

# Glossary



# Glossary

The development and understanding of Energy Vision 2020 requires the careful, consistent use of certain key terms and phrases. Here are definitions of terms that are used often in the process. (Terms in definitions which are themselves defined in the Glossary are printed in *italics*.)

## A

**A&I Costs**—Those expenses anticipated over the life of a facility for additions and improvements. These costs are typically capitalized.

**Abatement**—Reducing the degree of intensity of, or eliminating, pollution.

**A/C**—Air Conditioning.

**Acid Gas**—The gas product from a coal gasification unit that has not had the sulfur compounds removed.

**Acid Deposition**—The wet or dry deposition of acidic chemical compounds from the atmosphere.

**Acid Rain**—A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur dioxide and nitrogen oxides and other substances are transformed by chemical processes in the atmosphere, often far from the original sources, and then deposited on Earth in either a wet or dry form. The wet forms, popularly called “acid rain,” can fall as rain, snow, or fog. The dry forms are acidic gases or *particulates*.

**Add-Ons**—Purchases of new or additional equipment of a type previously not present in an existing facility, such as the purchase of a food freezer for a home that previously had none or the purchase of a second room air-conditioner.

**Administrative Costs**—Expenses incurred by the utility for program planning, design, management, and administration. They include labor, office supplies, data processing, and other such costs. They exclude the costs of marketing, purchase of equipment for programs, incentives, and monitoring and evaluation.

**Advanced Batteries**—An advanced technology battery that has more storage capacity than a lead acid battery.

**Aesthetics**—The visual perception of appearance of features in relation to one’s sense of beauty.

**AFUE**—Annual fuel utilization efficiency (AFUE) is an efficiency rating used for natural gas appliances based on average usage including on and off cycling described in a standardized Department of Energy test procedure. These ratings are listed in publications from the Gas Appliance Manufacturers Association (GAMA).

**Agricultural Sector**—The group of non-residential customers engaged in the production of crops or livestock, forestry, fishing, hunting, or trapping.

**Air Separation Plant**—A facility that produces nitrogen and oxygen from air.

**Air Toxins**—Various man-made and naturally occurring materials that are known or suspected of causing serious public health impacts, but for which no *National Ambient Air Quality Standards* exist.

**Allowance**—*Emissions Trading Options*.

**Alluvial**—Sediment deposited by flowing water.

**Ambient**—Surrounding.

**Ambient Air Quality Standards**—See National Air Quality Standards.

**Anaerobic**—Life in the absence of air or free oxygen.

**Annual Participation**—The number of customers enrolled in a particular utility sponsored customer service program for a given year.

**Annual Participation Rate**—The ratio of the number of participating units in a particular year to the number of eligible units.

**Aquatic**—Characteristic of or pertaining to water.

**Aquifer**—A water-bearing rock, rock formation, or group of rock formations.

**Archaeological Resources**—Material remains of past human activity.

**ASD**—An adjustable speed drive (ASD) may be used to control the speed of an electric motor.

**ASHRAE**—American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Inc.

**Attainment Areas**—Those areas that meet all *National Ambient Air Quality Standards* as determined by monitoring air pollutant levels.

**Attributes**—A measure of a resource option's characteristics or a measure of evaluation results.

**Availability**—The percentage of time in a given year that a TVA power plant (or generating unit in a power plant) can be called on to produce power.

**Avoided Cost**—The incremental cost to TVA for *capacity* or *energy* or both which, TVA would have to pay for the next best alternative option.

## B

**Base Load**—The minimum *load* over a given period of time.

**Base Load Capacity**—Large power plants, often coal- or nuclear-fueled, which are designed to operate around the clock at high *capacity factors*.

**Base Load Unit**—Units or plants which are designed for nearly continuous operation at or near full capacity to provide all or part of the base load. A generating unit which is normally operated to meet all, or part, of the minimum load demand of a utilities system over a given amount of time.

**Baseline**—A mid-range set of assumptions on all variables, reflecting a “business as usual” decision strategy.

**Beneficial Electrification**—Promoting the use of electricity and electrical technologies in processes that will improve a customer's productivity, quality of life, or economy over existing energy sources or technologies.

**Benefit/Cost Ratio**—The ratio of benefits produced by a course of action to the costs incurred in undertaking the course of action.

**Benthic Invertebrates**—An animal living on sea or lake bottoms that lacks a backbone or spinal column.

**Benthos**—Aquatic invertebrates that live on or in the first few inches of mud, sand, gravel, or other materials that make up the bottom of streams and lakes, e.g., worms, snails, crayfish, mussels, clams.

**Best Management Practice (BMP)**—A practice, or combination of practices, that is determined to be the most effective, practical means of preventing or reducing non-point source pollution to a level compatible with maintaining water quality.

**Biocide**—A substance that is destructive to many different organisms.

**Biodiversity**—The diversity of life in all its forms and all its levels of organization. Also termed “biological diversity”.

**Biomagnification**—The accumulation of chemicals in organisms beyond the concentration that would occur if the chemical were in equilibrium between the organism and its surroundings. Biomagnification can occur in both terrestrial and aquatic environments.

**Biomass**—A source of energy embodied in organic matter (mainly plants). Biomass-based energy systems use wood, agricultural and wood waste, municipal waste, and landfill gas as fuels.

**Biomass Cofiring**—The use of *biomass* as a secondary fuel supplement in a coal-fired plant.

**Biota**—The animal and plant life of a particular region considered as a total ecological entity.

**BLN**—Bellefonte Nuclear Plant

**Boiler**—A component that consumes a fuel for a heat source to produce steam from water.

**Boiling Water Reactor**—A nuclear power reactor cooled and moderated by ordinary water, which is allowed to boil in the core to generate steam that passes directly to the turbine.

**Bottom Ash**—A solid residue from combustion of a fuel, such as coal.

**British Thermal Unit (Btu)**—A commonly used unit of energy, especially for fuels or heat. A kilowatthour is equal to 3412 Btu.

**Buffering Capacity**—Ability of a stream to absorb acids and bases without altering the stream pH.

## C

**CAES**—*Compressed Air Energy Storage*.

**Call Option**—A financial tool that provides TVA the right to buy future power from another utility, an independent power producer, or a cogenerator. TVA can buy the right to actually purchase power and decide at a later date whether to purchase it.

**Canopy**—Refers to a layer of foliage in a forest formed by the crowns of trees.

**Capability**—(1) With respect to *supply-side resources*, the amount of electric power that a generating unit or electric system can reliably deliver under specified conditions over a specified period of time; (2) with respect to *demand-side resources*, the ability and skills to perform *demand-side*

*management* activities such as market research, program design, evaluation, etc.

**Capacity**—The amount of electric power that can be delivered by a generating unit or electric system, as determined by manufacturer's nameplate ratings or by testing. (For example, the capacity of a combustion turbine power plant, based on its nameplate rating, would be stated as 225 MW.)

**Capacity Factor**—A universal standard for measuring power plant performance. The ratio a plant's actual output to its maximum potential output, expressed as a percentage.

**Capacity Margin**—The total installed capacity of TVA's system in excess of peak load, divided by total installed capacity. Stated another way, Capacity Margin =  $(Reserve\ Margin) / (1 + Reserve\ Margin)$ .

**Carbon Dioxide (CO<sub>2</sub>)**—A colorless, odorless, nonpoisonous gas that results from fossil fuel combustion and is normally a part of the *ambient* air.

**Carbon Monoxide (CO)**—A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

**Cascaded Humidified Advanced Turbine (CHAT)**—An advanced Ericson cycle that employs intercooling, recuperation, reheat, and humidification of a *combustion turbine* with a cascaded topping turbine.

**Cedar Glades**—Distinctive plant communities occurring where certain types of limestone weather to produce bare rock outcrops or thin layers of soil.

**CHAT**—*Cascaded Humidified Advanced Turbine*.

**Chemical Coproduction**—The production of a chemical product while simultaneously producing electricity.

**Chlorofluoro-Carbons (CFCs)**—A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, and insulation or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere, they drift into the upper atmosphere, where their chlorine components destroy ozone.

