copper arsenate, chromated copper arsenate-emulsified treatment, creosote, pentachlorophenol.*)

AMP American MainStreet Publications. (*See National Country Market Sales Cooperative.*)

ampere (A) A measure of how much electricity moves through a conductor, and indicating the size of circuit breakers and fuses. Amperes equal watts (W) divided by volts (V); a 1,000-W heater at 120 V draws 8.33 A. Abbreviation acceptable on first reference when used with a numeral. (*See Ohm's Law.*)

AMR automated meter reading.

anaerobic digester Equipment where biodegradable organic matter, such as livestock waste, gets broken down by bacteria into biogas (primarily methane) that can be used to generate heat and electricity. Sometimes called a *methane digester*. (*See baseload power plant, biomass, distributed generation, renewables.*)

ancillary services Items necessary to support reliable operation of an interconnected transmission system. The Federal Energy Regulatory Commission has identified six ancillary services: reactive power and voltage control, loss compensation, scheduling and dispatch, load following, system

protection, and energy imbalance. (See *Federal Energy Regulatory Commission, transmission, transmission system, wholesale power market.*)

annual meeting Once-a-year gathering of electric cooperative members held according to a cooperative's bylaws for the purpose of electing directors/trustees and conducting other business.

anthracite A hard, high-energy coal containing lots of carbon and little volatile matter most commonly mined in northeastern Pennsylvania. (See *bituminous coal, coal, lignite, subbituminous coal.*)

apparent power The amount of electricity a utility provides; also the product of voltage and current and handy for sizing equipment or wiring. NOTE: Adding the apparent power amounts for two loads will not result in an accurate total unless both have the same displacement between current and voltage (the same power factor). Conventionally expressed in volt-amperes or kilovolt-amperes. (See *alternating current, kilovolt-ampere, power factor, reactive power, real power, volt-ampere.*)

APPA American Public Power Association.

arc fault circuit interrupter (AFCI) A fire-protection device that instantly breaks an electric circuit when a non-working electric arc develops. Spell out on first reference.

arc flash A type of electrical explosion (essentially a short circuit through the air) that usually causes substantial damage, fire, or injury. In an arc-flash incident, an enormous amount of concentrated energy explodes outward from electrical equipment. This creates pressure waves that can damage hearing, a high-intensity flash that can destroy eyesight, and a superheated ball of gas that can blast molten metal, tools, and other objects through the air and severely burn an unprotected worker's body. The temperature of an arc flash sometimes reaches 35,000 degrees Fahrenheit—about four times hotter than the surface of the sun. The 2007 *National Electrical Safety Code* required all electric distribution utilities in states that have adopted the code to perform assessments by January 1, 2009, to determine the potential exposure of lineworkers and other field personnel to arc-flash hazards and identify protective clothing needs. Electric cooperatives that are USDA Rural Utilities Service borrowers must comply with all sections of the *National Electrical Safety Code*. (See *National Electrical Safety Code*.)

area coverage The extension of electric service to everyone who wants it within a given area at no additional charge; a basic tenet of electric cooperatives. The federal Rural Electrification

Administration made area coverage a condition for all electric loans starting in 1950. (*See franchise, Rural Electrification Administration, service area/territory.*)

Arkansas Living Official consumer publication of the Little Rock, Arkansas-based Electric Cooperatives of Arkansas (formerly Arkansas Electric Cooperative, Inc.).

Army Corps of Engineers (*See U.S. Army Corps of Engineers.*)

arrester Never use arrestor. (*See lightning arrester.*)

ash (*See bottom ash, coal ash, coal combustion byproducts, fly ash, slag.*)

assn. Abbreviation for *association*; used chiefly in footnotes, captions, tables, etc., where space is at a premium. Spell out in normal text.

Atomic Energy Commission (*See Nuclear Regulatory Commission.*)

Atomic Safety and Licensing Board (*See U.S. Atomic Safety and Licensing Board.*)

ATV all-terrain vehicle.

automated meter reading (AMR) Specially equipped metering devices that allows utilities to remotely collect kilowatt-hour use (and in some cases demand) information and transfer it to a central database for billing and/or analyzing purposes. Data, which flows just one way, can be gathered and sent via drive-by or walk-by readings as well as radio frequency, powerline (note one word) carrier, telephone lines, or wireless systems. (*See advanced metering infrastructure, meter, meter data management system, smart grid, smart meter.*)

automatic vehicle location (AVL) Technology that tracks the geographic location of a vehicle. Electric cooperatives use AVL to better schedule line crews while in the field and ensure their safety.

Autry Leadership Award for “Always On” Communication A lifetime achievement recognition bestowed annually by the Council of Rural Electric Communicators on an electric cooperative communicator who has made “an extraordinary impact and contribution” to the practice of “Always On” communication. Established in 2017 in honor of longtime cooperative communicator Jimmy

Autry from Flint Energies in Georgia. (*See Certified Cooperative Communicator, Edgar F. Chesnutt Award, J.C. Brown CEO Communication Leadership Award, Laberge Award for Excellence in Strategic Communication, Spotlight on Excellence Awards.*)

average cost The revenue requirement of a utility divided by its sales.

AVL automatic vehicle location.

avoided cost A calculation that estimates the expense an electric utility incurs to supply or generate a certain amount of power. In practice, it refers to the price that qualifying facilities under the Public Utility Regulatory Policies Act of 1978 are entitled to receive for excess power sold to a utility. Avoided cost is established at the price a utility would have paid for power had it not purchased from a qualifying facility. (*See Public Utility Regulatory Policies Act, qualifying facility, small power producer.*)

AWEA American Wind Energy Association.

B

backup, back up *Backup* is a noun or an adjective. *Back up* is a verb.

backup charge The rate consumers with distributed generation systems pay to a utility for providing backup power. Also called a *standby charge*. (*See distributed generation.*)

backup power Electricity supplied when generating units are not in service because of emergencies, outages, or scheduled maintenance.

barrel (bbl.) A measurement equal to 42 U.S. gallons. A barrel of No. 6 or bunker C oil commonly weighs 300 lb. and boasts an energy content of about 6.32 million Btu. However, these figures can vary from one oil field to another. Abbreviation may have originated as a symbol for blue barrels used by Standard Oil in its early days.

base load The minimum amount of electric power delivered or required from a generating system over a specified period; usually measured in megawatts.

baseload power plant A large, efficient generating station—typically with a capacity factor of at least 65 percent—that provides dependable electric power year-round at a low cost per kilowatt-hour. Coal-fired, nuclear, hydro, and (increasingly) large natural gas-fired power plants make up most baseload generation in the United States, although smaller-scale biomass facilities (such as anaerobic digesters and plants burning wood waste, poultry litter, or landfill gas) and geothermal power systems, if properly operated, can also produce baseload power output (though in much smaller quantities). High-temperature solar thermal energy (concentrating solar power) has begun making inroads as a baseload power source in the Southwest. *(See anaerobic digester, biomass, capacity factor, coal, geothermal power, hydroelectric power, intermediate load plant, natural gas, nuclear power, peaking plant, solar thermal energy.)*

base rate The portion of a total electric rate that covers the cost of doing business unrelated to fuel expenses.

bbl. barrel.

beneficial electrification *(See efficient electrification.)*

binary cycle A closed-loop power plant capable of producing electric generation from moderate- to low-temperature geothermal (generally hot groundwater) resources. In a binary cycle system, hot water is pumped from a well and passes through a heat exchanger where it warms a secondary fluid (usually a hydrocarbon such as isobutane or isopentane) boasting a lower boiling point than water. This causes the secondary fluid to vaporize with enough force to drive a turbine-generator. The secondary fluid then condenses and returns to the loop system; the water gets pumped back into the well. *(See baseload power plant, geothermal power.)*

biomass Biological material that can be used as a fuel or exploited for industrial purposes (such as chemicals, fibers, plastics, etc.). In electricity generation, biomass consists of two types: closed-loop biomass (trees or crops grown expressly for power production) and open-loop biomass (sawdust, tree trimmings, timber slash, wood chips, farm byproducts, animal waste, and landfill gas). Nationwide, cooperatives utilize nearly 560 MW of biomass for energy generation. *(See anaerobic digester, baseload power plant, power density, renewables, synthetic fuel.)*

biomass conversion The process of producing fuels or energy from renewable organic matter such as plant or animal wastes.

bituminous coal A high-energy soft coal that ranks below anthracite in energy value; includes most of the coal mined in the United States. *(See anthracite, coal, lignite, subbituminous coal.)*

blackout Total power failure over a large area, often caused by the malfunction of generating equipment or transmission facilities. *(See outage, rolling blackouts.)*

BLC Board Leadership Certificate.

blockchain A software-based technology made famous by bitcoin that offers a secure financial platform for individuals to directly buy and sell goods and services without going through an established intermediary such as a bank. Some energy market participants see blockchain as a means to “elbow the utility aside,” putting more power in the hands of consumers. Others see it as a useful tool—alongside other technologies and components that make up the palette of “transactive energy”—for allowing solar, battery storage and other distributed energy resources to become more productive grid assets. In energy, the peer-to-peer trading characteristics of blockchain can be used to help a homeowner who has installed a solar array or battery storage, for example, sell some of his or her power directly to a neighbor—potentially outside the control and knowledge of the local utility. *(See distributed energy resources, transactive energy.)*

block rate A pricing structure where consumers pay a specific amount for a set amount of kilowatt-hours (kWh), with the price per kWh changing as set quantities are exceeded. For example, the first 100 kWh may cost 10 cents per kWh, the next 100 kWh may cost 8 cents per kWh, and all additional kWh may cost 6 cents per kWh. Under this type of rate, charges may also increase as thresholds are crossed. *(See class rate, cost-based rate, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate.)*

blog A frequently updated, interactive website that lists content, such as commentary, news, images, and video, in reverse chronological order. Individual articles are called *posts*. Readers can interact with authors, called *bloggers*, by leaving comments in response to posts. Short for *weblog*. Twitter has become a popular microblog. *(See social media, social networking.)*

Board Leadership Certificate (BLC) An advanced educational curriculum for electric cooperative directors/trustees developed by the National Rural Electric Cooperative Association. The Board Leadership Certificate can be attained after a director/trustee has achieved Credentialed Cooperative

Director status and completed a total of 10 credits from 900-level training courses. *(See Credentialed Cooperative Director, Director Gold Certificate, National Rural Electric Cooperative Association.)*

Bonneville Power Administration (BPA) One of four regional federal agencies (established in 1937) that market electricity generated primarily at federal dams. Based in Portland, Oregon, BPA sells wholesale power from 31 U.S. Army Corps of Engineers and federal Bureau of Reclamation hydro projects to utilities serving in eight western states: all of Idaho, Oregon, and Washington as well as contiguous swaths of California, Montana, Nevada, Utah, and Wyoming. *(See Alaska Power Administration, Bureau of Reclamation, power marketing administrations, U.S. Army Corps of Engineers.)*

bottom ash Heavier, coarser solids, ranging from the size of grains of sand to small pebbles, that fall to the bottom of a boiler when coal gets burned. *(See coal ash, coal combustion byproducts, fly ash, scrubber sludge, slag.)*

BPA Bonneville Power Administration.

BPL broadband over powerline.

British thermal unit (Btu) A measure of energy, it's the amount of heat needed to raise the temperature of one pound of water by one degree Fahrenheit. Abbreviation acceptable on all references. *(See Btu tax, energy.)*

broadband Often called *high-speed Internet*, it includes any data transmission connection to the consumer at least 25 megabits per second (Mbps) for downloading information and 3 Mbps for uploading. Standard broadband technologies available to rural residents include cable modem, digital subscriber line (DSL) service over existing copper telephone wires, satellite dishes, or wireless systems. As of 2018, nearly 34 million Americans, mostly in rural areas, lacked broadband access. More than 100 electric cooperatives had invested in broadband initiatives.

broadband over powerline (BPL) Technology that holds the promise of allowing a consumer to access high-speed Internet service simply by plugging a computer or other web-enabled device into a power outlet. With BPL, utilities connect substations to the Internet (via fiber-optic lines or satellite

hookups) and then “inject” broadband signals on existing electric distribution wires. In this usage, write out *powerline* as one word.

broker A firm that acts as a “middle man” in the sale and purchase of electricity but never takes ownership of it. (*See power marketer.*)

brownout A small, temporary voltage reduction implemented by a utility to conserve electricity during periods of high power consumption.

BTS NRECA Business and Technology Strategies. (*See Cooperative Research Network.*)

Btu British thermal unit. Singular and plural are the same. Abbreviation acceptable on all references.

Btu tax A levy based on the heat content of a particular fuel. Advocates contend a Btu tax—by moving the U.S. economy from income-based to consumption-based taxation—will slash greenhouse gas emissions, promote energy conservation, and reduce dependency on foreign oil. In 1993, the Clinton administration unsuccessfully proposed a Btu tax on coal, natural gas, liquefied natural gas, gasoline, nuclear power, hydropower, and imported electricity at a base rate of 25.7 cents per million Btu; refined petroleum products were slated for an additional levy of 34.2 cents per million Btu (for a total tax of 59.9 cents per million Btu). Congress nearly passed the plan, but after bogging down moved instead to increase the federal excise tax on gasoline from 14.1 cents per gallon to its current level of 18.4 cents per gallon. (*See British thermal unit, carbon tax, greenhouse gases.*)

bulk power Large amounts of electricity shipped across a transmission system, generally on a wholesale level. (*See cyber security, financial transmission rights, grid, locational marginal pricing, North American Electric Reliability Corporation, regional transmission organization, rolling blackouts, transmission congestion, transmission system, wheeling, wholesale power market.*)

bundling The vertical organization of a utility into generation, transmission, and distribution segments. Bundling of an electric bill means the consumer gets charged just one amount for all components involved in providing electricity. (*See unbundling.*)

Bureau of Reclamation An agency within the U.S. Department of the Interior, established in 1902, that has constructed more than 600 dams and reservoirs in 17 western states, including such iconic projects as Hoover Dam on the Colorado River and Grand Coulee Dam on the Columbia River. The

federal Bureau of Reclamation owns and operates 58 federal hydropower facilities. (*See hydroelectric power, power marketing administrations, U.S. Army Corps of Engineers.*)

bus An electrical conductor that serves as a common connection for two or more electrical circuits.

bus-bar Large conductors that carry electricity out of a power plant.

bus-bar cost The total cost of generating electricity, excluding substation and transmission losses.

business incubator An organization that allows startup companies to pool secretarial, data processing, and management services while offering subsidized rent.

bylaws Rules for governing an organization, such as an electric cooperative, approved by the membership. Almost always used in the plural. (*See quorum.*)

byproduct Something produced in the making of something else. Use as one word.

C

CAIDI Customer Average Interruption Duration Index.

CAIR Clean Air Interstate Rule.

cap and trade A system of reducing airborne pollutants from large stationary sources (such as power plants, factories, and refineries) using market forces. Under a cap-and-trade regime, each emitting facility has limits placed on the amount of a particular pollutant it can release—the cap. Sources that emit less than the cap can sell the extra allowances to those not able to achieve reductions as easily—the trade. A cap-and-trade system was first created in the Clean Air Act of 1990 for curbing emissions of acid rain-causing sulfur dioxide. Since 1999, 21 eastern states and the District of Columbia have been using a similar cap-and-trade strategy to cut smog-producing nitrogen oxides emissions. California and Oregon have instituted economywide cap-and-trade plans on greenhouse gas emissions. A U.S. Environmental Protection Agency (EPA) cap-and-trade plan for reducing toxic mercury emissions from power plants (the Clean Air Mercury Rule) was rejected by the U.S. Court of Appeals for the District of Columbia in February 2008. A cap-and-trade proposal to curtail the release of carbon dioxide and six other greenhouse gases—methane, nitrous oxide, hydrofluorocarbons,

perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride—was adopted by the U.S. House in late June 2009 but died in the U.S. Senate. Under EPA’s never-implemented 2015 Clean Power Plan aimed at trimming greenhouse gas emissions from existing fossil fuel-fired power plants, states would be able to fashion their own methods of cutting emissions based on a menu of options that includes creating or joining cap-and-trade programs similar to the Regional Greenhouse Gas Initiative involving nine northeastern states. *(See Clean Air Act, Clean Air Interstate Rule, Clean Air Mercury Rule, Clean Power Plan, greenhouse gases, Mercury and Air Toxics Standards, New Source Performance Standards, nitrogen oxides, sulfur dioxide, U.S. Environmental Protection Agency.)*

capacitor A device that stores electrical charges and maintains voltage levels in power lines to improve electric system efficiency. *(See power factor.)*

capacity The potential for generating power, measured in kilowatts or megawatts, of a power plant. Also the electric load, measured in watts or kilowatts, of a piece of electrical equipment. As of 2019, the United States had 1.22 million MW of installed power capacity: 44 percent natural gas, 23 percent coal, 22 percent renewables (including biomass and hydropower), and 9 percent nuclear. *(See megawatt, nameplate rating.)*

capacity factor The ratio of actual net electrical energy generation to the maximum possible energy that could have been generated if a plant operated at its maximum capacity rating over the same time. Capacity factor is normally reported as a percentage.

capital credits Margins credited to cooperative members each year based on their purchases (in the case of electric cooperatives, electricity) from the cooperative. Used by the cooperative as working capital for a period of time, then paid back to individual members. Also called *patronage capital* or *equity capital*. Capital credits should not be confused with profits, which are a return *on* capital. Retirement of capital credits provides a return *of* member-furnished capital. Use “s” on credits in all cases, as no cooperative retires, and no consumer receives, just one “credit.” Also: for legal reasons, capital credits can be “retired” or “allocated,” but not “refunded.” *(See first in, first out, last in, first out, margin, percentage method, not-for-profit.)*

captiv e consumer An individual who does not have a realistic alternative to buying power from a local utility.

captive shipper Utilities, chemical manufacturers, steel mills, mines, lumber and wood products companies, and grain processors that must rely on a single railroad line for transporting goods or receiving raw materials.

carbon capture and storage (CCS) The technical process of separating carbon dioxide gas from power plant emissions (primarily coal- or natural gas-fired generation); compressing it; pumping it down into spent oil and natural gas wells, saline reservoirs, or inaccessible coal seams; and entombing it there forever. The Trump administration in December 2018 proposed scrapping a 2015 Obama-era U.S. Environmental Protection Agency mandate that set carbon dioxide emissions limits on new and modified coal-fired power plants at a level only met by carbon-capture technology. The replacement rule would raise allowable carbon dioxide emissions from new and modified coal plants to a point that could be achieved without stripping out carbon dioxide emissions, while ensuring advanced technologies are employed so coal gets burned cleanly and efficiently. *(See algae reactor, carbon dioxide, carbon sequestration, carbon sink, clean-coal technology, climate change, EPRI Prism, greenhouse gases.)*

carbon dioxide A colorless, odorless gas produced by all animals, plants, fungi, and microorganisms during respiration and used by plants during photosynthesis. Carbon dioxide also gets emitted when fossil fuels like coal and natural gas or vegetable matter are burned, and from volcanoes and other geothermal processes such as hot springs and geysers. Although essential to life, the gas is increasingly viewed as a pollutant—higher carbon dioxide emissions as a result of industrialization, many scientists contend, have created a heat-trapping greenhouse effect in the atmosphere that’s now disrupting climate patterns and warming the planet. Don’t use the abbreviation CO₂. *(See algae reactor, climate change, global warming, greenhouse effect, greenhouse gases.)*

carbon footprint The impact human activities have on the environment based on the amount of greenhouse gases produced as measured in units of carbon dioxide. Individuals, nations, and organizations (like electric cooperatives) can use the calculations to conceptualize their contribution to climate change. *(See carbon dioxide, climate change, global warming, greenhouse effect, greenhouse gases.)*

carbon intensity The amount of carbon dioxide produced per unit of economic output, measured in metric tons of carbon dioxide per \$1,000 of gross domestic product. Between 1980 and 2006, U.S. carbon intensity fell by 43.6 percent even though the economy grew by 122 percent (from \$5.8 trillion to \$12.9 trillion) and population increased 31.5 percent (from 228 million to 300 million). The decline

came largely from improvements in how efficiently coal, natural gas, and oil (as well as any electricity those fuels generated) were consumed. (*See energy intensity, energy productivity, gross domestic product.*)

carbon sequestration Removing carbon dioxide from (or before it enters) the atmosphere by both natural (crops, forests, oceans, soil, and vegetation) and man-made means. Synonymous with the “storage” part of *carbon capture and storage*. (*See algae reactor, carbon capture and storage, carbon dioxide, carbon sink, clean-coal technology, climate change, greenhouse gases.*)

carbon sink A natural or man-made reservoir that accumulates and holds carbon dioxide molecules for an indefinite period. The main natural sinks are oceans, soil, and photosynthesis by plants and algae; the chief man-made sinks include landfills and carbon capture and storage projects. The process by which carbon sinks remove carbon dioxide from the atmosphere is known as *carbon sequestration*. (*See carbon capture and storage, carbon dioxide, carbon sequestration, climate change, greenhouse gases.*)

carbon tax A levy on energy sources that emit carbon dioxide into the atmosphere, based on the carbon content of a particular fuel. Carbon taxes are aimed at reducing consumption of coal, natural gas, and oil and with it, production of greenhouse gases. (*See Btu tax, carbon dioxide, greenhouse gases.*)

Carolina Country Official consumer publication of the Raleigh, North Carolina-based North Carolina’s Electric Cooperatives (formerly North Carolina Association of Electric Cooperatives).

CBA Cooperative Benefit Administrators, Inc.

CBO Congressional Budget Office.

CCA chromated copper arsenate.

CCA-ET chromated copper arsenate-emulsified treatment.

CCBs coal combustion byproducts.

CCC Certified Cooperative Communicator.

CCD Credentialed Cooperative Director.

CCPs coal combustion products. *(See coal combustion byproducts.)*

CCRs coal combustion residuals. *(See coal combustion byproducts.)*

CCS carbon capture and storage.

CCW coal combustion waste. *(See coal combustion byproducts.)*

ceiling cable A system that radiates heat from a ceiling, heating air in the room by convection.

central station service Electricity provided by a utility rather than self-generated by a consumer. *(See dynamo.)*

Certified Cooperative Communicator (CCC) Designation given to an electric cooperative communications or marketing professional who completes the demanding professional credentialing curriculum established by the Council of Rural Electric Communicators in 1985. A separate board of directors oversees the CCC program, as per guidelines issued by the Federal Trade Commission. Known as Certified Rural Electric Communicator until 2000. *(See Council of Rural Electric Communicators.)*

CES clean energy standard.

CFC National Rural Utilities Cooperative Finance Corporation. Spell out on first reference.

CFC Cooperative Educational Fund Created by the National Rural Utilities Cooperative Finance Corporation (CFC) in 1981 to promote awareness and appreciation of the seven cooperative principles. Through it, electric cooperative statewide associations currently receive \$4,000 each plus \$400 for every CFC member system or \$600 for each 100 percent CFC borrower cooperative in the statewide for various initiatives, such as hosting communicator training or teaching new employees about cooperatives. *(See 100 percent borrower, National Rural Utilities Cooperative Finance Corporation, NCSC Cooperative Youth Educational Grant Program.)*

CFC Solutions News Bulletin Biweekly (since January 2018) flagship publication of the Dulles, Virginia-based National Rural Utilities Cooperative Finance Corporation (CFC). It was originally launched in August 1996 as a monthly newsletter, *Solutions*, replacing CFC's weekly *News in Brief* publication. In January 1999, *Solutions* adopted a biweekly publication schedule; in August 2001, it was renamed *CFC Solutions News Bulletin*; in January 2008 it went weekly; in January 2018 it went back to biweekly. *CFC Solutions News Bulletin* reaches more than 60,000 readers via e-mail or hard copy; in the fall of 2019 a fully online version complementing the print publication was launched. (See *National Rural Utilities Cooperative Finance Corporation*.)

CFCs chlorofluorocarbons.

CFL compact fluorescent lightbulb. Plural is CFLs. (See *lightbulb*.)

CFL Charlie Cartoon mascot created in 2008 for the Touchstone Energy® Cooperatives Kids Zone website to promote energy efficiency. (See *HVAC Harriet*, *LED Lucy*, *Solar Sam*, *Touchstone Energy® Cooperatives*, *Wally the Water Heater*.)

chair, chairman, chairwoman The National Association of Parliamentarians insists on *chairman* for both sexes, and likes to avoid the gender-neutral term *chair*.

charge A quantity of electricity produced by either a surplus or shortage of electrons in an object.

cherry-picking The process of competing to serve another utility's most profitable consumers, normally big industries and housing projects. Also called *cream-skimming*. (See *franchise*, *service area/territory*, *territorial integrity*.)

chlorofluorocarbons (CFCs) Chemicals used as refrigerants and propellants in aerosol cans. Studies have shown that these compounds destroy the ozone layer in Earth's atmosphere. As a result, they are completely or partially banned in most countries. (See *ozone layer*.)

CHP combined heat and power. (See *cogeneration*.)

chromated copper arsenate (CCA) A mix of copper, chromium, and arsenic formulated as an oxide or salt that's commonly used as a preservative treatment for wood utility poles. Recognized for the

greenish tint it leaves on timber. (*See ammoniacal copper zinc arsenate, chromated copper arsenate-emulsified treatment, creosote, pentachlorophenol.*)

chromated copper arsenate-emulsified treatment (CCA-ET) A preservative treatment for wood utility poles that mixes chromated copper arsenate with a lubricant. The combination makes CCA-treated poles easier to climb and drive fasteners into. (*See ammoniacal copper zinc arsenate, chromated copper arsenate, creosote, pentachlorophenol.*)

circuit A conductor, such as wire, through which electric current flows; also the path electric current takes from a power source to a device using the power and then back to the source.

circuit breaker A switch that opens an electric circuit when a short occurs or the system otherwise experiences abnormal stress. (*See fuse.*)

class rate A pricing structure given to similar groups of electric consumers, such as residential, commercial, or industrial users. (*See block rate, cost-based rate, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate.*)

Claude Frazier Award (*See National Utility Training & Safety Education Association.*)

Clean Air Act The federal law (passed in its modern form in 1970) that serves as the backbone of efforts to control air pollution in the United States. It requires the U.S. Environmental Protection Agency (EPA) to develop and enforce regulations that protect the general public from exposure to airborne contaminants hazardous to human health. The statute was reauthorized and significantly amended in 1977 (with the inclusion of New Source Review provisions) and again in 1990 (creating a cap-and-trade program to curb emissions of acid rain-causing sulfur dioxide from power plants and other large stationary sources, like factories and refineries, and requiring those same sources to install and operate reasonably available control technology to reduce emissions of nitrogen oxides, a chief contributor to smog). In April 2009, EPA announced it was ready to use the Clean Air Act to curtail the release of carbon dioxide and five other greenhouse gases—methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—blamed for causing climate change. In December 2009, EPA found emissions of the six greenhouse gases from motor vehicle engines endanger public health and welfare; based on the endangerment finding, the agency proposed the first-

ever carbon dioxide emissions standards for passenger cars and light-duty trucks. The agency's never-implemented 2015 Clean Power Plan proposed regulations to control greenhouse gases from power plants, using Section 111(b) of the act for new and modified/reconstructed facilities and Section 111(d) for existing facilities. The Trump administration has proposed replacing the Clean Power Plan with the Affordable Clean Energy Rule. *(See acid rain, Affordable Clean Energy Rule, cap and trade, Clean Air Interstate Rule, Clean Power Plan, climate change, greenhouse gases, Mercury and Air Toxics Standards, New Source Performance Standards, New Source Review, nitrogen oxides, sulfur dioxide, Tailoring Rule, U.S. Environmental Protection Agency.)*

Clean Air Interstate Rule (CAIR) A U.S. Environmental Protection Agency (EPA) regulation issued on March 10, 2005, designed to permanently cap emissions of sulfur dioxide, nitrogen oxides, and particulate matter from power plants across 27 eastern states and the District of Columbia—the scheme aimed to slash pollutants drifting downwind, enabling Mid-Atlantic and southern states whose air quality was compromised by power plants in the Midwest to meet federal standards. CAIR was tossed by the U.S. Court of Appeals for the District of Columbia in 2008 and eventually replaced by the Cross-State Air Pollution Rule, which was issued by the EPA in July 2011 and upheld by the U.S. Supreme Court on April 29, 2014. *(See Cross-State Air Pollution Rule, nitrogen oxides, sulfur dioxide, U.S. Environmental Protection Agency.)*

Clean Air Mercury Rule A U.S. Environmental Protection Agency (EPA) regulation issued on March 15, 2005, that required coal-fired power plants to reduce mercury emissions 47 percent by 2010, and 79 percent by 2018, through a cap-and-trade plan. The U.S. Court of Appeals for the District of Columbia rejected the proposal on February 8, 2008, leading EPA to develop and issue the Mercury and Air Toxics Standards rule in December 2011. *(See Mercury and Air Toxics Standards.)*

Clean Air Transport Rule *(See Cross-State Air Pollution Rule.)*

clean-coal technology Any industrial system or application that reduces emissions from coal-fired power plants. *(See carbon capture and storage, integrated gasification combined cycle.)*

clean energy standard (CES) A provision considered by Congress that would require all electric utilities to produce a fixed amount of their retail power supply from generating sources that boast low or no emissions, such as renewables, hydropower, nuclear power, high-efficiency natural gas turbines (when replacing coal-burning power plants), and coal-fired stations equipped with carbon capture and

storage capabilities. A CES could credit utilities for energy efficiency gains as well. A national CES, as envisioned, would likely serve as a floor, rather than pre-empt, existing state renewable portfolio standards. While arguing that a federally mandated, one-size-fits-all CES policy is not needed and could result in disparate rate impacts across different areas of the nation, electric cooperatives support the following if a CES should be enacted: including a wide range of eligible resources in the definition of “clean” energy; exempting small utilities; recognizing regional differences in demand and energy resources; setting realistic timelines and targets; and incorporating cost-containment measures, such as a consumer price cap and a low alternative compliance payment, to mitigate expected cost increases.

(See carbon capture and storage, renewable electricity standard, renewable portfolio standards, renewables, small utility exemption.)

Clean Power Plan A never-implemented regulation issued by the U.S. Environmental Protection Agency (EPA) in final form on August 3, 2015, under Section 111(d) of the federal Clean Air Act, that called for a 27 percent cut nationally in greenhouse gas emissions (from 2005 levels) from existing fossil fuel-fired power plants by 2022, and 32 percent by 2030. Electric cooperatives opposed the rule, arguing EPA broadly overstepped its authority under the Clean Air Act and pointed to how implementation would disproportionately affect rural communities, raise electric bills, and jeopardize reliability. The U.S. Supreme Court stayed the regulation in February 2016. The Trump administration in August 2018 announced it would replace the Obama-era plan with the Affordable Clean Energy Rule. *(See Affordable Clean Energy Rule, cap and trade, New Source Performance Standards, New Source Review, Tailoring Rule, U.S. Environmental Protection Agency.)*

Clean Renewable Energy Bonds (CREBs) Created in the federal Energy Policy Act of 2005, and officially abolished under the Tax Cuts and Jobs Act of 2017, this tax incentive acted as a low-interest loan (in the form of a bond with interest costs shared between the issuer and federal government) to provide not-for-profit electric cooperatives with a way to invest in renewable generation. CREBs and its successor, New CREBs (authorized in 2008)—by helping lower the cost of power from renewable energy projects to a level competitive with conventional fuels, like coal or natural gas—leveled the “green power financing playing field” with investor-owned utilities, which could qualify for investment tax credits to support solar installation and production tax credits to “sprout” other renewable electricity sources involving wind, geothermal, closed-loop biomass (trees or crops grown expressly for electricity production), open-loop biomass (sawdust, tree trimmings, timber slash, wood waste, farm byproducts, animal waste, and landfill gas), capacity additions for existing small hydro (under 25 MW), municipal solid waste combustion, small irrigation (under 5 MW), and hydrokinetic

(ocean wave and tidal) power. When the program ended approximately \$1.25 billion in CREBs and New CREBs had helped electric cooperatives develop more than 60 renewable generation projects, representing roughly 460 MW, in 14 states. On an historical note, at the end of 2010 Congress did not renew funding for the program, but in early 2015 the Internal Revenue Service reallocated leftover New CREBs for cooperative use. *(See Energy Policy Act of 2005, investment tax credit, production tax credit.)*

climate change Periods of freezing and warming experienced by planet Earth. Policymakers are now focused on finding ways to reduce man-made greenhouse gas emissions blamed for contributing to what many scientists contend is a current cycle of global warming. Electric cooperatives, which support an “all-of-the-above” energy strategy for the nation, are encouraging elected officials to make sure that any climate change solutions adopted are “fair, affordable, and achievable” and can be sustained economically and politically for decades to come. *(See carbon capture and storage, carbon dioxide, carbon footprint, Clean Air Act, EPRI Prism, global warming, greenhouse effect, greenhouse gases.)*

closed-loop heat pump *(See heat pump.)*

Clyde T. Ellis Award An honor presented annually by the National Rural Electric Cooperative Association (NRECA) Board of Directors since 1974 to an electric cooperative employee, attorney, or director/trustee for outstanding accomplishments and service in increasing public interest and appreciation of electric cooperatives. Named for Clyde T. Ellis, NRECA’s first general manager from 1943 to 1968. *(See National Rural Electric Cooperative Association.)*

coal A readily combustible black or brownish-black rock composed primarily of carbon and hydrogen along with small quantities of other elements, notably sulfur. Coal remains the most commonly used fuel for generating electricity around the world, and the largest source of carbon dioxide emissions blamed for contributing to climate change. Coal accounts for about 64 percent of the power produced by generation and transmission cooperatives and 40 percent of all electric cooperative power requirements nationwide; overall, it makes up 30 percent of U.S. electric generation. Coal was the largest primary source of energy in the U.S. from 1885–1949, before being surpassed by oil. From 2010 to 2019, power plant owners either retired or announced plans to shutter at least 546 coal plants in 43 states, totaling 109,000 MW—nearly early 40 percent of the U.S. coal fleet. As of 2019, the United States had 246,000 MW of coal-fired capacity on-line, although another 17,000 MW was expected to be retired by 2025. *(See anthracite coal, baseload power plant, bituminous coal, carbon*

dioxide, clean-coal technology, climate change, coal liquefaction, coal slurry, fluidized-bed combustion, fossil fuel, generation and transmission cooperative, greenhouse gases, integrated gasification combined cycle, lignite, subbituminous coal, syngas, synthetic fuel.)

coal ash Residues, such as bottom ash, fly ash, scrubber sludge, and slag, generated by coal-fired power plants. Often used interchangeably with the term *coal combustion byproducts* or *coal combustion residuals*. Most coal ash, more than 70 million tons per year, ends up in impoundments and landfills. On December 19, 2014, the U.S. Environmental Protection Agency issued a rule that continues regulating coal ash as non-hazardous waste, confirming four previous non-hazardous determinations. The rule also included a compliance option allowing states to incorporate the federal criteria in their individual waste management plans. *(See bottom ash, coal combustion byproducts, fly ash, slag.)*

coal combustion byproducts (CCBs) Residues, such as bottom ash, fly ash, scrubber sludge, and slag generated by coal-fired power plants. Each year, the U.S. electric utility industry produces about 130 million tons of CCBs (roughly 8 percent from generation and transmission cooperatives)—an amount three times the volume of all municipal garbage collected nationwide. Fly ash accounts for more than half of the amount, scrubber sludge (also known as *flue gas desulfurization, or FGD, material*) approximately 25 percent, bottom ash another 16 percent, and slag about 7 percent. Currently, about one-third of fly ash (typically used as a Portland cement replacement) and a little more than one-fourth of scrubber sludge (the portion converted into synthetic gypsum for wallboard) is recycled for commercially beneficial uses. (Fly ash can also be mixed with coal and burned.) Overall, 47 percent of CCBs are recycled. The remainder, more than 70 million tons per year, ends up in impoundments and landfills. Many electric utility representatives prefer using the term *coal combustion products* instead. Also known as *coal combustion waste* or *coal combustion residuals*. *(See bottom ash, coal ash, fly ash, generation and transmission cooperative, scrubber sludge, slag.)*

coal combustion products (CCPs) *(See coal combustion byproducts.)*

coal combustion residuals (CCRs) *(See coal combustion byproducts.)*

coal combustion waste (CCW) *(See coal combustion byproducts.)*

coal gasification The conversion of coal to a gas. *(See integrated gasification combined cycle, syngas.)*

coal liquefaction The conversion of coal to liquid fuel, generally diesel. (*See synthetic fuel.*)

coal slurry Finely ground coal suspended in water for transport through a pipeline.

coal-to-diesel (*See coal liquefaction, synthetic fuel.*)

CoBank The Greenwood Village, Colorado-based lender (organized as a cooperative and a member of the Farm Credit System) that provides financing to rural agribusinesses, farm cooperatives, as well as water, electric, and telecommunications cooperatives and companies. Funds to finance CoBank loans come primarily from the sale of Farm Credit System securities to investors in national and international money markets. Formed in 1989 when 11 of the 13 Banks for Cooperatives (created under the Farm Credit Act of 1933) merged. Mergers with the remaining two Banks for Cooperatives were completed within the following decade. At March 31, 2018, CoBank had roughly \$20 billion in loans outstanding that were comparable to lending made by the National Rural Utilities Cooperative Finance Corporation. (*See government-sponsored enterprise/entity, National Rural Utilities Cooperative Finance Corporation, qualified lender.*)

Coefficient of Performance (COP) The ratio of heating or cooling provided by a heat pump (or other refrigeration machine) to the energy consumed by the system under designated operating conditions. The higher the COP, the more efficient the system.

cogeneration Producing both electricity and heat from a single source, such as tapping waste heat from an industrial process to generate electricity or using waste heat or steam from electric generation to boost industrial output or assist with heating. The U.S. Department of Energy Oak Ridge National Laboratory finds that increased deployment of cogeneration could meet close to 20 percent of the nation's power needs by 2030, up from 9 percent presently. Also known as *combined heat and power*. Nationwide, cooperatives utilize nearly 64 MW of cogeneration for energy generation, much of it heat recovered from natural gas pipeline compressor stations. (*See combined cycle, independent power producer, non-utility generator, Public Utility Regulatory Policies Act, qualifying facility.*)

coincident capacity The ratio of actual net electric generation to the maximum possible energy that could have been produced if a generation facility operated at its maximum capacity rating during a power supplier's peak demand. Coincident capacity factor is normally reported as a percentage. (*See intermittency, peak demand.*)

coincident demand The amount of power used by a consumer or class of consumers during a power supplier's peak demand. (*See non-coincident demand, peak demand.*)

coincidental peak The sum of two or more utility system load peaks that occur during the same time. (*See non-coincidental peak, peak load.*)

Colorado Country Life Official consumer publication of the Denver, Colorado-based Colorado Rural Electric Association.

combined cycle A method of generating power from waste heat created by one or more combustion turbines. High-pressure, high-temperature exhaust from the turbines can be captured to make steam and power a turbine-generator that produces additional electricity. The process greatly increases generating efficiency at low cost with zero emissions. A form of cogeneration, it's also known as *waste-heat recovery*. In a combined cycle power plant, waste heat from a natural gas-fired turbine powers a steam turbine. (*See cogeneration, combustion turbine, integrated gasification.*)

combined cycle power plant No hyphen needed on *combined cycle*. (*See combined cycle.*)

combined heat and power (CHP) (*See cogeneration.*)

combustion turbine An engine that typically burns natural gas, occasionally diesel fuel, or a combination of both to produce electricity. Combustion turbines, because of their generally rapid start-up and ramping times, are often used to meet short-term demand peaks. (*See peaking plant.*)

commercial paper Short-term investments (typically unsecured and issued by corporate borrowers with high credit ratings) having a definite maturity date.

