



## ENERGY GLOSSARY & TERMINOLOGY

### A

**ABSORPTANCE:** The ratio of the radiation absorbed by a surface to the total energy falling on that surface described as a percentage.

**ACCESS CHARGE:** A charge paid by all market participants withdrawing energy from the ISO controlled grid. The access charge will recover the portion of a utility's transmission revenue requirement not recovered through the variable usage charge.

**ACTIVE SOLAR ENERGY:** Solar radiation used by special equipment to provide space heating, hot water or electricity.

**ACTIVE SOLAR ENERGY SYSTEM:** A system designed to convert solar radiation into usable energy for space, water heating, or other uses. It requires a mechanical device, usually a pump or fan, to collect the sun's energy.

**ADDITION:** An alteration to an existing building that increases conditioned space.

**ADJUSTMENT BID:** A bid that is used by the ISO to adjust supply or demand when congestion is anticipated.

**ADVERSE HYDRO:** Water conditions limiting the production of hydroelectric power. In years having below-normal levels of rain and snow, and in seasons having less-than-usual runoff from mountain snow pack, there is then less water available for hydro energy production.

**AFTER-MARKET:** broad term that applies to any change after the original purchase, such as adding equipment not a part of the original purchase. As applied to alternative fuel vehicles, it refers to conversion devices or kits for conventional fuel vehicles.

**AGGREGATOR:** An entity responsible for planning, scheduling, accounting, billing, and settlement for energy deliveries from the aggregator's portfolio of sellers and/or buyers. Aggregators seek to bring together customers or generators so they can buy or sell power in bulk, making a profit on the transaction.

**AIR CHANGE:** The replacement of a quantity of air in a space within a given period of time, typically expressed as air changes per hour. If a building has one air change per hour, this is equivalent to all of the air in the building being replaced in a one-hour period.

**AIR CONDITIONER:** An assembly of equipment for air treatment consisting of a means for ventilation, air circulation, air cleaning, and heat transfer (either heating or cooling). The unit usually consists of an evaporator or cooling coil, and an electrically-driven compressor and condenser combination.

**AIR FILM:** A layer of still air adjacent to a surface which provides some thermal resistance.

**AIR FILM COEFFICIENT:** A measure of the heat transfer through an air film.

**AIR-TO-AIR HEAT EXCHANGER:** A device with separate air chambers that transfers heat between the conditioned air being exhausted and the outside air being supplied to a building.

**AIR POLLUTION:** Unwanted particles, mist or gases put into the atmosphere as a result of motor vehicle exhaust, the operation of industrial facilities or other human activity.

**ALTERATION:** Any change or modification to a building's construction.

**AMBIENT AIR TEMPERATURE:** Surrounding temperature, such as the outdoor air temperature around a building.

**ALCOHOL FUELS:** A class of liquid chemicals that have certain combinations of hydrogen, carbon and oxygen, and that are capable of being used as fuel.

**ALTERNATING CURRENT:** (AC) Flow of electricity that constantly changes direction between positive and negative sides. Almost all power produced by electric utilities in the United States moves in current that shifts direction at a rate of 60 times per second.

**ALTERNATIVE ENERGY SOURCES:** See RENEWABLE ENERGY.

**ALTERNATIVE (transportation) FUELS:** as defined by the National Energy Policy Act (EPAAct) the fuels are: methanol, denatured ethanol and other alcohols, separately or in mixtures of 85 percent by volume or more (or other percentage not less than 70 percent as determined by U.S. Department of Energy rule) with gasoline or other fuels; CNG; LNG; LPG; hydrogen; "coal-derived liquid fuels;" fuels "other than alcohols" derived from "biological materials;" electricity, or any other fuel determined to be "substantially not petroleum" and yielding "substantial energy security benefits and substantial environmental benefits."

**ALTERNATIVE FUEL VEHICLE (AFV):** motor vehicles that run on fuels other than petroleum-based fuels. As defined by the National Energy Policy Act (EPAAct), this excludes reformulated gasoline as an alternative fuel.

**ALTERNATIVE AND RENEWABLE FUELS AND VEHICLE TECHNOLOGY PROGRAM:** Created by Assembly Bill 118 (Nunez, Chapter 750, Statutes of 2007), the program with an annual budget of about \$100 million supports projects that develop and improve alternative and renewable low-carbon fuels, improve alternative and renewable fuels for existing and developing engine technologies, expand transit and transportation infrastructures, and establishing workforce training programs, conduct public education and promotion, and create technology centers, among other tasks.

**AMBIENT:** The surrounding atmosphere; encompassing on all sides; the environment surrounding a body but undisturbed or unaffected by it.

**AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (ARRA):** U.S. Congress passed the American Recovery and Reinvestment Act of 2009 on February 13, 2009, at the urging of President Obama, who signed it into law four days later. A direct response to the economic crisis, the Recovery Act strives to create new jobs and save existing ones, spur economic activity and invest in long-term growth, and foster unprecedented levels of accountability and transparency in government spending. Among its objectives, the act makes \$275 billion available for federal contracts, grants, and loans.

**ANAEROBIC DIGESTION:** A biological process in which biodegradable organic matters are broken down by bacteria into biogas, which consists of methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>), and other trace amount of gases. The biogas can be used to generate heat and electricity.

**ANSI:** American National Standards Institute is the national organization that coordinates development and maintenance of consensus standards and sets rules for fairness in their development. ANSI also represents the USA in developing international standards.

**ANCILLARY SERVICES:** The services other than scheduled energy that are required to maintain system reliability and meet WSCC/NERC operating criteria. Such services include spinning, non-spinning, and replacement reserves, voltage control, and black start capability.

**AMPERE (Amp):** The unit of measure that tells how much electricity flows through a conductor. It is like using cubic feet per second to measure the flow of water. For example, a 1,200 watt, 120-volt hair dryer pulls 10 amperes of electric current (watts divided by volts).

**ANGLE OF INCIDENCE:** The angle that the sun's rays make with a line perpendicular to a surface. The angle of incidence determines the percentage of direct sunshine intercepted by a surface.

**ANNUAL MAXIMUM DEMAND:** The greatest of all demands of the electrical load which occurred during a prescribed interval in a calendar year.

**ANIMAL WASTE CONVERSION:** Process of obtaining energy from animal wastes. This is a type of biomass energy.

**AFUE (Annual Fuel Utilization Efficiency):** A measure of heating efficiency, in consistent units, determined by applying the federal test method for furnaces. This value is intended to represent the ratio of heat transferred to the conditioned space by the fuel energy supplied over one year.

**ANTHRACITE:** Hard coal, found deep in the earth. It burns very hot, with little flame. It usually has a heating value of 12,000-15,000 British thermal units (Btus) per pound.

**APPLIANCE SATURATION:** A percentage telling what proportion of all households in a given geographical area have a certain appliance.

**APPLICANT:** Applicant means any person who submits an application for certification pursuant to the provisions of this division, including, but not limited to, any person who explores for or develops geothermal resources.

**APPLICATION:** Application means any request for certification of any site and related facility filed in accordance with the procedures established pursuant to this division. An applicant for a geothermal power-plant and related facilities may propose more than one site and related geothermal facilities in the same application.

**AREA LOAD:** The total amount of electricity being used at a given point in time by all consumers in a utility's service territory.

**ASHRAE:** Acronym for American Society of Heating, Refrigerating and Air- Conditioning Engineers.

**ASH:** Non-organic, non-flammable substance left over after combustible material has been completely burned.

**ASSOCIATED GAS:** Natural gas that can be developed for commercial use, and which is found in contact with oil in naturally occurring underground formations.

**ATGAS:** Synthetic gas produced by dissolving coal in a bath of molten iron. The process was developed by Applied Technology, Inc. Synthetic gas may be used as a substitute for natural gas in industrial and home uses.

**ATOM:**The smallest unit of an element consisting of a dense positively charged nucleus (of protons and neutrons) orbited by negatively charged electrons.

**ATOMIC ENERGY COMMISSION:**The independent civilian agency of the federal government with statutory responsibility to supervise and promote use of nuclear energy. Functions were taken over in 1974 by the Energy Research and Development Administration (now part of the U.S. Department of Energy) and the Nuclear Regulatory Commission.

**ATOMIC NUCLEUS:** The positively charged core of an atom.

**AUXILIARY ENERGY SUBSYSTEM:** Equipment using conventional fuel to supplement the energy output of a solar system. This might be, for example, an oil- fueled generator that adds to the electrical output of a substitutes for the solar system during long overcast periods when there is not enough sunlight.

**AUXILIARY EQUIPMENT:** Extra machinery needed to support the operation of a power plant or other large facility.

**AVERAGE COST:** The revenue requirement of a utility divided by the utility's sales. Average cost typically includes the costs of existing power plants, transmission, and distribution lines, and other facilities used by a utility to serve its customers. It also included operating and maintenance, tax, and fuel expenses.

**AVERAGE DEMAND:** The energy demand in a given geographical area over a period of time. For example, the number of kilowatt-hours used in a 24-hour period, divided by 24, tells the average demand for that period.