**Class I Areas**—National parks and wilderness areas given protective air quality standards, as designated by the *Clean Air Act Amendment of 1977*.

**Clean Air Act Amendment of 1970**—Enabling legislation, which instructs the Environmental Protection Agency (EPA), to set air quality standards for pollutants of concern.

**Clean Air Act Amendment of 1977**—Legislation which provides greater regulatory authority to the EPA to set specific provisions to protect national parks and wilderness areas designated as *Class I areas*.

**Clean Air Act Amendment of 1990**—Legislation which added additional regulatory authority to enforce compliance with air quality standards in *non-attainment areas*. It also set new requirements for *acid rain*, hazardous air pollutants, and for the monitoring and reporting on air emissions.

**Climate Challenge**—The principle utility industry component of President Clinton's Climate Change Action Plan, which provides for voluntary limiting *greenhouse gases* emissions (primarily CO<sub>2</sub>).

**CO**—*Carbon Monoxide*.

**CO<sub>2</sub>**—*Carbon Dioxide*.

**Coal Gasification**—The process of converting coal into gas.

**Coal Plant**—An electric generation plant that uses coal as its main source of fuel.

**Coalbed Methane**—A gas that is present in coal seams.

**Cogeneration**—The sequential production of electricity and useful thermal energy (generally steam or hot water) from a single fuel source.

**Coincident Peak**—The *demand* of a TVA customer or group of customers at the time TVA's entire system is at its *peak load*.

**Coincident Peak Demand**—The load (in kW) of an end use, customer, or group of customers at the time the utility experiences its greatest demand for electricity.

**Combined-Cycle Generating Unit**—A generating unit that combines a simple cycle *combustion turbine* and a heat recovery steam generator, which uses the exhaust heat from the *combustion turbine* to generate steam which in turn drives a steam turbine. (Electricity is generated by both *turbines*.)

**Combustion Technology**—*Combustion turbines—combined cycles* and simple cycles.

**Combustion Turbine (CT)**—A gas *turbine* that burns natural gas, fuel oil, or other similar fuels and drives a turbine and generator to produce electricity. Typically used as the primary generator of electricity in a combined cycle installation.

**Commercial Sector**—The group of non-residential and non-industrial customers that provides services, including retail, wholesale, finance, insurance, and public administration.

**Commodity**—Products that, in the eyes of the buyers, are identical regardless of who produced it. An example is coal that meets a particular standard.

**Commodity Industry**—An industry that produces a *commodity*. For example, most agriculture and mining industries are commodity industries.

**Community**—An assemblage of plants, animals, bacteria, and fungi that live in an environment and interact with one another, forming a distinctive living system with its own composition, structure, environmental relations, development, and functions.

**Compressed Air Energy Storage (CAES)**—Compressed Air Energy Storage (CAES) combines features from conventional *combustion turbines* and *pumped hydro storage*. During periods of relatively low electric loads, and therefore low power generation costs, air is compressed and stored in an underground reservoir. During periods of high electric loads, the compressed air is released to drive turbine generators to produce electricity. The equipment is analogous to the compressor used in a combustion turbine, and the process is similar to the pumping and storing of water at a higher elevation in pumped hydro generation.

**Configuration Control**—The process of maintaining consistency between the physical condition of a nuclear plant and its associated design and engineering records.

**Conservation**—A reduction in either *energy* usage or *peak demand* so as to provide the prior end-use service levels at a lower cost.

**Constraint**—A qualification of the minimum and / or maximum amount of an output or cost that could or should be produced or incurred in a given time period.

**Contingency**—A plan or reserve capacity to handle an unplanned outage of a gen-

erator, transmission line, transformer, or other piece of electrical equipment on a transmission system.

**Conversion**—The modification of a power plant (either fully or partially constructed) to enable the plant to use a fuel that is different than the fuel originally intended. For example, a partially constructed nuclear plant might be modified so that it would use pulverized coal as a fuel source.

**COP**—The Coefficient of Performance (COP) is the ratio of useful energy output (e.g., but of space or water heating value) to the energy input (btu value of natural gas or electricity).

**Coproduct**—A secondary product that is produced usually in an industrial process in addition to the primary product.

**Cost-Effectiveness**—A measure of the degree to which a course of action provides benefits in excess of its cost.

**Cradle-To-Grave**—A term used to describe the generation (e.g., mining), transportation, storage, treatment, and disposal of a fuel or waste product.

**Criteria**—Units of measure used in integrated resource planning. They are derived from issues or concerns. For example, an evaluation criteria for concern over future rates can be short-term rate impact.

**Cultural Resources**—The physical remains (artifacts, ruins, burial grounds, petroglyphs, etc.) and conceptual contents or contexts (such as a setting for legendary, historic, or prehistoric events for native people) of an area which are useful in gaining knowledge about man's past.

**Cumulative Effects**—The net/total changes in electricity use or demand caused by all of the program's participants

from the time of a program's inception through the current year.

**Cumulative Participation**—The net/total number of participating units from the start of a program through the current year.

**Cumulative Participation Rate**—The ratio of the total number of participating units from the start of a program through the current year to the total number of eligible units.

**Cumulative Probability Distribution**—A table or graph that shows the chance that an unknown value will turn out to be less than each of a series of given values. For example, if a random July day in the year 2000 is picked, one might estimate that there is a 10 percent probability that the high temperature will be below 70 degrees, 25 percent probability of it being below 80 degrees, 50 percent chance of below 90 degrees, 90 percent chance of below 100 degrees, and 99.9 percent chance of below 110 degrees.

**Customer Class**—A group of customers with similar characteristics, such as economic activity or level of electricity use. Standard electric utility customer classes include residential, commercial, and industrial.

**Customer Service Options**—Actions taken to influence the nature of loads on the customer side of the meter.

## D

**DBH**—*Diameter at Breast Height*.

**Decision Analysis**—A decision-making process that provides a mathematical framework by which a large set of resource *strategies* can be evaluated for a number of uncertain parameters. For example, an ultimate decision might include five sub-decisions, each with five key uncertain parameters, for which there are three values representing the range of likely outcomes. Under this example, 1,115 scenarios would be evaluated in making the decision.

**Decommissioning**—The process of closing down and putting a facility into a safe state after its useful life has come to an end.

**DECON**—A nuclear decommissioning option, where all radioactive and contaminated materials are removed from the plant. The reactor site may then be released for unrestricted use with no further licensing requirements. Under this option, it is assumed that the entire reactor facility will be dismantled and disposed.

**Declining Block Rates**—An electric rate structure that assesses a lower average unit charge as usage increases.

**Delivery Point**—A physical location on TVA's transmission system that is the contractual point at which a customer takes delivery of electricity from TVA.

**Delta**—In load forecasting, the increase or decrease in the forecast sales caused by the high or low levels of any of the assumptions in the forecast.

**Demand**—The amount of electric energy used at a specific point in time, measured in watts (or multiples thereof, such as *kilowatt*, *megawatt*, or *gigawatt*).

Demand is measured for individual customers, for groups or classes of customers, and for TVA's system as a whole.

**Demand-Side Management (DSM)**—Activities which influence electricity use on the customer's side of the meter. Examples include home weatherization, use of compact fluorescent lighting, etc.

**Demand-Side Management Measure**—A single technology, such as a compact fluorescent light bulb, which can be used to alter customer *load*.

**Demand-Side Management Programs**—Organized utility activities that are intended to affect the amount and timing of customer electricity use.

**Demand-Side Resource**—Bundles or packages of DSM activities which can be used to reduce customer energy demands, and thus be viewed in many respects like a generating source.

**Derating**—Lowering the capacity rating of a generating unit due to factors such as age, loss of efficiency in equipment, loss of availability, or loss of reliability of the unit.

**Derivatives**—Financial instruments for a commodity whose value is tied to something else, such as fuel costs or interest rates. Derivatives do not call for immediate delivery of the commodity from seller to buyer. *Call options* and futures are examples of these instruments.

**Design Capacity**—The generating capability of a plant that sets the sizing of all plant components. This is usually close to the full load capability of a plant.