Committee on the Relation of Electricity to Agriculture (CREA) An organization formed in 1923 by the National Electric Light Association, the American Farm Bureau Federation, National Grange, American Society of Agricultural Engineers, U.S. departments of Agriculture, Commerce, and Interior, and various electric equipment manufacturers—in partnership with participating state land grant universities and county agents—that conducted America's first large-scale rural electrification pilot study. Investor-owned utilities underwrote CREA's activities over the next 10 years, contributing an estimated \$1.4 million; manufacturers donated \$1 million worth of equipment. Unfortunately, resulting

CREA initiatives with farming communities in 31 states were doomed by a lack of affordable rates and a major agricultural recession. However, CREA programs did demonstrate that electricity could promote economic development and improve the rural quality of life by reducing drudgery, improving sanitation and diet, and increasing time available for recreation. (*See investor-owned utility, National Electric Light Association.*)

common mortgage A financial instrument between the National Rural Utilities Cooperative Finance Corporation (CFC) and the federal Rural Electrification Administration (now USDA Rural Utilities Service) that secured long-term loans made concurrently to electric cooperatives by the two organizations. The mortgage provided CFC with a lien on borrower assets equal to the federal government. (*See concurrent loan, lien accommodation, mortgage, National Rural Utilities Cooperative Finance Corporation, Rural Electrification Administration, Rural Utilities Service.*)

communication/communications Communication (singular) refers to theories, methods, and strategies of how information is effectively sent and received. Communications (plural) refers to the physical systems that are used to send and receive information (telephone exchange servers, radio/TV/film equipment, smart grid components, etc.). In essence, *communications* describes tools used for employing *communication*.

Community Service Awards (*See Electric Cooperative National Community Service Awards.*)

community solar Centralized photovoltaic (PV) systems where segments are sold or leased to consumers. In return, participating members receive payment, or credit back on their electric bills, based on how much electricity was produced by the system and how much of it they own/subscribe to. Community solar appeals to consumers who either can't install PV panels at their home due to property that isn't properly oriented to capture the sun's rays or want to avoid costs associated with designing, permitting, building, maintaining, and insuring their own residential PV setups. Community solar arrays typically are larger than residential rooftop or backyard systems but smaller than utility-scale projects. Sometimes called *solar gardens*. At the end of 2017, electric cooperatives had installed 196 community solar systems. (*See National Renewables Cooperative Organization, photovoltaics, Solar Cooperative Community Projects, solar power, Solar Utility Network Deployment Acceleration, tax-equity flip, utility-scale solar.*)

compact fluorescent lightbulb (CFL) A type of fluorescent lamp designed to replace incandescent lightbulbs. Compared with incandescents delivering the same amount of visible light, CFLs use

25 percent to 33 percent less energy and boast a longer life. Note that *lightbulb* is now used as one word, according to *Merriam-Webster's Collegiate Dictionary, Eleventh Edition*. (See *energy efficiency*.)

competitive transition charge (CTC) A temporary assessment on an electric bill that recovers a utility's stranded costs. (See *stranded costs*.)

compressed-air energy storage Power plants that generate electricity with air previously pumped into an underground cavern during times of low electricity use. When needed (generally to shave demand peaks), the compressed air gets withdrawn to drive a turbine. Extended operation of compressed-air energy storage plants can be achieved by burning an air/natural gas mix. Compressed-air units are increasingly looked at as a possible way to "store" electricity from renewable energy systems, particularly wind farms, to make them more reliable sources of generation. PowerSouth Energy Cooperative, a generation and transmission cooperative based in Alabama, operates the only compressed-air energy storage facility in the United States. (See *energy storage, distributed energy resources, generation and transmission cooperative, off-peak power, peak demand, pumped-storage hydro*.)

concentrating solar power (See *solar thermal energy*.)

concurrent loan A long-term loan made by the National Rural Utilities Cooperative Finance Corporation (CFC) at the same time as a federal Rural Electrification Administration (REA, now USDA Rural Utilities Service, or RUS) long-term loan. Plant revenue ratio determined the amount of supplemental capital each borrower received. Based on that measure, REA/RUS provided 70 percent, 80 percent, or 90 percent of a borrower's long-term requirements, with CFC supplying the rest. Drawdown occurred with 50 percent of the REA/RUS funds going first, followed by the entire CFC portion, and then the remaining REA/RUS amount. Concurrent lending dried up in the late 1990s and early 2000s as cooperative borrowers began using RUS-guaranteed Federal Financing Bank loans or buying out their government debt entirely. (See *100 percent borrower, common mortgage, Federal Financing Bank, guaranteed loans, RUS, independent borrower, lien accommodation, National Rural Utilities Cooperative Finance Corporation, plant revenue ratio, Rural Electrification Administration, Rural Utilities Service*.)

conductor Material that allows an electric current to pass through; also, the wire or cable that carries electricity across an electric distribution or transmission system. When describing distribution facilities in particular, use *wire* or *line* to avoid confusion.

congestion costs Expenses that arise from the less-than-optimal dispatch of generation facilities due to transmission constraints. (*See financial transmission rights, locational marginal pricing, regional transmission organization, transmission, transmission congestion, transmission system, wholesale power market.*)

Congressional Budget Office (CBO) A non-partisan arm of Congress that prepares fiscal estimates on the cost of legislation and federal policy.

CONNECT Conference Annual national education forum, summit, and expo for electric cooperative marketing, member services, and communications professionals. Use all capital letters on *CONNECT*, as in “*the CONNECT ’15 Conference, sponsored by NRECA and Touchstone Energy® Cooperatives, will be held in May.*”

connection charge A one-time levy paid by a consumer for expenses involved in connecting electric service to a home or a business. (*See consumer charge, energy charge, facilities charge, service charge.*)

conservation The careful and wise use of resources, as well as changes in consumer behavior to save energy. Conservation differs from energy efficiency in that behavioral changes center on cutbacks aimed at using less electricity. (*See energy efficiency.*)

conservation voltage reduction (CVR) A practice used by utilities to curtail load during periods of high electricity consumption, especially in emergencies where failure to take action could lead to cascading blackouts. Since watts equals volts times amps, CVR functions on the principle that by trimming volts a certain percentage you can also snip off watts. The preferred range for electric service is set at between 114 V and 126 V. Electric cooperatives, which often maintain long feeder lines, put a major focus on maintaining acceptable voltage levels. As a result, dropping voltage at a substation to perform CVR makes some cooperative engineers nervous. Now with the ability of advanced metering infrastructure systems to accurately monitor end-of-line voltage, CVR may become a more accepted way to ramp up demand-side management/load shaving efforts for very little added expense. (*See*

advanced metering infrastructure, ampere, demand-side management, load, load management, volt, watt.)

consolidation A legal process by which two or more corporate entities combine to become a completely new corporation. All legacy identities cease to exist and a new name results. *(See merger.)*

construction work in progress (CWIP) A utility regulatory commission term. CWIP is not allowed in the rate base of regulated utilities. However, some agencies, including the Federal Energy Regulatory Commission, treat CWIP on a case-by-case basis. *(See Federal Energy Regulatory Commission, net utility plant.)*

consumer What electric cooperatives call (or should call) those who use their services. Investor-owned utilities employ the less personal, profit-associated word *customer*. *(See consumer-member, member, owner.)*

consumer charge A levy sometimes used to recover fixed costs for serving individual accounts. These costs are recovered through a flat charge, regardless of the amount of energy used. *(See connection charge, energy charge, facilities charge, service charge.)*

consumer choice The ability for consumers (investor-owned utilities use the less personal, profit-associated word *customers*) to select between competing companies in buying electric generation. Used interchangeably with *power supply choice, retail choice, retail competition, retail wheeling, and shopping for power*. Choice works both ways: you don't have to choose a new electric generation supplier and suppliers don't have to choose you. At the beginning of 2018, 15 states plus the District of Columbia allowed some form of consumer choice, five states permitted limited competition. Electric cooperatives are exempt from electric competition in all but four states: Delaware, Maine, Maryland, and New Hampshire. (NOTE: Between late 1995 and 2000, 23 states and the District of Columbia had enacted retail electric competition; eight states later repealed those laws. In Pennsylvania, because no electric generation suppliers entered cooperative service territories to serve consumers, due in large part to competitive cooperative rates, the state formally exempted electric cooperatives from its 18-year-old statute in 2014.) Also, a term describing the ability of consumers to "go off the grid" by installing distributed generation. *(See default service, deregulation, Electric Energy Consumer Bill of Rights, electric generation supplier, price to compare, provider of last resort, re-regulation, restructuring, standard offer service.)*

consumer loyalty Inclination of a consumer to choose one product or brand over time.

consumer-member More inclusive wording for all persons (including children) served by an electric cooperative than the more restrictive *member* (which refers just to the person[s] listed on the electric account). Never use *member-consumer* as members can neither be consumed nor owned. NOTE: Many cooperative consumers find the word *owner* uncomfortable as it implies financial responsibility, so always avoid using *member-owner* or *owner*. For most usage, stick with the simple form *consumer* or *member*. (See *consumer*, *member*, *member-consumer*, *member-owner*, *owner*.)

contract demand The maximum level of power a generating utility agrees to have available for delivery. Measured in kilowatts.

cooling tower A structure used to vent steam produced by a nuclear power plant. (See *nuclear power*.)

co-op Short for *cooperative*. Always use the hyphen. Otherwise, it's a small shed where barnyard fowl roost.

Co-op Connections[®] (See *Touchstone Energy*[®] *Cooperatives*.)

Co-op Nation A slogan that describes the power of unity, purpose, and history behind electric cooperatives. First coined in 2009 as the moniker for the social media channel used by *Straight Talk*, the monthly electronic news resource of the National Rural Electric Cooperative Association. (See *Straight Talk*.)

Co-op Owners for Political Action (See *ACRE Co-op Owners for Political Action*[®].)

cooperative (co-op) A business owned and governed by members who use its services. Democratically controlled and operated on an at-cost, not-for-profit basis, a cooperative returns any excess revenue, called margins, to members on the basis of patronage. The first known cooperative formed in the United States, the Philadelphia Contributionship for the Insurance of Houses from Loss by Fire, was organized by Benjamin Franklin in 1752. It still operates today. In 1804, the initial farm marketing cooperative was established by dairymen in the Connecticut River Valley. The first irrigation cooperative was launched in California in 1853; by 1857, New York and Ohio had adopted laws enabling the operation of cooperative (mutual) insurance companies. The modern cooperative

movement, though, traces its roots to a store started by 28 weavers and other artisans in the town of Rochdale (pronounced Rotch-dale) in northern England in 1844. Approximately 29,200 cooperatives operate in the United States. (*See cooperative principles, cooperative values, electric cooperative, Rochdale Principles.*)

Cooperative Action Network A website that provides opportunities for consumer-member input on legislative and regulatory issues important to electric cooperatives. (*See Our Energy, Our Future*[®].)

Cooperative Benefit Administrators, Inc. (CBA) A wholly owned for-profit subsidiary of the National Rural Electric Cooperative Association (NRECA) based in Lincoln, Nebraska, that processes and administers medical, dental, vision, prescription drug, insurance, and disability claims for electric cooperative employees, retirees, dependents, and directors/trustees participating in the NRECA Group Benefits Trust. CBA commenced operations on May 29, 1984. (*See National Rural Electric Cooperative Association.*)

Cooperative.com A website launched on September 1, 2001, that seeks to improve collaboration among electric cooperative directors/trustees, chief executives, and staff; provide access to timely industry-specific tools, information, and educational opportunities; and meet other electric cooperative program needs. Sponsored by the National Rural Electric Cooperative Association, National Rural Utilities Cooperative Finance Corporation, and Federated Rural Electric Insurance Exchange. Capital “C” on “Cooperative” preferred usage. (*See National Rural Electric Cooperative Association, National Rural Utilities Cooperative Finance Corporation, and Federated Rural Electric Insurance Exchange.*)

Cooperative Innovators Awards Honors presented annually from 2005 to 2008 by the Cooperative Research Network (now NRECA Business and Technology Strategies) recognizing electric cooperatives that adopted new technologies or found creative ways to solve various marketing, engineering, operations, member services, supply chain, and information challenges. The awards have since been discontinued. (*See NRECA Business and Technology Strategies.*)

Cooperative Living Official consumer publication of the Glen Allen, Virginia-based Virginia, Maryland & Delaware Association of Electric Cooperatives.

Cooperative Month An annual October commemoration started in 1930 focusing on the importance of cooperative organizations. Minnesota became the first state to officially proclaim October as Cooperative Month in 1948; it became a national event in 1964.

cooperative principles A set of guidelines that govern cooperative operations. Originally drawn up by Charles Howarth, one of 28 weavers and other artisans who founded the Rochdale Society of Equitable Pioneers in Rochdale, England, on December 21, 1844, these principles were introduced into the United States in 1874 by the National Grange, and formally written down by the International Cooperative Alliance in 1937 (last updated in 1995). The cooperative principles are:

1. Open and Voluntary Membership
2. Democratic Member Control
3. Members' Economic Participation
4. Autonomy and Independence
5. Education, Training, and Information
6. Cooperation Among Cooperatives
7. Concern for Community

Initial capitalize the seven principles, with the actual principle noted in quotation marks: “*Concern for Community,*” *the Seventh Cooperative Principle*; *XYZ Electric Cooperative extensively promotes the Second Cooperative Principle, “Democratic Member Control.”* (See *cooperative, cooperative values, Rochdale Principles.*)

Cooperative Research Network (See *NRECA Business and Technology Strategies.*)

Cooperative Response Center (CRC) The nationwide, cooperatively owned and operated 24/7 contact center and software provider that offers various services (primarily to electric cooperatives) including after-hours dispatch, round-the-clock consumer care, and monitoring of home security and personal medical alarm systems. Founded in 1992, CRC operates out of offices in Austin, Minnesota; Dunlap, Tennessee; and Abilene, Texas.

Cooperative System Integrity Fund (Integrity Fund) An account created in 1986 by the National Rural Utilities Cooperative Finance Corporation (CFC) to assist electric cooperatives in fighting takeover and annexation attempts by investor-owned utilities and municipal electric systems. In addition to electric service territory threats, the fund—administered by CFC with decisions made by a five-member committee composed of CFC, National Rural Electric Cooperative Association and Rural Electric Statewide Managers Association representatives—can also be tapped by cooperatives to preserve their right to offer non-electric energy services and to combat regulatory, judicial, or legislative issues that threaten a cooperative’s existence under the cooperative business model. Monies for the Integrity Fund come from voluntary contributions by electric cooperatives of either a

percentage of their annual CFC capital credits refund (typically 5 percent) or direct cash contributions. *(See National Rural Utilities Cooperative Finance Corporation.)*

cooperative values A set of six ideals that underpin the seven cooperative principles, which form the basis for every cooperative enterprise in the world today. The cooperative values are: Self-Help, Self-Responsibility, Democracy, Equality, Equity, and Solidarity. The International Cooperative Alliance also separately lists cooperative “ethical values” of Honesty, Openness, Social Responsibility, and Caring for Others. *(See cooperative, cooperative principles, Rochdale Principles.)*

COP Coefficient of Performance.

copper-clad steel Wire first marketed in 1915 that combines the high mechanical resistance of steel with the conductivity and corrosion resistance of copper. The product boasts very little scrap value since copper recovery is impractical, which helps deter metal thieves. *(See metal theft.)*

copper theft *(See metal theft.)*

Corps U.S. Army Corps of Engineers.

cost-based rate A pricing structure where consumers in each class (residential, commercial, and industrial) pay their fair share of a cooperative’s costs so no group subsidizes another. *(See block rate, class rate, cost-of-service study, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate.)*

cost of service The “price tag” of providing a consumer with electricity, excluding generation.

cost-of-service rate Price for power based on covering expenses associated with constructing and operating facilities necessary to produce and deliver electricity. *(See market-based rate.)*

cost-of-service study An analysis that determines how much money an electric utility incurs to serve various classes of consumers; provides the basis for evaluating different discount and incentive programs and results in the development of cost-based rates. Generally, service expenses can be placed in three separate “buckets”: consumer-related facility costs for billing, meters as well as maintenance of the distribution system (lines, poles, etc.); demand-related costs tied to providing capacity to deliver

power; and variable energy costs connected to power plant fuel and operations and maintenance. (*See cost-based rate, fixed costs, variable costs.*)

cost shifting (*See cross-subsidization.*)

Council of Rural Electric Communicators (CREC) A volunteer group of electric cooperative communicators that works to improve communications with electric cooperative consumers and advance the recognition, education, and professionalism of peers. Established on October 27, 1981, CREC sponsors the annual Spotlight on Excellence Awards, Autry Leadership Award for “Always On” Communication, J.C. Brown CEO Communication Leadership Award, Laberge Award for Excellence in Strategic Communication, and New Co-op Communicators Orientation programs, and created the Certified Cooperative Communicator program. (*See Autry Leadership Award for “Always On” Communication, Certified Cooperative Communicator, Edgar F. Chesnutt Award, J.C. Brown CEO Communication Leadership Award, Laberge Award for Excellence in Strategic Communication, Spotlight on Excellence Awards.*)

cove heater A heating system installed on a wall near the ceiling, combining radiant and convective heat.

CRC Cooperative Response Center.

CREA Committee on the Relation of Electricity to Agriculture.

cream-skimming (*See cherry-picking.*)

CREBs Clean Renewable Energy Bonds.

CREC Council of Rural Electric Communicators.

Credentialed Cooperative Director (CCD) An educational curriculum designed to provide electric cooperative directors/trustees with basic knowledge and skills needed to perform their duties. Directors/trustees earn a CCD certificate by attending five required courses and successfully completing a learning assessment for each. After achieving CCD status, directors/trustees can work to obtain their Board Leadership Certificate. The CCD program is administered by the National Rural

Electric Cooperative Association. *(See Board Leadership Certificate, Director Gold Certificate, National Rural Electric Cooperative Association.)*

credit union A financial cooperative formed by a group of people with a shared field of membership who join together to save money and make loans at the lowest possible cost. There more than 7,000 credit unions in the United States, serving 110 million members.

creosote A thick, oily liquid derived from coal tar that's commonly used as a preservative treatment for wood utility poles. *(See ammoniacal copper zinc arsenate, chromated copper arsenate, chromated copper arsenate-emulsified treatment, pentachlorophenol.)*

critical-peak pricing A method of setting rates where power costs are much higher during a limited number of hours per year (typically fewer than 80 hours). Consumers are given notice ranging from one day to one hour before a utility implements critical-peak pricing. These rates are generally coupled with time-of-use rates where the cost for electricity varies according to the time when it's consumed, whether during more expensive peak (usually afternoon) or cheaper off-peak (usually nighttime) demand periods. Higher prices are meant to discourage use at those times. *(See block rate, class rate, cost-based rate, declining block rate, demand rate, dynamic pricing, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, peak demand, ratchet rate, real-time pricing, step rate, time-of-use rate.)*

crossarm A wood, laminated wood, or fiberglass support attached to a pole that holds wire and insulators. One word. *(See pole.)*

Cross-State Air Pollution Rule A U.S. Environmental Protection Agency (EPA) regulation issued on July 6, 2011, that aimed to permanently cap emissions of sulfur dioxide, nitrogen oxides, and particulate matter from approximately 1,200 fossil fuel-fired power plants across 27 states and the District of Columbia in the eastern half of the United States (not counting New England states or Delaware). The goal: Enable “downwind” states whose air quality is compromised by power plants elsewhere to meet federal standards. The rule was largely upheld by the U.S. Supreme Court on a 6-2 vote on April 29, 2014. As implemented, affected states are also responsible for reducing ozone pollution, a main component in smog, to 75 parts per billion measured over eight hours. *(See Clean Air Interstate Rule, Mercury and Air Toxics Standards, nitrogen oxides, sulfur dioxide, U.S. Environmental Protection Agency.)*

cross-subsidization The practice of charging rates higher than the actual cost of service to one class of consumers so that lower rates can be provided to another class. Also known as *cost shifting*.

CTC competitive transition charge.

current A flow of electrically charged particles, measured in amperes.

Currents Official consumer publication of the Tempe, Arizona-based Grand Canyon State Electric Cooperative Association. Produced by Ruralite Services in Hillsboro, Oregon. (*See Ruralite.*)

cushion of credit An interest-bearing, escrow-like account automatically created by the USDA Rural Utilities Service (RUS) for each electric and telephone cooperative borrower that, after October 1, 1987, made voluntary payments in excess of amounts due on an RUS loan. Deposits and accumulated interest in cushion of credit accounts could only be used to make scheduled payments on RUS loans. Because cushion of credit deposits earned fixed 5 percent annual interest, electric cooperative use of cushion of credit accounts surged during the low-interest rate period following the 2007–2009 Great Recession—from approximately \$600 million to more than \$7 billion, with 452 electric and 194 telephone cooperatives participating. In the 2018 Farm Bill, new deposits were prohibited and monies in previously created accounts were allowed to earn 5 percent interest through September 30, 2020; 4 percent through September 30, 2021; and the lower 1-year Treasury bond rate, capped at 5 percent interest, thereafter. Electric cooperatives were also given the ability to tap existing cushion of credit money to prepay RUS loans of their choosing at no penalty through September 2020. No hyphens needed with usage. (*See insured loans, Rural Economic Development Loan and Grant Program, Rural Utilities Service.*)

customer (*See consumer.*)

Customer Average Interruption Duration Index (CAIDI) A reliability indicator that shows the average outage time experienced by a consumer over the course of a year. (*See Momentary Average Interruption Frequency Index, System Average Interruption Duration Index, System Average Interruption Frequency Index.*)

cutout A transformer fuse so named because when the fuse is removed the circuit opens.

CVR conservation voltage reduction.

CWIP construction work in progress.

cyberspace A general reference to doing things electronically by computer over the Internet. (*See information superhighway, Internet, website, World Wide Web.*)

cyber security The process of protecting data and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction. Critical infrastructure protection standards issued by the North American Electric Reliability Corporation are designed to defend bulk power systems from “cyber-tage.” Use as two words (at least for now). (*See bulk power, North American Electric Reliability Corporation.*)

cycle A single period of two phases in which alternating current reverses direction before returning to the source. Alternating current consists of a succession of cycles. (*See alternating current.*)

D

DA distribution automation.

dark-sky lights Outdoor lighting that meets requirements of the Tucson, Arizona-based International Dark-Sky Association. Dark-sky fixtures direct all of their light downward to increase illumination on sidewalks and around homes while eliminating glare (light trespass) that interferes with stargazing. (*See light pollution.*)

data Information organized for analysis or used as the basis for decision-making.

day-ahead market The competitive wholesale power market for the following day, or more specifically, the market for wholesale electricity 24 hours in advance of a given time in any day. (*See spot market, wholesale power market.*)

daylight saving time No hyphen, no “s” on saving.

DC direct current. Abbreviation acceptable on second reference.

debt-to-equity ratio The amount an electric cooperative owes in relation to the amount it owns.

declining block rate A pricing structure where a consumer pays less for electricity as use increases beyond one or more fixed kilowatt-hour amounts during a specific billing period. *(See block rate, class rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate.)*

default service Electricity supplied by local utilities to consumers who do not choose a competitive electric generation supplier. In some states, it's called *provider of last resort* or *standard offer service*. *(See consumer choice, deregulation, electric generation supplier, price to compare, provider of last resort, standard offer service.)*

defined benefit plan, defined contribution plan No hyphen needed. Currently, roughly 880 electric cooperatives and more than 56,000 electric cooperative employees, retirees, and their spouses/beneficiaries participate in NRECA's Retirement Security (RS) Plan, a defined benefit pension program created in 1948. Many cooperatives also take part in the NRECA 401(k) Pension Plan, a defined contribution offering.

degree day A measurement of how much the average daily temperature varies from a standard reference temperature; employed to estimate heating and cooling requirements for a home or building.

delivery point The interconnection where one utility supplies power to another.

demand The amount of electricity drawn from an electric system at a given time, measured in kilowatts. *(See demand charge, demand interval, demand meter, energy, load.)*

demand charge A pricing structure for electricity based on the maximum amount of system power a consumer uses. *(See demand, demand interval, demand meter, energy, load.)*

demand interval A period of time during which the flow of electricity gets averaged to determine demand. *(See demand, demand charge, demand meter, energy, interval meter, load.)*

demand meter An electric meter that also measures and records maximum demand over a specified period of time. *(See demand, demand charge, demand interval, energy, load, meter.)*

demand ratchet *(See ratchet rate.)*

demand rate A pricing structure where a consumer, usually a large commercial or industrial account, pays for electricity based on the maximum kilowatts used during times of peak demand. *(See block rate, class rate, cost-based rate, declining block rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate.)*

demand response Programs or mechanisms that reduce electricity consumption based on market signals or other incentives. Demand response includes direct control of specialized appliances and equipment (notably large-capacity grid-enabled electric resistance water heaters, electric thermal storage furnaces and room heating cabinets, air conditioning, and dual fuel systems), time-of-use rates, interruptible contracts with large commercial and industrial accounts, dispatch of consumer-owned (distributed) generation into the wholesale power market, battery storage, personal energy management, and other initiatives. As of 2018, electric cooperatives could control 6 percent of their peak load through demand-response activities, including approximately 1,440 MW of residential load. Although cooperatives account for only about 10 percent of total retail electricity sales nationally, their combined demand-response resources equal almost 20 percent of the demand-response capacity of the entire electric sector. *(See demand-side management, dispatchable generation, distributed generation, interruptible rate, load management, meter data management system, on-bill financing, peak demand, peak load, peak load shifting/shaping/peak shaving, personal energy management, Reciprocal Internal Combustion Engine rule, time-of-use rate, ZigBee.)*

demand-side management A utility program aimed at reducing total consumer use of electricity through conservation or efficiency measures, or by shaving peak demand through demand-response activities. Most often referred to by electric cooperatives as *load management*. *(See conservation voltage reduction, load management, integrated resource planning, peak demand, peak load shifting/shaping/peak shaving, Reciprocal Internal Combustion Engine rule.)*

Department of Agriculture *(See U.S. Department of Agriculture.)*

Department of Energy *(See U.S. Department of Energy.)*

Depression, The *(See Great Depression.)*

DER distributed energy resources.

deregulation Major reduction of government oversight of private industry. To better describe legislative and regulatory initiatives aimed at allowing retail electric consumers to choose between competing electric generation suppliers, use *restructuring*, as many aspects of utility regulation still remain. (See *consumer choice*, *default service*, *Electric Energy Consumer Bill of Rights*, *electric generation supplier*, *price to compare*, *provider of last resort*, *re-regulation*, *restructuring*, *standard offer service*.)

derivative A financial instrument whose value depends on something else—interest rates, mortgages, raw materials, commodities, or the ability of an industry or homeowner to pay debts, for example. Derivatives range from futures transactions that farmers use to lock in (hedge) crop prices to specialized products like financiers placing bets on the shifting relationship between two countries’ currencies. Most derivatives are over-the-counter deals (swaps) between two parties. Under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, speculative derivatives deals must go through a clearinghouse where all parties post collateral to cover everyone’s losses. “End users”—companies such as electric cooperatives that depend on derivatives simply to hedge business risks (notably against wild swings in prices for power plant fuels, like natural gas)—were exempted from the burdensome clearing requirements. In keeping with legislative intent, the federal Commodity Futures Trading Commission (CFTC) on March 28, 2013, unanimously approved a final order exempting transactions between and among electric cooperatives, municipal electric systems, federal power marketing administrations, federal and state agencies with electric operations, and Indian tribes from clearing, recognizing that not-for-profit cooperative dealings are generally non-financial and involve the physical delivery of a commodity—electric power. The National Rural Utilities Cooperative Finance Corporation was further exempted from separate Dodd-Frank margining requirements under a January 2015 law extending provisions of the federal Terrorism Risk Insurance Act. (See *all-requirements contract*, *generation and transmission cooperative*, *National Rural Utilities Cooperative Finance Corporation*.)

desuperheater A device that recovers heat from a heat pump or central air conditioner for use in heating or preheating water.

DFA distribution fault anticipation.

DG distributed generation. Abbreviation acceptable on second reference.

digger derrick A type electric utility line truck that digs holes and sets poles. No need for hyphen.

direct access The ability of a retail consumer to purchase electricity directly from the competitive power market rather than through his or her local distribution utility.

direct current (DC) Electricity that flows through a conductor in a single direction. Spell out on first reference. *(See alternating current, electricity.)*

direct loans *(See hardship loans, insured loans, municipal rate loans, Rural Utilities Service, Treasury rate loans, Treasury Rate Plus loans.)*

Director Gold Certificate An educational curriculum designed to provide electric cooperative directors/trustees who have achieved Credentialed Cooperative Director (CCD) and Board Leadership Certificate (BLC) status with continuing knowledge and skills. Directors/trustees who have earned their CCD and BLC and completed three additional BLC credits are eligible for Director Gold certification. To maintain Director Gold standing, directors/trustees must earn three credits from approved courses or conference attendance within a two-year period. The Director Gold Certificate program is administered by the National Rural Electric Cooperative Association. *(See Board Leadership Certificate, Credentialed Cooperative Director, National Rural Electric Cooperative Association.)*

disaggregation Separating a vertically integrated utility into smaller, individually operated distribution, transmission, and generation divisions.

dispatchable generation Sources of electricity—such as certain types of properly sited and operated distributed generation systems (emergency generators, anaerobic digesters, microhydro projects) as well as natural gas- or diesel-fired peaking plants—that can be started up quickly at the request of power grid operators to meet peak demand conditions, back up wind farms or solar arrays, or relieve transmission congestion. Solar and wind power systems cannot be dispatched, as they're plagued by intermittency issues. *(See anaerobic digester, baseload power plant, demand response, distributed generation, intermittency, microhydro, peak demand, peaking plant, transmission congestion.)*

dispersed generation *(See distributed generation.)*

distributed energy resources (DER) Decentralized energy technologies, such as rooftop solar photovoltaics, demand-response, local energy storage, electric vehicles, and microgrids, designed to supplement or replace power produced by large generating plants. *(See anaerobic digester, backup charge, combustion turbine, demand response, dispatchable generation, distributed generation, electric vehicle, energy storage, fuel cells, intermittency, interruptible rate, load management, microgrid, microhydro, peaking plant, photovoltaics, plug-in electric vehicle, plug-in hybrid electric vehicle, small power producer, transmission congestion, wind turbine.)*

distributed generation (DG) Decentralized generation technologies designed to supplement or replace power produced by large generating plants. In most cases, distributed generation is located at or near the point of use. For homeowners and farmers, examples include standby, or emergency, generators that run on gasoline, diesel fuel, or natural gas and “backyard” renewable energy systems such as anaerobic digesters, small wind turbines, rooftop solar photovoltaic arrays, and microhydro projects. Factories may rely on cogeneration that uses natural gas or industrial waste products as fuel. In situations where an unscheduled outage could result in tens of thousands of dollars of lost production and possibly damaged equipment or dead animals and ruined produce, many commercial and industrial consumers—like manufacturers, data centers, retail outlets, hospitals, and large livestock and poultry operations—install diesel and natural gas-fired generators or combustion turbines or even fuel cells as a supplemental power supply to protect their livelihood and enhance service reliability. Dispatchable DG designs—such as properly sited and operated back-up generators managed together—potentially can create a virtual power plant to firm up intermittent solar and wind power, deliver emergency capacity more quickly than combustion turbine peaking plants, relieve transmission congestion, provide voltage and frequency support, and be used as a part of a load management program to reduce peak demand. In return for allowing their DG units to be tapped in these ways, consumers usually receive a reduced electric rate or other considerations like free fuel and interconnection costs or generator maintenance. Also called *consumer-owned generation, on-site generation, dispersed generation, or distributed energy*. *(See anaerobic digester, backup charge, combustion turbine, demand response, dispatchable generation, EPRI Prism, fuel cells, intermittency, interruptible rate, load management, microgrid, microhydro, peaking plant, photovoltaics, small power producer, transmission congestion, wind turbine.)*

distribution automation (DA) Digital technologies that help utilities monitor the flow of electricity along a distribution grid in near real-time; pinpoint outages; identify voltages out of allowed ranges;

and transmit signals to transformers, capacitors, circuit breakers, and other equipment to initiate diagnostic or corrective actions. Also called *down-line automation*. (See *smart grid*.)

distribution cooperative An electric cooperative that operates a distribution system, purchases wholesale power, and delivers it to consumers. (See *electric cooperative, generation and transmission cooperative*.)

distribution fault anticipation (DFA) A smart grid technology that uses high-resolution monitors installed on electric lines and cutting-edge algorithms to pinpoint hard-to-find electric system trouble spots before they morph into full-blown outages. In its purest form, DFA “reads and identifies” specific fault signatures in a waveform—such as a cracked insulator or a tree limb occasionally brushing a line and causing a blink. Instead of learning about an event, like an outage, after it occurs, cooperatives are able to go out and fix potential problem ahead of time. (See *down-line automation, smart grid*.)

distribution system Poles, wire, substations, and transformers used to deliver electric energy to consumers. Electric cooperatives own and maintain 2.6 million miles of distribution lines—42 percent of the nation’s total—spanning 56 percent of the United States and 88 percent of U.S. counties.

diversification Any endeavor outside the core function or mission of a business.