**AVERAGE HYDRO:** Rain, snow and runoff conditions that provide water for hydroelectric generation equal to the most commonly occurring levels. Average hydro usually is a mean indicating the levels experienced most often in a 104-year period.

**AVOIDED COST:** (Regulatory) The amount of money that an electric utility would need to spend for the next increment of electric generation to produce or purchase elsewhere the power that it instead buys from a co-generator or small-power producer. Federal law establishes broad guidelines for determining how much a qualifying facility (QF) gets paid for power sold to the utility.

**AVOIDED COST:** The cost the utility would incur but for the existence of an independent generator or other energy service option. Avoided cost rates have been used as the power purchase price utilities offer independent suppliers.

**AZIMUTH:** The angular distance between true south and the point on the horizon directly below the sun. Typically used as an input for opaque surfaces and windows in computer programs for calculating the energy performance of buildings.

## B

**BALANCED SCHEDULE:** A Scheduling Coordinator's schedule is balanced when generation, adjusted for transmission losses, equals demand.

**BALLAST:** A device that provides starting voltage and limits the current during normal operation in electrical discharge lamps (such as fluorescent lamps).

**BARREL:** In the petroleum industry, a barrel is 42 U.S. gallons. One barrel of oil has an energy content of 6 million British thermal units. It takes one barrel of oil to make enough gasoline to drive an average car from Los Angeles to San Francisco and back (at 18 miles per gallon over the 700-mile round trip).

**BARRELS PER DAY EQUIVALENT (BPD-Equivalent):** A unit of measure that tells how much oil would have to be burned to produce the same amount of energy.

**BASE LOAD:** The lowest level of power production needs during a season or year.

**BASE LOAD UNIT:** A power generating facility that is intended to run constantly at near capacity levels, as much of the time as possible.

**BASELINE FORECAST:** A prediction of future energy needs which does not take into account the likely effects of new conservation programs that have not yet been started.

**BASE RATE:** That portion of the total electric or gas rate covering the general costs of doing business unrelated to fuel expenses.

**BATTERY:** A device that stores energy and produces electric current by chemical action.

**BDT:** Acronym for "bone dry tons." This is a measurement of biomass that has zero percent moisture content. Amounts are usually given in BDT/year.

**BENZENE:** A type of colorless liquid hydrocarbon that can be used as a motor fuel. Its chemical symbol is C<sub>6</sub>H<sub>6</sub>.

**BI-FUEL VEHICLE:** A vehicle with two separate fuel systems designed to run on either fuel, using only one fuel at a time. These systems are advantageous for drivers who do not always have access to an alternative fuel refueling station. Bi-fuel systems are usually used in light-duty vehicles. One of the two fuels is typically an alternative fuel.

**BI-GAS:** A process being developed as a means of making synthetic gas from coal. The synthetic gas would be intended to substitute for natural gas in meeting industrial and home energy needs.

**BILATERAL CONTRACT:** A two-party agreement for the purchase and the sale of energy products and services.

**BIOCONVERSION:** Processes that use plants or micro-organisms to change one form of energy into another. For example, an experimental process uses algae to convert solar energy into gas that could be used for fuel.

**BIODIESEL:** a biodegradable transportation fuel for use in diesel engines that is produced through the transesterification of organically- derived oils or fats. It may be used either as a replacement for or as a component of diesel fuel.

**BIOFUEL:** Fuel produced from renewable biomass material, commonly used as an alternative, cleaner fuel source.

**BIOGAS:** The mixture of methane, carbon dioxide, and other minor gases formed from the decomposition of organic materials.

**BIOMASS:** Energy resources derived from organic matter. These include wood, agricultural waste and other living-cell material that can be burned to produce heat energy. They also include algae, sewage and other organic substances that may be used to make energy through chemical processes.

**BIOSPHERE:** The zone at and adjacent to the earth's surface where all life exists; all living organisms of the earth.

**BITUMINOUS COAL:** Soft coal containing large amounts of carbon. It has a luminous flame and produces a great deal of smoke.

**BLACKOUT:** A power loss affecting many electricity consumers over a large geographical area for a significant period of time.

**BOILER:** A closed vessel in which water is converted to pressurized steam.

**BOILING WATER REACTOR:** (BWR) A nuclear power unit in which water used as a coolant is allowed to boil at the core. The resulting steam may be used to drive electric turbines.

**BOTTLED GAS:** The liquified petroleum gases propane and butane, contained under moderate pressure (about 125 pounds per square inch and 30 pounds per square inch respectively), in cylinders.

**BOTTOMING CYCLE:** A means to increase the thermal efficiency of a steam electric generating system by converting some waste heat from the condenser into electricity rather than discharging all of it into the environment.