**Diameter at Breast Height (DBH)**—Tree diameter (outside bark) at breast height (4.5 feet above the ground).

**Diesel Generators**—An electrical generator powered by a traditional diesel engine.

**Direct-Installation Programs**—Activities in which the utility (or its contractor) installs *DSM measures* in the facilities of participating customers; such programs generally cover low-cost measures, such as water heater wraps and compact fluorescent lamps.

**Direct Served Customers**—A group of approximately 60 ultimate consumers with large or unusual power requirements that are served directly by TVA.

**Dispatchable**—Capable of being connected or disconnected from a utility's system as necessary for cost-effective and efficient operation of the system. Generally applies to generating facilities, but could also apply to a load which is interruptible when necessary.

**Dispersed Load Center**—Distribution of electricity from a point at which the load of a given area is assumed to be concentrated.

**Distributed Generation**—Power generation facilities located close to energy users. These are normally small size units (i.e., less than 50 MW) and may include both generation and energy storage technologies.

**Distributor**—A company that usually buys wholesale electricity from a provider and delivers it to individual commercial, industrial, and household customers.

**Diversified Coincident Peak Demand Effect**—The change caused by a utility's DSM program in the demand for electricity at the time the utility experiences its system peak.

**Diversified Demand**—The average load (in kW) across a group of customers or end uses during a given time period.

**DOE 2**—A public domain building energy analysis software program developed with funding from the Department of Energy.

**DSM**—*Demand-Side Management*.

**DX**—Direct expansion (DX) refers to cooling equipment with a refrigerant to air coil and no chilled water system.

## E

**Early Replacement**—The removal of equipment before it reaches its normal retirement age and the substitution of new, typically more efficient equipment for the old.

**Econometric Models**—Models that use statistical relationships between past electricity sales and actual major historical factors, such as economic activity and prices, to forecast future electricity sales.

**Economic Dispatch**—The hour-by-hour operation of TVA's system of generating units to meet hourly and daily load swings in a way that minimizes the cost of producing electricity.

**Economic Potential**—An estimate of the possible energy savings assuming that all energy-efficient options will be adopted and all existing equipment will be replaced with the most efficient whenever it is cost-effective to do so, without regard to market acceptance.

**Economy Surplus Power (ESP)**—A form of interruptible power sold by TVA. The price for ESP changes hourly and is based on a markup over the incremental cost of the power. There are several

variations of ESP with different markups and interruption provisions.

**Ecosystem**—Any unit that includes all organisms (i.e., the community) in a given area interacting with the physical environment.

**EER**—Energy efficiency ratio (EER) is a ratio calculated by dividing the cooling capacity of a cooling unit in *Btus* per hour (Btuh) by the power input in watts at any given set of rating conditions, expressed in Btuh per watt (Btuh/watt). These ratings are listed in publications by the Air-Conditioning & Refrigeration Institute (ARI).

**EF**—Energy Factor (EF) is a measure of the overall efficiency rating of a water heater certified by the Gas Appliance Manufacturers Association (GAMA).

**Effects**—These include: (a) direct effects caused by an action and occur at the same time and place; (b) indirect effects caused by an action and occur later in time or farther removed in distance, but still reasonably foreseeable. Effects and impacts as used in this document are synonymous.

**Effluent**—Wastewater—treated or untreated—that flows out of a treatment plant, sewer, or industrial out fall. Generally refers to wastes discharged into surface waters.

**EIS**—Environmental Impact Statement.

**Electric and Magnetic Fields (EMF)**—Two types of energy fields which are emitted from any device that generates, transmits, or uses electricity.

**Eligible Market**—The subset of the total market that is qualified to participate in a customer service program based on the program's participation criteria.

**Embayment**—A body of water forming a bay.

**Embedded Costs**—Costs already incurred or committed to. Usually applies to an investment such as a generating plant or transmission line.

**EMF**—*Electric and Magnetic Fields*.

**Emission**—Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, or aircraft exhausts.

**Emissions Offsets**—Reductions in emissions from existing facilities used to offset the emission produced from a new facility.

**Emissions Trading Options**—An Environmental Protection Agency policy that allows an electric plant complex with several facilities to decrease air pollution from some facilities while increasing it from others, so long as total results are equal to or better than those required by previous limits. Facilities where this is done are treated as if they exist in a bubble in which total air pollutant emissions are averaged out. Complexes that reduce emissions substantially may be able to “bank” their “credits/*allowances*” or sell them to other industries.

**EMS**—Energy management system is a term used for automated control of *HVAC* and lighting systems in buildings.

**Endangered Species**—Any biotic species formally listed as in danger of extinction throughout all or a significant portion of its range of habitat.

**Endemic**—Native to and limited to only a particular region.

**End Use**—The ultimate benefits provided by electricity. For example, commercial electric energy uses can be segmented into several end uses, such as lighting, air conditioning, ventilation, heating, cooking, refrigerating, etc.

**End Use Model**—An energy demand forecasting approach which is based on the end uses of electricity and the factors that influence such end uses, such as electricity consumption, end-use efficiencies, turn-over of appliance stock, etc.

**Energy**—The amount of power consumed over a period of time, measured in watt hours, *kWh*, *MWh*, or *GWh*.

**Energy Efficiency**—(1) With regard to *supply-side resources*, reducing the amount of fuel required to produce a given amount of electric energy; (2) with regard to *demand-side management resources*, reducing the amount of electric energy used without reducing the functionality of that use—for example, by replacing a 74-watt incandescent light bulb with an 18-watt compact fluorescent light bulb delivering the same amount of lumens.

**Energy Efficiency Programs**—Programs (sometimes called energy conservation programs) that are aimed at reducing the amount of energy used by specific end-use devices and systems without degrading the services provided, thereby reducing overall electricity consumption (*kWh*), often without regard for the (e.g., peak or of-peak) timing of program-induced savings. Such savings are generally achieved by substituting technically more advanced equipment to produce the same level of end-use services (e.g., lighting or warmth) with less electricity.

**Energy Storage**—A mechanism for retaining energy during light load periods, when energy production costs are relatively low, and releasing the energy during high

peak periods. The duration of an energy storage cycle rarely exceeds one week.

**ENTOMB (Entombment)**—A nuclear decommissioning option that consists of sealing residual radioactive or contaminated materials and components within a structure that prevents access by unauthorized personnel. The entombment boundary would normally consist of those portions of the reactor building above certain levels of radioactivity. If necessary, additional reinforced concrete is poured to close up these areas, integral access hatches, and manways. Non-radioactive systems and structures are drained and de-energized, then secured throughout the dormancy period until final disposition.

**Environmental Externalities**—Externalities are activities which result from the production and consumption of goods and services that impose costs or benefits on society that are not reflected in the prices of those goods or services. For example, negative externalities such as pollution and sonic booms can impose costs on a society that are not reflected in the prices of those goods associated with the pollution or sonic boom. Discussions of externalities in the utility industry have generally dealt with environmental externalities arising from various forms of pollution.

**Environmental Mitigation**—Reducing the potential degree of environmental impact.

**Environmental Protection Agency (EPA)**—A federal agency charged with implementing a number of environmental statutes.

**EPACT of 1992**—The Energy Policy Act of 1992 introduced many topics such as *energy efficiency*, *DSM*, *IRP*, *renewable energy sources*, *transmission access*, *research on EMF*, and *energy independence*.

**Equipment Cost**—The price of components that the utility purchases directly for a DSM program, including the cost of DSM measures distributed free to participants.

**Erosion**—The process by which soil particles are detached and transported by water and gravity to some downslope or downstream point.

**ESP**—*Economy Surplus Power*.

**Evaluation Criteria**—Measures to evaluate the contribution of resource options to stated objectives and values.

**Evaluation and Measurement**—The phase of a DSM program which focuses on determining the effectiveness and actual field results of the program.

**Existing Buildings**—Structures that are in use as of the beginning of the current year.

**Externalities**—Consequences or impacts of resource development and consumption that are not directly accounted for in the price paid for the resource developed and consumed.