DOE U.S. Department of Energy.

down A power plant or piece of electrical equipment that’s not operating. (See *on-line*.)

down-line automation Digital technologies (meters, devices, and software applications) combined with two-way communications that help utilities monitor the flow of electricity along a distribution grid in near real-time; pinpoint outages; identify voltages out of allowed ranges; and transmit signals to transformers, capacitors, circuit breakers, and other equipment to initiate diagnostic or corrective (self-healing) actions that can isolate, reroute power around, or even remotely repair the cause of a power interruption. Also called *distribution automation*. (See *distribution fault anticipation, smart grid*.)

dragline A large mobile excavator used in a strip mine to remove dirt and other material covering coal seams.

DSL digital subscriber line. (*See broadband.*)

dual fuel A system where a supplemental heating source, such as an oil furnace, takes over when electricity is cut off to heat pumps or electric baseboard systems during times of peak electric consumption. Designed to keep a lid on power costs by making it unnecessary for a utility to call on more expensive sources of power. Also, a standby or emergency generator that can operate on two different fuels, such as natural gas and oil. No hyphen needed on *dual fuel system*. (*See heat pump.*)

ductwork Passages usually made of sheet metal through which hot or cool air is blown in a forced-air system.

dusk-to-dawn lights (*See dark-sky lights, high-pressure sodium vapor lights, induction lighting, light-emitting diode, mercury vapor lights, metal halide lights.*)

dynamic pricing A method of setting rates where the retail price for electricity varies according to the cost of wholesale power at the time it's consumed. While dynamic pricing can include relatively simple time-of-use rates, it typically refers to prices that track wholesale power costs in real-time. (*See block rate, class rate, cost-based rate, critical-peak pricing, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, peak demand, ratchet rate, real-time pricing, step rate, time-of-use rate.*)

dynamo The very first electric generator capable of producing power for consumers on a large scale, it converted mechanical rotation within a magnetic field into a pulsing direct current. Rarely seen today (except in museums) due to the nearly universal use of alternating current. Thomas Edison built six Jumbo dynamos for his Pearl Street Station in New York City—the first central station power system in the United States. It began commercial operation on September 4, 1882. (*See alternating current, central station service, direct current, generator, turbine, turbine-generator.*)

E

Earth, earth Capitalize when referring to the planet. As with other planets, do not precede the name with the article *the*. Used lowercase, it means soil, ground, etc.

earth-coupled heat pump (*See heat pump.*)

easement An agreement allowing a utility to use private property for a specific purpose, such as building a distribution or transmission line. *(See right-of-way.)*

Eastern Interconnection *(See grid.)*

ECBA Electric Cooperative Bar Association.

ECO Energy Co-Opportunity.

ECT.coop An online news source published from January 2010 until late 2016 by the National Rural Electric Cooperative Association that covered daily political, economic, research, and business issues relevant to the electric cooperative network. Successor to *Electric Co-op TODAY*, replaced by *electric.coop*. *(See electric.coop, Electric Co-op TODAY, National Rural Electric Cooperative Association, Rural Electric Minuteman, The, Rural Electric News Letter.)*

Edgar F. Chesnutt Award The highest honor bestowed through the annual Spotlight on Excellence Awards program sponsored by the Council of Rural Electric Communicators, it's given to an electric cooperative judged as having the "Best Total Communication Program." Named for Edgar F. Chesnutt, who served as manager of corporate communications with Little Rock, Ark.-based Arkansas Electric Cooperatives, Inc., a statewide service association, from 1961 until his death in 1987. *(See Autry Leadership Award for "Always On" Communication, Certified Cooperative Communicator, Council of Rural Electric Communicators, J.C. Brown CEO Communication Leadership Award Council of Rural Electric Communicators, Laberge Award for Excellence in Strategic Communication, National Rural Electric Cooperative Association, Spotlight on Excellence Awards.)*

Edison Electric Institute (EEI) The Washington, D.C.-based trade association of investor-owned utilities and electric utility holding companies. Organized in 1933. Successor to the National Electric Light Association. *(See National Electric Light Association.)*

EEI Edison Electric Institute.

EECLP Energy Efficiency and Conservation Loan Program.

EER energy efficiency ratio.

EERE U.S. Office of Energy Efficiency and Renewable Energy.

EF energy factor.

efficiency A ratio of the work or energy output over the amount of energy input.

efficient electrification Replacing direct use of fossil fuels for commercial and residential heating and cooling, water heating, transportation and other applications with electric technologies in ways (such as shifting periods when power is used) that reduce energy costs and overall carbon emissions to the benefit of both consumers and the environment. In an era of declining kilowatt-hour sales and increasing penetration of renewable resources, efficient electrification can increase electric consumption while simultaneously greening the grid—linking electric utilities to a clean energy future. *(See demand response, demand-side management, electric vehicle, energy efficiency, greenhouse gases, heat pump, load management, renewables, thermal energy storage, water heater.)*

EGS electric generation supplier.

EIA U.S. Energy Information Administration.

EIS environmental impact statement.

ELCON Electricity Consumers Resource Council.

electric.coop The official website site of the National Rural Electric Cooperative Association, launched in September 2016, organized around three primary content pillars—energy and technology innovation, community development, and the cooperative advantage. *(See ECT.coop, National Rural Electric Cooperative Association.)*

electric and magnetic fields (EMF) Radiation surrounding power lines; present whenever electric power is used. Already plural, so do not use *EMFs*. Also avoid using *electromagnetic fields*.

electric competition *(See consumer choice, deregulation.)*

electric cooperative A not-for-profit utility owned by those (members) who use its services. Electric cooperatives generate and purchase wholesale power, own or arrange for the transmission of that

power, distribute power, and aggregate power purchases for consumers. Known by various names in different parts of the United States—*electric cooperative associations, electric membership corporations, electric power associations, rural electric cooperatives, rural electric cooperative associations, rural electric cooperative corporations, and rural electric membership corporations*. Probably the first American electric cooperative was established in Yellow Medicine County, Minnesota, in 1914—Stony Run Light & Power Company (predecessor to Montevideo-headquartered Minnesota Valley Cooperative Light & Power Association). Also that year, Tunnelville Cooperative Electric Company in Vernon County, Wisconsin (forerunner to Westby-based Vernon Electric Cooperative), energized an initial 10 farms on November 1, while Parkland Light & Water Company in Tacoma, Washington, oldest of the nation’s mutual utilities, a form of cooperative, was incorporated on February 17. By 1930, 46 consumer-owned electric cooperatives had organized in 13 states. Most of these early cooperatives were very small, serving from 10 to 360 members. *(See distribution cooperative, generation and transmission cooperative, electrical district, mutual utility, public power district, public utilities, public utility district.)*

Electric Cooperative Alumni Club An organization of former electric cooperative employees, chief executives, and director/trustees that assists the National Rural Electric Cooperative Association with political activism and concern-for-community efforts. *(See National Rural Electric Cooperative Association.)*

Electric Cooperative Bar Association (ECBA) A National Rural Electric Cooperative Association professional network formed in March 2000 that allows nearly 700 electric cooperative attorneys to share advice and expertise. *(See National Rural Electric Cooperative Association.)*

Electric Cooperative National Community Service Awards Honors presented annually by the National Rural Electric Cooperative Association recognizing electric cooperatives for outstanding leadership and contributions in the categories of Community Investment, Energy Efficiency, and Youth Programs. *(See National Rural Electric Cooperative Association.)*

Electric Co-op TODAY A weekly newspaper published by the National Rural Electric Cooperative Association from July 1, 1995, through December 4, 2009, that covered political, economic, research, and business issues relevant to the electric cooperative network. The publication, a successor to the *Rural Electric News Letter*, went fully online in January 2010 as *ECT.coop*. *(See ECT.coop, electric.coop, Rural Electric Minuteman, The, Rural Electric News Letter.)*

Electric Cooperative Youth Tour Acceptable alternative to *Rural Electric Youth Tour*. (See *Rural Electric Youth Tour*.)

electric current (See *electricity*.)

electric energy The flow of charged particles (electrons).

Electric Energy Consumer Bill of Rights An eight-point policy statement adopted by electric cooperatives in March 1999 that emphasizes their commitment to protecting the economic interests of all consumers during restructuring of the electric utility industry.

electric generation supplier (EGS) A broker, marketer, aggregator, or electric utility generation subsidiary operating in a competitive retail power market that sells electricity to end-use consumers. (See *consumer choice, default service, price to compare, provider of last resort, standard offer service*.)

Electric Power Supply Association (EPSA) The Washington, D.C.-based national trade association representing competitive power suppliers, such as independent power producers, merchant generators, and power marketers. EPSA members own than 480 electricity generation plants and 200,000 MW of capacity in 40 states and the District of Columbia. Formed as a result of a merger between the National Independent Energy Producers and the Electric Generation Association.

Electric Power Research Institute (EPRI) The nonprofit research consortium made up of electric utilities, including electric cooperatives, headquartered in Palo Alto, California. (See *EPRI Prism*.)

electric thermal storage (ETS) A type of room heater or household furnace that warms ceramic material in an insulated cabinet. ETS units are often used in load management programs because stored heat continues to be released even after power to the appliance gets switched off (as a way to shave power consumption during times of peak demand). (See *load management, peak demand, thermal energy storage*.)

electric vehicle (EV) Cars or light trucks powered by strictly by electricity (batteries). Some EVs, like the Chevy Volt, have a gasoline tank, but gas is only used to run a generator to produce electricity when the lithium-ion batteries are drained. EV batteries (16 kWh and larger) are generally fully charged after eight to 12 hours when connected to a regular 120-V outlet (Level 1 charging, up to 16

A) or more quickly (three to eight hours) using a Level 2 (240 V, up to 40 A) charging station. Fast-charge stations using AC current (Level 3, 240 V, drawing up to 96 kW) and high-speed DC chargers (at 480 V DC and up to 90 kW) can replenish fully depleted EV battery packs to 80 percent strength in approximately 30 minutes. Early model fast-charge stations are now being deployed at public locations (airports, shopping centers and highway truck stops). EVs differ from plug-in hybrid electric vehicles (PHEVs), which rely on the combination of a gasoline or diesel engine and rechargeable lithium-ion batteries for propulsion. The main worry for electric cooperatives from EVs and PHEVs involves use of home charging stations—household transformers may experience problems due to increased running and reduced cool-down times as well as capacity issues. However, since EVs and PHEVs will largely be recharged at night, cooperatives should experience better load factors and lower line losses. (*See distributed energy resources, EPRI Prism, plug-in hybrid electric vehicle.*)

electrical district A not-for-profit electric utility in Arizona that provides affordable irrigation pumping and central station electric service to farming regions. Organized as a political subdivision under a 1922 state law. Member-governed (land-based) electrical districts enjoy full status as members of the National Rural Electric Cooperative Association. (*See electric cooperative.*)

electricity The movement of electrons in a conductor from a negatively charged point to a positively charged point. (*See alternating current, direct current.*)

Electricity Consumers Resource Council (ELCON) The Washington, D.C.-based association of large industries formed in 1976 that advocates for policies promoting electric competition and consumer choice. (*See consumer choice, deregulation.*)

electricity theft The unlawful and dangerous practice of interfering with the operation of a meter or jumping power to another facility to lower or avoid paying electric bills. Also known as *theft of service* or *meter tampering*.

electromagnetic fields (*See electric and magnetic fields.*)

electronic meter reading A system that uses a handheld computer to record and store electric use information from consumers' meters and then transmits that information to a central computer for billing purposes.

electrostatic precipitator An electronic pollution-control device that removes particles of fly ash from power plant emissions. (*See fly ash.*)

e-mail/email Communications done by computer either through a local area network or the Internet. Use with or without a hyphen.

EMF electric and magnetic fields. Don't use *electromagnetic fields*. Lower case, emf stands for *electromotive force*.

eminent domain The power of a government body to condemn private property for public use after paying the property owner "just compensation." Sometimes used as a last resort by electric utilities in constructing power lines. (*See right-of-way.*)

emissions control equipment (*See pollution control.*)

enchantment Official consumer publication of the Santa Fe, New Mexico.-based New Mexico Rural Electric Cooperative Association.

energy The ability for doing work; may be natural or manufactured. In an electrical context, the quantity of energy consumed usually measured in joules or kilowatt-hours. Operating a 60-W lightbulb requires power, measured in watts. After an hour, when you switch off the light, you can measure the amount of energy that was consumed in joules or kilowatt-hours or even British thermal units. Another way to look at energy: people convert energy—measured in barrels of oil, tons of coal, and cubic feet of natural gas, for example—into power, tabulated in watts or horsepower. (*See British thermal unit, demand, demand charge, demand interval, demand meter, joule, kilowatt-hour, load, power.*)

energy audit An analysis of residential, commercial, or industrial buildings that shows consumers how to save money on their electric bills by making energy efficiency-related improvements.

energy charge The part of an electric bill based on the amount of electricity used. (*See connection charge, consumer charge, facilities charge, service charge.*)

Energy Co-Opportunity (ECO) A short-lived (1998–2002) national cooperative, based in Herndon, Virginia, that provided distributed generation technologies to electric cooperatives. It

focused primarily on marketing H Power residential-scale fuel cells, which derived hydrogen from propane. *(See fuel cells.)*

energy density The amount of energy that can be harnessed in a given volume, area, or mass. Gasoline, by weight, has 80 times the energy density of the best lithium-ion batteries, for example. *(See power density.)*

energy efficiency Using less energy to perform the same or additional functions. Sometimes called *the other power supply*, the *fifth fuel* (after coal, nuclear, natural gas, and renewables), or even the *first fuel* (before the others). Energy efficiency—a real resource that can be measured and verified—helps electric cooperatives temporarily head off the need to build new generation while curbing greenhouse gas emissions. In general, the biggest payoff for electric cooperatives comes from consumers implementing recommendations of energy audits and switching to more energy-efficient geothermal and air-source heat pumps, lighting, and appliances combined with improved power plant operating efficiencies and expansion of demand-response/load management programs. Energy efficiency differs from *conservation* in that it involves doing more with less electricity. NOTE: No hyphen needed when using energy efficiency in a modifying context (such as an *energy efficiency guide*), as “efficiency” can serve as a noun. *(See compact fluorescent lightbulb, conservation, demand response, energy audit, greenhouse gases, heat pump, load management, on-bill financing.)*

Energy Efficiency and Conservation Loan Program (EECLP) A USDA Rural Utilities Service (RUS) offering, finalized on December 5, 2013, and opened on February 3, 2014, that provides loans which electric cooperatives—with RUS-approved energy efficiency programs—can borrow and relend at a 1.5 percent markup to business and residential consumers for conducting energy audits, making energy efficiency improvements (upgrades to heating, lighting, and insulation), and installing renewable energy systems. In many cases loans are repaid to the cooperative through the consumer’s electric bill. A similar RUS Rural Energy Savings Program dovetails with EECLP, but is open to a broader pool of eligible borrowers, has a zero percent interest rate, and carries a longer loan term. *(See Energy Resources Conservation loan, on-bill financing, Rural Energy Savings Program, Rural Utilities Service.)*

Energy Efficiency and Renewable Energy *(see U.S. Office of Energy Efficiency and Renewable Energy.)*

Energy Efficiency Improvement Act A federal law signed on April 30, 2015, that preserved the manufacture of large-capacity (75 gallons or greater) grid-enabled electric resistance water heaters specifically for use in demand-response programs. The appliances, by shifting when and how electricity gets consumed (mostly by moving electric use for water heating to off-peak, overnight hours), reduce electric cooperative demand by an estimated 500 MW annually, saving consumers hundreds of millions of dollars. The thermal energy storage capabilities of electric water heaters can also “stockpile” wind power, which often reaches peak production at night. *(See demand response, demand-side management, energy efficiency, load management, thermal energy storage, water heater, wind power.)*

energy efficiency ratio (EER) A measure of how efficiently an appliance uses energy. Determined by dividing Btu per hour output by watts used. A higher EER means greater efficiency. *(See seasonal energy efficiency ratio.)*

energy factor (EF) A mandatory evaluation done on all water heaters regardless of fuel source (electricity, oil, propane, etc.) that indicates a unit’s overall energy efficiency based on the amount of hot water produced per unit of fuel consumed daily. EF includes recovery efficiency (how efficiently heat from the energy source is transferred to water); standby losses (the percentage of heat loss per hour from stored water compared to heat content of the water); and cycling losses (loss of heat as water circulates through a tank and/or inlet and outlet pipes). The higher the EF, the more efficient the water heater. But higher EF values do not always mean lower annual operating costs, especially when comparing fuel sources. *(See ENERGY STAR, water heater.)*

Energy Information Administration *(See U.S. Energy Information Administration.)*

energy intensity The amount of energy needed to produce \$1 worth of gross domestic product. Between 1980 and 2014, the U.S. economy grew by 149 percent (from \$5.8 trillion to nearly \$14.5 trillion), the population increased by 39 percent (from 228 million to 317 million), but the nation’s energy intensity fell by 42 percent, thanks largely to improvements in efficiency. Over that same span, even with a huge expansion in consumer electronics and computers, average per capita energy use in the U.S. declined by 2.5 percent. Energy intensity is the inverse of *energy productivity*. *(See carbon intensity, energy productivity, gross domestic product.)*

Energy Policy Act of 1992 A federal law that opened up the wholesale power market to competition. It gave the Federal Energy Regulatory Commission authority to order transmission-owning utilities to

provide interstate transmission service to other utilities, federal power marketing agencies, and independent power marketers for wholesale transactions.

Energy Policy Act of 2005 A federal law that provided tax incentives and loan guarantees for all types of energy production and conservation. Among other things the measure exempted all electric cooperatives with annual electricity sales of less than 4 million MWh from Federal Energy Regulatory Commission (FERC) jurisdiction; placed into law FERC's regulatory exemption for electric cooperatives that borrow from the USDA Rural Utilities Service; authorized Clean Renewable Energy Bonds to assist electric cooperatives in financing "green power" projects; and removed from 85/15 calculations electric cooperative earnings from nuclear decommissioning trust funds, income received from providing open transmission access, and (for the first seven years of consumer choice) revenue collected from non-members being served to offset load lost under retail competition. *(See Clean Renewable Energy Bonds, 85/15, FERC Lite, Public Utility Holding Company Act, Public Utility Regulatory Policies Act, small utility exemption.)*

energy productivity The ratio of annual gross domestic product to annual total primary energy use. It's the inverse of *energy intensity*. *(See carbon intensity, energy intensity, gross domestic product.)*

Energy Resources Conservation loan (ERC loan) Low-interest financing provided by some electric cooperatives to consumers for energy-saving home improvements and energy-efficient electric heating and cooling systems. Funding for ERC loans (which can't exceed seven years in length) comes from a cooperative deferring principal payments on a portion of qualifying debt owed to the USDA Rural Utilities Service (RUS), then loaning the deferral amount (at an interest rate not more than 300 basis points, or 3 percent, above the average interest rate on the note(s) being deferred) to consumers. Under the 2008 Farm Bill, ERC loans can be used for home energy audits as well. RUS presently has less than 40 ERC agreements, down from a high of several hundred. More than \$64 million has been deferred since the program was established in 1980. *(See Energy Efficiency and Conservation Loan Program, on-bill financing, Rural Utilities Service.)*

ENERGY STAR A voluntary, international standard for rating energy-efficient consumer products. Created by the U.S. Environmental Protection Agency (EPA) in 1992 for home computers and monitors, the program has since been expanded to cover more than 60 product categories and adopted by Australia, Canada, Japan, New Zealand, Taiwan, and the European Union. Devices carrying the ENERGY STAR logo, such as computers and electronics, kitchen and household appliances, residential lighting, windows, as well as homes, schools, acute care facilities, and offices, deliver the

same or better performance and in most cases use 20 percent to 30 percent less energy on average than comparable models. (Room air conditioners must use 10 percent less energy.) Electric resistance water heaters, by the way, do not qualify for ENERGY STAR since they are already as efficient (roughly 95 percent) as possible. EPA partners with the U.S. Department of Energy on the program. Capitalize in all uses, due to trademark requirements. *(See energy factor, water heater.)*

energy storage Technologies, such as batteries, compressed-air energy storage, pumped-storage hydro, solar thermal energy, and thermal energy storage that stockpile electricity for later consumption—generally, the power is generated during times of low (off-peak) electricity use. Energy storage is increasingly seen as a way to warehouse electricity produced by renewable energy systems, particularly wind farms, to make them more reliable sources of generation. Pumped-storage hydro, at 21,600 MW, makes up 95 percent of installed energy storage capacity nationwide. *(See compressed-air energy storage, distributed energy resources, electric thermal storage off-peak power, intermittency, peak demand, pumped-storage hydro, solar thermal energy, thermal energy storage.)*

ensure/insure In most usage, you want *ensure* (as in *guarantee*). Use *insure* only for insurance-related matters.

environmental impact statement (EIS) A report required by many state and federal regulators that outlines the likely environmental consequences of building and operating large-scale facilities such as power plants.

Environmental Protection Agency *(See U.S. Environmental Protection Agency.)*

environmentally beneficial electrification *(See efficient electrification.)*

EPA U.S. Environmental Protection Agency. Spell out on first reference.

EPRI Electric Power Research Institute. *(See EPRI Prism.)*

EPRI Prism A comprehensive set of recommendations in eight technology areas made by the Electric Power Research Institute that, if adopted nationally, would allow the electric utility industry to slow, halt, and eventually decrease carbon dioxide emissions to 2005 levels by 2030 while still meeting demand for affordable, reliable electricity. Failure to maximize any of the eight technologies in the “full portfolio” will dramatically jack up the cost of achieving climate change goals. The eight

components are: boosting end-use energy efficiency, decreasing transmission and distribution system line losses, improving the operating efficiency of fossil fuel-fired power plants, investing in renewable energy, expanding nuclear power capacity, capturing and storing carbon produced by coal-fired power plants, deploying electrotechnologies, like arc furnaces, for industrial and commercial use, and putting plug-in electric vehicles on the road. The EPRI Prism analysis, first released in 2007, undergoes periodic revision reflecting energy technology advances and policy developments. *(See carbon capture and storage, climate change, distributed generation, Electric Power Research Institute, global warming, greenhouse effect, greenhouse gases, plug-in electric vehicle, plug-in hybrid electric vehicle.)*

EPSA Electric Power Supply Association.

equity The monetary value of a property or business that exceeds the claims and/or liens against it by others. In an electric cooperative, equity represents the value of member ownership.

equity capital *(See capital credits.)*

ERC loan Energy Resources Conservation loan.

Ernest Shearer Award *(See National Utility Training & Safety Education Association.)*

ethanol A grain alcohol, largely produced from fermented and distilled corn; used as an octane-enhancer in gasoline.

ETS electric thermal storage.

EV electric vehicle. *(See plug-in electric vehicle, plug-in hybrid electric vehicle.)*

Executive Order 7037 Directive issued by President Franklin D. Roosevelt on May 11, 1935, establishing the Rural Electrification Administration as a part of a federal unemployment relief program. *(See Rural Electrification Act, Pace Act.)*

exit fee A charge assessed when an electric utility consumer switches power suppliers or chooses to self-generate electricity.

exposure voltage *(See neutral-to-earth voltage.)*

externality Hidden costs of an energy source or costs not covered in the price of fuel, such as expenses derived from cleaning up acid rain.

F

facilities charge The part of a consumer's electricity bill paid as reimbursement for equipment used to generate, transmit, and distribute electricity. *(See connection charge, consumer charge, energy charge, service charge.)*

FASB Financial Accounting Standards Board.

FBC fluidized bed combustion.

Federal Energy Regulatory Commission (FERC) A federal agency formed in 1977 with jurisdiction over interstate electricity sales, wholesale electric rates, natural gas pricing, oil pipeline rates, as well as hydroelectric licensing. FERC also reviews and authorizes liquefied natural gas terminals, interstate natural gas pipelines, and non-federal hydropower projects. Part of the U.S. Department of Energy, but functions independently. FERC replaced the Federal Power Commission. *(See construction work in progress, Federal Power Commission, North American Electric Reliability Corporation, regional transmission organization.)*

Federal Financing Bank (FFB) An arm of the U.S. Treasury created on December 29, 1973, to coordinate the borrowing of federal agencies, such as the USDA Rural Utilities Service (RUS), that provide loan guarantees. On August 20, 1974, RUS's predecessor, the Rural Electrification Administration, signed an agreement providing for FFB to make loans guaranteed by the agency. *(See guaranteed loans, RUS, independent borrower, qualified lender, USDA Guaranteed Underwriter Program.)*

Federal Power Commission A body created in 1920 to better coordinate federal hydropower development among cabinet-level departments. It was transformed into an independent regulatory agency in 1935. Predecessor to the Federal Energy Regulatory Commission. *(See Federal Energy Regulatory Commission.)*

Federated Federated Rural Electric Insurance Exchange.

federated cooperative A cooperative composed of smaller cooperatives.

Federated Rural Electric Insurance Exchange (Federated) The Shawnee, Kansas-based company that provides property and casualty insurance to electric and telephone cooperatives in 40 states. Formed as a stock-owned company, Federated Rural Electric Insurance Corporation, with governance by 15 Wisconsin electric cooperatives on July 20, 1957; the first policies were written in 1959. Originally headquartered in Madison, Wisconsin, Federated moved to Lenexa, Kansas, in 1982. It became a reciprocal exchange in October 1999—the closest structure you can get in the insurance business to operating as a cooperative. (*See Cooperative.com.*)

feed-in tariff A concept promoted by green power advocates that requires utilities to enter into long-term purchase power agreements with renewable energy producers at a price high enough to make the generation projects profitable—but not at a price reasonable for consumers. Feed-in tariffs, commonly used in Europe, can lead to the installation of inefficiently sized and poorly located systems, create operational challenges, and increase costs for consumers. (*See purchase power, tariff.*)

FERC Federal Energy Regulatory Commission.

FERC Lite A provision (Section 211A of the Federal Power Act) included in the federal Energy Policy Act of 2005 that extends Federal Energy Regulatory Commission jurisdiction over a number of otherwise exempt transmission entities (such as approximately 25 generation and transmission cooperatives and numerous large municipal electric systems). (*See Energy Policy Act of 2005, Federal Energy Regulatory Commission, generation and transmission cooperative, municipal electric system.*)

FFB Federal Financing Bank.

FFB loans (*See guaranteed loans, RUS.*)

FGD flue gas desulfurization material.

Financial Accounting Standards Board (FASB) The Norwalk, Connecticut-based independent organization recognized as the accounting profession's chief rulemaking body. Auditors, industry, government, and professional associations frequently submit topics to FASB to clarify various

accounting issues. After a hearing and comment period, FASB may issue a new “Statement of Financial Accounting Standards.” These statements affect accounting requirements for virtually all businesses that must issue financial reports.

financial transmission rights (FTRs) Hedging instruments that allow transmission customers to protect themselves against the risk of cost increases when receiving electricity across congested transmission lines. A necessary tool in centralized wholesale power markets, where transmission users pay market prices to move energy from one point on the system to another. *(See bulk power, locational marginal pricing, transmission, transmission congestion, transmission system.)*

Finding of No Significant Impact statement (FONSI) A document from the USDA Rural Utilities Service (RUS) stating that a given project will have no significant impact on environmental, cultural, historical, or archeological resources of the area affected; necessary before a project funded by RUS can proceed. *(See Rural Utilities Service.)*

firm energy Electricity guaranteed by a power supplier to be available at all times.

first in, first out A method of retiring capital credits where the earliest allocated credits are retired first. *(See capital credits, last in, first out, percentage method.)*

fission *(See nuclear fission.)*

fixed costs Expenses that stay the same regardless of other factors or the level of sales. A distribution cooperative’s fixed costs would include rent, taxes, long-term debt, depreciation on buildings, maintenance of the distribution system (lines, poles, etc.), and costs associated with billing and meters. *(See cost-of-service study, variable costs.)*

fixed resource requirement (FRR) A PJM Interconnection program that allows utilities to opt out of acquiring power requirements through PJM’s capacity market and instead procure it themselves via bilateral contracts. Rarely used, because as of 2018 FRR was an “all or nothing” choice—utilities must either obtain all of their capacity requirements on their own, or get all of them from PJM’s market. This restriction limited FRR to a handful of the PJM region’s biggest investor-owned utilities, including Duke Energy and American Electric Power. *(See fixed resource requirement, minimum offer pricing rule, PJM Interconnection, regional transmission organization, zero-emissions credits.)*

fixed costs recovery charge (*See stranded costs.*)

flashover An abnormal electrical discharge or arc, as from a high-voltage power line to a ground or between two pieces of equipment. (*See arc flash.*)

flat rate A pricing structure where consumers pay the same rate for each kilowatt-hour of electricity used, regardless of how much they consume. (*See block rate, class rate, cost-based rate, declining block rate, demand rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate.*)

flip-flop Practice of changing from one electric utility to another, usually due to rate differences. This practice is illegal in most states, but weak laws make it difficult to enforce.

Florida Currents Consumer publication used by some electric distribution cooperatives in Florida. Produced by Ruralite Services in Hillsboro, Oregon. (*See Ruralite.*)

Florida Reliability Coordinating Council One of eight North American Electric Reliability Corporation regional organizations that coordinate planning and operations among utilities. (*See North American Electric Reliability Corporation.*)

flue gas The mixture of gases and fly ash emitted from a coal-fired power plant. (*See algae reactor, fly ash, pollution control.*)

flue gas desulfurization material (FGD) (*See scrubber sludge.*)

fluidized bed combustion (FBC) An efficient method of burning coal to achieve lower sulfur dioxide and nitrogen oxides emissions. FBC mixes coal and a sulfur-absorbing material, such as limestone or dolomite, on upward-blowing jets of air during the combustion process. The tumbling action results in better heat transfer, so the mix burns at a temperature below the threshold of where nitrogen oxides form. FBC boilers can operate on biomass as well. Pressurized FBC systems generate additional electricity by producing a clean-burning gas that can drive a gas turbine, while steam created from heat in the fluidized bed gets captured to power a steam turbine. (*See biomass, nitrogen oxides, sulfur dioxide, syngas.*)

fly ash Tiny, talcum-like solids that escape in flue gas from a coal-fired boiler; removed by pollution-control equipment. *(See bottom ash, coal ash, coal combustion byproducts, electrostatic precipitator, flue gas, scrubber sludge.)*

FONSI Finding of No Significant Impact statement.

forced outage The period of time during which a power plant is scheduled to operate but cannot because of breakdowns or other unforeseen circumstances.

Form 7 Older name for the RUS Financial and Operating Report Electric Distributions, a financial and statistical summary filed annually by USDA Rural Utilities Service (RUS) distribution cooperative borrowers. It's also the current name for a slightly different version filled out each year by National Rural Utilities Cooperative Finance Corporation distribution system borrowers.

fossil fuel Hydrocarbon-based material such as coal, oil, or natural gas found within the top layer of Earth's crust and used to produce heat or power; also called *conventional fuels*. These materials were formed in the ground hundreds of millions of years ago from plant and animal remains.

franchise A license granted by a government entity giving a utility the right to serve consumers in a particular area. *(See service area/territory.)*

fuel adjustment clause A correction or modification on a consumer's monthly electric bill caused by an increase or decrease in the cost of an electric utility's fuel supply. This adjustment eliminates the need for a new rate approval each time fuel costs change. Also called a *power cost adjustment* or *wholesale power cost adjustment*.

fuel cells Devices similar to batteries that convert the chemical energy of fuels, such as hydrogen and natural gas, directly into electricity. *(See Energy Co-Opportunity.)*

fuel cost The total cost of fuel delivered to a power plant, including freight and other transportation charges, coupled with maintenance and mine reclamation costs.

Fuel Use Act *(See Powerplant and Industrial Fuel Use Act of 1978.)*

fuse A protective device for electric circuits containing a wire designed to melt and open the circuit under abnormally high electric loads. *(See circuit breaker.)*

fusion power The result of a reaction where two light atoms, such as hydrogen, fuse together to form a heavier atom, such as helium. In the process, some of the hydrogen mass gets converted into energy. Nuclear fusion occurs naturally in stars. Artificial fusion in a sustainable uncontrolled chain has also been achieved (the hydrogen bomb). Research into controlled fusion for producing electricity has been accompanied by extreme scientific and technological difficulties. Research into controlled fusion for producing electricity has been accompanied by scientific and technological difficulties due to the extreme temperatures and pressure needed to sustain a reaction, resulting in slow progress over the past 50-plus years. *(See nuclear fission.)*

G

GAO Government Accountability Office.

G&T generation and transmission cooperative. Plural is G&Ts.

G&T Communicators *(See National G&T Communicators Association.)*

GDP gross domestic product.

generation The production of electricity using fuels such as coal, natural gas, oil, and uranium or from renewable sources such as biomass, geothermal, hydro, hydrokinetic (ocean wave and tidal), solar, or wind.

generation and transmission cooperative (G&T) A wholesale power supply cooperative owned by a group of electric distribution cooperatives and sometimes other entities (like municipal electric systems). G&Ts produce power and/or purchase it from a variety of sources. Spell out on first reference. The nation's 60-plus G&Ts generate 5 percent of the nation's electricity (more than 200 billion kilowatt-hours as of 2015) and own all or part of 200 power plants with a combined installed capacity of more than 50,000 MW. G&T-owned power plants produce nearly one-half of the electricity supplied by electric distribution cooperatives to consumers. G&Ts also own and operate more than 67,000 miles of transmission lines. *(See all-requirements contract, distribution cooperative, electric cooperative, municipal electric system, purchase power.)*

generator A machine that converts mechanical energy into electrical energy. (*See dynamo, turbine, turbine-generator.*)

geographic information system (GIS) Any automated setup capable of integrating, storing, editing, analyzing, sharing, and displaying spatial data, such as maps, and presenting results of all those operations.