**BREEDER:** A nuclear reactor that produces more fuel than it consumes. The breeder, invented in the United States, is used as a power source in several European countries.

**BRITISH THERMAL UNIT (Btu):** The standard measure of heat energy. It takes one Btu to raise the temperature of one pound of water by one degree Fahrenheit at sea level. For example, it takes about 2,000 Btu to make a pot of coffee. One Btu is equivalent to 252 calories, 778 foot-pounds, 1055 joules, and 0.293 watt-hours. Note: In the abbreviation, only the B is capitalized.

**BROKER:** A retail agent who buys and sells power. The agent may also aggregate customers and arrange for transmission, firming and other ancillary services as needed.

**BROWNOUT:** A controlled power reduction in which the utility decreases the voltage on the power lines, so customers receive weaker electric current. Brownouts can be used if total power demand exceeds the maximum available supply. The typical household does not notice the difference.

**BUILDING ENVELOPE:** The assembly of exterior partitions of a building which enclose conditioned spaces, through which thermal energy may be transferred to or from the exterior, unconditioned spaces, or the ground.

**BULK POWER SUPPLY:** Often this term is used interchangeably with wholesale power supply. In broader terms, it refers to the aggregate of electric generating plants, transmission lines, and related-equipment. The term may refer to those facilities within one electric utility, or within a group of utilities in which the transmission lines are interconnected.

**BUNKER C FUEL OIL:** A very heavy substance, left over after other fuels have been distilled from crude oil. Also called NO. 6 FUEL, it is used in power plants, ships and large heating installations.

**BUSBAR:** In electric utility operations, a busbar is a conductor that serves as a common connection for two or more circuits. It may be in the form of metal bars or high-tension cables.

**BUTANE:** A hydrocarbon gas found in the earth along with natural gas and oil. Butane turns into a liquid when put under pressure. It is sold as bottled gas. It is used to run heaters, stoves and motors, and to help make petrochemicals.

**BUY THROUGH:** An agreement between utility and customer to import power when the customer's service would otherwise be interrupted.

**BUYER:** An entity that purchases electrical energy or services from the Power Exchange (PX) or through a bilateral contract on behalf of end-use customers.

## C

**CALL-BACK:** A provision included in some power sale contracts that lets the supplier stop delivery when the power is needed to meet certain other obligations.

**CALORIE (energy calorie:** small "c": as opposed to food Calorie: capital "C") Any of several approximately equal values of heat, each measured as the quantity of heat require to raise the temperature of 1 gram of water by 1 degree Celsius from a standard initial temperature, esp. from 3.98 degrees Celsius. 14.5 degrees Celsius, or 19.5 degrees Celsius, at 1 atmosphere pressure. A calorie is the unit of heat equal to 4.184 joules.

**CAP AND TRADE:** Cap and Trade is a market-based policy tool for protecting human health and the environment. A cap and trade program first sets an aggressive cap, or maximum limit, on emissions. Sources covered by the program then receive authorizations to emit in the form of emissions allowances, with the total amount of allowances limited by the cap. Each source can design its own compliance strategy to meet the overall reduction requirement, including sale or purchase of allowances, installation of pollution controls, implementation of efficiency measures, among other options. Individual control requirements are not specified under a cap and trade program, but each emissions source must surrender allowances equal to its actual emissions in order to comply. Sources must also completely and accurately measure and report all emissions in a timely manner to guarantee that the overall cap is achieved. (EPA)

**CAPACITY:** The amount of electric power for which a generating unit, generating station, or other electrical apparatus is rated either by the user or manufacturer. The term is also used for the total volume of natural gas that can flow through a pipeline over a given amount of time, considering such factors as compression and pipeline size.

There are various types of electricity capacity:

- **Dependable Capacity:** The system's ability to carry the electric power for the time interval and period specific, when related to the characteristics of the load to be supplied. Dependable capacity is determined by such factors as capability, operating power factor, weather, and portion of the load the station is to supply.
- **Installed (or Nameplate) Capacity:** The total manufacturer-rated capacities of equipment such as turbines, generators, condensers, transformers, and other system components.
- **Peaking Capacity:** The capacity of generating equipment intended for operation during the hours of highest daily, weekly or seasonal loads.
- **Purchased Capacity:** The amount of energy and capacity available for purchase from outside the system
- **Reserve Capacity:** Extra generating capacity available to meet peak or abnormally high demands for power and to generate power during scheduled or unscheduled outages. Units available for service, but not maintained at operating temperature, are termed "cold." Those units ready and available for service, though not in actual operation, are termed "hot."