**Federally Listed**—Animals or plants that have been officially added to the Federal lists of endangered or threatened wildlife or plants by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

## F

**Feedstock**—The raw materials utilized by a chemical production facility to make the final product.

**FERC**—Federal Energy Regulatory Commission

**Firm Capacity**—(1) With regard to *supply-side resources*, a binding commitment to purchase or sell *capacity*. Purchases increase the capability of TVA's system; sales decrease TVA's *capability*; (2) with regard to *demand-side management resources*, the amount of capability that must be provided to a customer under normal conditions.

**Firm Power**—Power sales which do not have arrangements in the contract for interruptions. (See *Interruptible Power*)

**Firm Power Supply Contracts**—Contracted power supply that is available 100 percent of the time except under conditions such as Force Majeure (circumstances that are normally beyond the control of the contracting parties, e.g., "Acts of God").

**Fixed Costs**—Costs associated with constructing and maintaining resources in an operable condition, including capitalized construction costs, fixed operating and maintenance costs and fuel inventory costs. These costs are recovered whether or not the resource is actually operated.

**Flexible Option**—A resource option that can be altered or modified in accordance with TVA needs.

**Flexible Strategy**—A combination of options that can be easily altered over time to meet TVA's power needs.

**Flexibility**—The degree to which resource decisions can be changed over time as events unfold and near-term futures become more clearly known.

**Fluidized Bed**—A Fluidized Bed Combustion Boiler burns solid fuel with a mixture of limestone to reduce sodium dioxide (SO<sub>2</sub>) emissions without the addition of a flue gas desulfurization system.

**Fly Ash**—The small ash particles that are carried out of a combustor with the existing flue gas. These particles are collected by appropriate equipment prior to discharging the flue gas into the atmosphere.

**Forced Outage**—The occurrence of a component failure or other condition that requires removal of a generating unit from service immediately or up to and including the next weekend.

**Forest Cover Type**—A descriptive classification of forest land based on present occupancy of an area by tree species (also known as "forest type"), such as:

- Oak-hickory. Forests in which upland oaks or hickory, singly or in combination, constitute a plurality of stocking.
- Oak-pine or mixed. Forests in which hardwoods (usually upland oaks) constitute a plurality of stocking but in which pines account for 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

**Forward Contract**—A transaction in which two parties agree to the purchase or the sale of a commodity at some future time under such conditions as the two agree upon.

**Fossil Fuel Plant**—A plant using coal, oil, natural gas or other fossil fuel as its source of energy.

**Free Drivers**—Customers who take *DSM* program recommended actions because of the program, but who do not participate directly in the program (e.g., they do not claim rebates).

**Free Riders**—Customers who would have adopted program recommended actions even without the program, but who participate directly in the program (e.g., they claim rebates).

**Fuel Cells**—A device capable of converting a fuel and an oxidizer directly to electricity.

**Fuel Switching Programs**—Programs that encourage customers to change from one fuel to another for a particular end-use.

**Full-Scale Programs**—Mature, system wide programs that are available to all of the eligible customers in the utility's service area.

**Future**—A combination of discrete values for key uncertainties that TVA is treated explicitly in Energy Vision 2020. For example, a *future* might assume a high rate of load growth, low oil prices, low coal prices, high interest rates, and no new carbon dioxide (CO<sub>2</sub>) emission regulations.

**Futures (Financial Market)**—The sale of a product for delivery at some time in the future for a specified price. Most major commodity markets have well-organized active futures markets. For example, farmers will sometimes sell part of their crops for fall delivery before the crop is even planted.

## G

**Gas-Fired Combined Cycle**—A generating unit consisting of a combustion turbine generator and a steam turbine generator. The primary fuel is natural gas.

**Gasifier**—A collection of equipment that produces a fuel gas from a typically solid fuel. This fuel gas is suitable for use as a fuel in a combustion turbine or as a feedstock for a chemical processing plant.

**General Information Programs**—Customer Service programs that inform customers about DSM options through such mechanisms as brochures, bill stuffers, TV and radio ads, and workshops.

**Geographic**—Belonging to or characteristic of a particular region.

**Gigawatt**—GW, an amount of electric power equal to 1,000 *MW* or 1 billion watts.

**Gigawatt hour**—GWh, an amount of energy equal to 1,000 *MWh* or 1 billion watt-hours.

**Global Warming**—The theory that certain gases such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and chlorofluorocarbon (CFC) in the earth's atmosphere effectively restrict radiation cooling, thus elevating the earth's ambient temperatures.

**Greenfield Site**—A new site which has not previously been developed.

**Greenhouse Effect**—The build-up of carbon dioxide and other trace gases that allows light from the sun's rays to heat the Earth but prevents a counterbalancing loss of heat.

**Greenhouse Gas Emissions**—A gas whose presence in the upper atmosphere contributes to the greenhouse effect by allowing visible light to pass through the atmosphere while preventing heat radiating back from the Earth from escaping. Greenhouse gases from *anthropogenic sources* include *carbon dioxide*, *nitrous oxide*, *methane*, and *chlorofluorocarbons (CFCs)*. There also are even larger quantities of naturally occurring greenhouse gases, notably ozone and water vapor, whose concentrations may be affected by interactions with atmospheric pollutants.

**Groundwater**—Water within the earth or geologic stratum that supplies wells and springs.

**GW**—Gigawatt, an amount of electric power equal to 1,000 *MW*, or 1 billion watts.

**GWh**—Gigawatt hour, an amount of energy equal to 1,000 *MWh*, or 1 billion watt-hours.

## H

**Habitat**—The total environmental conditions on a unit of land including food, cover, and water within the home range.

**Habitat Diversity**—The variety and variability of habitat types, as well as their interrelationships on a given area and scale.

**HAP**—*Hazardous Air Pollutants*.

**Hardwoods**—Angiosperms, usually broadleaf and deciduous. Soft hardwoods are soft-textured hardwoods such as boxelder, red and silver maples, hackberry, sweetgum, yellow poplar, blackgum, sycamore, black cherry, and elm. Hard hardwoods are hard-textured hardwoods such as sugar maple, hickory, dogwood, persimmon, black locust, beech, ash, black walnut, and all commercial oaks.

**Hazardous Air Pollutants (HAP)**—Air pollutants that are not covered by ambient air quality standards but that present, or may present, a threat of adverse health or environmental effects. These include an initial list of 189 chemicals designated by Congress that is subject to revision by the Environmental Protection Agency.

**Hazardous Waste**—A byproduct of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special *Environmental Protection Agency* lists.

**Haze**—Atmospheric moisture, dust, smoke, and vapor suspended to form a partly opaque condition.

**Heat Rate**—A measure of efficiency for electric generating units, based on the amount of thermal energy (measured in BTUs) needed to produce a *kWh* of electricity. The lower the heat rate, the more efficiently the generating plant turns fuel into electricity.

**Heat Recovery Steam Generator**—Heat Recovery Steam Generator recovers heat from combustion turbine exhaust gases to raise steam to power a steam turbine, which can be used to generate additional electricity.

**Heavy Metals**—Natural elements such as lead, mercury, cadmium, and nickel. They are mined from the earth and used in numerous manufacturing processes and countless products.

**Herbicide**—Any substance or mixture of substances intended to prevent the growth of, or destroy, unwanted plants or vegetation.

**High-Level Waste**—Material that is highly radioactive. In a nuclear power plant, high-level waste is spent fuel.

**Historic Site**—See Archeological Resources.

**HSPF**—Heating Season Performance Factor (HSPF) is the total heating output of a heat pump during its normal annual usage period for heating divided by the total electric power input in watt-hours during the same period. This rating is listed in publications by the American Refrigeration Institute (ARI).

**Hydro Electric Power Generation**—A dam creates an upper and a lower water reservoir. The height difference between the two reservoirs establishes potential energy that is used to generate electricity by allowing water from the upper reservoir to flow through a hydro *turbine* to the lower reservoir.

**IGCC**—*Integrated Gasification Combined Cycle*.

**Impacts**—*Effects*.

**Impoundment**—A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

**Incentive**—An award offered to encourage participation in a *DSM* program or adoption of recommended measures.

**Incentive Programs**—Programs that offer cash or noncash awards to customers, trade allies, or employees to encourage participation in a *DSM* program and adoption of recommended measures.