George W. Haggard Memorial Journalism Award (*See Haggard Award.*)

GEORGIA Magazine Official consumer publication of the Tucker, Georgia -based Georgia Electric Membership Corporation.

geothermal heat pump (*See heat pump.*)

Geothermal Heat Pump Consortium The Washington, D.C.-based group that promotes geothermal heat pump systems.

geothermal power Electricity produced using natural heat contained in rocks, hot water, and steam below Earth's surface. Three primary geothermal power plant technologies exist: dry steam, flash, and binary cycle. The choice depends on the state of the hydrothermal fluid (whether steam or water) and its temperature. Dry steam, the first type of geothermal power plants built, use steam from a geothermal reservoir (as pulled from wells) and route it directly through turbine-generators to create electricity. Flash steam plants, the most common variety today, pump water boasting temperatures greater than 360 degrees Fahrenheit under high pressure to generation equipment on the surface. Binary cycle power plants use moderate- to low-temperature water or steam and a secondary fluid within a closed-loop system to spin a turbine-generator. (*See baseload power plant, binary cycle, renewables, turbine-generator.*)

GFCI ground fault circuit interrupter.

gigawatt (GW) A measure of electric capacity equal to 1 billion W, 1 million kW, or 1,000 MW. On average, 1 GW of electricity will power between 800,000 and 1 million homes. *The United States needs to add 264,000 MW, or 264 GW, of generating capacity by 2030 to keep the lights on.*

Abbreviation acceptable on first reference when used with a numeral. (*See kilowatt, megawatt, watt.*)

GIS geographic information system.

global positioning system (GPS) A satellite-based navigation network made up of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications but in the late 1980s the government began making it available for civilian use. GPS works in all weather conditions, anywhere in the world (except parking garages and tunnels), 24 hours a day. Abbreviation acceptable on all references.

global warming A gradual warming of Earth's atmosphere thought by many scientists and public opinion leaders as being caused by increased concentrations of water vapor and greenhouse gases like carbon dioxide. Human activities, such as the burning of fossil fuels, increase concentrations of greenhouse gases that absorb outgoing radiation and trap heat closer to the ground. However, a significant number of climatologists argue that natural cyclical factors, such as a boost in solar radiation, changes in oceanic conveyors, and increased volcanic activity may play a much larger role. *(See climate change, EPRI Prism, greenhouse effect, greenhouse gases.)*

Government Accountability Office (GAO) A non-partisan congressional watchdog agency that audits federal programs.

government-sponsored enterprise/entity (GSE) A financial services corporation created by Congress to enhance the flow of credit to targeted sectors of the economy and to make capital markets more efficient and transparent. Examples include the Federal Agricultural Mortgage Corporation (Farmer Mac), Federal Home Loan Banks, Federal National Mortgage Association (Fannie Mae), Federal Home Loan Mortgage Corporation (Freddie Mac), and Farm Credit System institutions like CoBank. *(See CoBank.)*

GPS global positioning system.

grassroots One word when referring to the 42 million-plus electric cooperative consumers nationwide who give the electric cooperative program its political strength. *(See ACRE Co-op Owners for Political Action®, Our Energy, Our Future®)*

Great Depression The period of low business activity and economic deflation in the United States and elsewhere that began with the stock market crash of October 1929 and continued through the 1930s. Capitalize the shortened form *Depression* when referring to this specific era, but lowercase otherwise.

green energy/green power (*See renewables.*)

greenhouse effect A phenomenon caused by the trapping of heat due to a buildup of water vapor, carbon dioxide, methane, and other gases in Earth's atmosphere. James Hansen, a NASA researcher, first announced the greenhouse effect in 1981. Most world scientific organizations as well as large blocks of federal, state, and local policymakers believe that climate change caused by the greenhouse effect chiefly results from human activities—notably the burning of fossil fuels like coal and oil combined with deforestation—tipping the environmental balance. However, a significant number of climatologists argue that natural cyclical factors, such as a boost in solar radiation, changes in oceanic conveyors, and increased volcanic activity may play a much larger role. (*See carbon dioxide, climate change, EPRI Prism, global warming, greenhouse gases.*)

greenhouse gases Carbon dioxide and at least six other gases—methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride—that when emitted into the air contribute to the warming of Earth's atmosphere. According to the U.S. Department of Energy Carbon Dioxide Information Analysis Center at Oak Ridge National Laboratory in Tennessee, some 250 years of burning fossil fuels for industrial production, electricity, home heating, and transportation have released about 305 billion tons of carbon dioxide emissions, raising concentrations of carbon dioxide in the atmosphere from 280 parts per million in 1750 to 317 parts per million in 1958 to 403 parts per million (or 0.0403 percent of air molecules) as of 2016. Levels are 30 percent higher than in 1900, and carbon dioxide molecules can last for 100 years or more. U.S. carbon dioxide emissions have climbed roughly 40 percent since 1992; the rate of increase has accelerated from about 0.7 parts per million annually in the late 1950s to 2.7 parts per million per year since 2005. Other greenhouse gases, meanwhile, occur at a much lower level than carbon dioxide but are much more powerful. For example, methane boasts a 23 times greater warming impact than carbon dioxide; nitrous oxide almost 300 times greater. (*See Btu tax, carbon capture and storage, carbon dioxide, carbon sink, carbon tax, Clean Air Act, climate change, energy efficiency, EPRI Prism, global warming, greenhouse effect.*)

grid A network of interconnected high-voltage transmission lines and power generating facilities that allows utilities and other suppliers to share resources on a regional basis. The North American Electric

Reliability Corporation oversees reliability of the electric grid covering the United States, most of Canada, and the Mexican state of Baja California Norte. The nation's electric grid consists of three main sections: the Eastern Interconnection, which extends from the foot of the Rocky Mountains to the Atlantic seaboard, excluding most of Texas; the Western Interconnection, which runs from the Rocky Mountains to the Pacific coast; and the Texas Interconnection, which covers most of Texas. Also, any network of interconnected electric facilities, including a distribution system. (*See bulk power, microgrid, North American Electric Reliability Corporation, rolling blackouts, transmission system.*)

gross domestic product (GDP) The total market value of all goods and services produced within a country over a given period of time (usually a calendar year).

ground fault circuit interrupter (GFCI) A fire-protection device that instantly breaks an electric circuit when a short develops. Required for outlets used in bathrooms, kitchens, outdoors, or wherever electrical equipment might come into contact with water. Spell out on first reference.

groundman An electric utility employee whose primary duties involve providing on-the-ground support to lineworkers. For a gender-neutral reference, use *groundworker*.

ground-source heat pump (*See heat pump.*)

groundwater heat pump (*See heat pump.*)

GSE government-sponsored enterprise/entity.

guaranteed loan A loan that a third party agrees to repay if the borrower defaults; the USDA Rural Utilities Service has historically acted as the third party for electric cooperative borrowers. (*See guaranteed loans, RUS, USDA Guaranteed Underwriter Program.*)

guaranteed loans, RUS An electric cooperative loan program where the USDA Rural Utilities Service (RUS) provides a 100 percent government guarantee for distribution, subtransmission, bulk transmission, generation, and headquarters facilities (office, service, and warehouse) loans. For electric cooperatives that borrow from RUS, guaranteed loans are brokered by the Federal Financing Bank (FFB)—an arm of the U.S. Treasury—at market interest rates, plus one-eighth of 1 percent. As a result of provisions in the 2008 Farm Bill, RUS guaranteed loans may come directly from the U.S. Treasury; there is a possibility that RUS guaranteed loans made through FFB will be replaced by RUS Treasury

Rate Plus direct loans. From 2005 to 2014, RUS was prohibited from making guaranteed loans for traditional baseload coal, natural gas, and nuclear power plants, as those projects were deemed “too risky.” Under the 2014 Farm Bill, RUS can now impose an upfront fee to cover supposed taxpayer risk on baseload generation lending. RUS guaranteed loans are sometimes called *FFB loans*. (See *Federal Financing Bank, hardship loans, insured loans, municipal rate loans, qualified lender, Rural Utilities Service, Treasury rate loans, Treasury Rate Plus loans, USDA Guaranteed Underwriter Program*.)

GW gigawatt. Abbreviation acceptable on first reference when used with a numeral.

H

Haggard Award An honor presented annually since 1958 by the National Rural Electric Cooperative Association recognizing an electric cooperative statewide consumer publication that best presents “lucid, forthright contributions to electric cooperative objectives.” Named for George W. Haggard, first editor of the Texas statewide publication, who was killed in a plane crash in 1951. Formally known as the *George W. Haggard Memorial Journalism Award*. (See *National Rural Electric Cooperative Association*.)

hardship loans A USDA Rural Utilities Service direct insured loan program available to electric distribution cooperatives with electric rates at least 20 percent above the average for all utilities in their state and that serve consumers with average household incomes below the statewide median, or that have suffered a natural disaster. Hardship loans are made on a first-come, first-served basis at 5 percent interest and can be used for distribution, subtransmission, and headquarters (service and warehouse facility) purposes. (See *guaranteed loans, RUS, insured loans, means testing, municipal rate loans, Rural Electrification Loan Restructuring Act, Treasury rate loans, Treasury Rate Plus loans*.)

heat exchanger A device designed to transfer heat between two physically separated fluids or mediums of different temperatures.

heat pump An appliance that provides both heating and cooling by moving heat into or out of a structure. *Geothermal heat pumps*, also called *ground-source heat pumps*, come in two types: a *groundwater (open-loop) heat pump* uses well water; an *earth-coupled (closed-loop)* model moves a water and antifreeze solution through underground pipes to disperse heat. An *air-source heat pump* uses air to transfer heat. (See *dual fuel, heat sink*.)

heat sink A medium—such as water or earth—that receives heat released from a heat pump. (*See heat pump.*)

Herman C. Potthast Award National honor presented annually since 1972 by the Line Superintendents Section of the Pennsylvania Rural Electric Association, a statewide service organization in Harrisburg, Pennsylvania, to the electric cooperative job training and safety instructor who best reflects the qualities of dedication, leadership, cooperation, and service. The award, given to a member of the National Utility Training & Safety Education Association during its annual conference, commemorates Potthast, who worked for Wisconsin electric cooperatives as statewide job training & safety coordinator from 1943 to 1962 before joining the federal Rural Electrification Administration (REA) as field safety officer for the state from 1962 to 1966. He later served as REA chief of the borrowers' safety staff prior to his death in 1972. Badger State cooperatives also present a statewide version of the award. (*See National Utility Training & Safety Education Association.*)

hertz (Hz) An international measure of frequency or vibration equal to 1 cycle per second. The alternating current frequency used in North America is 60 Hz. In Europe and some other parts of the world, it is 50 Hz. Singular and plural forms are the same.

high-pressure sodium vapor lights A type of energy-efficient outdoor lighting, noted for its yellow glow, promoted by many electric cooperatives as *dusk-to-dawn lights*, *security lights*, *outdoor lights*, *yard lights*, *streetlights*, or *pole lights*. Use hyphen. (*See dark-sky lights*, *induction lighting*, *light-emitting diode*, *mercury vapor lights*, *metal halide lights*.)

high voltage Voltage in a power line greater than the 120 V to 240 V used in most residences.

holding company A corporate entity that partly or completely controls another company. Throughout the 1920s, electric utility holding companies bought smaller utilities, sometimes to the point that a holding company was as many as 10 steps removed from the operating utility. While the smaller utilities were subject to state regulation in many cases, holding companies were not. As a result, holding companies could issue new stock and bonds without state oversight, and their pyramid structure allowed them to inflate the value of utility securities. Consolidation of utilities continued until, by the early 1930s, 10 holding companies controlled 75 percent of all electric power production in the United States. Abuses spawned by electric utility holding companies led to passage in 1935 of the federal Public Utility Holding Company Act (PUHCA). The 1935 law was repealed in the federal Energy Policy Act of 2005, although some of its consumer protections were retained in a revised

PUHCA of 2005 thanks to electric cooperative efforts. (*See investor-owned utility, public utilities, Public Utility Holding Company Act.*)

horsepower (hp) A measure of power equal to 746 W, or 33,000 foot-pounds per minute. Abbreviation acceptable on all references.

horsepower-hour A measure of the work performed by 1 hp exerted for one hour.

hot stick An insulated pole, usually made of fiberglass, that protects line crews from electric shock when working on energized lines. Depending on the tool attached to the end of the stick, lineworkers can test for voltage, tighten nuts and bolts, apply tie wires, open and close switches, replace fuses, lay insulating sleeves on wires, and perform various other tasks. Two words.

hours-of-service rules Regulations issued by the Federal Motor Carrier Safety Administration designed to prevent accidents caused by fatigued long-haul truck and bus drivers. The restrictions, which took effect in January 2004, limit the time commercial interstate fleet operators can spend behind the wheel each day and each week and establish a minimum rest period between shifts. State laws apply for intrastate driving. Electric cooperatives were initially lumped in the rules because line trucks sometimes exceed 10,000 lbs. gross weight, not because of any safety concerns. However, compliance threatened to increase costs for cooperatives in performing routine line maintenance (given the distances between vehicle bays and the “end of the line”), slow down line crews trying to restore power after localized heavy storms (those not accompanied by a formal disaster declaration), and severely hamper out-of-state mutual assistance efforts. A permanent exemption for utility truck operators was included in the massive federal highway bill enacted in 2005.

hp horsepower. Abbreviation acceptable on all references.

HVAC Short for *heating, ventilation, and air conditioning* systems, as used in building design and construction.

HVAC Harriet Cartoon mascot created in 2009 for the Touchstone Energy[®] Cooperatives Kids Zone website to promote energy efficiency. (*See CFL Charlie, LED Lucy, Solar Sam, Touchstone Energy[®] Cooperatives, Wally the Water Heater.*)

hydro Short for *hydroelectric plant*.

hydroelectric plant A facility that produces electric energy from flowing water. Some hydroelectric plants generate power by releasing water from a reservoir to drive turbine-generators. Run-of-river stations use the natural energy of moving water from undammed waterways. Short form is *hydro*. (See *penstock, pumped-storage hydro, run-of-river, turbine-generator*.)

hydroelectric power A renewable baseload power source of electric generation created by flowing water. Since large hydroelectric power plants can ramp up from nothing to maximum output in just a few minutes without the need for an external power source, they have long been relied upon to restart electric grids after a blackout. Short form is *hydropower*. (See *baseload power plant, hydropower, microhydro, penstock, pumped-storage hydro, renewables, run-of-river*.)

hydrokinetic power Generation produced by the action of waves or tides. (See *ocean wave power, tidal power*.)

hydrophobics (See *superhydrophobics*.)

hydropower Short for *hydroelectric power*. Hydropower accounts for less than 1 percent of the electricity produced by generation and transmission cooperatives but about 9 percent of electric cooperative power requirements nationwide (with roughly 10,000 MW flowing from preference power contracts with federal or state dams and another 700 MW from other resources); overall, it makes up 6 percent to 8 percent (depending on rainfall) of U.S. electric generation. As of 2018, 49 percent of installed hydro capacity was owned by federal agencies, with an additional 23 percent owned by state authorities, municipal electric systems, and electric cooperatives. (See *generation and transmission cooperative, New York Power Authority, power marketing administrations, preference principle, pumped-storage hydro, renewables*.)

Hz hertz. Singular and plural forms are the same.

I

ice harvester (See *thermal energy storage*.)

IEEE A Piscataway, New Jersey-based nonprofit professional organization dedicated to the advancement of electricity-related technology. A leader in standards-making, it publishes the *National Electrical Safety Code*. IEEE was formerly used as an acronym for the Institute of Electrical and Electronics Engineers before becoming the group's formal name during the 2000s because technical fields had transcended traditional definitions and boundaries. (See *National Electrical Safety Code*.)

IGCC integrated gasification combined cycle.

Illinois Country Living Official consumer publication of the Springfield, Illinois-based Association of Illinois Electric Cooperatives.

incentive rate A discount used to attract economic development or encourage consumption of electricity during periods of low power use.

increasing block rate (See *inverted rate*.)

incubator (See *business incubator*.)

independent borrower An electric cooperative, public power district, or public utility district that never has or no longer borrows from the USDA Rural Utilities Service or Federal Financing Bank. Through 2018, more than 350 rural electric systems were not borrowing from the federal government. Out of those, more than 240 meet all of their secured term financing needs through the National Rural Utilities Cooperative Finance Corporation (CFC); the rest through a combination of lenders, including CFC and/or CoBank, and self-funding. The modern independent borrower movement began on October 21, 1986, when Congress enacted the Omnibus Budget Reconciliation Act of 1986 giving electric distribution cooperatives a one-year opportunity, during federal fiscal year 1987, to prepay all of their Rural Electrification Administration (REA) debt at its discounted present value (using the average yield on Aa-rated utility bonds as the discount rate). Twenty-nine electric cooperatives and public power districts took advantage, retiring \$667 million in REA loans at a \$406 million discount. The 29 systems joined 23 that had never taken out REA loans. (See *100 percent borrower, CoBank, Federal Financing Bank, National Rural Utilities Cooperative Finance Corporation, Rural Electrification Administration Improvement Act, Rural Utilities Service*.)

independent power producer (IPP) An entity other than a utility that generates wholesale power. (See *cogeneration, merchant plant, non-utility generator*.)

independent system operator (ISO) An organization responsible for providing non-discriminatory transmission services for one or more transmission owners while maintaining reliability. ISOs typically perform similar functions as regional transmission organizations (RTOs) but have somewhat less authority and typically cover smaller geographic areas. Both ISOs and RTOs are subject to Federal Energy Regulatory Commission jurisdiction. *(See Federal Energy Regulatory Commission, grid, regional transmission organization.)*

Indiana Connection Official consumer publication of the Indianapolis, Indiana-based Indiana Electric Cooperatives (formerly Indiana Statewide Association of Rural Electric Cooperatives).

induction The process by which an electrical conductor becomes electrified when near a charged body. Induction motors, which run on alternating current, are the preferred choice for most industrial applications due to their rugged construction, absence of brushes, and the ability to control speed. *(See alternating current.)*

induction lighting A type of fluorescent lamp that doesn't use electrodes. With magnetic induction lighting, a microwave generator creates an electric field that travels through a glass bulb. The current then ionizes molecules of mercury gas, producing ultraviolet radiation that strikes a phosphor coating on the inside surface and causing it to glow. More than 100,000 hours of use for induction lighting has been documented, giving it an edge in situations where it's inconvenient or dangerous to replace lights, such as high-ceiling atriums, parking garages, auditoriums, tunnels, and parks. It is also increasingly becoming popular as a dusk-to-dawn lighting option.

industrial rate A special pricing structure created for industrial consumers. *(See block rate, class rate, cost-based rate, declining block rate, demand rate, flat rate, interruptible rate, inverted rate, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate.)*

information superhighway A phrase describing the flow of data from the Internet through computers and other web-enabled devices. *(See cyberspace, Internet, World Wide Web.)*

Institute of Electrical and Electronics Engineers *(See IEEE.)*

insulation Material used to prevent the escape of electricity, heat, or sound.

insulators Devices that support electric wires and prevent an undesired flow of electricity; typically made of glass or porcelain, although fiberglass and polymer versions are coming into favor.

insured loans Direct financing offered by the USDA Rural Utilities Service that chiefly benefits electric distribution cooperatives. (*See hardship loans, municipal rate loans.*)

integrated gasification combined cycle (IGCC) A power generation system that converts coal into a clean-burning gas stripped of sulfur compounds and mercury, then burns the gas to generate electricity. (*See clean-coal technology, coal gasification, combined cycle, syngas.*)

integrated resource planning (IRP) A process through which an electric utility, after evaluating ways to meet future power requirements, selects a mix of generation and demand-side management options that best minimize costs to consumers while meeting reliability and other objectives. (*See generation, demand-side management.*)

Integrity Fund (*See Cooperative System Integrity Fund.*)

interchange Energy sold to one electric utility by another.

interconnection A tie permitting the flow of electricity between the facilities of two electric systems.

intermediate load plant An electric generating unit, usually a combustion turbine burning natural gas or diesel fuel, or using hydropower, that handles sharp increases in electricity demand by filling the power supply gap between baseload generation and peaking plants. Most intermediate load plants run during the day and early evening and shut down or greatly curtail output during nighttime and early morning hours. Also known as a *load-following plant*. (*See baseload power plant, combustion turbine, dispatchable generation, locational marginal pricing, peaking plant.*)

intermittency A major reliability challenge associated with wind power, solar power, and hydrokinetic (ocean wave and tidal) power that cycle on and off throughout a day. Even with good location and plenty of breezes, wind generation averages only about a 30 percent to 40 percent capacity factor and seldom operates at full output (due to a lack of wind) when power is needed most—during periods of peak demand on hot, humid summer weekday afternoons or cold winter mornings below minus 22 degrees Fahrenheit (when turbines shut down). Solar power systems, for their part, operate only during daylight hours and are affected by cloud cover. Wind and solar advocates prefer use of the term

variability instead. Some *concentrating solar power* systems can reduce intermittency by storing heat in a molten salt compound. (See *capacity factor, coincident capacity, dispatchable generation, hydrokinetic power, ocean wave power, solar power, solar thermal energy, tidal power, variability, wind power*).

International Year of Cooperatives 2012 (IYC 2012) A major celebration of everything cooperative stemming from United Nations General Assembly Resolution 64/136 (adopted on December 21, 2009), which declared 2012 as the International Year of Cooperatives. The proclamation, supported by the U.S. Senate in S.R. 87, enacted in July 2011, encouraged countries to promote the formation of cooperatives and raise awareness of cooperative contributions to social and economic development.

Internet A global system of interconnected computer networks that interchange data. Developed originally for the U.S. military but later extended to government, academic, and research institutions in the 1970s and to commercial use in 1988. While often used interchangeably with the term “World Wide Web,” the two are not one and the same: the World Wide Web is one of the services communicated via the Internet. (See *information superhighway, Voice over Internet Protocol, website, World Wide Web*.)

Internet Protocol (IP) A set of rules for processing packets of information sent between computers connected to the Internet. Each computer has at least one IP address, which acts like a telephone number for talking to that computer. Abbreviation acceptable on all references.

Internet Protocol television (IPTV) Video programming delivered through technologies used for computer networks, generally over a broadband connection. (See *broadband, NRTC*.)

interruptible rate A pricing structure where consumers, mostly large commercial and industrial accounts, pay a lower rate for electricity in exchange for giving a utility the right to cut off service temporarily during periods of high demand. (See *block rate, class rate, cost-based rate, declining block rate, demand rate, distributed generation, flat rate, industrial rate, inverted rate, load management, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate*.)

interval data Electric use information collected at regular times (often in 15-minute, 30-minute, and hourly periods) throughout the day. Also known as *interval meter data, demand interval data, interval load data, or electricity interval data*. (See *demand interval, interval meter, smart grid, time-of-use rate*.)

interval meter A type of electric meter that records and collects electric consumption data at regular times (often in 15-minute, 30-minute, and hourly periods) throughout the day. Also known as a *time-of-use meter*. (See *demand interval, interval data, meter, smart grid, smart meter, time-of-use rate*.)

inverted rate A pricing structure where consumers pay more per kilowatt-hour as consumption increases beyond a fixed amount during a billing period. Also called an *increasing block rate*. (See *block rate, class rate, cost-based rate, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, off-peak rate, offset rate, ratchet rate, step rate, time-of-use rate*.)

investment tax credit (ITC) A federal tax incentive created in 2006 available to homeowners, businesses, and investor-owned utilities to encourage solar power deployment. The federal Emergency Economic Stabilization Act of 2008 extended the 30 percent ITC for both residential and commercial solar photovoltaic and solar thermal system installations for eight years; in the fiscal year 2016 budget deal, the 30 percent ITC—which had been set to tumble to 10 percent—was extended through 2019, before ramping down to 26 percent in 2020, 22 percent in 2021, and finally 10 percent for commercial and third-party owned residential systems in 2022 (but zero for self-owned residential). The ITC helps lower the cost of power from solar projects to a level competitive with conventional fuels, like coal or natural gas. Electric cooperatives are not eligible for the ITC but were for a time able to directly use Clean Renewable Energy Bonds, New Clean Renewable Energy Bonds, or form for-profit entities eligible to receive payments covering 30 percent of a project’s capital costs through the U.S. Department of Treasury Section 1603 tax grant program (which expired at the end of 2011) for the same purpose. More recently, cooperatives have been able to form tax-equity flip structures. Spell out on first reference. (See *Clean Renewable Energy Bonds, production tax credit, Solar Cooperative Community Projects, Solar Utility Network Deployment Acceleration, tax-equity flip*.)

investor-owned utility (IOU) A stockholder-owned power company that generates, transmits, and distributes electric energy for a profit. Spell out on first reference. (See *holding company, public utilities, purchase power*.)

IOU investor-owned utility.

IP Internet Protocol.

IPP independent power producer.

IPTV Internet Protocol television.

IRP integrated resource planning.

ISO independent system operator.

ITC investment tax credit.

IYC 2012 International Year of Cooperatives 2012.

J

J joule.

J.C. Brown CEO Communication Leadership Award An annual honor—and a major component of the Spotlight on Excellence Awards program sponsored by the Council of Rural Electric Communicators—recognizing an electric cooperative chief executive who advances communications among electric cooperatives. Named for the late J.C. Brown, who headed the Raleigh, North Carolina-based North Carolina Association of Electric Cooperatives, a statewide service organization, and later served as editor and publisher of the National Rural Electric Cooperative Association’s *Rural Electrification Magazine* and *Rural Electric News Letter* before retiring in 1993 as publications director. (See *Autry Leadership Award for “Always On” Communication, Certified Cooperative Communicator, Council of Rural Electric Communicators, Edgar F. Chesnutt Award, Laberge Award for Excellence in Strategic Communication, National Rural Electric Cooperative Association, RE Magazine, Rural Electric News Letter, Spotlight on Excellence Awards.*)

joule (J) A unit of electrical energy equal to the work done when a current of 1 A passes through a resistance of 1 ohm for one second (synonymous with watt-second; 1 W equals 1 J per second). Consider this: The quantity of energy consumed is measured in *joules*; how quickly that energy gets consumed is measured in *watts*. Operating a 60-W lightbulb requires power, measured in watts. After an hour, when you switch off the light, you can measure the amount of energy that was consumed in joules or kilowatt-hours or even British thermal units. (See *British thermal unit, energy, kilowatt-hour, watts.*)

journey-level lineworker A gender-neutral replacement term for *journeyman lineman*.

journeyman lineman An electric utility employee who has completed apprenticeship training and learned the trade for working on power lines. For a gender-neutral reference, use *journey-level lineworker*.

K

Kansas Country Living Official consumer publication of the Topeka, Kansas-based Kansas Electric Cooperatives.

Kbps kilobits per second.

Kentucky Living Official consumer publication of the Louisville, Kentucky-based Kentucky Association of Electric Cooperatives.

key account Any load deemed vital to the financial well-being of an electric cooperative, usually a large business or industry.

Key Ratio Trend Analysis (KRTA) A report published annually since 1975 by the National Rural Utilities Cooperative Finance Corporation that tracks the median value of 145 financial and operational ratios over the previous five years for more than 800 participating electric distribution cooperatives. *(See National Rural Utilities Cooperative Finance Corporation.)*

kilobits per second (Kbps) A unit of data transfer equal to 1,000 bits per second.

kilovolt (kV) Equal to 1,000 V. Used to measure the amount of electric force carried through a high-voltage transmission line. Abbreviation acceptable on first reference when used with a numeral.

kilovolt-ampere (kVA) Equal to 1,000 VA. Abbreviation acceptable on first reference when used with a numeral. *(See volt-ampere.)*

kilowatt (kW) The basic unit of electric demand, equal to 1,000 W. A measure of both a utility's capacity and a consumer's demand or load. Abbreviation acceptable on first reference when used with a numeral. *(See watt.)*

kilowatt-hour (kWh) A unit of energy or work equal to 1,000 Wh. The basic measure of electric energy use. A 100-W lightbulb burning for 10 hours uses 1 kWh. Abbreviation acceptable on first reference when used with a numeral. *(See energy, joule, megawatt-hour, watt, watt-hour.)*

KIUC Currents Official consumer publication of Lihue, Hawaii-based Kaua'i Island Utility Cooperative. Produced by Ruralite Services in Hillsboro, Oregon. *(See Ruralite.)*

KRTA Key Ratio Trend Analysis.

kV kilovolt. Abbreviation acceptable on first reference when used with a numeral.

kVA kilovolt-ampere. Abbreviation acceptable on first reference when used with a numeral.

kVAR kilovolt-ampere reactive.

kW kilowatt. Abbreviation acceptable on first reference when used with a numeral.

kWh kilowatt-hour. Abbreviation acceptable on first reference when used with a numeral.

L

Laberge Award for Excellence in Strategic Communication An annual honor (established 2018) sponsored by the Council of Rural Electric Communicators recognizing an electric cooperative communicator with demonstrated excellence, influence and impact in cooperative communications, both as a practitioner and contributor. Named for the late Justin Erick LeBerge who served a short stint as senior leadership communications manager for the National Rural Electric Cooperative Association. *(See Autry Leadership Award for "Always On" Communication, Certified Cooperative Communicator, Council of Rural Electric Communicators, Edgar F. Chesnutt Award, J.C. Brown CEO Communication Leadership Award, National Rural Electric Cooperative Association, Spotlight on Excellence Awards.)*

LAN local area network.

landfill gas (*See biomass.*)

laser A device used in drilling and cutting, alignment and guidance, and in surgery. The underlying optical properties are exploited in holography, reading bar codes, and in recording and playing compact discs. An acronym, it stands for *light amplification by stimulated emission of radiation*.

last in, first out A method of retiring capital credits where the latest allocated credits are retired first. (*See capital credits, first in, first out, percentage method.*)

Leadership in Energy and Environmental Design (LEED) A program of the Washington, D.C.-based U.S. Green Building Council that recognizes the overall sustainability of properties by awarding points for just about any feature imaginable, from bike racks and rainwater collection systems to energy-efficient lighting and low-flow plumbing fixtures. LEED uses different tiers of certification such as Silver, Gold, or Platinum tailored for new buildings, existing buildings, and tenant buildouts.

least-cost planning Efforts undertaken by utilities and regulators to meet growing power needs without building new generating plants. Methods include buying power from other utilities, making maximum use of transmission grids, and developing energy efficiency and load management programs.

LED light-emitting diode.

LED Lucy Cartoon mascot created in 2013 for the Touchstone Energy[®] Cooperatives Kids Zone website to promote energy efficiency. (*See CFL Charlie, HVAC Harriet, Touchstone Energy[®] Cooperatives, Wally the Water Heater.*)

LEED Leadership in Energy and Environmental Design.

license plate rate A regional transmission pricing structure where costs are based on the transmission system where a transaction originates; similar to the way residents pay to license a car in their home state, but can drive anywhere. (*See postage stamp rate.*)

lien accommodation A financing adjustment that occurs when an electric cooperative, which has borrowed from the USDA Rural Utilities Service (RUS), uses another lender. The new lender will require a lien on any assets it finances, but the existing RUS mortgage supersedes other liens. To enable the new lender to obtain a first lien on the specific assets it is bankrolling, RUS must grant a lien accommodation that places the agency in a subordinated position. Under a 1998 RUS regulation, lien accommodations are not considered major federal actions for the purposes of National Environmental Policy Act compliance—cooperatives are working to ensure that RUS borrowers are not required to perform National Environmental Policy Act analysis on non-RUS financed projects requiring a lien accommodation. (*See Rural Utilities Service.*)

light pollution A technically incorrect term describing the glare associated with poorly designed outdoor lighting systems—nothing pollutes the light. Consider using *light trespass* or *sky glow* instead. (*See dark-sky lights.*)

lightbulb One word, according to *Merriam-Webster's Collegiate Dictionary, Eleventh Edition*.

light-emitting diode (LED) A highly efficient digital electronic component that emits light when an electrical current is applied in the forward direction of the units. Widely used for indicator lights and digital readouts on appliances and increasingly in higher power applications such as home lighting, flashlights, dusk-to-dawn lights, and traffic signals.

lightning arrester A device that protects electric utility equipment against damage caused by power surges from lightning strikes.

lignite A low-sulfur, low-energy coal found primarily in the upper Great Plains. (*See anthracite, bituminous coal, coal, subbituminous coal.*)

LIHEAP Low Income Home Energy Assistance Program.

line A cable that carries electricity from one point to another on an electric power system.

line loss Electricity that dissipates in the process of distributing or transmitting it over power lines.

lineman An electric utility employee who builds and maintains power lines. For a gender-neutral reference, use *lineworker* or *line technician*.

lineworker Preferred word for *lineman*.

liquefied natural gas (LNG) Methane that has been super-cooled and liquefied for easier long-distance transport.

Listserv Capitalize in all uses.

Living with Energy in Iowa Official consumer publication of the Des Moines, Iowa-based Iowa Association of Electric Cooperatives.

LMP locational marginal pricing.

LNG liquefied natural gas.

load The amount of electric power drawn at a specific time from an electric system, or the total power drawn from the system. (*See demand, demand charge, demand interval, demand meter, energy, peak load.*)

load control (*See demand response, demand-side management, load management, interruptible rate.*)

load curve A chart plotting a utility system's use of electricity over a period of time. Generation suppliers use this information to plan how much power they will need to produce at any given time. (*See load profile.*)

load factor The ratio of average demand to peak demand; a measure of efficiency that indicates whether a utility system's electrical use over a period of time remains reasonably stable or if it exhibits extreme peaks and valleys. A high load factor usually results in a lower average price per kilowatt-hour than a low load factor.

load-following plant (*See intermediate load plant.*)

load forecasting Predicting a utility system's load and kilowatt-hour sales growth.

load management An energy efficiency initiative whereby an electric utility reduces power consumption—and keeps the lid on wholesale generation costs—by shifting when and how electricity gets used. Load management programs include direct control of specialized appliances and equipment (notably large-capacity grid-enabled electric resistance water heaters, electric thermal storage furnaces and room heating cabinets, air conditioning, and dual fuel systems) in the homes of volunteer consumers, interruptible contracts with large commercial and industrial accounts (most of whom have installed backup generation), dispatch of consumer-owned (distributed) generation into the wholesale power market, personal energy management, time-of-use rates, and other incentives. Typically, load management kicks in for brief periods (just a few hours) during times of peak demand—the electric utility industry’s equivalent of rush-hour traffic, when power costs skyrocket. Load management essentially works like a “power plant in reverse,” helping to boost electric system efficiency, cut expensive demand charges utilities must pay for purchase power, and reduce the need for new power plants. Also called *demand response*, *demand-side management*, or *peak load shifting/shaping/shaving*. More than 250 cooperatives in 35 states use large-capacity grid-enabled electric resistance water heaters to reduce electric demand by an estimated 500 MW annually (mostly by moving electric use for water heating to off-peak, overnight hours), saving consumers hundreds of millions of dollars. (See *conservation voltage reduction*, *demand response*, *demand-side management*, *dispatchable generation*, *distributed generation*, *energy efficiency*, *Energy Efficiency Improvement Act*, *interruptible rate*, *peak demand*, *peak load*, *personal energy management*, *Reciprocal Internal Combustion Engine rule*, *thermal energy storage*, *time-of-use rate*.)

load profile A graph showing variations in electrical load for an account over time. A load profile will vary according to consumer type (residential, commercial, or industrial), weather conditions, and day of the week. Load profiles can be determined by direct metering or inferred from billing and other data. (See *load curve*.)

local area network (LAN) An interconnected computer network covering a small geographic area, like a home, office, or group of buildings. LANs boast high data-transfer rates and typically don’t require leased telecommunications lines. (See *wide area network*.)

locational marginal pricing (LMP) A market-based approach used to manage the efficient use of generation when transmission congestion occurs. LMP revolves around the idea that the price of any commodity should be based on the cost of bringing the last unit of that commodity—the one that balances supply and demand—to market. In centralized wholesale power markets, LMP prices are established by the last power station to come on-line to meet demand at any particular location on the

grid. LMP prices rise when transmission congestion prevents lower-cost generation outside a local area from being imported to meet load requirements, forcing higher-cost resources (generally the most expensive and least efficient peaking plants) within the load pocket to be dispatched. Since LMP provides market participants a clear and accurate signal of electricity prices at every spot on the grid, it theoretically provides incentives to build new generation, upgrade bulk power facilities, and reduce electricity consumption as a way to alleviate transmission bottlenecks, increase competition, and improve an electric system's ability to meet demand from low-cost resources. In practice, LMP has done little but increase costs to consumers. *(See bulk power, financial transmission rights, grid, peaking plant, transmission, transmission congestion, transmission system, wholesale power market.)*

Long-Range Study Committee A panel made up of chief executives from electric distribution cooperatives, generation and transmission cooperatives, and statewide associations formed by the National Rural Electric Cooperative Association (NRECA) in August 1967 to analyze future cooperative financing requirements and develop an alternate funding strategy to meet them. At the time, electric cooperative demand for capital was exceeding the amount Congress was willing to appropriate (\$300 million annually in 2 percent direct loans) through the federal Rural Electrification Administration. Consensus soon centered on creating an independent, nonprofit, self-help organization endowed with a solid financial base that would make loans only to electric cooperatives and other member systems that owned it. Based on the committee's recommendations, the NRECA Board of Directors and later electric cooperatives nationwide in January 1969 approved creating the National Rural Utilities Cooperative Finance Corporation (CFC). J.K. Smith, manager of what's now the Louisville, Kentucky-based Kentucky Association of Electric Cooperatives (statewide), chaired the group and later became CFC's first governor. *(See National Rural Electric Cooperative Association, National Rural Utilities Cooperative Finance Corporation, Rural Electrification Administration.)*

loop tariff A pricing structure where an electric cooperative installs, and then owns and maintains, residential geothermal loops for ground-source heat pump systems. *(See heat pump.)*

loop transmission An electric distribution system that allows consumers to receive electricity from more than one direction, providing a backup power feed in case of an outage.

loss control Safety programs aimed at preventing or limiting financial and personnel loss from accidents.

Louisiana Country Official consumer publication of the Baton Rouge, Louisiana-based Association of Louisiana Electric Cooperatives.