**CAPACITY FACTOR:** A percentage that tells how much of a power plant's capacity is used over time. For example, typical plant capacity factors range as high as 80 percent for geothermal and 70 percent for co-generation.

**CAPACITY RELEASE:** A secondary market for capacity that is contracted by a customer which is not using all of its capacity.

**CAPTIVE CUSTOMER:** A customer who does not have realistic alternatives to buying power from the local utility, even if that customer had the legal right to buy from competitors.

**CARBON DIOXIDE (CO<sub>2</sub>):** A colorless, odorless, non-poisonous gas that is a normal part of the air. Carbon dioxide is exhaled by humans and animals and is absorbed by green growing things and by the sea. CO<sub>2</sub> is the greenhouse gas whose concentration is being most affected directly by human activities. CO<sub>2</sub> also serves as the reference to compare all other greenhouse gases (see carbon dioxide equivalent). The major source of CO<sub>2</sub> emissions is fossil fuel combustion. CO<sub>2</sub> emissions are also a product of forest clearing, biomass burning, and non-energy production processes such as cement production. Atmospheric concentrations of CO<sub>2</sub> have been increasing at a rate of about 0.5% per year and are now about 30% above preindustrial levels. (EPA)

**CARBON DIOXIDE EQUIVALENT (CDE):** A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as "million metric tons of carbon dioxide equivalents"

(MMTCDE)" or "million short tons of carbon dioxide equivalents (MSTCDE)" The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP.  $MMTCDE = (\text{million metric tons of a gas}) * (\text{GWP of the gas})$  For example, the GWP for methane is 24.5. This means that emissions of one million metric tons of methane is equivalent to emissions of 24.5 million metric tons of carbon dioxide. Carbon may also be used as the reference and other greenhouse gases may be converted to carbon equivalents. To convert carbon to carbon dioxide, multiply the carbon by 44/12 (the ratio of the molecular weight of carbon dioxide to carbon). (EPA)

**CARBON MONOXIDE (CO):** A colorless, odorless, highly poisonous gas made up of carbon and oxygen molecules formed by the incomplete combustion of carbon or carbonaceous material, including gasoline. It is a major air pollutant on the basis of weight.

**CARBON SEQUESTRATION:** The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release the oxygen and store the carbon. Fossil fuels were at one time biomass and continue to store the carbon until burned. (EPA)

**CARCINOGENS:** Potential cancer-causing agents in the environment. They include among others: industrial chemical compounds found in food additives, pesticides and fertilizers, drugs, toy, household cleaners, toiletries and paints. Naturally occurring ultraviolet solar radiation is also a carcinogen.

**CATALYTIC CRACKING:** A refinery process that converts a high-boiling range fraction of petroleum (gas oil) to gasoline, olefin feed for alkylation, distillate, fuel oil and fuel gas by use of a catalyst and heat.

**CAULKING:** Material used to make an air-tight seal by filling in cracks, such as those around windows and doors.

**CELSIUS:** A temperature scale based on the freezing (0 degrees) and boiling (100 degrees) points of water. Abbreviated as C in second and subsequent references in text. Formerly known as Centigrade. To convert Celsius to Fahrenheit, multiply the number by 9, divide by 5, and add 32. For example:

>> 10 degrees Celsius  $\times 9 = 90$ ;  $90 / 5 = 18$ ;  $18 + 32 = 50$  degrees Fahrenheit.

**CFCs (CHLOROFLUOROCARBONS or CHLORINATED FLUOROCARBONS):** A family of artificially produced chemicals receiving much attention for their role in stratospheric ozone depletion. On a per molecule basis, these chemicals are several thousand times more effective as greenhouse gases than carbon dioxide. Since they were introduced in the mid-1930s, CFCs have been used as refrigerants, solvents and in the production of foam material. The 1987 Montreal protocol on CFCs seeks to reduce their production by one-half by the year 1998.

**CFM (cubic feet per minute):** A measure of flow rate.

**CHEMICAL ENERGY:** The energy generated when a chemical compound combusts, decomposes, or transforms to produce new compounds.

**CHILLER:** A device that cools water, usually to between 40 and 50 degrees Fahrenheit for eventual use in cooling air.

**CIRCUIT:** One complete run of a set of electric conductors from a power source to various electrical devices (appliances, lights, etc.) and back to the same power source.

**CLEAN FUEL VEHICLE:** is frequently incorrectly used interchangeably with "alternative fuel vehicle." Generally, refers to vehicles that use low-emission, clean-burning fuels. Public Resources Code Section 25326 defines clean fuels, for purposes of the section only, as fuels designated by ARB for use in LEVs, ULEVs or ZEVs and include, but are not limited to, electricity, ethanol, hydrogen, liquefied petroleum gas, methanol, natural gas, and reformulated gasoline.