**Incremental Cost**—The additional cost incurred because of an activity. For example, a plant sitting idle has costs associated with it such as interest on funds used to build it and basic maintenance. When started up, the plant has additional costs such as fuel, additional maintenance, and other costs. These latter costs are the incremental costs of producing the product. Similar terms are *avoided cost*, variable cost, and marginal cost.

**Incremental Fuel Cost**—The cost of replacing a unit of fuel in today's market.

**Incremental Participation**—The cumulative number of program participants in the current year minus the cumulative number of participants in the previous year.

**Independent Power Producer (IPP)**—Any person or entity who owns or operates, in whole or in part, one or more new independent power production facilities.

**Industrial Customer**—In the context of Energy Vision 2020, a business engaged in industrial activities, which buys electrical

energy either from TVA directly or a distributor, depending upon its electrical energy requirements.

**Industrial Sector**—The group of non-residential or commercial customers that provides products, including agriculture, construction, mining, and manufacturing.

**Inflexible Option**—A resource option that cannot be changed once construction or implementation begins (e.g., construction of a combustion turbine).

**Integrated Gasification Combined Cycle (IGCC)**—Integration of a coal gasification plant with a combined cycle plant. A coal gasification plant is a facility that converts coal into a synthetic fuel gas.

**Integrated Resource Planning (IRP)**—A utility planning process that evaluates *supply-side resources* and *DSM resources* on a level playing field to reliably and cost effectively meet the future energy needs of customers.

**Integration**—The process of combining resource options to become strategies, and uncertainties to become futures. Strategies are combined with futures to create scenarios.

**Interactive Planning**—A process whereby the assumptions, supporting data and information, and preliminary results of planning are subject to open and systematic discussion with *stakeholders* to discover the interactive and interdependent effects of planning factors.

**Interconnection**—An electrical connection on TVA's transmission system between TVA and a neighboring utility which allows the transfer of electrical energy between TVA's transmission system and the neighboring utility's transmission system.

**Intermediate Unit**—A generating plant that operates between 15 percent and 60 percent of the time. An intermediate plant normally runs more hours than a peaking plant, but less than a base-load plant.

**Internalized Costs**—Costs which result from the production and consumption of goods and services that are reflected in the price of those goods and services.

**Interruptible Power**—A type of *demand-side management* activity in which the power contract allows TVA limited rights to turn off the power when overall demand is high in return for a lower electricity price to the customer (*See Firm Power*).

**Interruptible Power Contracts**—Power supply contracts under which the consumer agrees to temporarily reduce its electric usage when the utility so requests. In return, the consumer is charged a reduced electric rate.

**IPP**—*Independent Power Producer*.

**IRP**—*Integrated Resource Planning*.

**Issue**—An expressed concern regarding TVA's energy resource plan or its implementation. For example, an industrial customer may see low electricity rates as vital to its continued operation.

**Karst (Topography)**—The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

**Karst Region**—A particular geographic region of irregular limestone in which erosion has produced fissures, sinkholes, underground streams, and caverns.

**Kilowatt**—kW, which is the amount of power equal to 1,000 watts.

**Kilowatt hour**—kWh, which is the amount of energy equal to 1,000 watt-hours.

**KM**—Kilometer, unit of length equal to 1,000 meters.

**kW**—Kilowatt, which is the amount of power equal to 1,000 watts.

**kWh**—Kilowatt-hour, which is the amount of energy equal to 1,000 watt-hours.

## L

**Lacustrine**—Living or growing in lakes; of or related to lakes.

**LAER**—Lowest Achievable Emission Rate

**Lead (Pb)**—A heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints, and plumbing compounds has been sharply restricted by federal regulations, but enormous quantities of lead already released into the environment are causing significant problems.

**Levelized Cost**—A stream of equal periodic costs or revenues that has the same present value as a given unequal stream of costs or revenues.

**Licensing Basis**—Those engineering, design, and analysis records and other documents that ensure conformance of a nuclear unit with applicable regulations.

**Life-Cycle Costs**—The total costs associated with the production and consumption of a resource during its use.

**Lignite**—An imperfectly formed coal, usually dark brown and often having woody texture.

**Limited Interruptible Power (LIP)**—A form of interruptible power sold by TVA. LIP customers get discounts from firm power rates in exchange for granting TVA limited rights to interrupt the power if necessary when the power supply situation is very tight. TVA's right to interrupt may be limited by several contract terms, such as the amount of power TVA may curtail, the period of interruption, or the duration between interruption.

**Load**—The amount of electric power that is drawn from TVA's electric system at a given point in time.

**Load-Building Programs**—Programs that aim to increase electricity consumption, generally without regard to the timing of the increased usage (e.g., peak or off-peak).

**Load Factor**—A measure of the variability in electric usage, defined as the ratio of energy actually consumed to the potential consumption at peak load for the period of time of interest. Load factor is usually calculated over a one year (8,760 hours) time period.

**Load Forecast**—A projection of future electricity sales measured in *kilowatt hours* and *peak loads* measured in *megawatts*. Depending on its intended use, a load forecast can cover a period as short as one hour or as long as 25 years or more.

**Load Management**—The control of customer demand during peak periods or during periods when supplies of electricity are short. Control can occur through the rescheduling or the direct curtailment of power demand. Unlike energy conservation, load management may not conserve energy.

**Load Not Served**—A measure of the reliability of a power system.

**Load Profile**—A curve or chart showing electrical power supplied or required plotted against time of occurrence; this illustrates the varying magnitude of the electric power load over time.

**Load Shape**—The time-of-use pattern of customer electricity use, generally a 24-hour pattern or an annual (8,760-hour) pattern.

**Load Shifting Programs**—Programs that aim to move or reschedule electricity consumption from one time to another (usually from the on-peak to off-peak periods during a single day).

**Loop Flow**—A flow of electricity from one place to another that follows a path other than the one specified in a contract or otherwise intended. A loop flow may pass through the transmission system of a utility not involved in the original transaction.

**Loss of Load Expectation**—The expected time that capacity is not sufficient to meet the system demand.

**Loss of Load Probability**—A measure of the expected number of hours per year that system demand will exceed system capacity.

**Low-Level Waste**—Radioactive material that is only slightly or moderately radioactively contaminated. Low-level radioactive waste consists largely of ordinary trash and other items that have come into contact with radioactive materials.

## M

**Mainstream Reservoirs**—Reservoirs on large rivers such as the Tennessee River.

**Maintenance Outage**—The removal of a generating unit from service to perform work on specific components that could have been postponed past the next weekend, but which could not be postponed from season to season. This is work done to prevent a potential *forced outage*.

**Market Potential**—An estimate of the possible energy savings that would occur because of normal market forces (i.e., likely customer adoption over time of various actions without a *DSM* program).

**Mature Trees**—Trees that have grown into the sawtimber class but have not yet begun to decline and die from natural processes.

**Megawatt**—MW, the amount of power equal to 1,000 KW or 1,000,000 watts.

**Methane (CH<sub>4</sub>)**—A greenhouse gas that is colorless, nonpoisonous, and flammable and is created by anaerobic decomposition of organic compounds.

**mg/m<sup>3</sup>**—Micrograms per cubic meter.

**micro-ACCESS**—A building energy analysis software program available through EPRI.

**microns**—A unit of length equal to one millionth of a meter.

**Milepost 160**—Marker on the Tennessee River that is considered to be a central location of the Tennessee Valley service area.

**Mitigation**—Measures taken to reduce adverse impacts.

**Mn**—Manganese, a hard and brittle metallic element that resembles iron but is not magnetic.

**Mobile Sources**—Transportation air pollution sources, primarily automobiles and trucks.

**Monitored Retrievable Storage (MRS)**—A temporary (40 years) collection and storage facility for spent nuclear fuel rods until a permanent waste repository is available.

**Monitoring and Evaluation Costs**—Expenditures associated with the collection and analysis of data used to assess DSM program operations and effects.