Low Income Home Energy Assistance Program (LIHEAP) A federal welfare program created in 1981 that offers financial support to eligible low-income households for paying home heating or cooling bills. Each state, territory, and tribal government receives LIHEAP funds as a block grant from the federal Administration for Children & Families (a division of the U.S. Department of Health and Human Services) and then operates individual programs. Applicants for LIHEAP cash grants and crisis payments must have an annual household income of less than 150 percent of the federal poverty level or 75 percent of state median income, whichever is greater; some states provide supplemental appropriations to expand coverage. LIHEAP provides a critical safety net for struggling electric cooperative consumers since rural communities have limited access to alternative energy assistance sources, like private fuel funds used in many large cities. The program also helps electric cooperatives absorb costs of delinquent accounts. Most state LIHEAP efforts include weatherization support, where contractors replace broken windows or install more energy-efficient furnaces. (*See Weatherization Assistance Program.*)

M

MACT maximum achievable control technology.

MAIFI Momentary Average Interruption Frequency Index.

man at the end of the line A phrase of unknown origin that has become a mantra or creed embodying the spirit of rural electrification: extending power to the last homestead in the farthest reaches of the last hollow in rural America. It's estimated that up to 10 percent of all electric cooperative consumers actually live at the end of a distribution line. (*See area coverage.*)

margin The difference between a cooperative's income and its expenses; returned to members in the form of capital credits as the cooperative's financial status permits. (*See capital credits, plant revenue ratio.*)

marginal-cost pricing A method of establishing the selling price of a commodity based on production costs of the last, most expensive unit sold.

market-based rate Price for generation based solely on what can be obtained in an open marketplace. This differs from cost-of-service rates, which are tied to the cost of construction and operation of facilities necessary to produce electricity. (*See cost-of-service rate.*)

market power The ability of a company to raise and maintain prices (and generate profits) above competitive levels for a significant period of time.

MATS Mercury and Air Toxics Standards.

Matson Award (*See William F. Matson Democracy Award.*)

maximum achievable control technology (MACT) Standards set by the U.S. Environmental Protection Agency to reduce emissions of 188 hazardous air pollutants (chiefly mercury and arsenic) from industrial facilities. For existing major sources—like coal- and oil-burning power plants rated at 25 MW or more—that emit 10 tons or more annually or more of any one hazardous air pollutant, or 25 tons per year or more of a mixture of pollutants, MACT standards reflect emissions control levels met by the average of the top 12 percent of similar sources in operation; for new power plants, MACT is based on the current level of emissions cuts realized by the best-controlled similar source. (*See Mercury and Air Toxics Standards, U.S. Environmental Protection Agency.*)

maximum drawdown The lowest reservoir level at a hydroelectric plant; likely occurs during severe drought.

Mbps megabits per second.

MDMS meter data management system.

MDSC modified debt service coverage.

means testing The practice of limiting loans to borrowers with special eligibility criteria. For electric cooperatives, means testing was attached to the awarding of USDA Rural Utilities Service (RUS) hardship insured loans under the Rural Electrification Loan Restructuring Act of 1993. The Bush administration, as part of its 2004 and subsequent federal budget blueprints, proposed additional means testing on all RUS electric loans, such as limiting them to “genuine rural areas with persistent poverty

rates.” Those requests were rejected by Congress. (*See hardship loans, once rural, always rural, Rural Electrification Loan Restructuring Act.*)

megabits per second (Mbps) A unit of data transfer equal to 1 million bits per second.

megawatt (MW) Equal to 1,000 kW or 1 million W, it measures either a utility’s capacity, a generating unit’s capacity, or a consumer’s demand or load. Abbreviation acceptable on first reference when used with a numeral. (*See kilowatt, gigawatt, megawatt-hour.*)

megawatt-hour (MWh) Equal to 1,000 kWh or 1 million Wh, it measures the actual amount of electricity a generating unit produces over a certain period of time. Abbreviation acceptable on first reference when used with a numeral. (*See kilowatt-hour.*)

member The actual person(s) listed on an account who receive service from an electric cooperative. In most cases, the number of members served by a cooperative differs from the total number of consumers served (not all consumers are members, as some are children, etc.) or the number of meters served (since some accounts have more than one meter). Members of the National Rural Electric Cooperative Association and National Rural Utilities Cooperative Finance Corporation are not-for-profit cooperatives and rural electric systems, not actual consumers (people). (*See consumer, consumer-member, member-consumer, member-owner, National Rural Electric Cooperative Association, National Rural Utilities Cooperative Finance Corporation, owner.*)

member-consumer, member-owner Since members of the National Rural Utilities Cooperative Finance Corporation (CFC) are not-for-profit cooperatives and rural electric systems, not actual consumers (people), CFC prefers the term *member-owner*. But in usage involving consumers (people), these terms should be avoided as members (actual consumers) can neither be consumed nor owned. In those cases, use *consumer-member* instead. NOTE: Many cooperative consumers find the word *owner* uncomfortable as it implies financial responsibility, so always avoid terms like *owner* or *consumer-owner*. For most usage, stick with the simpler *consumer* or *member*. (*See consumer, consumer-member, member, owner.*)

merchant plant A generation facility built to produce electricity as a commodity, and has not committed its full output to a specific customer or customers under long-term contracts.

Mercury and Air Toxics Standards (MATS) A U.S. Environmental Protection Agency (EPA) regulation issued on December 16, 2011, with compliance beginning on April 16, 2015, designed to curb emissions of hazardous air pollutants, such as mercury and arsenic, from coal- and oil-fired electric generating units 25 MW or larger. The U.S. Energy Information Administration in July 2016 noted that because of MATS electric power plant operators spent at least \$6.1 billion and installed emissions control equipment on 87,000 MW of coal generation—about 30 percent the nation’s total—between January 2015 and April 2016. In addition, operators retired another 20,000 MW GW of coal plants, about one-quarter in April 2015 alone when MATS took effect. Legal wrangling on the rule continues as well. On June 29, 2015, the U.S. Supreme Court rejected MATS on a 5-4 vote, saying EPA did not properly consider compliance costs during the initial “appropriate and necessary” finding stage before crafting the broad regulation. MATS was then sent back to the U.S. Court of Appeals for the District of Columbia—which had upheld the rule in 2014—for a rehearing to assess if the agency could provide a more thorough cost-benefit analysis, or if the regulation should be tossed completely. EPA later updated its calculations and found the regulation was still warranted. But opponents contend the agency relied on “co-benefits”—basically, counting reductions in pollutants outside of those directly regulated by the standards. A lawsuit challenging the EPA’s “fix” on costs was placed on hold by the D.C. appeals court while the Trump administration reviewed whether to roll back the rule—in late August 2018, the White House announced that MATS would be reconsidered; in December 2018, EPA said it would re-evaluate the government’s arguments for the necessity of MATS and whether to consider “co-benefits” in future air pollution rules. Originally proposed on March 16, 2011, MATS stemmed from a February 8, 2008, U.S. Court of Appeals for the District of Columbia decision that rejected a 2005 EPA cap-and-trade plan (the Clean Air Mercury Rule) for reducing power plant mercury emissions. (*See cap and trade, Clean Air Mercury Rule, Cross-State Air Pollution Rule, maximum achievable control technology, U.S. Environmental Protection Agency.*)

mercury vapor lights A popular type of outdoor lighting, noted for its white radiance, once promoted by many electric cooperatives as *dusk-to-dawn lights, security lights, outdoor lights, yard lights, streetlights, or pole lights*. The federal Energy Policy Act of 2005 banned the manufacture and import of fixtures and ballasts needed for operating mercury vapor lights as of January 1, 2008, with mercury vapor replacement bulbs phased out as of 2016. After that date, no replacements of mercury vapor lights will be possible. No need for a hyphen. (*See dark-sky lights, high-pressure sodium vapor lights, induction lighting, light-emitting diode, mercury vapor lights, metal halide lights.*)

merger A legal process by which two or more corporate entities combine, with one retaining its identity. (*See consolidation.*)

metal halide lights A type of energy-efficient outdoor lighting, noted for bright white and intense, though high temperature, brilliance and increasingly promoted by electric cooperatives as *dusk-to-dawn lights, security lights, outdoor lights, yard lights, streetlights, or pole lights*. Described by some as “lightning in a bottle,” metal halide floodlights have grown in popularity following the mandatory phaseout of mercury vapor lights. No need for a hyphen. *(See dark-sky lights, high-pressure sodium vapor lights, induction lighting, light-emitting diode, mercury vapor lights, metal halide lights.)*

metal theft The unlawful and (in the case of copper wire used for electric service) dangerous practice of stealing items made of metal and selling them for scrap. The most common products affected are those made of copper, aluminum, brass, and bronze. Many law enforcement officials believe that methamphetamine users are responsible for much of the epidemic. Metal theft forces electric cooperatives to spend tens of millions annually for replacement materials and repairs.

meter A device used to measure and record the amount of electricity used by a consumer. Newer models also communicate readings and other data with a utility. *(See automated meter reading, advanced metering infrastructure.)*

meter data management system (MDMS) A software module that lies between an electric cooperative’s automated meter reading or advanced metering infrastructure system and billing applications. MDMS collects, stores, analyzes, validates, and frames collected meter data for more accurate billing, better load forecasting, and active down-line equipment monitoring, enabling cooperatives to adopt time-of-use metering and allowing consumers, using personal energy management tools, to view hourly and daily electric use. Generation and transmission cooperatives see MDMS as a way to immediately measure the effectiveness of demand-response programs, including direct control of appliances and equipment. *(See automated meter reading, advanced metering infrastructure, demand response, generation and transmission cooperative, peak load, personal energy management, time-of-use metering.)*

meter tampering *(See electricity theft.)*

methane digester *(See anaerobic digester.)*

Michigan Country Lines Official consumer publication of the Okemos, Michigan-based Michigan Electric Cooperative Association.

microgrid Traditionally, a distribution system completely isolated (islanded) from the bulk power grid with power supplied from some form of distributed generation. Today, the definition has expanded to include any group of loads close together that can receive reliable service from one or more interconnected distributed generation resources even after being detached from the main grid. *(See distributed generation, grid.)*

microhydro Small hydroelectric plants that typically produce no more than 100 kW of power. *(See distributed generation, hydroelectric power, renewables.)*

Mid-West Mid-West Electric Consumers Association.

Mid-West Electric Consumers Association (Mid-West) The Wheat Ridge, Colorado-based lobbying and planning organization that represents more than 340 electric cooperatives and municipal utilities in the nine-state Missouri River drainage basin purchasing federal hydropower from the Western Area Power Administration. Formed in 1958. Use short form, Mid-West, on second reference. *(See Western Area Power Administration.)*

Midcontinent Independent System Operator (MISO) The Carmel, Indiana-headquartered regional transmission organization that coordinates roughly 130,000 MW, or 13 percent, of the nation's generating capacity, across all or parts of 15 states and the Canadian province of Manitoba. Prior to April 26, 2013, known as the *Midwest Independent System Operator* and later *Midwest Independent Transmission System Operator*. *(See regional transmission organization.)*

Midwest Reliability Organization One of eight North American Electric Reliability Corporation regional organizations that coordinate planning and operations among utilities. *(See North American Electric Reliability Corporation.)*

minimum offer pricing rule (MOPR) A PJM Interconnection market mechanism designed to prevent gaming by utility-owned natural-gas plants that have to buy capacity within PJM. To prevent those plants from underbidding into the capacity market to drive down prices, PJM sets a minimum price and requires any plants that bid under it to prove that they're not actually undercutting their cost of production. *(See PJM Interconnection, zero-emissions credits.)*

mill One-tenth of a cent. Used as a measure of electric energy bought and sold.

MISO Midcontinent Independent System Operator.

modified debt service coverage (MDSC) A financial ratio that gauges a borrower's ability to repay a loan. Essentially, it measures the number of times operating cash flow covers long-term debt service. An MDSC of 1.0 indicates a system generated only enough cash to cover principal and interest payments on its long-term debt for a year. For loans made since January 1, 1994, the National Rural Utilities Cooperative Finance Corporation requires electric cooperative borrowers to maintain a minimum MDSC of 1.35 or better for two of the last three years. *(See National Rural Utilities Cooperative Finance Corporation, times interest earned ratio.)*

Momentary Average Interruption Frequency Index (MAIFI) A reliability indicator that measures the average number of momentary interruptions (blinks) experienced by a consumer over the course of a year. *(See Customer Average Interruption Duration Index, System Average Interruption Duration Index, System Average Interruption Frequency Index.)*

MOPR minimum offer pricing rule.

MultiSpeak® Initiative (MultiSpeak) A collaboration between the National Rural Electric Cooperative Association and vendors, consultants, and electric utilities aimed at developing standard interfaces between commonly used (primarily distribution system) software applications and other automation tools. Launched in October 1999, MultiSpeak allows meters, consumer databases, utility equipment, and systems to “talk” to one another without expensive custom programming, helping boost efficiency and reliability. Today, MultiSpeak specifications (which permit interoperability among more than 30 different technologies) are used by hundreds of software purveyors and more than 800 electric cooperatives, municipal electric systems, investor-owned utilities (including Southern Company), and foreign power companies. MultiSpeak also has partnered with the Common Information Model, developed by the Geneva, Switzerland-based International Electrotechnical Commission, to create congruent global utility data integration standards. In September 2009, the National Institute of Standards and Technology included MultiSpeak as one of 31 foundational interoperability standards that can support smart grid implementation. Use registered trademark symbol after “MultiSpeak” on first reference. *(See National Rural Electric Cooperative Association, NRECA Business and Technology Strategies.)*

municipal electric system An electric distribution utility owned by a city, borough, or other incorporated community. As a public entity, municipal electric systems can levy taxes, issue government bonds, and adopt and enforce rules and regulations. Avoid use of the short form *muni*.

municipal rate loans A USDA Rural Utilities Service direct insured loan program available to electric distribution cooperatives with interest set at the current market yield on municipal bonds. Funds can be used for distribution, subtransmission, and headquarters (service and warehouse facility) purposes. *(See guaranteed loans, RUS, hardship loans, insured loans, Rural Electrification Loan Restructuring Act, Treasury rate loans, Treasury Rate Plus loans.)*

mutual utility A form of electric cooperative organized on a not-for-profit basis that delivers power across a specified service area. Consumer-governed mutual utilities, most of which are based in the state of Washington, enjoy full status as members of the National Rural Electric Cooperative Association. Parkland Light & Water Company in Tacoma, Washington, oldest of the nation's mutual utilities, was incorporated on February 7, 1914. *(See electric cooperative.)*

MW megawatt. Abbreviation acceptable on first reference when used with a numeral.

MWh megawatt-hour. Abbreviation acceptable on first reference when used with a numeral.

N

NAAQS National Ambient Air Quality Standards.

nameplate rating The maximum capacity of electrical equipment or a generator as stated on the attached nameplate. Actual capacity can vary due to age, wear, maintenance, or other conditions that hamper operation. *(See capacity.)*

NARUC National Association of Regulatory Utility Commissioners.

National Ambient Air Quality Standards (NAAQS) Levels of pollutants that can be present in the atmosphere without endangering public health and welfare; established by the U.S. Environmental Protection Agency. *(U.S. Environmental Protection Agency.)*

National Association of Regulatory Utility Commissioners (NARUC) A professional trade association, headquartered in Washington, D.C., composed of members of state and federal regulatory bodies that have authority over public utilities. *(See public utilities.)*

National Cooperative Services Corporation (NCSC) An affiliate of Dulles, Virginia-based National Rural Utilities Cooperative Finance Corporation (CFC) created on January 26, 1981, to help electric cooperatives reduce the cost of new generation facilities through tax-advantaged financing vehicles (such as leverage and safe harbor leases) available at the time. Today, NCSC offers services that CFC can't, such as financing electric cooperative for-profit ventures and acquisitions of investor-owned utility service territories. NCSC, boasting nearly 450 members as of 2018, obtains funding through CFC. *(See National Rural Utilities Cooperative Finance Corporation, NCSC Cooperative Youth Educational Grant Program.)*

National Consulting Group (NCG) A unit of the National Rural Electric Cooperative Association that provides electric cooperatives with fee-based strategic guidance in the areas of governance, utility operations, leadership continuity, human resources management, market research, and business process design. *(See National Rural Electric Cooperative Association.)*

National Country Market Sales Cooperative (NCM) The Austin, Texas-based advertising sales arm for most of the nation's electric cooperative statewide publications. Incorporated on January 5, 1996. Since late 2017, the NCM network has conducted business under the "American MainStreet Publications" banner.

National Electric Cooperative Statewide Editors Association (SEA) The education and training arm of the nation's 32 electric cooperative statewide consumer publications, which reach more than 12 million households each month in 42 states served by cooperatives. Formed on August 7, 1963, as the National Electric Cooperative Editorial Association; the current name was adopted on August 20, 1995. Predecessor organizations included the National Rural Electric Cooperative Press Association (April 22, 1947, to July 8, 1958) and the Rural Electric Consumer Publications Cooperative (July 8, 1958, to August 7, 1963). *(See Haggard Award, Willies Awards.)*

National Electric Light Association (NELA) The trade association of investor-owned utilities and electric utility holding companies formed in 1885. Predecessor to the Edison Electric Institute. *(See Edison Electric Institute.)*

National Electrical Code (NEC) The United States standard for safe installation of internal electrical wiring and equipment, part of the *National Fire Code* series published by the National Fire Protection Association. A publication title, italicize.

National Electrical Manufacturers Association (NEMA) The Rosslyn, Virginia-based service arm of the nation's electrical equipment and medical imaging manufacturers. Founded in 1926.

National Electrical Safety Code (NESC) Developed by IEEE, it sets ground rules for worker safety during the installation, operation, and maintenance of electric and telecommunication lines and associated equipment. A publication title, italicize. Electric cooperatives that are USDA Rural Utilities Service borrowers must comply with all sections of the code. (*See arc flash, IEEE.*)

National Food and Energy Council (*See Rural Electricity Resource Council.*)

National G&T Communicators Association The education and training arm of communicators who work for the nation's 60-plus generation and transmission cooperatives (G&Ts). Formed in August 1983. (*See generation and transmission cooperative.*)

National Information Solutions Cooperative (NISC) The Lake Saint Louis, Missouri-based information technology cooperative that develops and supports advanced software applications primarily for electric cooperatives and rural telecommunications carriers, but also Fortune 1,000 corporations, throughout the United States, American Samoa, and Canada. Also maintains offices in Cedar Rapids, Iowa; Mandan, North Dakota; and Shawano, Wisconsin. Formed on July 1, 2000, from a consolidation of Central Area Data Processing in St. Peters, Missouri, and North Central Data Cooperative in Mandan.

National Renewables Cooperative Organization (NRCO) The Carmel, Indiana-based cooperative formed in 2008 that assists generation and transmission cooperatives (G&Ts), electric distribution cooperatives that are not a member of a G&T, and electric distribution cooperatives that buy just a portion of their power needs from a G&T (partial-requirements cooperatives) but have the legal ability to purchase wholesale power in pursuing diversified, cost-effective "clean and green" energy projects nationwide. As of 2018, NRCO had 21 members and had helped them develop 821 MW of wind, 163 MW of utility-scale solar and nearly 10 MW of small-scale or community solar. (*See all-requirements contract, community solar, Solar Utility Network Deployment Acceleration, utility-scale solar.*)

National Rural Electric Cooperative Association (NRECA) The Arlington, Virginia-based national service organization representing more than 900 consumer-owned, not-for-profit electric cooperatives, public power districts, and public utility districts in the United States. NRECA oversees cooperative employee benefits plans; carries out federal government relations activities like lobbying; conducts management and director/trustee training; and spearheads communications, advocacy, and public relations initiatives. In addition, it coordinates national and regional conferences and seminars; offers member cooperatives advice on tax, legal, environmental, and engineering matters; and performs economic and technical research. Incorporated as a cooperative in the District of Columbia on March 19, 1942. *(See ACRE Co-op Owners for Political Action®, Action Committee for Rural Electrification, Board Leadership Certificate, Clyde T. Ellis Award, Co-op Nation, Cooperative Benefit Administrators, Inc., Cooperative.com, Credentialed Cooperative Director, Director Gold Certificate, electric.coop, Electric Cooperative Bar Association, Electric Cooperative National Community Service Awards, Haggard Award, Long-Range Study Committee, MultiSpeak® Initiative, National Consulting Group, NRECA Business and Technology Strategies, NRECA International, Next Generation Leader Program, Our Energy, Our Future®, Paul Revere Award, regional meeting, regional transmission organization, RE Magazine, Rural Electric Safety Achievement Program, Rural Electric Youth Tour, Straight Talk, TechAdvantage® Conference & Expo, William F. Matson Democracy Award, Willie Wiredhand, Wood Quality Control, Inc., Youth Leadership Council.)*

National Rural Telecommunications Cooperative *(See NRTC.)*

National Rural Utilities Cooperative Finance Corporation (CFC) The Dulles, Virginia-based lender created and owned by the nation's electric cooperatives. Incorporated on April 10, 1969, it lists more than \$27 billion in loans and loan guarantees with rural electric systems in 49 states. *(See 100 percent borrower, CFC Cooperative Educational Fund, CFC Solutions News Bulletin, common mortgage, concurrent loan, Cooperative.com, Cooperative System Integrity Fund, independent borrower, Long-Range Study Committee, National Cooperative Services Corporation, plant revenue ratio, qualified lender, Rural Telephone Finance Cooperative, Solar Utility Network Deployment Acceleration.)*

National Utility Training & Safety Education Association (NUTSEA) An organization whose primary activities involve job training, safety education, and Rural Electric Safety Achievement Program administration for electric cooperatives and related organizations. Originally formed in the early 1940s as the Rural Electric Association Safety and Job Training Instructors, the name was changed in 1976. Use with ampersand. NUTSEA presents four major honors each year: the Ernest Shearer Award to the electric cooperative job training and safety instructor who best exemplifies

enduring strength, leadership, devotion to duty, service, loyalty, and achievement in the improvement, progress, and success of NUTSEA; the O.G. Anderson Safety Award to an electric cooperative line superintendent who has demonstrated significant achievements in line maintenance safety practices and/or training; the Claude Frazier Award to any past or present NUTSEA member for outstanding contributions to safety, health excellence, and stewardship; and the Herman C. Potthast Award to the electric cooperative job training and safety instructor who best reflects the qualities of dedication, leadership, cooperation, and service. *(See Herman C. Potthast Award, Rural Electric Safety Achievement Program.)*

natural gas A gaseous fossil fuel consisting primarily of methane but including significant quantities of ethane, propane, butane, and pentane used for electric generation, heating, cooking, and public transportation. Natural gas accounts for about 23 percent of the power produced by generation and transmission cooperatives and 25 percent of all electric cooperative power requirements nationwide; overall, it makes up 32 percent of U.S. electric generation. Natural gas compressor stations are the largest collective load for electric cooperatives nationwide. *(See baseload power plant, carbon capture and storage, carbon dioxide, combustion turbine, fossil fuel, fuel cells, generation and transmission cooperative, liquefied natural gas, peaking plant, syngas, synthetic fuel.)*

NCG National Consulting Group.

NCM National Country Market Sales Cooperative.

NCSC National Cooperative Services Corporation.

NCSC Cooperative Youth Educational Grant Program Created by the National Cooperative Services Corporation (NCSC) in 2009 and launched the next year to assist educational programs aimed at teenagers. Through it, electric cooperative statewide associations are eligible for a grant of \$200 for each NCSC member cooperative they serve. *(See CFC Cooperative Educational Fund, National Cooperative Services Corporation.)*

NELA National Electric Light Association.

NEMA National Electrical Manufacturers Association.

NESC *National Electrical Safety Code.*

net generation The total amount of electricity produced at a power plant less the amount of electricity used by the plant itself.

net metering An incentive where owners of small renewable energy systems receive retail credit for at least a portion of the electricity they generate. In its pure form, a consumer's electric meter will spin backwards whenever he/she uses less power than the renewable energy system produces, effectively banking excess electricity production for future credit.

net utility plant Used to measure the value of security on a loan, it's determined by adding the total value of a borrower's physical plant (electric facilities and buildings) plus construction work in progress, minus accumulated provision for depreciation and amortization. (*See construction work in progress, plant revenue ratio, utility plant.*)

neutral-to-earth voltage Essentially, electricity that develops on the grounded neutral system of a farm or home. If the voltage reaches sufficient levels, livestock coming into contact with grounded devices, like stanchions, water troughs, and milking machines, or people getting out of a swimming pool or securing boats at a dock, may receive a mild electrical shock. Neutral-to-earth voltage, also called *neutral-to-ground voltage* or *exposure voltage*, can be tough to troubleshoot and expensive to correct. Avoid using the technically incorrect term *stray voltage*.

neutral-to-ground voltage (*See neutral-to-earth voltage.*)

New CREBs (*See Clean Renewable Energy Bonds.*)

New Source Performance Standards (NSPS) Pollution control requirements for air and water issued by the U.S. Environmental Protection Agency (EPA). On January 8, 2014, EPA issued NSPS rules aimed at curbing the release of carbon dioxide and six other greenhouse gases blamed for contributing to climate change from new fossil fuel-fired power plants under Section 111(b) of the federal Clean Air Act. To do so it sets an emissions cap for coal-burning stations of 1,100 lb. of carbon dioxide per MWh over a 12-month period or 1,000 to 1,050 lb. of carbon dioxide per MWh over an 84-month period—an impossible level for coal plants, which average in excess of 1,800 lb. of carbon dioxide emissions per MWh, to achieve without partial carbon capture and storage equipment, technology that is not yet economically viable. The NSPS on greenhouse gases, as outlined, will push utilities and merchant operators away from coal to natural gas baseload generation, because most new combined cycle gas

plants produce emissions below the range of 1,000 lb. of carbon dioxide per MWh imposed on those facilities. Electric cooperatives warn, though, that natural gas prices are more volatile than coal, making the fuel source a dicey option, and believe that requiring partial carbon capture at new coal units will not survive legal challenge. *(See Affordable Clean Energy Rule, cap and trade, Clean Power Plan, combined cycle, greenhouse gases, U.S. Environmental Protection Agency.)*

New Source Review (NSR) A provision in federal Clean Air Act amendments adopted in 1977 that requires installation of expensive, state-of-the-art pollution controls—like scrubbers—when equipment at a coal-fired power plant, refinery, or factory undergoes an upgrade or operational change deemed to be a “major modification.” In contrast, projects considered “routine maintenance, repair, or replacement” are exempt. To determine whether the work is major, utilities must project whether it will increase emissions. Electric cooperatives, holding that NSR rules are confusing, arbitrary, and stymie plant improvements, have strongly urged Congress and the U.S. Environmental Protection Agency to clarify the matter. In reauthorizing the Clean Air Act in 1990, Congress recognized that power plants have a typical life expectancy of 65 years or more and electric utilities are expected to maintain existing capabilities and reliability of those plants during their useful life without NSR kicking in. *(See Affordable Clean Energy Rule, Clean Air Act, Tailoring Rule.)*

New York Power Authority (NYPA) America’s largest state-owned electricity provider, it operates 18 generating facilities and more than 1,400 circuit-miles of transmission lines. NYPA sells preference hydropower from the Niagara Power Project to electric cooperatives in New York, Pennsylvania, New Jersey, and Ohio. *(See hydroelectric power, preference principle.)*

Next Generation Leader Program An initiative launched by the National Rural Electric Cooperative Association in 2016 to help electric cooperatives retain and nurture top staff talent. *(See National Rural Electric Cooperative Association.)*

nitrogen oxides Highly reactive and poisonous compounds of nitrogen and oxygen formed when fossil fuels are burned at high temperatures, and a leading contributor to smog and acid rain. Nitrogen oxides are emitted by automobiles, trucks, and various non-road vehicles as well as major stationary sources such as power plants, industrial boilers, refineries, and cement kilns. Always plural. Don’t use the abbreviation NOx. *(See acid rain, algae reactor, cap and trade, Clean Air Act, Clean Air Interstate Rule, Cross-State Air Pollution Rule.)*

NISC National Information Solutions Cooperative.

non-coincident demand The highest demand for power by a consumer or class of consumers that occurs at a different time than a power supplier's system peak demand. *(See coincident demand, peak demand.)*

non-coincidental peak The sum of two or more utility system load peaks that do not occur at the same time. Meaningful when considering peak loads within a limited period, such as a day, week, month, and a heating or cooling season. *(See coincidental peak, peak load.)*

non-firm power Generation or power-producing capacity supplied or available under a commitment carrying limited availability.

non-utility generator A corporation, person, agency, authority, or other entity that owns electric generating capacity and is not defined as a utility under state or federal law. The term includes small power producers (such as electric cooperative consumers with renewable energy systems) and independent power producers. *(See cogeneration, independent power producer, Public Utility Regulatory Policies Act, purchase power, qualifying facility, small power producer.)*

nonprofit An organization engaging in public interest activities—such as humanitarian, charitable, educational, or environmental efforts—that obtains money for services without seeking to realize a profit. Nonprofits do things for people in a relationship of dependency. Electric cooperatives, in contrast, as self-help organizations, are generally considered *not-for-profit*. For legal reasons, the National Rural Utilities Cooperative Finance Corporation is described as nonprofit. *(See National Rural Utilities Cooperative Finance Corporation, not-for-profit.)*

North American Electric Reliability Corporation (NERC) The Atlanta, Georgia -based organization charged with overseeing reliability of the electric grid covering the United States, most of Canada, and the Mexican state of Baja California Norte. NERC develops and enforces reliability standards; assesses reliability annually via 10-year and seasonal forecasts; monitors the bulk power system; evaluates users, owners, and operators for preparedness; and educates, trains, and certifies industry personnel. While a self-regulating body, NERC remains subject to oversight by the Federal Energy Regulatory Commission and governmental authorities in Canada. *(See bulk power, cyber security, Federal Energy Regulatory Commission, Florida Reliability Coordinating Council, grid, Midwest Reliability Organization, Northeast Power Coordinating Council, ReliabilityFirst Corporation, SERC*

Reliability Corporation, Southwest Power Pool, Texas Reliability Entity, Western Electricity Coordinating Council.)

Northeast Power Coordinating Council One of eight North American Electric Reliability Corporation regional organizations that coordinate planning and operations among utilities. *(See North American Electric Reliability Corporation.)*

North Dakota Living Official consumer publication of the Mandan, North Dakota.-based North Dakota Association of Rural Electric Cooperatives.

not-for-profit An incorporated, self-help organization established with the sole purpose of providing a service at the lowest possible cost and where ownership lies with stakeholders (users) and not outside investors. Not-for-profit entities, such as cooperatives and credit unions, maintain a surplus of income over expenditures but use that excess revenue to improve service and return it to stakeholders. *(See capital credits, nonprofit.)*

NRC Nuclear Regulatory Commission.

NRCO National Renewables Cooperative Organization.

NRECA National Rural Electric Cooperative Association.

NRECA Business and Technology Strategies (BTS) A division of the National Rural Electric Cooperative Association that conducts collaborative studies aimed at accelerating technological innovations for use by electric cooperatives. Partnering with cooperatives, national labs, academic institutions, and industry, BTS monitors, evaluates, and applies advanced technologies to help electric cooperatives control costs, increase productivity, and enhance services to their members. Subjects being examined include carbon management and utilization, energy efficiency and demand response, smart grid deployment, and system reliability. Originally formed in 1973 as the NRECA Research Fund, it was revamped into the Rural Electric Research program in 1988 and became the Cooperative Research Network (CRN) in 1997 as part of a mission refocus driven by electric utility deregulation. BTS, which officially replaced CRN in 2015, is overseen by the NRECA Strategic Technology Advisory Committee. *(See Cooperative Innovators Awards, National Rural Electric Cooperative Association, Solar Utility Network Deployment Acceleration.)*

NRECA International A wholly owned subsidiary of the National Rural Electric Cooperative Association created on November 1, 1962, to combat communist expansion and foster goodwill by helping developing countries provide rural residents with safe, reliable, and affordable electricity. By designing, constructing, and operating electric utilities in remote locations around the globe while training local personnel to own and manage the systems, NRECA International efforts have increased agricultural productivity, produced millions of new jobs, and resulted in an enhanced quality of life for more than 150 million people in 40-plus nations. The division also encompasses duties of the former NRECA International Foundation, a registered charitable 501(c)(3) organization founded in 1985 that partners with electric cooperatives in the United States to supply donated equipment and recruit volunteer electric cooperative personnel to work with electric cooperatives overseas. *(See National Rural Electric Cooperative Association, Sister Cooperative Partnership Program.)*

NRTC The Herndon, Virginia-based organization that provides a smorgasbord of advanced telecommunications and information technology products and services to approximately 1,500 electric cooperatives, telephone cooperatives, and affiliates in 48 states. NRTC offerings include WildBlue satellite high-speed Internet service, automated meter reading, long-distance and mobile phone programs, and Internet Protocol television. Incorporated on August 6, 1986. Known as the National Rural Telecommunications Cooperative prior to a 2016 rebranding initiative. *(See Cooperative.com, Internet Protocol television, WildBlue.)*

NSPS New Source Performance Standards.

NSR New Source Review.

NTCA – The Rural Broadband Association The Arlington, Virginia-based service organization representing about 900 telephone cooperatives and other small, independent telecommunications carriers across the United States. Formed in February 2013 from a merger of the National Telephone Cooperative Association and the Organization for the Promotion and Advancement of Small Telecommunications Companies. Use en dash with spaces in name.

nuclear fission The energy produced by splitting atoms (such as uranium) in a nuclear reactor. *(See fusion power, nuclear power, reactor.)*

nuclear fuel reprocessing The chemical separation of spent nuclear fuel into plutonium, reusable uranium, and a small amount of waste products. Fear of nuclear weapons proliferation led the United

States to indefinitely suspend the commercial reprocessing and recycling of high-level nuclear waste in 1977 and focus on long-term storage. *(See nuclear power, Nuclear Waste Fund, Yucca Mountain.)*

nuclear power A method whereby steam, produced from water heated to a boil through nuclear fission, spins a turbine to generate electricity. In nuclear power plants, a reactor contains a core of nuclear fuel, primarily enriched uranium. When uranium atoms are hit by neutrons they fission (split), releasing heat and more neutrons. Under controlled conditions the neutrons keep striking more uranium atoms, creating a self-sustaining chain reaction used to boil water. Nuclear power accounts for 10 percent of the electricity produced by generation and transmission cooperatives and 15 percent of all electric cooperative power requirements nationwide; overall, it makes up 20 percent of U.S. electric generation. Research on producing nuclear fission through a molten-salt reactor—using a liquid mixture of salts, some being salts of uranium and thorium—instead of uranium is taking place as well. *(See baseload power plant, cooling tower, generation and transmission cooperative, nuclear fission, reactor, small modular reactor, uranium.)*

Nuclear Regulatory Commission (NRC) Federal agency responsible for the licensing and safety of nuclear power plants; successor to the U.S. Atomic Energy Commission. *(See U.S. Atomic Safety and Licensing Board, Yucca Mountain.)*

Nuclear Waste Fund An account created in the federal Nuclear Waste Policy Act of 1982 to pay for construction of a permanent, central geologic repository to store spent uranium fuel bundles and other high-level radioactive waste from commercial nuclear power plants, defense installations, and national laboratories. (The Nuclear Waste Policy Act called on the U.S. Department of Energy [DOE] to begin developing such a facility.) From 1983 until year-end 2016, Americans who consume electricity produced by nuclear power plants had paid nearly \$46.7 billion, including interest, into the federal Nuclear Waste Fund through a one-tenth of 1 cent per kilowatt-hour fee. Roughly \$1 billion of the total came from electric cooperative consumers. However, Congress has used most of the revenue collected to mask the size of the federal budget deficit (just \$13.5 billion had been spent on repository work through 2017). In 1987, amendments to the Nuclear Waste Policy Act focused DOE repository-building efforts exclusively at Yucca Mountain, Nevada, With the Obama administration deciding to shelve construction at Yucca Mountain, 16 utilities in 2009 sued DOE to halt payments to the fund. After five years of legal wrangling, DOE formally suspended payments on May 16, 2014. *(See National Association of Regulatory Utility Commissioners, Yucca Mountain.)*

NUTSEA National Utility Training & Safety Education Association.