**CLERESTORY:** A wall with windows that is between two different (roof) levels. The windows are used to provide natural light into a building.

**CLIMATE CHANGE:** Also referred to as 'global climate change'. The term 'climate change' is sometimes used to refer to all forms of climatic inconsistency, but because the Earth's climate is never static, the term is more properly used to imply a significant change from one climatic condition to another. In some cases, 'climate change' has been used synonymously with the term, 'global warming'; scientists however, tend to use the term in the wider sense to also include natural changes in climate. See also Enhanced Greenhouse Effect. (EPA)

**CLIMATE ZONE:** A geographical area is the state that has particular weather patterns. These zones are used to determine the type of building standards that are required by law.

**CLUNKERS:** also known as gross-polluting or super- emitting vehicles, i.e., vehicles that emit far in excess of the emission standards by which the vehicle was certified when it was new.

**COAL:** Black or brown rock, formed under pressure from organic fossils in prehistoric times, that is mined and burned to produce heat energy.

**COAL CONVERSION:** Changing coal into synthetic gas or liquid fuels.

**COAL OIL:** Oil that can be obtained by distilling bituminous coal.

**COAL SEAM:** A mass of coal, occurring naturally at a particular location, that can be commercially mined.

**COAL SLURRY PIPELINE:** A pipe system that transports pulverized coal suspended in water.

**COGENERATOR:** Cogenerators use the waste heat created by one process, for example during manufacturing, to produce steam which is used, in turn, to spin a turbine and generate electricity. Cogenerators may also be QFs.

**COGENERATION:** Cogeneration means the sequential use of energy for the production of electrical and useful thermal energy. The sequence can be thermal use followed by power production or the reverse, subject to the following standards:

(a) At least 5 percent of the cogeneration project's total annual energy output shall be in the form of useful thermal energy.

(b) Where useful thermal energy follows power production, the useful annual power output plus one-half the useful annual thermal energy output equals not less than 42.5 percent of any natural gas and oil energy input.

**COKE:** A porous solid left over after the incomplete burning of coal or of crude oil.

**COKE OVEN GAS:** Gas given off by coke ovens. Coke oven gas is interchangeable with goal gas.

**COMBINED CYCLE PLANT:** An electric generating station that uses waste heat from its gas turbines to produce steam for conventional steam turbines.

**COMBINED HEAT AND POWER:** Also known as "cogeneration," it is the simultaneous production of electricity and heat from a fuel source such as natural gas, biomass, biogas, coal, waste heat, or oil. Combined heat and power is not a single technology, but an integrated energy system that can be modified depending on the energy user's needs.

**COMBINED HYDRONIC SPACE/WATER HEATING:** a system in which both space heating and domestic water heating are provided by the same water heater(s).

**COMBUSTION Burning:** Rapid oxidation, with the release of energy in the form of heat and light.

**COMFORT CONDITIONING:** The process of treating air to simultaneously control its temperature, humidity, cleanliness, and distribution to meet the comfort requirements of the occupants of the conditioned space.

**COMFORT ZONE:** The range of temperatures over which the majority of persons feel comfortable (neither too hot nor too cold).

**COMPETITIVE TRANSMISSION CHARGE:** A non-bypassable charge that customers pay to a utility for the recovery of its stranded costs.

**COMMERCIALIZATION:** Programs or activities that increase the value or decrease the cost of integrating new products or services into the electricity sector.

**COMPRESSED NATURAL GAS (CNG):** natural gas that has been compressed under high pressure, typically between 2,000 and 3,600 pounds per square inch, held in a container. The gas expands when released for use as a fuel.

**CONDENSATE:** Liquid fuel obtained by burning gas or vapor produced from oil and gas wells.

**CONDENSER:** A heat exchanger in which the refrigerant, compressed to a hot gas, is condensed to liquid by rejecting heat.

**CONDITIONED FLOOR AREA:** The floor area of enclosed conditioned spaces on all floors measured from the interior surfaces of exterior partitions for nonresidential buildings and from the exterior surfaces of exterior partitions for residential buildings.

**CONDITIONED SPACE:** Enclosed space that is either directly conditioned space or indirectly conditioned space.

**CONDITIONED SPACE, DIRECTLY:** An enclosed space that is provided with heating equipment that has a capacity exceeding 10 Btus/(hr-ft<sup>2</sup>), or with cooling equipment that has a capacity exceeding 10 Btus/(hr-ft<sup>2</sup>). An exception is if the heating and cooling equipment is designed and thermostatically controlled to maintain a process environment temperature less than 65 degrees Fahrenheit or greater than 85 degrees Fahrenheit for the whole space the equipment serves.