**Multi-Attribute Tradeoff Analysis**—An approach designed for interactive participation by a group to make tradeoff comparisons among different attributes for many strategies and futures.

**MW**—Megawatt, the amount of power equal to 1,000 KW or 1,000,000 watts.

**MWh**—Megawatt hour, the amount of power equal to 1,000 kWh or 1,000,000 watt hours.

## N

**NAPAP**—*National Acid Precipitation Assessment Program*.

**National Acid Precipitation Assessment Program (NAPAP)**—A 10-year scientific study of the effects of, and sources contributing to, *acid deposition* that was conducted by the federal government from 1980 to 1990.

**National Ambient Air Quality Standards (NAAQS)**—Uniform, national air quality standards established by the *Environmental Protection Agency* that restrict ambient levels of certain pollutants to protect public health (primary standards) or public welfare (secondary standards). Standards have been set for *ozone*, *carbon monoxide*, *particulates PM (10)*, *sulfur dioxide*, *nitrogen dioxide*, and *lead*.

**Native Species**—Species normally indigenous to an area; not introduced by man.

**Natural Resources**—The elements of the natural environment that are evaluated as resources (i.e. water resources, forests).

**NEPA**—National Environmental Policy Act.

**Net Effect**—The change in electricity use or demand for a participating customer that can be attributed to the utility *DSM* program, expressed in *MWh/year* and *MW*.

**New Construction**—Buildings and facilities that are constructed during the current year; it may also include major renovations of existing facilities.

**New Construction Programs**—Customer service programs that affect the design and construction of residential and commercial buildings and manufacturing facilities; such programs may also include major renovations of existing facilities.

**New Participants**—Customers who take part in a customer service program during the current year and did not participate in the program during the previous year.

**NIMBY**—An acronym for “Not In My Backyard”, used to characterize a person or group resisting development of a project within their neighborhood or another geographic area of concern.

**Nitrogen Dioxide (NO<sub>2</sub>)**—The result of nitric oxide combining with oxygen in the atmosphere. A major component of photochemical smog.

**Nitrogen or Nitrous Oxides (NO<sub>x</sub>)**—A product of combustion by mobile and stationary sources and a major contributor to the formation of ozone in the troposphere and acid deposition.

**Non-attainment Area**—A geographic area that does not meet one or more of the *National Ambient Air Quality Standards*

for the criteria pollutants designated in the Clean Air Act.

**Non-coincident Peak**—The absolute peak demand imposed on TVA by a customer, group of customers or all the customers as a whole, but not necessarily at the same time.

**Non-point Sources**—Pollution sources that are diffuse and do not have a single point of origin or are not introduced into a receiving stream from a specific outlet. The pollutants are generally carried off the land by storm water runoff.

**Normal Replacement**—The removal of worn-out (and perhaps obsolete) equipment and the installation of new equipment.

**NO<sub>x</sub>**—Nitrogen Oxide or Nitrous Oxide.

## O

**Off-Peak**—The periods of time during which energy is being delivered far below the maximum demands that could be placed on a utility system.

**Off System Sales**—Sales of electricity by TVA to utilities outside the TVA service area.

**On-Peak**—The periods of time during which energy is being delivered near, or at, the maximum coincident peak load.

**OPEC**—Organization for Petroleum Exporting Companies.

**Operating and Maintenance (O&M) Costs**—Noncapital, equipment-related expenses that continue over the life of the equipment; they include fuel costs as well as costs for maintaining and servicing equipment. There are both fixed and variable O&M costs.

**Options**—Actions TVA can take to resolve an issue. For example, if TVA forecasts an energy deficit, it has the option to meet it with *DSM* programs or with other resources.

**Option (Financial Market)**—In financial markets, the right to buy or sell something at some time in the future at a specified price. For example, a utility that is unsure about whether it will need an additional 100 *MW* of power next winter may buy an option from a neighboring utility today. The neighboring utility is then obligated to deliver the power at the agreed-upon price if the other utility requests it. However, the utility that bought the option is under no obligation to buy the power.

**Option Purchase Agreement**—A proposal, in the form of *call options*, *put options*, or *forward contracts*, by marketers, brokers, and others in the electric industry to sell TVA electricity.

**Outage**—The operating condition of a generating unit when it is unavailable for service.

**Ozone (O<sub>3</sub>)**—A substance found in the stratosphere and the *troposphere*. In the stratosphere (the atmospheric layer beginning 7 to 10 miles above the Earth's surface) ozone is a form of oxygen found naturally that provides a protective layer shielding the Earth from ultraviolet radiation. In the troposphere (the layer extending up 7 to 10 miles from the Earth's surface), ozone is a chemical oxidant and a major component of photochemical smog. Depending on its concentration, ozone can seriously affect the human respiratory system and is one of the most widespread of all the criteria pollutants. Ozone in the troposphere is produced through complex chemical reactions of *nitrogen oxides* and sunlight.

## P

**Palustrine**—Relating to marshes or wetlands.

**Participant Costs**—Those expenses associated with taking part in a *DSM* program paid by the customer and not reimbursed by the utility.

**Participants**—Units used by a utility to measure participation in its *DSM* programs; such units of measurement include customers or households for residential programs and customers, floor area, or *kW*-connected for commercial and industrial customers.

**Participation Rate**—The ratio of the number of *participants* in a program to the number eligible for the program, with both the numerator and denominator defined in the same units.

**Particulate**—Minute separate particles.

**Particulate Collection Devices**—Environmental control systems (i.e., *electrostatic precipitators*, baghouses) designed to remove suspended *particulate* matter (i.e., *fly ash*) from coal-fired boiler flue gas.

**Pathogens**—An agent that causes disease, especially a microorganism such as a bacterium or fungus.

**PCBs**—*Polychlorinated biphenyls*.

**Peak Demand**—The maximum rate of electricity use, expressed in *kW*.

**Peak Load**—The maximum load experienced by TVA's electric system over a given period of time.

**Peak-Clipping Programs**—Load reduction programs that aim to reduce electricity demand (*kW*) at certain critical times, typically when the utility experiences system peak demand.

**Peaking Capacity**—Capacity that is available for use and used to meet peak load. Such capacity, usually represented by *combustion turbines*, often has low capital costs and high fuel costs, and is designed to operate for relatively short periods of time.

**Peaking Units**—A generating unit available to assist in meeting that portion of peak load which is above base and intermediate loads.

**Penetration**—The ratio of the number of new units of a specific type (e.g., DSM measures) installed to the total number of new units installed during a given time (e.g., the fraction of new air-conditioner sales that exceeds an energy-efficiency ratio of 10).

**Pesticide**—Chemical materials used to control undesirable insects, animals, diseases, vegetation, or other forms of life.

**pH**—A measure of the acidity or alkalinity of a solution. pH is represented on a scale of 0 to 14, with 7 being a neutral state, 0 most acid, and 14 most alkaline.

**Phase I and Phase II Acid Rain Control**—The 1990 Clean Air Act Amendments require fossil-fuel fired generation units to reduce their SO<sub>2</sub> and NO<sub>x</sub> emissions in two phases in order to control acid rain. The Phase I compliance period commences on January 1, 1995; the Phase 2 compliance period commences on January 1, 2000.

**Photovoltaics**—Solar-photovoltaic (PV) power plants convert solar energy to electricity using a semiconductor material, usually silicon doped with phosphorus and boron, to generate direct current.

**Physiographic Provinces**—Systematic description of areas with some point of physical geography in common.

**Pilot Program**—A program designed and implemented to test a technology, process, or product on a limited basis in order to evaluate its effectiveness and identify potential problem areas.

**Planned Outage**—The removal of a generating unit from service for inspection and/or general overhaul of one or more major equipment groups. This is work which is usually scheduled well in advance of the planned outage period (e.g., annual boiler overhaul, five-year turbine overhaul).

**Plume**—A flowing, often somewhat conical, trail of emissions from a continuous point source.

**PM 10**—Minute separate particles equal to 10 microns or less.

**Point Sources**—A stationary location or fixed facility from which pollutants are discharged or emitted. Also, any single identifiable source of pollution, for example, a pipe, ditch, ship, ore pit, or factory smokestack.