NYPA New York Power Authority.

O

Occupational Safety and Health Administration (OSHA) Federal agency that sets safe workplace standards and enforces its rules through periodic inspections.

ocean wave power A form of hydrokinetic power that converts mechanical energy from the constant rising and falling of ocean waves into electricity. Most ocean wave power systems rely on buoy technology to run a piston that in turn drives a generator. *(See hydrokinetic power, tidal power.)*

OCR oil-circuit recloser.

Office of Management and Budget (OMB) A White House branch that prepares fiscal estimates and budgets.

off-peak power Electricity supplied during periods of low consumption. *(See peak demand, system demand.)*

off-peak rate A pricing structure where consumers pay a special low amount for electricity used during times of low consumption. *(See block rate, class rate, cost-based rate, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, offset rate, ratchet rate, step rate, time-of-use rate.)*

offset rate A pricing structure where a cooperative passes along certain charges to consumers. *(See block rate, class rate, cost-based rate, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, ratchet rate, step rate, time-of-use rate.)*

O.G. Anderson Safety Award *(See National Utility Training & Safety Education Association.)*

ohm The amount of resistance overcome by 1 V in causing 1 A to flow. An ohm measures resistance to current flow in electrical circuits.

Ohm's Law A formula that holds *the strength of an unvarying electrical circuit is directly proportional to the electromotive force and inversely proportional to the resistance of the circuit*. In other words, voltage is equal to current multiplied by resistance. Use the following formula: $E = I \times R$, where E is voltage in volts, I is current in amperes, and R is resistance in ohms.

Ohio Cooperative Living Official consumer publication of the Columbus, Ohio-based Ohio's Electric Cooperatives (formerly Ohio Rural Electric Cooperatives).

oil A liquid fossil fuel found in rock formations consisting of a complex mixture of hydrocarbons and other organic compounds. Refined and distilled, it can be turned into a variety of products such as asphalt, diesel fuel, gasoline, heating oil, jet fuel, kerosene, lubricants, paraffin wax, sulfuric acid, tar, and aromatic chemicals. More accurately referred to as *petroleum*. Oil, primarily diesel fuel, accounts for less than 1 percent of the power produced by generation and transmission cooperatives and less than 1 percent of all electric cooperative power requirements nationwide; overall, it makes up less than 1 percent of U.S. electric generation. Oil has been the largest primary source of energy in the U.S. since 1950. (*See combustion turbine, generation and transmission cooperative, peaking plant, syngas, synthetic fuel.*)

oil-circuit recloser (OCR) A device that protects electric lines by momentarily interrupting service when a fault occurs, then restoring power automatically after the fault clears. This keeps outages from occurring when temporary problems arise, such as tree branches touching a line. Use with hyphen.

Oklahoma Living Official consumer publication of the Oklahoma City, Oklahoma-based Oklahoma Association of Electric Cooperatives.

OMB White House Office of Management and Budget.

on-bill financing A way of helping cooperative members (typically low income) pay for long-term residential energy efficiency improvements or renewable energy investments through electric bills. In most cases a cooperative makes loans to consumers for efficiency upgrades, with the payment (equal to a percentage of resulting energy savings) tacked on to a consumer's monthly bill. On-bill financing programs not only save members significant energy dollars, they can delay the need for new generation resources, especially if combined with aggressive demand-response activities. (*See demand response,*

energy efficiency, Energy Efficiency and Conservation Loan Program, Energy Resources Conservation loan, load management, Rural Energy Savings Program, Rural Utilities Service.)

once a borrower, always a borrower *(See once rural, always rural.)*

once rural, always rural Lending policy used by the USDA Rural Utilities Service where any electric cooperative borrower is considered eligible for loans despite demographic changes in its service territory. The historic practice was officially written into law as part of the 2008 Farm Bill. Also referred to as *once a borrower, always a borrower. (See means testing.)*

on-line, online A generating plant that's operating is *on-line*. *Online* refers to communications over the Internet. *(See down.)*

on-site generation *(See distributed generation.)*

open access Permitting wholesale power suppliers and sellers to move power over the transmission lines of other utilities.

open-loop heat pump *(See heat pump.)*

operating expenses Costs needed to generate electricity, such as those associated with running a power plant, maintenance, taxes, and depreciation.

operating income The amount of money remaining to a utility after operating expenses are deducted from operating revenues.

operating reserve Generating capacity available within a short period of time to meet demand in case a power plant goes down or another supply disruption occurs. Most power systems are designed so that, under normal conditions, the operating reserve always matches the capacity of the largest generator plus a fraction of peak load. The operating reserve can be divided into spinning reserves and supplemental reserves. *(See capacity, demand, peak load, reserves, spinning reserve, supplemental reserve.)*

operating revenues Money a utility receives from selling goods and services.

Operation Round Up[®] A “members helping members” program where electric cooperative consumers agree to round up their monthly electric bills to the next whole dollar amount. The extra pennies, nickels, dimes, and quarters then flow into a fund managed by individual electric cooperatives and are used to assist worthy community organizations as well as members who fall on hard times. Some 250 local electric cooperatives nationwide currently run Operation Round Up programs, which have raised more than \$100 million over the years. Developed and launched by Palmetto Electric Cooperative in Hardeeville, South Carolina, in 1989. Use with registered trademark symbol on first reference; no hyphen on “Round Up.”

OSHA U.S. Occupational Safety and Health Administration.

osmotic power A type of renewable energy derived from the difference in the salt concentration between seawater and river water—it relies on osmosis with ion-specific membranes. The cost of the membrane has been a major obstacle to development so far, although a more cost-effective electrically modified polyethylene plastic membrane has been successfully tested for commercial use. The key waste product is brackish water. Also called *salinity gradient power*. (See *renewables*.)

Our Energy, Our Future[®] The largest and most aggressive grassroots awareness and advocacy campaign in electric cooperative history. At its core, the effort sought to engage all 42 million electric cooperative consumers in discussing with their elected officials the complexities associated with providing safe, reliable, and affordable power in an environmentally responsible fashion. Launched in late February 2008; replaced by the Cooperative Action Network in September 2013. Use with registered trademark symbol on first reference. (See *Cooperative Action Network*, *grassroots*, *National Rural Electric Cooperative Association*.)

outage Interruption of service to an electric consumer because of malfunctioning power plants, transmission lines, substations, or distribution equipment.

outdoor lights (See *dark-sky lights*, *high-pressure sodium vapor lights*, *induction lighting*, *light-emitting diode*, *mercury vapor lights*, *metal halide lights*.)

overnight capital costs An economic measure used for large construction projects, such as power plants, that includes labor, materials, and infrastructure but not financing, inflation, litigation, and

permitting expenses. Essentially a snapshot in time; assumptions are based on a power plant being built overnight.

owner Avoid using this word when referring to an electric cooperative consumer, as it implies a level of financial responsibility that makes folks uncomfortable. *Consumer, member, or consumer-member* is preferred, depending on context. (See *consumer, consumer-member, member.*)

ozone layer A section of the upper atmosphere containing a form of oxygen that screens out ultraviolet radiation. Studies showed this layer was being destroyed by chemicals from aerosol cans and refrigeration units, which were then banned. (See *chlorofluorocarbons.*)

P

Pace Act A federal law (officially the Department of Agriculture Organic Act) enacted on September 21, 1944, that extended the mission of the federal Rural Electrification Administration (REA) indefinitely beyond its targeted 1946 expiration date. The measure also fixed the interest rate on REA direct loans (loans made from funds appropriated annually by Congress) at 2 percent (previously they had been set at variable rates) and lengthened the loan payback period from 25 years to 35 years. Named after the bill's author, U.S. Rep. Stephen Pace (D-Georgia). (See *Executive Order 7037, Rural Electrification Act, Rural Electrification Administration, Rural Electrification and Telephone Revolving Fund, Rural Electrification Loan Restructuring Act.*)

pad-mount transformer An electric transformer mounted on the ground, usually on concrete, and seen most often in housing developments with limited overhead line construction. (See *pole-mount transformer, transformer.*)

passive solar energy Radiation from sunlight that can be used to provide heat and light without complicated machinery; typically controlled by building design and location. (See *active solar energy, photovoltaics, solar power, solar thermal energy.*)

patronage capital (See *capital credits.*)

Paul Revere Award An honor presented annually by the National Rural Electric Cooperative Association Board of Directors since 2008 that recognizes “outstanding achievement in the mobilization of electric cooperative consumer grassroots activities on an issue of importance to the

well-being of electric cooperatives and their consumer-members.” Electric distribution cooperative consumers, staff, directors/trustees, and statewide association staff and directors/trustees are eligible. *(See National Rural Electric Cooperative Association.)*

payback A method of calculating how long it will take to recover the additional cost of a more efficient appliance or building material.

PCBs polychlorinated biphenyls. Abbreviation acceptable on all references.

peak demand The electric utility industry’s equivalent of rush-hour traffic, when power costs run the highest. It’s the greatest demand placed on an electric system, measured in kilowatts or megawatts; also, the time of day or season of the year when that demand occurs.

peak pricing *(See critical-peak pricing, time-of-use rate.)*

peak load The amount of electric power required by a consumer or a utility system during times when electric consumption reaches its highest point; measured in kilowatts or megawatts. *(See demand response, demand-side management, load management, personal energy management.)*

peak load plant *(See peaking plant.)*

peak load shifting/shaping/peak shaving *(See demand-side management, load management, Reciprocal Internal Combustion Engine rule.)*

peaking plant An electric generating unit, usually a combustion turbine burning natural gas or diesel fuel, that operates at high cost for brief periods during times of high electricity consumption. Also called a *peak load plant*. *(See baseload power plant, combustion turbine, dispatchable generation, intermediate load plant, locational marginal pricing.)*

Penn Lines Official consumer publication of the Harrisburg, Pennsylvania-based Pennsylvania Rural Electric Association.

penstock An enclosed pipe that delivers water to a hydroelectric plant. *(See hydroelectric plant, hydroelectric power, run-of-river, turbine-generator.)*

penta pentachlorophenol.

pentachlorophenol (penta) An organochlorine compound commonly used as a preservative treatment for wood utility poles. *(See ammoniacal copper zinc arsenate, chromated copper arsenate, chromated copper arsenate-emulsified treatment, creosote.)*

people's utility district *(See public utility district.)*

percentage method Retirement of capital credits by paying a portion of the amount in a member's account, regardless of how long it has been there. *(See capital credits; first in, first out, last in, first out.)*

perm Unit of measurement for the rate at which water moves through a membrane. Used to measure vapor barriers in home construction and remodeling.

personal energy management Demand-response technologies, such as in-home displays, free online web portals, smartphone applications, or smart thermostats combined with peak-pricing indicators, that inform consumers in real time when peak load conditions on an electric grid approach or occur. Consumers can then use the data to voluntarily decide when and how to curtail electric use to save money. *(See demand response, load management, peak demand, smart grid, smart thermostat, ZigBee.)*

petroleum *(See oil.)*

PEV plug-in electric vehicle. *(See electric vehicle.)*

PHEV plug-in hybrid electric vehicle.

photovoltaics (PV) Materials that generate electric power directly from sunlight. *(See active solar energy, community solar, distributed generation, passive solar energy, power density, renewables, solar power, solar thermal energy, utility-scale solar.)*

PJM PJM Interconnection.

PJM Interconnection (PJM) The Valley Forge, Pennsylvania-headquartered regional transmission organization that coordinates roughly 184,000 MW, or nearly 20 percent, of the nation's generating capacity, in all or parts of 13 Mid-Atlantic, Midwest, and southern states and the District of Columbia. *(See fixed resource requirement, minimum offer pricing rule, regional transmission organization, zero-emissions credits.)*

plant revenue ratio A measurement of the relative productivity of a cooperative's utility plant, determined by comparing plant value to the revenue it generates. A high ratio could indicate a cooperative is not generating adequate margins relative to the cost of plant investment. A low ratio could reflect reasonable investment in plant and revenues received. At one point in time, plant revenue ratio determined the amount of supplemental National Rural Utilities Cooperative Finance Corporation capital each USDA Rural Utilities Service borrower received. *(See capital, concurrent loan, margin, National Rural Utilities Cooperative Finance Corporation, Rural Utilities Service, utility plant.)*

plug-in electric vehicle Cars or light trucks powered by strictly by electricity (batteries). Simply known as *electric vehicles (EVs)*. *(See distributed energy resources, electric vehicle, EPRI Prism, plug-in hybrid electric vehicle.)*

plug-in hybrid electric vehicle (PHEV) Cars or light trucks that rely on the combination of a gasoline or diesel engine and rechargeable lithium-ion batteries for propulsion. Unlike standard hybrid vehicles, where much smaller 1.3-kWh nickel-metal hydride batteries are recharged by the gasoline engine and a regenerative braking system, PHEV batteries (ranging from 9 kWh to 16 kWh and perhaps even larger) are generally fully charged after eight to 12 hours when connected to a regular 120-V outlet (Level 1 charging, up to 16 A) or more quickly (three to eight hours) using a Level 2 (240 V, up to 40 A) charging station. Fast-charge stations using AC current (Level 3, 240 V, drawing up to 96 kW) and high-speed DC chargers (at 480 V DC and up to 90 kW) can replenish fully depleted PHEV battery packs to 80 percent strength in approximately 30 minutes. Early model fast-charge stations are now being deployed at public locations (airports, shopping centers and highway truck stops). PHEVs differ from electric vehicles (EVs), which run strictly on battery power (some EVs, like the Chevy Volt, have a gasoline tank, but gas is only used to run a generator to produce electricity when the batteries are drained). Several electric cooperatives are testing PHEV SUVs and bucket trucks. The main worry for electric cooperatives from PHEVs and EVs involves use of home charging stations—household transformers may experience problems due to increased running and reduced cool-down times as well as capacity issues. However, since PHEVs and EVs will largely be recharged at night, cooperatives

should experience better load factors and lower line losses. *(See distributed energy resources, electric vehicle, EPRI Prism, plug-in electric vehicle.)*

PMAs power marketing administrations.

pole A long, slender beam made of wood, steel, concrete, composite fiberglass, ductile iron, or laminated wood that serves as the backbone of electric cooperative efforts to provide safe, reliable, and affordable electric service across 56 percent of the U.S. In many cases, poles and crossarms represent between 20 percent to 33 percent of a distribution cooperative's annual materials budget and an equal percentage of its overall utility plant investment. Electric cooperatives own and maintain roughly 38 million poles (about one-third of those in use by electric and telephone utilities nationwide; generally cooperatives average 18 poles per mile of primary distribution line), and purchase an additional 600,000 to 700,000 annually. Most wood distribution poles today are fashioned from southern yellow pine (80 percent), with lodgepole pine, Douglas fir, and western red cedar common in the Rocky Mountains and Pacific Northwest, and red (also called northern or Norway) pine in the Upper Midwest. While wood poles have a life expectancy of 40 years, a good pole in the right conditions can last indefinitely. Steel and fiberglass poles, which are much costlier than wood, boast an 80- to 120-year life expectancy. Only 20 percent of pole-sized trees cut each year become poles, as straightness, scars, hooks, shake, and insect damage relegate most to the general lumber pile. *(See ammoniacal copper zinc arsenate, chromated copper arsenate, chromated copper arsenate-emulsified treatment, creosote, crossarm, pentachlorophenol, pole attachments, pole lights, underground residential distribution, Wood Quality Control, Inc.)*

pole attachments Cables and related equipment, typically deployed by telephone, cable TV, and broadband companies, that “piggyback” on electric utility poles, conduits, and rights-of-way for a fee. Electric cooperatives base pole attachment rates and terms on local costs and conditions, not profit. As a result, the federal Telecommunications Act of 1996 exempts electric cooperatives from Federal Communications Commission pole attachment rate-setting authority, an exemption first established by Congress in 1978.

pole lights *(See dark-sky lights, high-pressure sodium vapor lights, induction lighting, light-emitting diode, mercury vapor lights, metal halide lights.)*

pole-mount transformer An electric transformer mounted on a utility pole. *(See pad-mount transformer, transformer.)*

pollution control Steps taken to ease any harmful environmental effects resulting from electricity production. (*See flue gas.*)

polychlorinated biphenyls (PCBs) Once used as insulation in electric transformers, PCBs were found in the mid-1970s to be toxic and banned. Abbreviation acceptable on all references.

postage stamp rate A regional transmission pricing structure that establishes a single rate for all users; similar to the way postage is charged in that it costs the same amount to send a letter across the country as it does down the street. (*See license plate rate.*)

Potthast Award (*See Herman C. Potthast Award.*)

power In the context of electricity, a general term that can include energy (kWh), capacity (kW), or both. Use the specific term *energy* or *capacity* whenever possible. In a scientific sense, *energy* is the ability to do work, *power* is the rate at which work gets done. Operating a 60-W lightbulb requires power, measured in watts. After an hour, when you switch off the light, you can measure the amount of energy that was consumed in joules or kilowatt-hours or even British thermal units. Another way to look at power: people convert energy—measured in barrels of oil, tons of coal, and cubic feet of natural gas, for example—into power, tabulated in watts or horsepower. (*See energy, watt.*)

power cost adjustment (*See fuel adjustment clause.*)

power density The amount of power that can be harnessed in a given volume, area, or mass. For example a 2,700-MW nuclear power plant sitting on 18.75 acres boasts a power density of 300 hp per acre. To produce an equivalent amount of power would require 21,267 square miles of corn ethanol (power density of 0.25 hp per acre), or 2,606 square miles of biomass (2.1 hp per acre), or 869 square miles of wind (6.4 hp per acre), or 156 square miles of solar photovoltaics (36 hp per acre.) Because of their low power densities, some environmental groups refer to wind and solar power projects as “energy sprawl.” (*See energy density.*)

power factor The ratio between real power (electricity used) and apparent power (the amount of electricity provided) in a circuit, expressed as a number between 0 and 1. When voltage and current are perfectly in sync, electric cooperatives achieve a 100 percent power factor (or 1). Normally, though, power factor comes in below 100 percent necessitating use of specialized equipment like capacitors to

keep an electrical system in balance. Commercial and industrial consumers are often required to maintain a power factor of 0.95 or more; the average home boasts a power factor of 0.9, or 90 percent. *(See alternating current, apparent power, capacitor, reactive power, real power.)*

powerhouse An electric generating station.

power line A conductor (wire) that carries electricity from a generation source to a supplier or the ultimate consumer. Two words in this usage.

powerline carrier A system for moving data over an electric power line. Note one word on *powerline* in this usage.

power marketer Persons or companies that sell wholesale power they generate themselves, purchase from others, or both. Power marketers are required to register with the Federal Energy Regulatory Commission. *(See aggregator, broker, Federal Energy Regulatory Commission, purchase power.)*

power marketing administrations (PMAs) The umbrella term for the federal Bonneville Power Administration (BPA), Southeastern Power Administration (SEPA), Southwestern Power Administration (SWPA), and Western Area Power Administration (WAPA). PMAs sell wholesale power at-cost from 134 federal hydropower projects owned and operated by the U.S. Army Corps of Engineers or the federal Bureau of Reclamation (as well as one managed by the U.S. State Department International Boundary and Water Commission), giving first priority to the electricity (under the preference principle) to not-for-profit, consumer-owned electric cooperatives and publicly owned municipal electric systems. More than 600 electric cooperatives and 500 municipal electric systems in 34 states, serving 60 million consumers, receive power from a PMA. The multipurpose dams that churn out mostly baseload generation for the PMAs account for approximately 49 percent (roughly 38,000 MW) of the country's hydroelectric output—preventing an estimated 85.5 million tons of carbon dioxide emissions from entering the atmosphere each year. Most entered service during a 25-year stretch between the late 1930s and early 1960s. *(See Alaska Power Administration, baseload power plant, Bonneville Power Administration, Bureau of Reclamation, hydroelectric power, preference principle, purchase power, Southeastern Power Administration, Southwestern Power Administration, U.S. Army Corps of Engineers, Western Area Power Administration.)*

power pool Two or more utility systems connected to increase reliability and operating efficiencies.

Powerplant and Industrial Fuel Use Act of 1978 An ill-conceived federal law that restricted the use of natural gas to fire new power plants, encouraging utilities to switch to building coal or nuclear facilities instead. The Fuel Use Act took effect just as electric cooperatives were in the middle of a major power plant building cycle. In the end, many systems found themselves shifting generation strategies midstream—an expensive proposition. Due to the legislation, utility construction costs soared, and with them, cooperative electric bills. Congress repealed the measure in 1987.

power purchase agreement (PPA) A contract between an electric cooperative(s) and a third-party developer to purchase solar energy. Under the arrangement, the developer handles all of the tasks associated with constructing, operating, and financing a solar power project, while retaining full risk of operations and performance over the PPA period. PPA rates are typically set by the tax benefits available to the developers. (*See photovoltaics, solar power, utility-scale solar.*)

power strip An electrical device consisting of a cord with a plug on one end and several electric sockets on the other. Two words, no hyphen.

power supplier A company that provides electricity, either by generating it or by arranging for its delivery to a consumer.

power supply choice (*See consumer choice.*)

PPA power purchase agreement.

PPD public power district.

preference principle An antimonopoly measure authorized by Congress that gives publicly owned municipal electric systems (since 1906) and not-for-profit, consumer-owned electric cooperatives (since creation of the Tennessee Valley Authority in 1933) first right, or preference, to purchase hydropower produced at federal or state dams. Preference provides cooperatives access to wholesale power at reasonable rates and creates a competitive yardstick for measuring electricity costs. Preference provisions are included in the governing statutes for the nation's power marketing administrations and with various other federal or state dam projects, notably through the Flood Control Act of 1944, Bonneville Project Act, Pacific Northwest Electric Power Planning and Conservation Act,

and Niagara Redevelopment Act of 1956. (*See hydroelectric power, New York Power Authority, power marketing administrations.*)

price to compare The cost per kilowatt-hour for generation and transmission from a local utility that a competitive electric generation supplier has to beat for a consumer to save money. (*See consumer choice, default service, deregulation, electric generation supplier, provider of last resort, standard offer service.*)

provider of last resort Electricity supplied by local utilities to consumers who do not choose a competitive electric generation supplier. In some states, it's called *default service* or *standard offer service*. (*See consumer choice, default service, deregulation, electric generation supplier, price to compare, standard offer service.*)

Price-Anderson Act Federal legislation first passed in 1957 that partially indemnifies nuclear power plant operators against liability claims arising from accidents while still ensuring compensation for the general public. The act was most recently renewed for another 20 years as part of the Energy Policy Act of 2005.

private power company (*See investor-owned utility.*)

privatization Turning over government or public assets to private interests to be operated for profit.

production tax credit (PTC) A federal tax incentive designed to support the introduction of renewable energy. In its most recent form, for-profit companies can qualify for a 2.3 cents per kWh PTC when installing wind, geothermal, and closed-loop biomass (trees or crops grown expressly for electricity production) generation systems for the first 10 years of their operation. Other renewable technologies, such as open-loop biomass (sawdust, tree trimmings, timber slash, wood chips, farm byproducts, animal waste, and landfill gas), capacity additions for existing small hydro (under 25 MW), municipal solid waste combustion, small irrigation (under 5 MW), and hydrokinetic (ocean wave and tidal) power plants received a lesser PTC of 1.2 cents per kWh. Production tax credits lower the cost of power from renewable energy projects to a level competitive with conventional fuels, like coal or natural gas. Electric cooperatives, as not-for-profit utilities, are not eligible for PTCs but were for a time able to use Clean Renewable Energy Bonds or New Clean Renewable Energy Bonds (which expired at the end of 2010 and were formally abolished at the end of 2017) or form for-profit entities eligible to receive payments covering 30 percent of a project's capital costs through the U.S. Department of Treasury

Section 1603 tax grant program (which expired at the end of 2011) for the same purposes. Originally enacted as part of the federal Energy Policy Act of 1992, the PTC was extended six times and on six occasions (1999, 2001, 2003, 2012, 2013, and 2014) allowed to sunset. This on-again/off-again status contributed to a boom-bust development cycle that particularly plagued the wind industry. In the fiscal year 2016 budget deal, the PTC for all eligible generation was extended through 2016; the wind component was allowed to continue longer but start declining in value after December 2021—for construction beginning in 2022, the wind credit drops to 60 percent; for 2023 construction, it drops to 40 percent; and in 2024 gets totally phased out. Spell out on first reference. *(See Clean Renewable Energy Bonds, Energy Policy Act of 1992, investment tax credit.)*

PTC production tax credit.

public power district (PPD) Locally controlled political subdivisions within the state of Nebraska, similar to a county, formed to distribute electricity on a not-for-profit basis across a specified service area. PPDs (some are called *rural public power districts*, or *RPPDs*) differ from electric cooperatives in that they are not required to allocate capital credits or hold annual meetings, and directors are elected on the state general election ballot (candidates only need to reside within the PPD/RPPD’s boundaries, not be connected to its power lines). PPDs/RPPDs enjoy full status as members of the National Rural Electric Cooperative Association. Nebraska has 26 PPDs/RPPDs. The state’s conversion from a mixture of investor-owned utilities serving the state to a “public power empire” spanned the 1940s—the last privately owned utility line was cut on December 29, 1949. *(See electric cooperative, public utility district.)*

public utilities Private, for-profit, and state-regulated businesses that provide an essential commodity or service, such as water, electricity, natural gas, or cable TV. Also, entities selling wholesale power or providing interstate transmission service subject to oversight by the Federal Energy Regulatory Commission. *(See holding company, Federal Energy Regulatory Commission, investor-owned utility, regulation.)*

public utility district (PUD) A political entity, similar to a school district, formed in Washington, California, and Oregon (where they’re called *people’s utility districts*) to distribute electricity on a not-for-profit basis across a specified service area. PUDs differ from electric cooperatives in that they are not required to allocate capital credits or hold annual meetings, and commissioners (i.e. directors) are elected on the state general election ballot (candidates only need to reside within the PUD’s

boundaries, not be connected to its power lines). PUDs enjoy full status as members of the National Rural Electric Cooperative Association. *(See electric cooperative, public power district.)*

Public Utility Holding Company Act (PUHCA) One of the most important consumer protection statutes ever enacted. The original 1935 federal law limited the size (geographic scope) of investor-owned utility holding companies, banned common ownership of electric and natural gas utilities, and curbed self-dealing among utility affiliates while opening up holding company books and records to inspection by the U.S. Securities and Exchange Commission and state regulators. The Depression-era measure was repealed in the Energy Policy Act of 2005, although some of its consumer safeguards were retained in a revised PUHCA of 2005 thanks to electric cooperative efforts. *(See holding company, investor-owned utility, public utilities.)*

Public Utility Regulatory Policies Act (PURPA) One of five parts of the National Energy Act of 1978 and designed to promote greater use of self-generated, mostly “clean and green” energy. PURPA Section 210 created an electricity sales market for non-utility generators, independent power producers (such as industrial cogeneration), or consumers with small-scale renewable generation like anaerobic digesters or solar systems, by requiring electric utilities to buy power from them at the utility’s avoided cost, subject to state regulator-approved terms and conditions. The Energy Policy Act of 2005 repealed sections of PURPA requiring utilities to buy power from these qualifying facilities if the Federal Energy Regulatory Commission found they have access to real-time competitive wholesale power markets. The 2005 energy law also revoked requirements that utilities sell power to qualifying facilities in territories with active retail competition. *(See avoided cost, cogeneration, independent power producer, non-utility generator, qualifying facility, small power producer.)*

PUD public utility district, people’s utility district.

PUHCA Public Utility Holding Company Act.

pumped-storage hydro A hydroelectric plant that generates power during times of peak demand by using water previously pumped to an elevated reservoir during times of low electricity use. Pumped-storage hydro remains the largest-capacity form of electricity storage (95 percent) currently available (21,600 MW from 43 facilities, most built between 1960 and 1990 to store excess generation from nuclear and coal-fired power plants), generating about 3 percent of the nation’s total electricity needs.

(See compressed-air energy storage, energy storage, distributed energy resources, hydroelectric plant, hydropower, off-peak power, peak demand.)

purchase power Wholesale power bought through a long-term contract or off the spot market. Purchase power from investor-owned utilities, non-utility generators, power marketers, federal power marketing administrations, state power agencies, and others makes up roughly 50 percent of the electricity supplied by electric cooperatives nationwide; the rest is provided from power plants owned almost exclusively by generation and transmission cooperatives. No “d” needed on purchase in this usage, although power can indeed be “purchased.” *(See investor-owned utility, generation and transmission cooperative, non-utility generator, power marketer, power marketing administrations, power purchase agreement, spot market.)*

PURPA Public Utility Regulatory Policies Act.

PV photovoltaics.

Q

QF qualifying facility.

quad A quadrillion Btus, equal to the energy contained in 8 billion gallons of gasoline—a year’s supply for 10 million cars.

qualified lender For electric cooperatives, loans carrying a USDA Rural Utilities Service (RUS) guarantee can be made through qualified cooperative lenders (to date, just the National Rural Utilities Cooperative Finance Corporation and CoBank), which obtain funds from the Federal Financing Bank (FFB)—an arm of the U.S. Treasury that coordinates the borrowing of federal agencies providing loan guarantees. The government guarantee allows qualified lenders to raise money at a reduced rate compared to capital markets. For the privilege of borrowing from FFB, qualified lenders pay a 30-basis-points (three-tenths of 1 percent) fee annually for as long as a loan remains outstanding. Those fees then flow into the federal Rural Economic Development Loan and Grant Program to provide additional funding for rural businesses expansion and job creation. *(See Federal Financing Bank, guaranteed loans, RUS, National Rural Utilities Cooperative Finance Corporation, Rural Economic Development Loan and Grant Program, Rural Utilities Service, USDA Guaranteed Underwriter Program.)*

qualifying facility (QF) A distinct class of electricity producers consisting of either renewable generators up to 80 MW in capacity or highly efficient cogenerators of any size that meet criteria established by the Federal Energy Regulatory Commission (FERC). When a generation unit of this type meets Public Utility Regulatory Policies Act and FERC requirements for size and efficiency, local electric utilities are obligated to interconnect, sell backup power to, and purchase the output from the QF at their avoided cost, subject to any state regulator-approved terms and conditions if the generation was a byproduct of an industrial process. Under the Energy Policy Act of 2005, utilities no longer have to buy power from QFs if FERC finds they have access to real-time competitive wholesale power markets, or sell power to QFs in territories with active retail competition. *(See avoided cost, cogeneration, Public Utility Regulatory Policies Act, small power producer.)*

quorum Number of members who must be present for an electric cooperative to legally conduct business. Usually established in a cooperative's bylaws. *(See bylaws.)*

R

rad A measure of the amount of radiation absorbed by the human body.

radiant energy Energy traveling outward from a source with a wave motion.

radiation Energy emitted as waves or nuclear particles; a natural component of the environment and an inevitable byproduct of nuclear power.

radiator A device that transfers heat to room air by circulating steam or hot water through pipes.

ratchet rate A pricing structure incorporated into utility rate designs to minimize the risk of providing service to consumers whose loads vary throughout the year. The ratchet spreads out costs over an annual basis, based on maximum past or present electric demand. For example, if peak demand during summer hits 500 kW and the rate design includes a 50 percent ratchet, the minimum billing would be 250 kW for following months, even if actual demand was lower. *(See block rate, class rate, cost-based rate, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, step rate, time-of-use rate.)*

rate The cost per kilowatt-hour for electricity.

rate base The total value of a utility's plants, transmission lines, buildings, and other equipment.

rate of return The percentage of profit a utility earns on an investment in electric facilities; generally, it applies only to regulated investor-owned utilities.

RBCS Rural Business-Cooperative Service.

REA Rural Electrification Administration.

REA circus A federal Rural Electrification Administration (REA) traveling road show that demonstrated electric appliances and products for agricultural and home use. Officially called the *REA Farm Equipment Tour*, it ran from October 1938 until the end of 1941. (See *Rural Electrification Administration*.)

REA Farm Equipment Tour (See *REA circus*.)

reactive power The portion of power flow due to stored energy that returns to the source in each alternating current cycle. Since reactive power flow transfers no net energy to a load, it's sometimes called "wattless" or "non-working" power. Reactive power becomes important when an electric load or a home appliance contains coils or capacitors, as electricity will periodically return to the power plant and then "slosh" back and forth across power lines. Reactive power has been described as the bouncing up and down that happens when you walk forward across a trampoline, even though the movement seems to head in the opposite direction. Electric cooperatives work hard to balance real power and reactive power in distribution and transmission operations as failure to do so can cause excessive line losses, reduce capacity, and destabilize the system. Conventionally expressed in *volt-amperes reactive* or *kilovolt-amperes reactive*. (See *alternating current*, *apparent power*, *power factor*, *real power*.)

reactor A complex machine that uses boiling water to produce steam, which in turn spins a turbine to generate electricity. Heat for boiling the water comes through the fission, or splitting, of uranium atoms. Research on producing nuclear fission through a molten-salt reactor—using a liquid mixture of salts, some being salts of uranium and thorium—instead of uranium is taking place as well. (See *nuclear fission*, *nuclear power*, *small modular reactor*, *uranium*.)

real power Electricity actually used, defined as the portion of power flow that, when averaged over a complete alternating current cycle, results in the net transfer of energy in one direction. If an electric load or appliance behaves purely as a resistor (such as a heater or an incandescent lightbulb), then the device consumes real power only. Conventionally expressed in *watts* or *kilowatts*. (See *alternating current, apparent power, power factor, reactive power*.)

real-time pricing A method of setting rates where the retail rate for electricity varies on an hourly or more frequent basis as the price of wholesale power changes. (See *block rate, class rate, cost-based rate, critical-peak pricing, declining block rate, demand rate, dynamic pricing, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, peak demand, ratchet rate, step rate, time-of-use rate*.)

REC/RECs renewable energy certificate/renewable energy certificates.

Reciprocal Internal Combustion Engine rule (RICE rule). A U.S. Environmental Protection Agency (EPA) emissions regulation finalized on January 14, 2013, covering all stationary backup generators that burn diesel fuel, gasoline, or natural gas. RICE says electric utilities can call on these types of generators for up to 100 hours each year for emergency demand response, voltage support, and testing purposes without their owners retrofitting them with expensive emissions-control equipment. In addition, 50 of those hours are set aside for non-emergency situations, including deployment to address reliability at local or regional levels. Since May 3, 2014, generators used at manufacturing plants, agricultural processing facilities, and schools, for example, that don't meet EPA's emergency exemptions must make whatever emissions control upgrades are necessary to participate in electric cooperative peak-shaving activities. A federal appeals court in May 2015 tossed out the 100 hours exemption as well. (See *demand response, demand-side management, load management, peak load shifting/shaping/peak shaving, U.S. Environmental Protection Agency*.)

Red Flags rule A Federal Trade Commission regulation aimed at stemming the tide of identity theft. It required electric cooperatives, like all utilities with "covered accounts," to implement identity theft prevention programs by November 1, 2008. Enforcement was delayed three times before finally kicking in on December 31, 2010.

REDL&G Rural Economic Development Loan and Grant Program.

regional meeting A gathering of electric cooperative leaders from states within one of 10 regions of the National Rural Electric Cooperative Association. Use numerals and ampersand when referring to regions: *The NRECA Regions 1 & 4 Meeting will be held in Pittsburgh, Pennsylvania. (See National Rural Electric Cooperative Association.)*

regional transmission organization (RTO) An entity established to ensure non-discriminatory access to transmission systems on a regional basis, perform regional transmission planning, implement and operate competitive wholesale power markets, and improve regional system reliability. The voluntary formation of RTOs was encouraged by the Federal Energy Regulatory Commission (FERC) under Order 2000 issued on December 20, 1999. RTOs perform similar functions as independent system operators (ISOs) but have expanded authority and cover larger, multi-state geographic areas. Both ISOs and RTOs are subject to FERC jurisdiction. The nation's seven existing RTOs/ISOs are Valley Forge, Pennsylvania-based PJM Interconnection; Carmel, Indiana-headquartered Midcontinent Independent System Operator; ISO New England in Holyoke, Massachusetts; New York ISO in Rensselaer, New York; California ISO in Folsom, California; Electric Reliability Council of Texas in Austin, Texas; and the Southwest Power Pool in Little Rock, Arkansas. There are also two RTOs in Canada: Alberta Electric System Operator and the Ontario Independent Electricity System Operator. The annual *RTO Report Card* produced by the National Rural Electric Cooperative Association finds that RTOs have not done a satisfactory job of encouraging investment in generation and transmission because their short-range markets do little to reduce long-term risk. In addition, RTOs have not made much progress in allowing all generators within a region to compete against one another on all price levels. *(See bulk power, Federal Energy Regulatory Commission, independent system operator, Midcontinent Independent System Operator, PJM Interconnection, transmission system, wholesale power market.)*

regulation A governmental order carrying the force of law. Because public utilities, such as stockholder-controlled investor-owned power companies, gain a natural monopoly within a given area, governmental oversight of rates and service becomes necessary to protect consumers from rampant price gouging and shoddy performance. Not-for-profit local electric cooperatives, being member-owned and controlled, boast built-in consumer protection. As a result, most states exempt electric cooperatives from utility regulation. *(See electric cooperative, holding company, investor-owned utility, not-for-profit, public utilities.)*

reliability Every utility's goal of providing uninterrupted electric service to consumers.