**CONDITIONED SPACE, INDIRECTLY:** Enclosed space that: (1) has a greater area weighted heat transfer coefficient (u-value) between it and directly conditioned spaces than between it and the outdoors or unconditioned space; (2) has air transferred from directly conditioned space moving through it at a rate exceeding three air changes per hour.

**CONDUCTANCE:** The quantity of heat, in Btu's, that will flow through one square foot of material in one hour, when there is a 1 degree F temperature difference between both surfaces. Conductance values are given for a specific thickness of material, not per inch thickness.

**CONDUCTION:** The transfer of heat energy through a material (solid, liquid or gas) by the motion of adjacent atoms and molecules without gross displacement of the particles.

**CONDUCTIVITY (k):** The quantity of heat that will flow through one square foot of homogeneous material, one inch thick, in one hour, when there is a temperature difference of one degree Fahrenheit between its surfaces.

**CONGESTION:** A condition that occurs when insufficient transfer capacity is available to implement all of the preferred schedules simultaneously.

**CONGESTION MANAGEMENT:** Alleviation of congestion by the ISO.

**CONSERVATION:** Steps taken to cause less energy to be used than would otherwise be the case. These steps may involve improved efficiency, avoidance of waste, reduced consumption, etc. They may involve installing equipment (such as a computer to ensure efficient energy use), modifying equipment (such as making a boiler more efficient), adding insulation, changing behavior patterns, etc.

**CONTINENTAL SHELF:** The portion of the sea bottom that slopes gradually from the edge of a continent. Usually defined as areas where water is less than 200 meters or 600 feet deep.

**CONTRACT PATH:** The most direct physical transmission tie between two interconnected entities. When utility systems interchange power, the transfer is presumed to take place across the "contract path," notwithstanding the electrical fact that power flow in the network will distribute in accordance with network flow conditions. This term can also mean to arrange for power transfer between systems.

**CONTRACTS FOR DIFFERENCES (CFD):** A type of bilateral contract where the electric generation seller is paid a fixed amount over time which is a combination of the short-term market price and an adjustment with the purchaser for the difference. For example, a generator may sell a distribution company power for ten years at 6-cents/kilowatt-hour (kWh). That power is bid into Poolco at some low /kWh value (to ensure it is always taken). The seller then gets the market clearing price from the pool and the purchaser pays the producer the difference between the Poolco selling price and 6-cents/kWh (or vice versa if the pool price should go above the contract price).

**CONTROL AREA:** An electric power system, or a combination of electric power systems, to which a common automatic generation control (AGC) is applied to match the power output of generating units within the area to demand.

**CONVECTION:** Transferring heat by moving air, or transferring heat by means of upward motion of particles of liquid or gas heat from beneath.

**CONVENTIONAL GAS:** Natural gas occurring in nature, as opposed to synthetic gas.

**CONVERSION:** device or kit by which a conventional fuel vehicle is changed to an alternative fuel vehicle.

**CONVERSION FUEL FACTOR:** A number stating units of one system in corresponding values of another system.

**CONVERTED VEHICLE:** a vehicle originally designed to operate on gasoline that has been modified or altered to run on an alternative fuel.

**CONVERTER:** Any technology that changes the potential energy in a fuel into a different form of energy such as heat or motion. The term also is used to mean an apparatus that changes the quantity or quality of electrical energy.

**COOLING CAPACITY, LATENT:** Available refrigerating capacity of an air conditioning unit for removing latent heat from the space to be conditioned.

**COOLING CAPACITY, SENSIBLE:** Available refrigerating capacity of an air conditioning unit for removing sensible heat from the space to be conditioned.

**COOLING CAPACITY, TOTAL:** Available refrigerating capacity of an air conditioner for removing sensible heat and latent heat from the space to be conditioned.

**COOLING DEGREE DAY:** A unit of measure that indicates how heavy the air conditioning needs are under certain weather conditions.

**COOLING LOAD:** The rate at which heat must be extracted from a space in order to maintain the desired temperature within the space.

**COOLING LOAD TEMPERATURE DIFFERENCE (CLTD):** A value used in cooling load calculations for the effective temperature difference ( $\Delta T$ ) across a wall or ceiling, which accounts for the effect of radiant heat as well as the temperature difference.