**Parts per million (PPM)**—The number of parts of a given substance or pollutant in a million parts of a base material; a measure of concentration.

**Present Value**—The value of future dollars in terms of what they are worth today. The loan amount one could borrow today and pay back with the future dollars.

**Pressurized Water Reactor (PWR)**—A light water reactor in which the water used as a moderator is kept under pressure, preventing it from boiling at normal temperatures.

**Prevention of Significant Deterioration (PSD)**—A program in which state or federal permits for new or modified sources in places where air quality is already better than required to meet pri-

mary and *secondary ambient air quality standards*.

**Price Taker**—In any market, a buyer or seller with no individual control over the price of the product.

**Primary Particulates**—Particles emitted directly from a source.

**Private Costs**—Cost borne by those producing a good (e.g., fuel, operation and maintenance, and capital costs). Also referred to as “utility cost.

**PSCs or PUCs**—Public Service Commissions or Public Utility Commissions; state authorities that regulate utilities.

**Pulverized Coal**—The pulverized coal (PC) fired boiler with *steam turbine* power generation is currently the principal electricity generation technology in the United States.

**Pumped Storage Hydro Plant**—A hydro plant that continuously recycles water through two reservoirs, one upper and one lower. When demand for electricity is high, water held in the upper reservoir is released through a long underground power tunnel. Electricity is generated by the force of falling water driving hydraulic turbines connected to large generators. When demand is low, the generators reverse and function as electric motors to pump water from the lower reservoir back to the upper, where it is stored for reuse during peak demand periods.

**Put Option**—An option granting the holder the right to sell the underlying security or commodity at a certain price at a specified period of time.

## Q

**Qualitative Evaluation**—An assessment using qualities or rankings rather than a measurement or estimate of quantity.

**Quantitative Evaluation**—An assessment based on a measurement or estimate of quantity.

## R

**Radionuclides**—Radioactive nuclides.

**Rate Impact Measure Test**—A test which measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the utility implementing a resource option.

**Real Prices**—(Or constant dollar prices, prices excluding inflation) As applied to price changes, the rate of change in a price over time adjusted for the overall inflation rate. For example, if the price of a widget goes up 1 percent while the average price of all goods sold in the economy goes up 2 percent, the real price of the widget is said to have declined 1 percent.

**Rebate**—Money given to customers, contractors, homebuilders, or other trade allies who make equipment choices to help the purchaser defray the incremental cost of DSM measures.

**Reburn**—A process that reduces emissions of  $NO_x$  by staging of the combustion process. A secondary fuel (either pulverized coal or natural gas) is introduced into the furnace after primary combustion and chemically reduces the previously formed  $NO_x$ .

**Reference Case**—One given set of circumstances used to compare all other sets of circumstances. This is TVA's "No Action" alternative.

**Regional Haze**—A type of visibility impairment which is the result of dispersed and intermixed pollutants from many sources.

**Reliability**—The ability of TVA's electric system to deliver uninterrupted power to its customers.

**Renewable Resources**—Power plants or other generating devices whose fuel source is generally considered to be renewable. These include generators fueled by biomass, water, photovoltaics, solar, wave, or wind energy.

**Renewables**—See *Renewable Resources*.

**Repowering**—Replacing or adding to the source of power of an existing electric generating station.

**Request for Proposal (RFP)**—Formal action by TVA to request competitive bids from developers, marketers, brokers, electric utilities, and other entities that can potentially supply low cost power to TVA.

**Rerating**—Changing the nameplate capacity of a generating unit.

**Reserve Margin**—The difference between the capability of TVA's electric system and expected *peak load*, expressed as a percentage of expected peak load.

**Residential Sector**—The group of customers to whom electricity is sold for household purposes, including space heating, water heating, air conditioning, lighting, and appliances in single-family, multifamily, and mobile homes.

**Resources**—*Supply-side* or *Customer Service Options* which can be used by TVA to meet future customer energy needs.

**Resource Option**—*Supply-side* or *Customer Service actions* TVA can take to meet future customer energy needs.

**Resource Strategy**—A combination of *resource options* used to fulfill a particular *future*.

**Retail Competition**—Competition for the business of ultimate consumers.

**Retrofit**—Replacement or upgrading of equipment before it reaches normal retirement age.

**Retrofit Programs**—Programs that upgrade existing facilities and equipment before they reach their normal retirement age.

**Revenue Requirements**—The amount or money that must be recovered from customers to cover a utility's fixed and variable costs.

**River Substrate**—A layer of material or substance in a river.

**Robustness**—The degree to which an energy resource strategy meets an objective for most or all futures.

## S

**SAFSTOR**—With the Safstor option, fuel assemblies, nuclear source material, and radioactive liquid and solid wastes will be removed from the plant. The external doors and hatches of the buildings will be secured to prevent unauthorized entry. Buildings will be accessible only to fulfill periodic inspections and surveillance requirements. Systems needed for these functions will be maintained throughout the dormancy period in accordance with the requirements of a possession-only license issued by NRC. A full-time security force will also be provided to ensure prevention of unauthorized entry.

**Saturation**—On the demand side, the percentage of a group of customers that have a particular end use. For example,

the residential saturation of heat pumps is 50 percent if half of residential customers have them. In the commercial sector, saturations (also known as fuel shares) are generally measured on a percentage of square footage basis.

**SCADA**—*Supervisory Control and Data Acquisition*.

**Scenario**—In the context of Energy Vision 2020, the combining of one *strategy* with one *future*.

**Scoping**—The procedure in Energy Vision 2020 by which TVA identified important issues and determined the extent of analysis necessary for an informed decision on a proposed action. Scoping is an integral part of any environmental analysis.

**Scrubber**—A device that removes sulfur dioxide from flue gas using lime or limestone.

**Scrubber Sludge**—The *effluent* from a scrubber that is discharged and is stored in a landfill, principally as a calcium sulfate.

**Secondary Particulates**—Particles formed in the atmosphere from emitted gases.

**Sedimentation**—The action or process of depositing sediment.

**Seedling**—Live trees of a species less than 1.0 inch in *diameter at breast height* that are expected to survive and develop.

**SEER**—Seasonal Energy Efficiency Ratio (SEER) is the total cooling of a central unitary air conditioner or unitary heat pump in Btu's during its normal annual usage period for cooling divided by the total electric energy input in watt-hours during the same period. This rating is listed in publications by the American Refrigeration Institute (ARI).

**Sensitive Species**—Species that are listed with states as needing special management.

**Sensitivity Analysis**—The process of changing a characteristic or assumption about a resource or a strategy in to determine the impact this change has on a set of *evaluation criteria*.

**Sheet Erosion**—*Erosion* of a uniform layer of surface soil from a large area caused by runoff water.

**Short Rotation Woody Crops**—A species of trees grown (on a relatively short rotation schedule) for the explicit purpose of harvesting for use in power production.

**Soil**—A dynamic natural medium composed of mineral and organic materials in which plants grow.

**Sorbent**—A substance that takes up and holds.

**Species**—A class of individuals having common attributes and designated by a common name.

**Spent Fuel**—Nuclear fuel that can no longer economically sustain a chain reaction.

**Stakeholder**—For the purposes of Energy Vision 2020, an individual, a group of individuals, or an organization that may be affected by or have a vested interest in a TVA decision or action. TVA's stakeholders include its customers, residents of the Tennessee Valley, etc.

**State Implementation Plan (SIP)**—*Environmental Protection Agency* approved state plans for the establishment, regulation, and enforcement of air pollution standards.

**Steam Generator**—In pressurized water reactors, a huge "radiator" where heat

from the primary (reactor coolant) loop is transferred to the secondary (steam) loop without mixing of the two streams of water.

**Storage Units**—Facilities that are able to store low cost, off-peak generated energy and discharge this energy during high demand peak periods.

**Stranded Costs**—Costs that a utility faces because of *stranded investments*. For example, a utility may owe money on a closed plant that is generating no income. If an investment can operate and cover part of its cost, only the portion of the cost not covered would be stranded.