ReliabilityFirst Corporation One of eight North American Electric Reliability Corporation regional organizations that coordinate planning and operations among utilities. Note use of italics on name. (*See North American Electric Reliability Corporation.*)

rem “Roentgen equivalent, man.” A measure of radiation received by an individual. A dose of 100 rem will cause severe illness; 500 rem or more is considered fatal.

RE Magazine Monthly flagship publication of the National Rural Electric Cooperative Association. Editorial content focuses on national issues of importance to electric cooperatives, industry trends, emerging technologies, solutions to management and operational challenges, new products and services, and profiles of interesting electric cooperative personalities. *RE Magazine* acceptable on all references. First rolled off the presses in October 1942. Known as *Rural Electrification Magazine* until March 2001. (*See National Rural Electric Cooperative Association, Straight Talk.*)

REMDC Rural Electric Management Development Council.

renewable electricity standard (RES) A provision considered by the 111th Congress (2009–11) that would have amended the federal Public Utility Regulatory Policies Act of 1978 and required all electric utilities to obtain 20 percent (U.S. House) or 15 percent (U.S. Senate) of their retail power supply from specific renewable energy sources, such as wind, solar, biomass, or geothermal, by 2021, or pay a 2.2 cents per kWh compliance fee. The Senate RES allowed energy efficiency gains to count as well. A national RES, as envisioned, would have served as a floor, rather than pre-empted, existing state renewable portfolio standards. Because of insufficient transmission capacity to move renewable (primarily wind) energy to population centers, electric cooperatives viewed RES proposals as a back-door tax increase on consumers and sought a full exemption from any RES mandates. In addition, cooperatives called on Congress to provide the Federal Energy Regulatory Commission with eminent domain authority on transmission siting and/or states to commit to building needed transmission lines. (*See carbon capture and storage, clean energy standard, Federal Energy Regulatory Commission, Public Utility Regulatory Policies Act, renewable portfolio standards, renewables.*)

renewable energy certificate/credit; renewable energy certificates/credits (REC/RECs)

Environmental attributes associated with the generation of 1 MWh of renewable energy that can be sold to other electric utilities and electric generation suppliers to meet state renewable portfolio

standards or marketed to companies and institutions wanting to demonstrate their “green” commitment. *(See electric generation supplier, renewable portfolio standards, renewables, zero-emissions credits.)*

renewable portfolio standards (RPS) Laws passed by 29 states, two territories, and the District of Columbia (as of year-end 2018) that require investor-owned utilities, competitive electric generation suppliers, as well as some municipal electric systems and electric cooperatives to add increasing amounts of “clean and green” electricity to their retail power supply mix (generally 25 percent or more) by a certain date (mostly by 2030). Hawaii, Nevada, and North Carolina allow energy efficiency to count toward half of their RPS. Eight other states (Indiana, North Dakota, Oklahoma, South Dakota, Utah, Vermont, Virginia, and West Virginia) and two territories have passed non-binding renewable energy goals. Eighteen states call for electric cooperatives to meet RPS mandates. In three others that generally exempt cooperatives from an RPS, Montana holds that cooperatives with more than 5,000 members develop similar renewable standards; Pennsylvania allows cooperatives to comply by offering energy efficiency or demand-side management programs; and Texas rescinds its exemption if cooperatives participate in consumer choice. *(See renewable electricity standard, renewables.)*

renewables Sources of energy that are naturally replenishable, including wind, solar, biomass, geothermal, hydro, and hydrokinetic (ocean wave and tidal) power. Non-hydro renewables account for about 1 percent of the power produced by generation and transmission cooperatives and nearly 8 percent of electric cooperative power requirements nationwide; overall, renewables make up close to 10 percent of U.S. electric generation. Nationwide, cooperatives own more than 980 MW of non-hydro renewable energy generation with another 8,215 MW under long-term contract (roughly 73 percent of the total being percent wind)—in addition to roughly 10,000 MW of preference power from contracts with federal hydroelectric facilities. *(See anaerobic digester, biomass, energy density, generation and transmission cooperative, geothermal power, hydroelectric power, hydrokinetic power, hydropower, microhydro, ocean wave power, photovoltaics, power density, power marketing administrations, preference principle, osmotic power, solar power, tidal power, wind power.)*

RERC Rural Electricity Resource Council.

re-regulation Returning governmental jurisdiction over an industry previously freed of such control. *(See consumer choice, deregulation, Electric Energy Consumer Bill of Rights, restructuring, standard offer service.)*

RES renewable electricity standard.

RESAP Rural Electric Safety Achievement Program.

reserves Extra generating capacity required to provide for variations in demand, load-forecasting errors, loss of equipment, and area protection. (*See operating reserve, spinning reserve, supplemental reserve.*)

RESMA Rural Electric Statewide Managers Association.

RESP Rural Energy Savings Program.

restructuring Changes made in the electric utility industry to promote competition. Also refers to the reorganization of an electric utility. (*See consumer choice, default service, deregulation, Electric Energy Consumer Bill of Rights, electric generation supplier, price to compare, provider of last resort, re-regulation, standard offer service.*)

retail choice (*See consumer choice.*)

retail competition (*See consumer choice.*)

retail wheeling (*See consumer choice.*)

retrofit Installation or replacement of equipment at an existing power plant.

Revolving Fund The Revolving Fund was eliminated as part of the Federal Credit Reform Act of 1990. It is short for *Rural Electrification and Telephone Revolving Fund*. Acceptable on all references. (*See Rural Electrification and Telephone Revolving Fund.*)

RICE rule Reciprocal Internal Combustion Engine rule.

right-of-way A strip of land owned by another party on which a utility places poles, wires, substations, and other facilities. Sometimes acquired through eminent domain. Use hyphens for both the noun and adjective form. Plural is *rights-of-way*. (*See easement, eminent domain.*)

Rochdale Principles A set of business guidelines drawn up by Charles Howarth, one of 28 weavers and other artisans who founded the Rochdale Society of Equitable Pioneers in Rochdale, England, on December 21, 1844. (The tradesmen had banded together to open a store selling food items they could not otherwise afford, starting out with a meager selection of butter, sugar, flour, oatmeal, and a few candles but soon expanding to include tea and tobacco. Eventually, the enterprise was so successful that the group was able to open a cooperative factory and textile mill.) The Rochdale (pronounced Rotch-dale) Principles serve as the basis of the seven cooperative principles used today. *(See cooperative, cooperative principles, cooperative values.)*

rolling blackouts Controlled power outages designed to lessen the threat of a major cascading outage, caused by short supply and high demand for power affecting major transmission systems. Rolling blackouts are scheduled for predetermined sectors of the transmission grid at timed intervals. This spreads the burden of power shortages across an entire region for short, manageable periods (usually no more than a few hours) rather than allowing imbalances to destabilize the grid and cause extended, unplanned blackouts that can jeopardize public safety and damage sensitive equipment. *(See blackout, grid, outage, transmission system.)*

RPS renewable portfolio standards.

RTFC Rural Telephone Finance Cooperative.

RTO regional transmission organization.

run-of-river A hydroelectric plant that diverts the natural energy of moving water from undammed waterways to drive turbine-generators and produce power. *(See hydroelectric plant, hydroelectric power, penstock, turbine-generator.)*

Rural Business-Cooperative Service (RCBS) A division of the U.S. Department of Agriculture that oversees the Rural Economic Development Loan and Grant Program. *(See Rural Electric Development Loan and Grant Program, USDA Rural Development.)*

Rural Economic Development Loan and Grant Program (REDL&G) A federal Rural Business-Cooperative Service offering that uses electric cooperatives as “pass-throughs” to make loans and grants available for rural businesses expansion and job creation. Parties that receive REDL&G assistance see no real difference between loans and grants—in both cases, local electric cooperatives

furnish the funds as a zero-interest loan with a payback of up to 10 years. Cooperatives, though, guarantee repayment of REDL&G loans to the federal government. With REDL&G grants, electric cooperatives agree to create a revolving loan fund and match 20 percent of the amount. The match and subsequent loan repayments capitalize the revolving fund so it can assist additional local projects. REDL&G has a record of leveraging \$5 in private sector investment for every \$1 provided. Since approval of the first applications in 1989, the program has supplied in excess of \$800 million to more than 1,600 projects nationwide, generating nearly 67,000 jobs. REDL&G receives funding through the USDA Guaranteed Underwriter Program (through fees paid by qualified cooperative lenders) as well as appropriations from Congress. The \$15 million-plus provided annually by the National Rural Utilities Cooperative Finance Corporation through its participation in the USDA Guaranteed Underwriter Program (and a tiny amount from CoBank from its participation) are the primary sources of REDL&G funding. (*See National Rural Utilities Cooperative Finance Corporation, qualified lender, Rural Business-Cooperative Service, USDA Guaranteed Underwriter Program, USDA Rural Development.*)

Rural Electric Magazine (*See RE Magazine.*)

Rural Electric Management Development Council (REMDC) An organization of about 45 electric cooperatives founded in May 1958 that explores ways to improve management effectiveness.

Rural Electric Minuteman, The A weekly newsletter published by the National Rural Electric Cooperative Association from April 18, 1958, through May 5, 1967, that covered political issues relevant to the electric cooperative network. (*See ECT.coop, electric.coop, Electric Co-op TODAY, Rural Electric News Letter.*)

Rural Electric Nebraskan Official consumer publication of the Lincoln, Nebraska-based Nebraska Rural Electric Association.

Rural Electric News Letter A weekly newsletter published by the National Rural Electric Cooperative Association from May 12, 1967, through August 25, 1995, that covered political, economic, research, and business issues relevant to the electric cooperative network. The publication replaced *The Rural Electric Minuteman* and was succeeded by *Electric Co-op TODAY*. (*See ECT.coop, electric.coop, Electric Co-op TODAY, Rural Electric Minuteman, The.*)

Rural Electric Safety Achievement Program (RESAP) An evaluation of electric cooperative safety and loss control programs administered by the National Rural Electric Cooperative Association. Launched in 1967 as the Rural Electric Safety Accreditation Program; officially renamed in 2011. RESAP encourages electric cooperatives to develop a “safety first” culture and adopt practices that will reduce workplace injuries by establishing a foundation for continuous safety improvements. Key elements include leadership engagement; assessments (a triennial formal appraisal by independent parties and annual self-assessments); development of annual safety improvement plans; ongoing training; and a focus on key safety fundamentals. *(See National Rural Electric Cooperative Association.)*

Rural Electric Statewide Managers Association (RESMA) An organization made up of electric cooperative statewide association chief executives. *(See statewide.)*

Rural Electric Youth Tour An annual educational trip to Washington, D.C., held during June for high school students (mostly seniors-to-be) selected by local electric cooperatives. The program, first launched in 1957 by Texas electric cooperatives, has been coordinated by the National Rural Electric Cooperative Association since 1964 in conjunction with electric cooperative statewide organizations. *Youth Tour* acceptable on second reference. *Electric Cooperative Youth Tour* acceptable alternative. *(See National Rural Electric Cooperative Association, statewide, Youth Leadership Council.)*

Rural Electricity Resource Council (RERC) An Ohio-based nonprofit association formed in 1957 that provides technical assistance, educational resources, and training to power suppliers on subjects such as motors, standby generators, neutral-to-earth voltage, energy audits, and power quality—all with a focus on rural applications. Known as the National Food and Energy Council until 2008.

rural electrification Wording that describes the introduction of electricity into rugged and remote areas previously not served by investor-owned or government-run power companies.

Rural Electrification Act Legislation signed into law by President Franklin D. Roosevelt on May 21, 1936, that provided official status to the federal Rural Electrification Administration (REA) as a lending agency for electric cooperatives and authorized \$410 million in variable-rate direct loans for a 10-year program to light up the countryside. An amendment, the Hill-Poage Rural Telephone Act of 1949, authorized REA to make loans to telephone cooperatives as well as existing small telephone companies and mutual associations for extending dial-tone phone service to rural areas. *(See Executive Order 7037, Pace Act, Rural Electrification Administration, Rural Electrification Administration*

Improvement Act, Rural Electrification and Telephone Revolving Fund, Rural Electrification Loan Restructuring Act, Rural Utilities Service.)

Rural Electrification Administration (REA) A federal agency established by Executive Order 7037 on May 11, 1935, to provide financing as well as engineering, management, and legal assistance to electric and later telephone cooperatives. REA became part of the U.S. Department of Agriculture (USDA) on May 1, 1939. On October 20, 1994, under the Federal Crop Insurance Reform and Department of Agriculture Reorganization Act, REA was abolished and replaced by the USDA Rural Utilities Service. *(See common mortgage, concurrent loan, Executive Order 7037, independent borrower, Pace Act, Rural Electrification Act, Rural Utilities Service.)*

Rural Electrification Administration Improvement Act A bill signed into law on October 21, 1992, that permanently allows distribution cooperatives to buy out federal Rural Electrification Administration (now USDA Rural Utilities Service, or RUS) direct and insured loans at a discount, reflecting the government's cost of borrowing. However, systems that prepay are ineligible for additional RUS insured loans for 10 years, but can access RUS guaranteed loans. *(See guaranteed loans, RUS, independent borrower, insured loans, Rural Electrification Administration, Rural Utilities Service.)*

Rural Electrification and Telephone Revolving Fund A U.S. Treasury fund created under Rural Electrification Act amendments signed into law by President Richard Nixon on May 11, 1973. The Revolving Fund—so-named because money that electric cooperative borrowers paid back on their outstanding loans was used to make new loans—provided standard 5 percent insured loans as well as 2 percent hardship insured loans to electric cooperatives and rural telephone systems. It also eliminated the 2 percent direct loan program that had been in place since the Pace Act of 1944. While electric cooperative lending flowed from the Revolving Fund, the full amount of annual loan levels set by Congress counted against the federal budget, making the program seem like a several-billion-dollar drain even though the loans would be repaid with interest. The Revolving Fund was eliminated as of October 1, 1991, as part of the Federal Credit Reform Act of 1990. Congress now only appropriates the true (subsidy) costs of new electric cooperative loans. *(See insured loans, Pace Act, Revolving Fund, subsidy costs.)*

Rural Electrification Loan Restructuring Act A law signed on November 1, 1993, that moved federal Rural Electrification Administration (REA) electric loan programs to Treasury rates. It replaced 5 percent insured loans with insured loans carrying interest rates set at the current market yield on

municipal bonds. The interest rate on municipal rate insured loans was then capped at a maximum 7 percent for cooperatives meeting one of two tests: serving less than 5.5 consumers per mile of line, or having higher kilowatt-hour rates than the state average for all utilities and serving consumers with average household incomes below the state average. In addition, the measure abolished 2 percent REA hardship insured loans and created a new 5 percent fixed-rate hardship insured loan program. The legislation came after President Bill Clinton announced his intention to “reform” REA by reducing interest rate subsidies for insured loans during his initial State of the Union address. (*See hardship loans, means testing, municipal rate loans, Rural Electrification Administration.*)

Rural Electrification Magazine (*See RE Magazine.*)

Rural Electrification News Official publication of the federal Rural Electrification Administration from 1935 to 1953.

Rural Energy Savings Program (RESP) A provision included in the 2014 Farm Bill (and reauthorized in the 2018 Farm Bill) that allows electric cooperatives to tap \$75 million annually (subject to congressional appropriations) in USDA Rural Utilities Service (RUS) zero-interest financing to make loans to homeowners and small business consumers for weatherization and energy efficiency projects. Cooperatives that choose to borrow from the program can charge up to 5 percent on resulting consumer loans (enough to cover overhead and administration costs as well as loan losses). Consumer loans, not to exceed 10 years and generally ranging from \$1,500 to \$7,000, will be repaid through energy savings on individual electric bills, with the debt remaining connected to the dwelling where work was performed. Before loan approval, a careful energy audit of a home or business must be conducted to ensure that any efficiency improvements pay for themselves. Several cooperatives, as permitted by state laws, have created their own on-bill financing initiatives, which can be expanded through RESP funds. RUS also operates a similar Energy Efficiency and Conservation Loan Program, but RESP is open to a broader pool of eligible borrowers, has a zero percent interest rate, and carries a longer loan term (up to 20 years). (*See Energy Efficiency and Conservation Loan Program, on-bill financing, Rural Utilities Service.*)

Ruralite Official consumer publication of the Hillsboro, Oregon-based Ruralite Services, which provides publication assistance to electric cooperatives and public utility districts based in Alaska, California, Idaho, Nevada, Oregon, and Washington. (*See Currents, Florida Currents, KIUC Currents.*)

Rural Missouri Official consumer publication of the Jefferson City, Missouri-based Association of Missouri Electric Cooperatives.

Rural Montana Official consumer publication of the Great Falls, Montana-based Montana Electric Cooperatives' Association.

rural telephone cooperative Consumer-owned enterprises first organized in the 1890s to bring telephone service to farms and rural homes. The Hill-Poage Rural Telephone Act of 1949 authorized the federal Rural Electrification Administration to make loans to telephone cooperatives as well as existing small telephone companies and mutual associations for extending dial-tone phone service to rural areas.

Rural Telephone Finance Cooperative (RTFC) A Dulles, Virginia-based member-owned, not-for-profit cooperative created on September 8, 1987, to lend money to rural telephone and telecommunications systems. An affiliate of the National Rural Utilities Cooperative Finance Corporation. *(See National Rural Utilities Cooperative Finance Corporation.)*

Rural Utilities Service (RUS) A U.S. Department of Agriculture (USDA) agency that lends money and offers engineering and accounting assistance to the nation's consumer-owned electric and telephone cooperatives. Under the Federal Crop Insurance Reform and Department of Agriculture Reorganization Act of 1994, RUS officially replaced the federal Rural Electrification Administration. From 1935 to 2018, 20 administrators had led REA/RUS (19 individuals as David Hamil served two non-consecutive stints as administrator). *(See common mortgage, concurrent loan, Energy Efficiency and Conservation Loan Program, Energy Resources Conservation loan, guaranteed loans, RUS, hardship loans, independent borrower, insured loans, lien accommodation, municipal rate loans, plant revenue ratio, qualified lender, Rural Energy Savings Program, Rural Electrification Administration, Treasury rate loans, Treasury Rate Plus loans, USDA Guaranteed Underwriter Program, USDA Rural Development.)*

RUS Rural Utilities Service.

RUS guaranteed loans *(See guaranteed loans, RUS.)*

R-value A number showing the ability of insulation to resist the transfer of heat. Higher R-values indicate more effective insulation.

S

sag The distance between the actual location of a wire (at its lowest point in a given span) and an imaginary line drawn between the wire's two adjacent supports.

SAIDI System Average Interruption Duration Index.

SAIFI System Average Interruption Frequency Index.

salinity gradient power (*See osmotic power.*)

satellite dish A bowl-shaped antenna used to receive broadcasts transmitted from orbiting satellites. Dishes come in large, backyard C-band (increasingly rare) and small 18-inch direct-broadcast satellite (DBS) models.

SCADA Supervisory Control and Data Acquisition.

sCOOP Solar Cooperative Community Projects.

scrubbers Expensive devices that remove up to 95 percent of the sulfur dioxide and some other pollutants from coal-fired power plant smokestack emissions. Most scrubbers work by spraying a slurry of pulverized limestone or dolomite and water into flue gas. Calcium carbonate in the limestone or dolomite then reacts with sulfur dioxide to form calcium-sulfur compounds. The newest scrubber technology (forced oxidation) introduces air into the process to convert the resulting scrubber sludge into calcium sulfate (synthetic gypsum). (*See coal combustion byproducts, flue gas, scrubber sludge.*)

scrubber sludge A solid substance produced as part of a flue gas scrubber system. The sludge is often combined with fly ash to help it dry out and stabilize. Some forced oxidation scrubbers create a sludge that's primarily synthetic gypsum, which can be used in the manufacturing of wallboard, cement additives, and plaster. Also called *flue gas desulfurization material*. (*See bottom ash, coal ash, coal combustion byproducts, fly ash, scrubbers, slag.*)

SEA National Electric Cooperative Statewide Editors Association.

seasonal account An electric consumer who uses electricity for only part of a year, such as the owner of a lakeside cottage, beach house, or hunting cabin.

seasonal energy efficiency ratio (SEER) A way to measure the efficiency of air-conditioning units or systems. A higher SEER means a more energy-efficient unit or system. *(See energy efficiency ratio.)*

security lights *(See dark-sky lights, high-pressure sodium vapor lights, induction lighting, light-emitting diode, mercury vapor lights, metal halide lights.)*

SEDC Southeastern Data Cooperative.

SEER seasonal energy efficiency ratio.

SEPA Smart Electric Power Alliance.

SEPA Southeastern Power Administration.

SERC Reliability Corporation One of eight North American Electric Reliability Corporation regional organizations that coordinate planning and operations among utilities. *(See North American Electric Reliability Corporation.)*

service area/territory The geographic region that a utility is required to serve, or has the exclusive right to serve, in supplying electricity to the ultimate consumer. *(See area coverage, cherry-picking, man at the end of the line, Pace Act, territorial integrity.)*

service charge An amount on a consumer's electric bill designed to recover some of the fixed costs of providing electric service; generally a flat rate charged whether or not any electricity is consumed. *(See connection charge, consumer charge, energy charge, facilities charge.)*

shareholders/stakeholders For-profit companies have *shareholders*; not-for-profit entities, like electric cooperatives, have *stakeholders*.

shopping for power *(See consumer choice.)*

short, short circuit Establishment of an accidental or unintended electrical conducting path that bypasses the planned route from an electric power source to the intended load or appliance.

single-phase power An electric circuit that consists of one alternating current. (*See three-phase power.*)

Sister Cooperative Partnership Program An initiative launched in 1963 by NRECA International—a subsidiary of the National Rural Electric Cooperative Association—that allows electric cooperatives in the United States to individually establish relationships with and provide monetary support, equipment, volunteer labor, and management advice to a cooperative counterpart in a developing country. The program has been active in Bolivia, Costa Rica, Guatemala, and the Philippines. (*See National Rural Electric Cooperative Association, NRECA International.*)

slag A hard, glassy material formed from coal bottom ash melted by combustion. This heat-fused substance accumulates on the sides and bottom of a coal-fired boiler and must be removed periodically and disposed of according to environmental regulations. (*See bottom ash, coal ash, coal combustion byproducts, fly ash, scrubber sludge.*)

small modular reactor (SMR) A promising type of nuclear power plant whose components—generally smaller than a rail car—are able to be shipped in pieces and assembled on site. The advanced integral pressurized water reactors, housed in an underground containment structure, include significant built-in safety features, such as the ability to shut down “passively” (with the assistance of gravity) if a malfunction occurs. SMRs—which can also be air-cooled—cost much less than a full-size commercial nuclear power plant constructed from the ground up: \$900 million (\$5,000 per kW) compared to \$5 billion to \$10 billion for a traditional 1,110-MW to 1,700-MW nuclear facility. Industry leaders are particularly enamored that prefabricated units can be added as needed, avoiding what some experts call the “single-shaft risk” associated with locking up billions of dollars in a generating station during uncertain economic times. (*See nuclear fission, nuclear power, reactor, uranium.*)

small power producer An entity that generates electricity primarily from a renewable energy system with capacity under 80 MW. As defined by the federal Public Utility Regulatory Policies Act, small power producers can use some fossil fuels as part of their generation but renewables must provide at least 75 percent of the total energy input. Small power producers include homeowners and farmers who self-generate electricity for their own needs from a backyard or rooftop renewable energy facility and

sell the surplus back to their local utility. (*See distributed generation, net metering, non-utility generator, Public Utility Regulatory Policies Act, qualifying facility, renewables.*)

small utility exemption A December 2013 Small Business Administration (SBA) rule that defines distribution cooperatives with 1,000 or fewer employees, generation and transmission systems operating fossil fuel-fired power plants with 750 or fewer workers, and other generation and transmission cooperatives with 500 or fewer employees as “small.” The definition replaced a 4 million MWh per year threshold in retail electric sales established by SBA in 1974. While cooperatives are technically not considered “small businesses” due to their not-for profit status, and are not eligible for SBA loans, the ability to qualify as a small entity helps cooperatives qualify for special consideration from the U.S. Environmental Protection Agency and the U.S. Occupational Safety and Health Administration, and potentially gain exemptions from adverse legislation. For example, the federal Energy Policy Act of 2005 exempted utilities, including both electric distribution and generation and transmission cooperatives, with annual electricity sales of less than 4 million MWh from Federal Energy Regulatory Commission jurisdiction. (*See clean energy standard, Energy Policy Act of 2005, renewable electricity standard, renewable portfolio standards.*)

Smart Electric Power Alliance (SEPA) A Washington, D.C.-based trade organization made up of more than 1,000 electric utilities, renewable energy project developers, and technology companies focused on integration and deployment of solar, demand response, distributed energy resources, and supporting technologies onto the grid. Formed in 1992 as the Solar Electric Power Association; new name adopted in April 2016.

smart grid The use of technologies and tools that help electric utilities better meet consumers’ needs reliably and affordably by more effectively monitoring demand and system conditions on a near real-time basis. The smart grid combines digital meters and devices, software applications, and two-way communications that allow utilities to track the flow of electricity with great precision; pinpoint outages; identify voltages out of allowed ranges; and transmit messages to transformers, capacitors, circuit breakers, and other distribution equipment to initiate diagnostic or corrective (self-healing) actions that can isolate, reroute power around, or even remotely repair the cause of a power interruption. It can also let utilities record consumer electric use in various time intervals, communicate that consumption data among authorized staff, and provide consumers with hourly or more frequent power pricing information so they can respond to changing electricity needs. The U.S. Department of Energy lists seven functions of a smart grid: enabling informed participation by consumers; accommodating all generation and energy storage options; creating new products, services, and

markets; delivering power quality for the range of needs in the twenty-first century; optimizing asset utilization and operating efficiency; addressing disturbances—automated outage prevention, containment, and restoration; and operating resiliently against physical and cyber attacks and natural disasters. Quick bite: Across the nation, utilities are modernizing electric distribution systems by deploying advanced communications and automation technologies—including two-way digital meters—to improve reliability, increase efficiency, and help control electricity costs for consumers. (See *advanced metering infrastructure, automated meter reading, distribution fault anticipation, down-line automation, grid, personal energy management, smart meter, ZigBee.*)

smart meter A digital electric meter that identifies consumption patterns in detail over various time intervals, then uses two-way communications to transmit the information back to a local utility for power quality monitoring and billing purposes. Smart meters also let electric consumers react to electricity price signals and more actively participate in utility demand-response programs. Quick bite: Utilities are replacing old analog meters with digital meters that can receive and transmit data about electric use. The new meters can also provide information that helps a utility diagnose outages and improve power quality. (See *advanced metering infrastructure, automated meter reading, demand response, down-line automation, interval meter, meter, smart grid.*)

smartphone One word.

smart thermostat A type of programmable thermostat that lets electric consumers react to electricity price signals and more actively participate in utility demand-response programs. Electric utilities can also access smart thermostats during times of peak demand and adjust temperatures to lower electricity use. (See *advanced metering infrastructure, demand response, peak demand, personal energy management, smart grid.*)

SMR small modular reactor.

social media Information created and distributed among peers and the public through online forums. Unlike print or broadcast media (industrial media), social media content gets generated, shared, and discussed by individual users, generally at low or no cost. Social media includes online communities/Listservs; blogs (such as WordPress and Blogger); microblogs (like Twitter); social networks (Facebook, LinkedIn, and Pinterest), social bookmarking services (Delicious), diggs (notably Digg and Wikio), multimedia sharing sites (Flickr and YouTube); and RSS news feeds. (See *blog, social networking.*)

social networking Establishing, maintaining, and interacting with personal and professional contacts through online communities, such as Facebook, LinkedIn, and Pinterest. *(See blog, social media.)*

Solar Cooperative Community Projects (sCOOP) A collaboration between the National Rural Utilities Cooperative Finance Corporation (CFC), Federated Rural Electric Insurance Exchange, and the National Renewables Cooperative Organization that developed a tax-equity flip financing vehicle for electric cooperatives interested in building community or utility-scale solar systems. *(See community solar, Federal Rural Electric Insurance Exchange, investment tax credit, National Renewables Cooperative Organization, National Rural Utilities Cooperative Finance Corporation, Solar Utility Network Deployment Acceleration, tax-equity flip, utility-scale solar.)*

solar gardens *(See community solar.)*

Solar Sam Cartoon mascot created for the Touchstone Energy[®] Cooperatives Kids Zone website to promote solar power. *(See CFL Charlie, HVAC Harriet, LED Lucy, Solar Sam, Touchstone Energy[®] Cooperatives, Wally the Water Heater.)*

solar power Energy absorbed from photons (elementary particles) in sunlight and converted into heat or electricity. Utility-scale solar power made up 1.5 percent of the nation's total generating capacity at the end of 2018. Through the end of 2017, more than 400 electric cooperatives were utilizing 868 MW of solar for energy generation. *(See active solar energy, intermittency, passive solar energy, photovoltaics, renewables, solar thermal energy, utility-scale solar.)*

solar thermal energy Technology that harnesses sunlight for heat and characterized by three types. Low temperature solar thermal collectors typically are used to heat swimming pools. Medium-temperature collectors heat water for residential and commercial use. High-temperature collectors, also known as *concentrating solar power*, produce baseload generation by using long troughs of shiny parabolic mirrors that concentrate the sun's rays on receiver tubes filled with synthetic oil (or a tower containing molten salt). The fluid gets heated to as high as 750 degrees Fahrenheit before being pumped through heat exchangers to create steam that spins a turbine-generator. Concentrating solar power is also seen as a way to stockpile electricity for later use. Solar thermal energy differs from solar photovoltaics, which converts sunlight directly into electricity. *(See active solar energy, baseload power plant, distributed energy resources, energy storage, intermittency, passive solar energy, photovoltaics, solar power.)*

Solar Utility Network Deployment Acceleration (SUNDA) A project that ran from October 2013 to July 2018 designed to help electric cooperatives better address engineering, member relations, and financing issues involved with installing solar photovoltaic systems. In all, 17 cooperatives in 10 states developed 22 solar facilities, totaling more than 30 MW. SUNDA was a partnership between NRECA Business and Technology Strategies, National Renewables Cooperative Organization, and National Rural Utilities Cooperative Finance Corporation, with support from the U.S. Department of Energy SunShot Initiative. Some projects within SUNDA tapped the Solar Cooperative Community Projects (sCOOP) financing model. *(See community solar, National Renewables Cooperative Organization, National Rural Utilities Cooperative Finance Corporation, NRECA Business and Technology Strategies, photovoltaics, Solar Cooperative Community Projects.)*

Solutions News Bulletin *(See CFC Solutions News Bulletin.)*

SOS standard offer service.

South Carolina Living Official consumer publication of the Cayce, South Carolina-based The Electric Cooperatives of South Carolina.

South Dakota Electric Cooperative Connections Official consumer publication of the Pierre, South Dakota-based South Dakota Rural Electric Association.

Southeastern Data Cooperative (SEDC) The Atlanta, Georgia -based provider of billing and accounting software for the electric utility industry. Started in July 1976 by 19 electric cooperatives. By the end of that year SEDC boasted 30 members across Alabama, Georgia, Mississippi, South Carolina and Tennessee.

Southeastern Power Administration (SEPA) One of four regional federal agencies (established in 1950) that markets electricity generated primarily at federal dams. Based in Elberton, Georgia, it sells wholesale power from 23 U.S. Army Corps of Engineers hydro projects to utilities serving in 11 states: Alabama, Florida, Georgia, Illinois, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. *(See power marketing administrations, U.S. Army Corps of Engineers.)*

Southwest Power Pool Regional Entity One of eight North American Electric Reliability Corporation regional organizations that coordinate planning and operations among utilities. (*See North American Electric Reliability Corporation.*)

Southwestern Power Administration (SWPA) One of four regional federal agencies (established in 1943) that markets electricity generated primarily at federal dams. Based in Tulsa, Oklahoma, it sells wholesale power from 24 U.S. Army Corps of Engineers hydro projects to utilities serving in six states: Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas. (*See power marketing administrations, U.S. Army Corps of Engineers.*)

spike An increase in voltage lasting less than 1/60th of a second. Usually caused by heavy loads coming on-line.

spike suppressor (*See surge suppressor.*)

spinning reserve Extra generating capacity available from a power plant on short notice in case another generating station on the system goes down. (*See capacity, operating reserve, reserves, supplemental reserve.*)

Spotlight on Excellence Awards An annual awards program sponsored by the Council of Rural Electric Communicators and the National Rural Electric Cooperative Association recognizing the body of outstanding work produced by electric cooperative communication and marketing professionals during the preceding year. (*See Autry Leadership Award for “Always On” Communication, Council of Rural Electric Communicators, Edgar F. Chesnutt Award, J.C. Brown CEO Communication Leadership Award, LaBerge Award for Excellence in Strategic Communication.*)

spot market A commodity exchange that allows producers of surplus power to instantly locate available buyers, negotiate prices within milliseconds, and deliver the actual energy just a few minutes later. (*See day-ahead market, wholesale power market.*)

stakeholders/shareholders For-profit companies have *shareholders*; not-for-profit entities, like electric cooperatives, have *stakeholders*.

standard offer service (SOS) Electricity supplied by local utilities to consumers who do not choose a competitive electric generation supplier. Sometimes called *default service* or *provider of last resort*. In

Pennsylvania, SOS works differently. Utilities refer certain consumers who call in (such as those with high-bill complaints or who don't have any switching options) to a randomly selected retail electric generation supplier participating in the SOS program. The supplier, or a third party acting on behalf of the supplier, must offer the consumer a standard 7 percent discount versus the electric distribution utility's price-to-compare rate, fixed for 12 months. *(See consumer choice, default service, deregulation, electric generation supplier, price to compare, provider of last resort.)*

standby charge *(See backup charge.)*

statewide association An organization formed by electric cooperatives operating in one or more states that offers government relations, communications, job training and safety, economic development, education, group purchasing, and other services. Sometimes shortened to just "statewide."

Statewide Editors Association *(See National Electric Cooperative Statewide Editors Association.)*

step rate A pricing structure where consumers pay a different amount depending on kilowatt-hours (kWh) used; the more kWh a consumer uses, the cheaper the cost of each kWh. *(See block rate, class rate, cost-based rate, declining block rate, demand rate, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, ratchet rate, time-of-use rate.)*

Straight Talk Monthly electronic news resource of the National Rural Electric Cooperative Association containing editorial, graphic, audiovisual, and other materials that support local electric cooperatives in communicating with their consumers through statewide publications, newsletters, bill stuffers, social media outlets, and websites. Known as *PowerKit* from 1996 until 2006 and *Rural Electric News Service* before that. From 2008 to 2013 *Straight Talk* fell under the *RE Magazine* umbrella. *(See Co-op Nation, RE Magazine, National Rural Electric Cooperative Association.)*

stranded benefits Positive actions many regulators and consumer groups argue will be lost under electric utility competition. These include environmental protection, energy efficiency, low-income ratepayer assistance, and community service programs.

stranded costs Assets owned by utilities that become uneconomical in a competitive marketplace. Primary examples of stranded costs include power plants or transmission lines. *(See competitive transition charge.)*

strategic electrification *(See efficient electrification.)*

strategic marketing Process of gathering information to meet consumer needs.

stray voltage Avoid using this technically incorrect term. Use *neutral-to-earth voltage*, *neutral-to-ground voltage*, or *exposure voltage* instead. *(See neutral-to-earth voltage.)*

strip mining Extracting coal from underground seams by digging pits with giant shovels called draglines.

subbituminous coal Coal with a medium capability of producing heat. *(See anthracite, bituminous coal, coal, lignite.)*

subsidiary A business controlled by another enterprise, called the parent company, but with its own identity, including charter, officers, and board of directors.

subsidy costs What USDA Rural Utilities Service (RUS) loan programs actually cost taxpayers after the loans are repaid with interest. Calculated as the difference between the official federal borrowing rate and the sometimes lower rate charged on RUS loans, plus any loan defaults. Subsidy costs are appropriated annually by Congress. Since 2009, the RUS Electric Loan Program has earned roughly \$1 billion for the federal government. In fiscal year 2013, for example, it brought in more than \$369 million. *(See Revolving Fund, Rural Electrification and Telephone Revolving Fund.)*

substation An electrical facility containing equipment for controlling the flow of electricity from supplier to user.

subtransmission system The network of poles, lines, and wires used to interconnect a high-voltage transmission network with a distribution system. *(See bulk power, transmission system.)*

sulfates Chemical compounds of sulfur contained in many fossil fuels.

sulfur dioxide A poisonous gas created during the combustion of fossil fuels when sulfates combine with oxygen. A principal contributor to acid rain. Don't use the abbreviation SO₂. *(See acid rain, cap and trade, Clean Air Act, Clean Air Interstate Rule, scrubbers, Cross-State Air Pollution Rule.)*

SUNDA Solar Utility Network Deployment Acceleration.

superconductors Materials that carry an electric current without friction and, as a result, don't waste energy by producing heat. An electric current could conceivably flow in a loop of superconducting wire forever. Superconductors are already in use in hospital MRI machines, cell-phone towers, and high-speed maglev trains but presently can only function at extremely low temperatures.

superhydrophobics High-tech materials that aggressively repel water and could be used as coatings to protect electric lines and equipment from problems such as a ice buildup.

Supervisory Control and Data Acquisition (SCADA) A distribution monitoring system that supplies data from substations, feeders, control breakers, and switches to a main command center; manages demand-response/load management efforts; keeps an eye on down-line devices; and controls capacitors.

supplemental heating A heating system used during extremely cold weather when additional heat is needed to moderate indoor temperatures.

supplemental reserve Extra generating capacity not connected to an electric system that can be brought on-line after a short delay. Often involves importing power from an interconnected system or reducing power exports. (*See capacity, operating reserve, reserves, spinning reserve.*)

supply-side management Activities conducted on the utility's side of an electric meter.

surge Overvoltages lasting longer than one-sixtieth of a second, often caused by the automatic switching on or off of motor-driven devices or lightning strikes near a power line.

surge suppressor A device that protects consumer electronic equipment and appliances from short-term, high-voltage flows of electricity such as lightning strikes; also called a *spike suppressor*.

swaps (*See derivative.*)

SWPA Southwestern Power Administration.

syngas Any gaseous mixture generated by the gasification of a carbon-containing fuel, such as coal or municipal waste. Also includes the steam reforming of natural gas or oil to produce hydrogen. (*See coal gasification, integrated gasification combined cycle.*)

synthetic fuel Combustible liquid obtained from coal, natural gas, biomass, or other solids such as oil shale, tar sands, and waste plastics. (*See coal liquefaction.*)

System Average Interruption Duration Index (SAIDI) A reliability indicator that measures the average outage time for each consumer over the course of a year. (*See Customer Average Interruption Duration Index, Momentary Average Interruption Frequency Index, System Average Interruption Frequency Index.*)

System Average Interruption Frequency Index (SAIFI) A reliability indicator that measures the average number of service interruptions experienced by a consumer over the course of a year. (*See Customer Average Interruption Duration Index, Momentary Average Interruption Frequency Index, System Average Interruption Duration Index.*)

system demand The total amount of energy required to supply all consumers served by a utility or within a region. (*See off-peak power, peak demand.*)

T

Tailoring Rule A U.S. Environmental Protection Agency (EPA) regulation, effective January 2, 2011, designed to control emissions of six greenhouse gases—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—from new and modified large stationary sources, including power plants, emitting 100,000 tons or more of pollutants each year. The U.S. Supreme Court in June 2014 struck down portions of the rule that established greenhouse gas reduction requirements for both new and existing sources regardless of whether other increases of traditional pollutants occurred, but otherwise reaffirmed the agency's authority to regulate greenhouse gases from existing power plants under Section 111(d) of the federal Clean Air Act. In response, EPA on August 31, 2016, released a proposed rule saying New Source Review at power plants would be triggered only by non-greenhouse gas pollutants, at which point requirements would apply to greenhouse gas emissions. Power plants would need to emit at least 75 tons of greenhouse gases annually before having to install state-of-the-art pollution controls. (*See Affordable Clean Energy Rule,*

carbon dioxide, Clean Air Act, Clean Power Plan, greenhouse gases, New Source Review, New Source Performance Standards, U.S. Environmental Protection Agency.)

take-and-pay contract An agreement that says payment shall be made only for power actually delivered.

take-or-pay contract An agreement that stipulates payment must be made whether or not the power contracted for gets used.

takeover Acquisition of a cooperative or company accomplished by buying the owners' equity.

take over (verb).

tap An electric circuit with limited capacity extending from a distribution line; usually supplies a small number of consumers.

tariff A statement of a utility's rates, terms, and conditions of service as filed with a utility regulatory body. *(See feed-in tariff.)*

tax-equity flip A financial structure, used primarily for developing utility-scale solar power projects, that enables not-for-profit electric cooperatives to harness tax benefits similar to those available to for-profit entities. Under it, a cooperative sets up a taxable subsidiary that forms a "special-purpose entity" funded by the taxable subsidiary and an equity partner with taxable income. The tax-equity partner provides a majority of the investment, which together with the contribution from the subsidiary covers costs of the project. Typically, the tax-equity partner's ownership interest is in place for an initial period of about six years, while the special-purpose entity enters into a long-term power purchase agreement with the cooperative and operates the project. During the initial six years, the tax-equity partner receives most of the distributions (99 percent) comprised mainly of the tax benefits. After that initial period, distributions "flip"—95 percent to the cooperative subsidiary and 5 percent to the tax-equity partner. The cooperative then has the ability to buy out the tax-equity investor's ownership interest. *(See community solar, investment tax credit, photovoltaics, power purchase agreement, Solar Cooperative Community Projects, Solar Utility Network Deployment Acceleration, utility-scale solar.)*

TechAdvantage® Conference & Expo Trade show and summit for manufacturers, suppliers, and vendors who market to electric cooperatives. Held in conjunction with the annual meeting of the

National Rural Electric Cooperative Association. Use with ampersand. Apply registered trademark symbol on first reference, as in “*the NRECA TechAdvantage® Conference & Expo will be held in February.*” (See *National Rural Electric Cooperative Association.*)

Tennessee Magazine, The Official consumer publication of the Nashville, Tennessee-based Tennessee Electric Cooperative Association.

Tennessee Valley Authority (TVA) A quasi-governmental agency created by Congress in 1933 to develop hydroelectric resources throughout the Tennessee River Valley. TVA, which operates 29 hydropower dams as well as a diversified generation portfolio of three nuclear plants, six coal stations, 17 natural gas plants and various renewables, receives no taxpayer funding, deriving virtually all of its revenues from sales of electricity. In addition to operating and investing its revenues in its electric system, TVA provides flood control, navigation and land management for the Tennessee River system and assists local power companies, including electric cooperatives in northern and western Alabama, northwestern Georgia, southern Kentucky, northern and eastern Mississippi, western North Carolina, Tennessee, and southwestern Virginia, as well as state and local governments with economic development and job creation. (See *preference principle, power marketing administrations.*)

territorial dispute A disagreement between two utilities about which one has the right to deliver electricity to a particular service area or consumer.

territorial integrity Legally supported right of an electric utility not to have consumers in its franchised service territory connected to the lines of another electric utility. (See *franchise, cherry-picking, service area/territory, territorial dispute.*)

Texas Co-op Power Official consumer publication of the Austin, Texas-based Texas Electric Cooperatives.

Texas Interconnection (See *grid.*)

Texas Reliability Entity One of eight North American Electric Reliability Corporation regional organizations that coordinate planning and operations among utilities. (See *North American Electric Reliability Corporation.*)

theft of service (See *electricity theft.*)

therm A measure of heat equal to 100,000 Btu.

thermal energy storage Technologies that store electricity in a reservoir for later consumption—generally, the power is generated during times of low (off-peak) electricity use. Thermal energy storage is most commonly employed as an air-conditioning system, sometimes called an *ice harvester*, in large office buildings where cold water, ice, or an icy slurry, gets produced at night when electricity costs less to generate. The frosty material then cools circulated air the next day. Because large-capacity grid-enabled electric resistance water heaters, electric thermal storage furnaces and room heating cabinets also provide thermal energy storage, they have traditionally served as the backbone of electric cooperative load management programs. Thermal energy storage is increasingly viewed as a way to “stockpile” wind power, which often reaches peak production during off-peak overnight hours. *(See demand-side management, distributed energy resources, efficient electrification, electric thermal storage, energy storage, intermittency, load management, peak demand, peak load, water heater.)*

three-phase power An electric circuit that consists of three separate currents delivered at one-third cycle intervals by means of three wires; typically used to power large industrial motors that operate at 230 V or higher. *(See single-phase power.)*

tidal power A form of hydrokinetic power that converts mechanical energy from the motion of tides into electricity. *(See hydrokinetic power, ocean wave power, renewables.)*

TIER times interest earned ratio.

time-of-use meter *(See interval meter.)*

time-of-use metering Measures both electric consumption and time of use. *(See interval meter, meter data management system, time-of-use rate.)*

time-of-use rate A pricing structure where the cost for electricity varies according to the time when it's consumed. Time-of-use rates can include on/off-peak rates, critical-peak pricing, dynamic pricing, and real-time pricing. *(See block rate, class rate, cost-based rate, critical-peak pricing, declining block rate, demand rate, dynamic pricing, flat rate, industrial rate, interruptible rate, inverted rate, off-peak rate, offset rate, peak demand, ratchet rate, real-time pricing, step rate.)*

times interest earned ratio (TIER) A ratio of margins to long-term interest expense, indicating the ability of an electric cooperative to meet financial obligations. TIER equals long-term interest plus margins divided by long-term interest; essentially, the number of times a cooperative's earnings cover interest payments on long-term debt. A cooperative with interest costs of \$100,000 and margins of \$150,000 has a TIER of 2.5. The USDA Rural Utilities Service requires electric cooperative borrowers to maintain a minimum TIER of 1.25. *(See modified debt service coverage.)*

tipple A facility that loads coal onto trucks or rail cars.

TODAY in Mississippi Official consumer publication of the Ridgeland, Mississippi-based Electric Cooperatives of Mississippi (formerly Electric Power Associations of Mississippi).

Touchstone Energy *(See Touchstone Energy® Cooperatives.)*

Touchstone Energy® Cooperatives Branding program of the nation's electric cooperatives launched on April 4, 1998. Use registered trademark symbol on first reference and full name throughout articles; avoid the shortened *Touchstone Energy*. The brand offers more than 60 services, including the Co-op Connections® Card, which provides cooperative consumers with discounts at participating local and national retailers and pharmacies; energy education programs like *Super Energy Saver* aimed at teaching children grades K-5 about electricity, electrical safety, and energy savings, and *Get Charged! Electricity and You* curriculum kits targeted toward instructing middle school students about electric cooperatives and electricity in general; branded hot-air and cold-air balloons; Co-op Web Builder, which allows cooperatives to easily create and update websites using standardized templates; SitesAcrossAmerica.com, a web-based clearinghouse of commercial and industrial properties available in electric cooperative service territories; and ongoing national advertising and energy efficiency promotional campaigns. *(See CFL Charlie, HVAC Harriet, LED Lucy, Solar Sam, Wally the Water Heater.)*

“tougher than a boiled owl” A phrase uttered out of exasperation by former U.S. Sen. Alan Simpson (R-Wyo.) in August 1991 that came to symbolize electric cooperative political resilience and clout. During floor debate on the 1992 federal budget year Agriculture appropriations bill that set Rural Electrification Administration electric loans at levels he thought much too high, Simpson railed from the Senate floor that, politically, electric cooperatives were “tougher than a boiled owl.”

transactive energy Techniques for managing the generation, consumption or flow of electric power within a utility's system through the use of economic or market-based factors while considering grid reliability constraints. Transactive energy technologies—including blockchain—can turn consumer-owned distributed energy resources into grid assets and minimize any erosion of service or business opportunities. *(See blockchain, distributed energy resources.)*

transformer A device used to raise or lower voltage along electric distribution or transmission lines. *(See pad-mount transformer, pole-mount transformer.)*

transmission The process of moving large amounts of electricity from where it's generated to where it's used, as well as the facilities needed to move that power. *(See bulk power, license plate rate, postage stamp rate, wheeling.)*

transmission bottlenecks *(See transmission congestion.)*

transmission congestion A condition that occurs when a transmission system operates at full capacity and proper efficiency, yet still can't supply all consumers. If congestion occurs in a competitive wholesale power market, utilities that control transmission facilities could engage in price gouging. As a result, federal and state regulatory agencies and regional transmission organizations attempt to build in safeguards to prevent such abuses and ensure that congestion-related price increases reasonably reflect extra costs incurred in alleviating the situation. Also called *transmission bottlenecks* or *transmission constraints*. *(See congestion costs, financial transmission rights, locational marginal pricing, regional transmission organization, transmission, transmission system, wholesale power market.)*

transmission constraints *(See transmission congestion.)*

transmission facility Towers, poles, lines, and wires used to move large amounts of electricity from a generating plant to a substation.

transmission system The interconnected network of lines, poles, wires, and other equipment that move large amounts of electricity from generating plants to distribution systems, whether on a local or regional level. *(See bulk power, grid, subtransmission system, wheeling.)*

Transport Rule *(See Cross-State Air Pollution Rule.)*

Treasury rate loans USDA Rural Utilities Service financing available to electric distribution cooperatives with interest rates set daily by the U.S. Treasury and determined at the time of each loan advance. Funds can be used for distribution, subtransmission, renewable generation, and headquarters (service and warehouse facility) purposes. *(See guaranteed loans, RUS, hardship loans, insured loans, municipal rate loans, Treasury Rate Plus loans.)*

Treasury Rate Plus loans A pending USDA Rural Utilities Service (RUS) direct loan program authorized in the 2008 Farm Bill where loans for distribution, subtransmission, bulk transmission, generation, and headquarters facilities (office, service, and warehouse) purposes are made at market interest rates, plus one-eighth of 1 percent. There is a possibility RUS Treasury Rate Plus loans could one day replace RUS guaranteed loans made through the Federal Financing Bank, since the programs largely mirror each other. *(See Federal Financing Bank, guaranteed loans, RUS, hardship loans, insured loans, municipal rate loans, Treasury rate loans.)*

turbine A rotary engine that extracts energy from moving water, gas, steam, or air. The simplest turbines boast one moving part, a rotor assembly—essentially, a shaft with blades attached. *(See combustion turbine, dynamo, generator, turbine-generator, wind turbine.)*

turbine-generator A steam, gas, air, or water-driven turbine coupled directly to a generator that produces electricity. *(See dynamo, hydroelectric plant, generator, turbine.)*

TVA Tennessee Valley Authority.

U

UDI Utility Data Institute.

UL Registered trademark of Underwriters Laboratories, Inc.

unbundling Splitting operations of an electric utility into separate generation, transmission, and distribution components. An unbundled electric bill may itemize charges associated with providing electric service. *(See bundling.)*

underground residential distribution (URD) Electric distribution conduit that runs below the surface, often in housing developments with limited overhead line construction. Electric cooperatives maintain roughly 500,000 miles of URD nationwide.

Underwriters Laboratories, Inc. (UL) The Chicago, Illinois-based not-for-profit firm that tests and sets minimum standards for electricity-consuming items. The UL seal on a product means the item was tested and found safe to use under the conditions for which it was designed. Consumers are urged to look for the UL seal on all electrical appliances and equipment.

uninterruptible power supply (UPS) A device typically used to protect computers, telecommunications equipment, or other electric-using appliances where an unexpected power disruption could cause injuries, fatalities, or data loss.

universal service Electricity sufficient to meet the basic needs of virtually everyone regardless of income or where they may live.

universal service charge A levy placed on retail electric providers by regulators and used to assist utilities in providing service to low-income or hard-to-reach (i.e. rural) consumers.

UPS uninterruptible power supply.

uranium A soft, radioactive metal and the heaviest natural element; used as a fuel for nuclear energy. One pound of enriched uranium contains nearly 3 million times the energy contained in a pound of coal.

URD underground residential distribution (line/cable).

usage, use Since *usage* primarily refers to language practice, the preference in all other contexts, including electricity, is *use*: *Load management helps reduce electric use; Joe's monthly electric bill shows a decrease in kilowatt-hour use.* Many electric cooperatives and other utilities over the past decade have elected to use *electric use* on bill statements and other documents for this reason.

U.S. Army Corps of Engineers (Corps) A federal agency within the U.S. Department of Defense responsible for large-scale dam construction and operation; works with the federal Bureau of Reclamation in the West. Other functions include flood control, irrigation, and river navigation

projects. *Corps* acceptable on second reference. (See *Bureau of Reclamation, hydroelectric power, power marketing administrations.*)

U.S. Atomic Safety and Licensing Board The independent, trial-level legal arm of the federal Nuclear Regulatory Commission. (See *Nuclear Regulatory Commission, Yucca Mountain.*)

USDA U.S. Department of Agriculture.

USDA Guaranteed Underwriter Program A financing stream created in the 2002 Farm Bill and appropriated annually by Congress allowing qualified cooperative lenders (to date, only the National Rural Utilities Cooperative Finance Corporation and CoBank) to access loans carrying a USDA Rural Utilities Service guarantee for the purposes of “utility infrastructure.” USDA Guaranteed Underwriter Program funds are brokered through the Federal Financing Bank (FFB)—an arm of the U.S. Treasury that coordinates the borrowing of federal agencies providing loan guarantees. The government guarantee allows qualified lenders to raise money at a reduced rate compared to what can be obtained from the capital markets. For the privilege of borrowing from FFB, qualified lenders pay a 30-basis-points (three-tenths of 1 percent) fee annually for as long as a USDA Guaranteed Underwriter Program loan remains outstanding. Those fees then flow into the federal Rural Economic Development Loan and Grant Program to provide additional funding for rural businesses expansion and job creation. (See *CoBank, Federal Financing Bank, guaranteed loans, RUS, National Rural Utilities Cooperative Finance Corporation, qualified lender, Rural Economic Development Loan and Grant Program, Rural Utilities Service.*)

USDA Rural Development A mission area of the U.S. Department of Agriculture (USDA) that covers rural electric, water, environmental, telecommunications, distance learning, and telemedicine programs administered primarily through four agencies: Rural Utilities Service, Rural Business-Cooperative Service, Rural Housing Service, and Office of Community Development. Created under the Federal Crop Insurance Reform and Department of Agriculture Reorganization Act of 1994. (See *Rural Economic Development Loan and Grant Program.*)

U.S. Department of Agriculture (USDA) The federal cabinet-level department responsible for implementing national farm, rural development, and nutrition policy.

U.S. Department of Energy (DOE) The federal cabinet-level department responsible for implementing national energy policy.

use, usage Since *usage* primarily refers to language practice, the preference in all other contexts, including electricity, is *use*: *Load management helps reduce electric use; Joe's monthly electric bill shows a decrease in kilowatt-hour use.* Many electric cooperatives and other utilities over the past decade have elected to use *electric use* on bill statements and other documents for this reason.

used and useful Requirement that before fixed assets of a generating plant may be included in a utility's rate base, the plant in question must be in operation (used) and be needed to provide service to the public (useful).

U.S. Energy Information Administration (EIA) The highly respected statistical arm of the U.S. Department of Energy.

U.S. Environmental Protection Agency (EPA) A federal bureau with cabinet-level status created in 1970 that oversees the nation's environmental science, research, education, and assessment efforts. One of its primary duties involves developing and enforcing rules and regulations for environmental protection. (*See Affordable Clean Energy Rule, cap and trade, Clean Air Act, Clean Air Interstate Rule, Clean Air Mercury Rule, Clean Power Plan, Cross-State Air Pollution Rule, Mercury and Air Toxics Standards, New Source Performance Standards, New Source Review.*)

U.S. House Acceptable on all references for the United States House of Representatives.

U.S. Office of Energy Efficiency and Renewable Energy (EERE) An advanced research and development and technology demonstration mission area within the U.S. Department of Energy that seeks to strengthen America's security, environmental quality, and economic vitality by bringing clean, reliable, and affordable energy solutions to the marketplace through public-private partnerships. EERE also oversees the federal Weatherization Assistance Program. (*See Weatherization Assistance Program.*)

U.S. Senate Acceptable on all references for the United States Senate.

utility An entity (whether investor-owned, cooperative, or municipal) that provides electric, water, or natural gas service for residential, commercial, and industrial consumption.

Utility Data Institute (UDI) A Washington, D.C.-based research firm that tracks trends in the electric utility industry.

utility plant All fixed assets of a utility, including poles, wires, components, substations, transmission, and headquarters facilities in service, purchased, sold, or leased to others. *(See net utility plant, plant revenue ratio.)*

utility-scale solar A solar photovoltaic system ranging from a capacity of 500 kW (0.5 MW) to hundreds of megawatts. For perspective, a 1-MW alternating current (AC) solar array can produce enough energy to power about 200 homes (depending on location) and may cover five or more acres. Because of their size, most utility-scale solar systems are constructed in a fixed-tilt ground-mount configuration. This means that the panels are placed on the ground (rather than on a building), and are tilted in place to gain maximum exposure to sunlight. *(See community solar, National Renewables Cooperative Organization, photovoltaics, power purchase agreement, Solar Cooperative Community Projects, solar power, Solar Utility Network Deployment Acceleration, tax-equity flip.)*

V

V volt. Abbreviation acceptable on first reference when used with a numeral.

VA volt-ampere. Abbreviation acceptable on first reference when used with a numeral.

VAR volt-ampere reactive.

variable costs Utility expenses that change based on the costs of power plant fuel and operations and maintenance. A distribution cooperative's variable costs are generally tied to wholesale power supply purchases. *(See cost-of-service study, fixed costs.)*

variability A major reliability challenge associated with wind power, solar power, and hydrokinetic (ocean wave and tidal) power systems, which cycle on and off throughout a day. Even with good location and plenty of breezes, wind generation averages only about a 30 percent to 40 percent capacity factor and seldom operates at full output (due to a lack of wind) when power is needed most—during periods of peak demand on hot, humid summer weekday afternoons or cold winter mornings below minus 22 degrees Fahrenheit (when turbines shut down). Solar power systems, for their part, operate only during daylight hours and are affected by cloud cover. While synonymous with the term

intermittency, wind and solar advocates prefer its use. (See *capacity factor*, *coincident capacity*, *dispatchable generation*, *hydrokinetic power*, *intermittency*, *ocean wave power*, *solar power*, *solar thermal energy*, *tidal power*, *wind power*).

viewshed The landscape or topography visible from a geographic point, especially one having aesthetic value.

virtual private network (VPN) An interconnected computer setup in which some connections are bridged with virtual circuits over the Internet or a large data system instead of with physical wires.

Voice over Internet Protocol (VoIP) Technology used to transmit telephone calls over the Internet or other data networks. (See *Internet*.)

VoIP Voice over Internet Protocol.

volt (V) A unit of electric force that measures the pressure of electricity. Abbreviation acceptable on first reference when used with a numeral. (See *kilovolt*.)

voltage An electromotive force that acts like water pressure and causes electrons to flow. Voltage measures the potential for current flow and may exist between objects without an actual flow of current.

volt-ampere (VA) The basic unit of electric power, figured as the product of a system's voltage multiplied by amperes. Apparent power is conventionally expressed in either volt-amperes or kilovolt-amperes. Abbreviation acceptable on first reference when used with a numeral. (See *apparent power*, *kilovolt-ampere*, *power factor*.)

volt-ampere reactive (VAR) The conventional way of expressing reactive power. (See *power factor*, *reactive power*.)

VPN virtual private network.

W

W watt. Abbreviation acceptable on first reference when used with a numeral.

Wally the Water Heater Cartoon mascot created in 2009 for the Touchstone Energy[®] Cooperatives Kids Zone website to promote energy efficiency. *(See CFL Charlie, HVAC Harriet, LED Lucy, Solar Sam, Touchstone Energy[®] Cooperatives.)*

Walmart A retail giant that has become the largest collective consumer of electric cooperative power nationwide. Spell out as one word based on the company's new branding initiative.

WAN wide area network.

WAPA Western Area Power Administration.

waste-heat recovery *(See cogeneration, combined cycle.)*

water heater An appliance for heating potable water, such an *electric water heater*. Do not use *hot water heater*. Large-capacity (typically 80 gallons or more) grid-enabled electric resistance water heaters are a key part of many electric cooperative load management programs—more than 250 cooperatives in 35 states use the devices to reduce electric demand by an estimated 500 MW annually, saving consumers hundreds of millions of dollars. *(See Energy Efficiency Improvement Act, energy factor, ENERGY STAR, load management, thermal energy storage.)*

watt (W) The standard unit of electric power, equal to 1/746 hp or 1 J per second. Named for James Watt, a nineteenth century engineer from Scotland. Abbreviation acceptable on first reference when used with a numeral. People convert energy—measured in barrels of oil, tons of coal, and cubic feet of natural gas, for example—into power, tabulated in watts or horsepower. Operating a 60-W lightbulb requires power, measured in watts. After an hour, when you switch off the light, you can measure the amount of energy that was consumed in joules or kilowatt-hours or even British thermal units. *(See British thermal unit, energy, gigawatt, horsepower, joule, kilowatt, kilowatt-hour, megawatt.)*

watt-hour (Wh) Energy converted or consumed at a rate of 1 W for a period of one hour. Abbreviation acceptable on first reference when used with a numeral. *(See kilowatt-hour.)*

watt-second (Ws) *(See joule.)*

weatherhead The top of the conduit supporting a consumer's service wire, constructed to resist the action of weather. One word.

Weatherization Assistance Program A U.S. Department of Energy (DOE) program created in 1976 that enables low-income families to permanently reduce energy bills by making their homes more energy efficient. DOE's Office of Energy Efficiency and Renewable Energy oversees the program and provides funding and technical guidance to states, which then set eligibility guidelines and select weatherization service providers—usually local nonprofit agencies. (*See Low Income Home Energy Assistance Program, U.S. Office of Energy Efficiency and Renewable Energy.*)

weather stripping Insulation placed around doors and windows to save energy. Two words, no hyphen.

website Name for a publication posted on the World Wide Web. Use as one word, small "w." *Web site* (two words, capital "W") still OK to use, but rapidly going out of style. (*See cyberspace, information superhighway, Internet, World Wide Web, XML.*)

wellness program Organized effort to promote good health by encouraging employees to exercise, eat properly, reduce stress, follow through on preventive screenings, and adopt safety awareness.

Western Area Power Administration (WAPA) One of four regional federal agencies (established in 1977) that markets electricity generated primarily at federal dams. Based in Lakewood, Colorado, WAPA sells wholesale power from 57 U.S. Army Corps of Engineers, federal Bureau of Reclamation, and U.S. State Department International Boundary and Water Commission hydro projects to utilities serving in 15 states: Arizona, California, Colorado, Iowa, Kansas, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Texas, Utah, and Wyoming. (*See Bureau of Reclamation, power marketing administrations, U.S. Army Corps of Engineers.*)

Western Electricity Coordinating Council One of eight North American Electric Reliability Corporation regional organizations that coordinate planning and operations among utilities. (*See North American Electric Reliability Corporation.*)

Western Interconnection (*See grid.*)

Wh watt-hour. Abbreviation acceptable on first reference when used with a numeral.

wheeling Delivering large amounts electricity from a generating plant to a distribution system across another utility's transmission lines. *(See bulk power, transmission.)*

White House Office of Management and Budget. *(See Office of Management and Budget.)*

wholesale competition A market-based system where an electricity supplier has the option to buy power for resale from a variety of generation providers.

wholesale power market A system that allows trading between generators, retailers, and financial intermediaries both for short-term (spot price) and future (forward price) electricity delivery periods. *(See day-ahead market, spot market.)*

wholesale power cost adjustment *(See fuel adjustment clause.)*

wide area network (WAN) An interconnected computer setup with a wide coverage area using routers and leased communications links. *(See local area network.)*

Wi-Fi A wireless technology brand owned by the Wi-Fi Alliance used to certify the interoperability of wireless computer networking devices, typically in reference to wireless Internet service.

WildBlue A satellite-delivered high-speed Internet service for homes and small offices available through participating members of NRTC and many local satellite TV dealers. *(See NRTC.)*

William F. Matson Democracy Award An honor presented annually by the National Rural Electric Cooperative Association to an electric cooperative employee or director/trustee for outstanding accomplishments and service to the program through political action, political education, and participation in the Action Committee for Rural Electrification. Named for William F. Matson, who served as the first president of the Harrisburg, Pennsylvania-based Pennsylvania Rural Electric Association, a statewide service organization, and Allegheny Electric Cooperative, a generation and transmission cooperative, from 1964 to 1986. *(See Action Committee for Rural Electrification, National Rural Electric Cooperative Association.)*

Willie Wiredhand A cartoon figure created on October 30, 1950, by Andrew “Drew” McLay, a freelance artist working for the National Rural Electric Cooperative Association. Adopted as the official electric cooperative mascot in 1951, and awarded trademark protection following a January 7, 1957, ruling by a three-judge panel from the Fourth U.S. Circuit Court of Appeals. Willie Wiredhand features a lamp’s socket head, wire arms, two-prong plug legs, and insulated lineworker gloves. *(See National Rural Electric Cooperative Association.)*

Willies Awards Honors presented annually by the National Electric Cooperative Statewide Editors Association to member publications for excellence in writing, photography, and design. *(See National Electric Cooperative Statewide Editors Association.)*

WiMAX Worldwide Interoperability Microwave Access. Abbreviation acceptable on all references.

wind farm A group number of large wind turbines built close together. *(See wind power, wind turbine.)*

wind power Converting the kinetic energy present in wind motion to produce electricity. At the end of 2018, the U.S. boasted more than 96,000 MW of wind power generating capacity, approximately 7 percent of the nation’s total, making it the largest renewable resource (ahead of hydropower at 80,000 MW). Nationwide, more than 560 electric cooperatives in 36 states utilize more than 7,500 MW of wind for energy generation. *(See intermittency, power density, renewables, wind turbine.)*

wind turbine A device that, by capturing the wind’s energy with two or three propeller-like blades mounted on a rotor, generates electricity. *(See distributed generation, turbine, wind power, yaw drive.)*

wires charge Fee imposed on retail consumers for wheeling power through a local distribution system. This charge would cover the cost of providing distribution service and may also include additional charges levied by regulators, such as supporting energy efficiency programs, renewable energy sources, and possibly stranded costs.

Wisconsin Energy Cooperative News Official consumer publication of the Madison, Wisconsin-based Wisconsin Electric Cooperative Association.

WQC Wood Quality Control, Inc.

Wood Quality Control, Inc. (WQC) A National Rural Electric Cooperative Association subsidiary created in 1982 that provides a modern, economical, and effective quality-assurance service for inspecting treated wood poles and crossarms. *(See National Rural Electric Cooperative Association.)*

work force Use as two words.

Worldwide Interoperability Microwave Access (WiMAX) A telecommunications technology that provides for the wireless transmission of data, at broadband speeds, in a variety of ways. Usually referred to by just the acronym. *(See broadband.)*

World Wide Web A section of the Internet that makes possible the almost instantaneous exchange of information by linking documents and graphics into electronic pages. *(See blog, cyberspace, information superhighway, Internet, social media, social networking, website.)*

Ws watt-second.

Wyoming Rural Electric News Official consumer publication of the Casper, Wyoming-based Wyoming Rural Electric Association.

X, Y, and Z

XML eXtensible Markup Language. XML lets website developers and designers create customized page tags that offer greater flexibility in organizing and presenting information. Abbreviation acceptable on all references. *(See website.)*

yard lights *(See dark-sky lights, high-pressure sodium vapor lights, induction lighting, light-emitting diode, mercury vapor lights, metal halide lights.)*

yaw drive Upwind wind turbines face into the wind; the yaw drive keeps the rotor facing into the wind as its direction changes. Downwind turbines don't require a yaw drive; the wind blows the rotor downwind.

yaw motor The motor that powers a yaw drive.

YLC Youth Leadership Council.

Youth Leadership Council (YLC) A working group assembled each year that's made up of one outstanding Rural Electric Youth Tour student from each participating state. YLC members are given hands-on opportunities to develop leadership and presentation skills, broaden their understanding of electric cooperatives, and participate in resolutions and grassroots advocacy activities during the annual meeting of the National Rural Electric Cooperative Association (NRECA). A national spokesperson is also selected by YLC members to address the NRECA Annual Meeting and the following year's Youth Tour participants. Sometimes called "redshirts" due to the red golf shirts or sweaters members wear while performing their duties. Known as the *Youth Consulting Board* from 1976 to 1998. (See *National Rural Electric Cooperative Association, Rural Electric Youth Tour.*)

Youth Tour Acceptable on second reference for *Rural Electric Youth Tour* or *Electric Cooperative Youth Tour*. (See *Rural Electric Youth Tour.*)

Yucca Mountain A ridge located about 90 miles northwest of Las Vegas, Nevada, near former nuclear warhead testing grounds, that Congress in 2002 formally designated as the site of a permanent, central geologic repository for storing spent uranium fuel bundles and other high-level radioactive waste from commercial nuclear power plants, defense installations, and national laboratories. Under 1987 amendments to the federal Nuclear Waste Policy Act of 1982 (the amendments focused U.S. Department of Energy repository studies exclusively at Yucca Mountain), the facility was supposed to have begun accepting waste shipments by January 31, 1998, with capacity limited to 77,000 metric tons. But work remains slowed by lawsuits, Nevada political resistance and congressional infighting—latest estimates have the repository costing \$96.2 billion to finish (if ever) and operate through 2133. As of year-end 2018, more than 86,000 metric tons of high-level nuclear waste (growing by 2,000 tons per year) was sitting in aboveground cooling pools or dry casks at 121 sites in 39 states, including 75 operating or decommissioned nuclear power plants around the country. The nation's existing fleet of 99 operating (and two under construction) commercial nuclear power reactors at 61 sites could produce a total of 143,000 tons of waste over their lifetime as presently licensed. In January 2012, the 15-member presidential Blue Ribbon Commission on America's Nuclear Future officially proposed establishing one or more above-ground centralized interim depots where used reactor fuel could be stored and launching an effort (by a new independent congressionally chartered corporation) to find—through a consent-based process—a different permanent repository location. The to-be-created quasi-governmental agency would also license, build, and operate the nuclear waste facilities. (See *nuclear fuel reprocessing, Nuclear Waste Fund.*)

ZECs zero-emissions credits.

zero-emissions credits (ZECs) State subsidies, similar to renewable energy credits earned by wind and solar generators, designed to reward nuclear power plants for their environmental (clean air) benefits and help keep them operating in competitive wholesale power markets. ZECs in different forms have been adopted by Connecticut, New York, Illinois, New Jersey, and Ohio. *(See fixed resource requirement, minimum offer pricing rule, nuclear power, PJM Interconnection, regional transmission organization, renewable energy certificates/credits.)*

zero-interest loans. *(See Rural Economic Development Loan and Grant Program.)*

ZigBee A “lightweight” wireless technology protocol developed by the nonprofit ZigBee Alliance of companies as an open global standard for low-cost, low-power sensor networks (such as those used with household electronics, security and entertainment systems, and appliances) that do not require large amounts of communications bandwidth. A ZigBee-enabled home area/automation network, for example, permits active consumer participation in demand-response programs aimed at controlling electricity consumption. *(See demand response, personal energy management, smart grid.)*