**Stranded Investment**—An investment in plant or equipment that loses its value because of competition that forces down the price of the product. In the electric utility industry, firms may have been allowed or directed by regulators to build high cost capacity to meet the obligation to serve their customers. If the market is open to competition, lower cost producers may capture these customers, causing the high cost capacity to close and become a stranded investment.

**Strategy**—In the context of Energy Vision 2020, a combination of options intended to fulfill a particular resource goal. For example, an energy deficiency in 2007 might be met with a combination of *supply-side resources* and *DSM resources*.

**Streams**—A continually, frequently, or infrequently flowing body of water that follows a defined course. The three classes of streams are:

- Ephemeral: A channel that carries water only during and immediately following rainstorms. Also known as a "dry wash."
- Intermittent: A watercourse that flows in a well-defined channel during the wet seasons of the year, but not the entire year.
- Perennial: A watercourse that flows throughout the year or nearly so (90 per

cent of the time) in a well-defined channel.

**Substation**—An assemblage of equipment for the purposes of switching and/or changing or regulating the voltage of electricity.

**Succession**—A process of biotic community development that involves changes in species, structure and community processes over time.

**Sulfur Dioxide (SO<sub>2</sub>)**—A heavy, colorless, gaseous air pollutant formed primarily by the combustion of fossil plants.

**Sunk Cost**—The sum of previous investments; monies that have already been spent.

**Supercritical Pulverized Coal-Fired Plant**—A supply-side option that is technically similar to the subcritical pulverized coal (PC) fired plant, except that the supercritical boiler operates at supercritical pressures of greater than 3,200 pounds per square inch.

**Supervisory Control and Data Acquisition (SCADA)**—A real-time system that gathers information on an electrical system and also can be used to perform real-time control actions to modify the electrical system. These actions can include switching transmission lines in and out of service, switching capacitors in and out of service, starting and stopping generators, etc.. A SCADA system usually has centralized computer controls with communications equipment to gather and transmit real-time information between the central control center and the electric system.

**Supply-Side Resource**—Resources that meet customer needs by increasing production of electricity (e.g. hydro, fossil, nuclear, combustion turbines, etc.).

**Surface Water**—Streams, rivers, ponds, lakes, and manmade reservoirs.

**Surrogate Measure**—A measure that can be used to represent one or more other measures in an analysis. For example, sulfur dioxide can be an effective surrogate for other air pollution emissions elements when analyzing certain air pollution characteristics.

**System Energy Requirements**—The total energy the generating system needs to produce to meet customer needs over some time period, generally a year. System energy requirements include all sales and *system losses*. Customer needs are measured before *demand-side management* measures are applied.

**System Losses**—Difference between the energy metered at the generator and the energy recorded at the customers' meters.

**System Reliability**—The guarantee of system performance at all times and under all reasonable conditions to ensure constancy, quality, adequacy, and economy of electricity. It is also the assurance of a continuous supply of electricity for customers at the proper voltage and frequency.

## T

**Tailwater**—Water downstream from a dam, including those waters released from the dam.

**Takeback**—Changes in customer behavior resulting in greater energy use stimulated by participation in a *DSM* program.

**Target Market**—The group of customers (a subset of the eligible market) that is the focus of utility marketing efforts.

**Thermal Stratification**—Layering of water with different temperatures, where it is warmer near the surface and colder near the bottom.

**Threatened Species**—Species formally listed as threatened with extinction.

**Topography**—The physical features of a place or region. Commonly refers to land forms and variation in elevation.

**Total Program Costs**—All expenses associated with a *DSM* program regardless of whether borne by the utility, participating customer, or trade allies. The costs paid by customers and trade allies are first adjusted for incentives from the utility to avoid double-counting costs.

**Total Resource Cost (TRC) Test**—A benefit-cost test which measures the net costs of a demand-side program as a resource option based on the total cost of the program, including both the participants' and the utility's costs. The costs in this test are the program costs paid by both the utility and the participants plus the increase in supply costs for any period in which load has been increased. All equipment costs are included in this test.

**Total Value Test**—Extends the *Total Resource Costs* test to not only include the total cost of an option, but also the effects upon the benefits or "value" that participants and ratepayers receive.

**Trade Allies**—Organizations (e.g., architect and engineer firms, building contractors, appliance manufacturers and dealers, and banks) that affect the energy-related decisions of customers who might participate in *DSM* programs.

**Trade Off**—When satisfying more of one need means satisfying less of another.

**Transmission System**—That portion of a utility that is used for the purpose of transmitting electric energy in bulk to other principal parts of the system or to other utility systems.

**Troposphere**—Lower atmosphere.

**TSP**—Total suspended particulate matter.

**Turbine**—A machine for directly converting the kinetic and/or thermal energy of a flowing fluid (air, hot gas, steam, or water) into useful rotational energy.

## U

**Unbundling of Services**—To give separate prices for transmission services such as delivery of active power, regulation of system frequency, sag and surge control, waveform quality services, etc.) and power generation.

**Utility Costs**—All the expenses (administrative, equipment, incentives, marketing, monitoring and evaluation, and other) incurred by a utility in a given year for operation of a DSM program regardless of whether the costs are capitalized or expensed.

**Uncertainties**—In the context of Energy Vision 2020, issues or concerns that are generally beyond TVA's control that may affect the cost or performance of its energy resources in the future.

**Utility-Grade Installations**—Designs that typically provide greater reliability, particularly under adverse conditions, than *Independent Power Producer* (IPP) installations using similar technologies.

## V

**Valley-Filling Programs**—Programs that typically seek to increase off-peak electricity consumption (without necessarily reducing on-peak demands).

**Variable Costs**—Costs associated with the generation of electricity that vary with the utilization of the generating station, such as fuel, consumable supplies, etc.

**Variable Frequency Drive (VFD)**—A variable frequency drive is a type of *ASD* that varies the frequency of the electricity to an electric motor to control its speed.

**Visibility Impairment or Degradation**—Visibility Impairment or degradation is usually defined as aesthetic damage where the ability to discern form, color or texture is reduced and therefore the scenic value is also diminished. Or, as stated in 40 CFR 51.30(x), visibility impairment is "...any humanly perceptible change in visibility (visual range, contrast, coloration) from that which would have existed under natural conditions."

**Visual Quality Zones (VQZs)**—Areas of the landscape denoted by specified distances from the observer. Used as a frame of reference in which to discuss landscape characteristics or activities of man sometimes referred to as "distance zones".

**Volatile Organic Compounds**—Any organic compound that participates in atmospheric photochemical reactions except for those designated by the *Environmental Protection Agency* administrator as having negligible photochemical reactivity.

**Volt**—The unit of electromotive force or electric pressure analogous to water pressure in pounds per square inch. It is the electromotive force which, if steadily applied to a circuit having a resistance of one ohm, will produce a current of one ampere.

## W

**Water Quality**—A term used to describe the chemical, physical, and biological char-

acteristics of water, usually with respect to its suitability for a particular purpose.

**Watershed**—The entire area that contributes to a drainage or stream.

**Weather Adjusted (Or Weather Normalized)**—Having the effects of the difference between actual and expected normal weather removed. For example, TVA forecasts summer peaks for a normally expected valley-wide average temperature of 96 degrees. If the peak one year occurs at 100 degrees, a weather adjusted peak will be estimated by applying a per degree adjustment factor to the four degree difference.

**Wheeling**—Transferring electrical energy produced by another utility or an *independent power producer (IPP)* to a customer in one's own service area or through one's own transmission system to a neighboring utility.

**Wholesale Electric Competition**—Competition for the business of *wholesale power customers*.

**Wholesale Customer**—An organization that purchases bulk electric power for distribution and resale to ultimate retail consumers. There are 160 municipal and cooperative power distributors that are wholesale customers to TVA.

**Wholesale Power**—Power sold to other utilities or local power *distributors* for resale to ultimate consumers of electricity.

**Wind Farm**—Groups of Wind Turbines.

## Z

**Zebra Mussel**—An imported mussel which fouls, among other things, water intake structures.

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