**COOLING TOWER:** A device for evaporatively cooling water by contact with air.

**CO-OP:** This is the commonly used term for a rural electric cooperative. Rural electric cooperatives generate and purchase wholesale power, arrange for the transmission of that power, and then distribute the power to serve the demand of rural customers. Co-ops typically become involved in ancillary services such as energy conservation, load management and other demand-side management programs in order to serve their customers at least cost.

**COOPERATIVE (Electric utility):** A joint venture organized by consumers to make electric utility service available in their area.

**COP (COEFFICIENT OF PERFORMANCE):** Used to rate the performance of a heat pump, the COP is the ratio of the rate of useful heat output delivered by the complete heat pump unit (exclusive of supplementary heating) to the corresponding rate of energy input, in consistent units and under specific conditions.

**CORD:** A measure of volume, 4 by 4 by 8 feet, used to define amounts of stacked wood available for use as fuel. Burned, a cord of wood produces about 5 million calories of energy.

**CORPORATE AVERAGE FUEL ECONOMY (CAFE):** A sales-weighted average fuel mileage calculation, in terms of miles per gallon, based on city and highway fuel economy measurements performed as part of the federal emissions test procedures. CAFE requirements were instituted by the Energy Policy and Conservation Act of 1975 (89 Statute. 902) and modified by the Automobile Fuel Efficiency Act of 1980 (94 Statute. 1821). For major manufacturers, CAFE levels in 1996 are 27.5 miles per gallon for light-duty automobiles. CAFE standards also apply to some light trucks. The Alternative Motor Fuels Act of 1988 allows for an adjusted calculation of the fuel economy of vehicles that can use alternative fuels, including fuel-flexible and dual-fuel vehicles.

**CRUDE OIL:** Petroleum as found in the earth, before it is refined into oil products. Also called CRUDE.

**CRUDE OIL STOCKS:** Stocks held at refineries and at pipeline terminals. Does not include stocks held on leases (storage facilities adjacent to the wells).

**CUBIC FOOT:** The most common unit of measurement of natural gas volume. It equals the amount of gas required to fill a volume of one cubic foot under stated conditions of temperature, pressure and water vapor. One cubic foot of natural gas has an energy content of approximately 1,000 Btus. One hundred (100) cubic feet equals one therm (100 ft<sup>3</sup> = 1 therm).

**CURIE:** A measure of radioactivity.

## D

**DAY-AHEAD MARKET:** The forward market for energy and ancillary services to be supplied during the settlement period of a particular trading day that is conducted by the ISO, the PX, and other Scheduling Coordinators. This market closes with the ISO's acceptance of the final day-ahead schedule.

**DAY-AHEAD SCHEDULE:** Day-ahead Schedule A schedule prepared by a Scheduling Coordinator or the ISO before the beginning of a trading day. This schedule indicates the levels of generation and demand scheduled for each settlement period of that trading day.

**DAYLIGHTING:** The use of sunlight to supplement or replace electric lighting.

**DAYLIGHTING CONTROL:** A control system that varies the light output of an electric lighting system in response to variations in available daylight.

**DEEP MINING:** Extraction of coal or minerals at depths greater than 1,000 feet. Coal usually is deep-mined at not more than 1,500 feet.

**DEGREE DAY:** A unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal annual heating load of a building. When the mean temperature is less than 65 degrees Fahrenheit the heating degree days are equal to the total number of hours that temperature is less than 65 degrees Fahrenheit for an entire year.

**DELTA:** A difference in temperature. Often used in the context of the difference between the design indoor temperature and the outdoor temperature.

**DEMAND:** The rate at which energy is delivered to loads and scheduling points by generation, transmission or distribution facilities.

**DEMAND-SIDE MANAGEMENT:** Also known as "DSM," these programs consist of the planning, implementing, and monitoring activities of electric utilities that are designed to encourage consumers to change their level and pattern of electricity usage.

**DEMAND (Utility):** The level at which electricity or natural gas is delivered to users at a given point in time. Electric demand is expressed in kilowatts.

**DEMAND BID:** Demand Bid A bid into the PX indicating a quantity of energy or an ancillary service that an eligible customer is willing to purchase and, if relevant, the maximum price that the customer is willing to pay.

**DEMAND BILLING:** The electric capacity requirement for which a large user pays. It may be based on the customer's peak demand during the contract year, on a previous maximum or on an agreed minimum. Measured in kilowatts.

**DEMAND CHARGE:** The sum to be paid by a large electricity consumer for its peak usage level.

**DEMAND SIDE MANAGEMENT (DSM):** The methods used to manage energy demand including energy efficiency, load management, fuel substitution and load building.

**DEMONSTRATION:** The application and integration of a new product or service into an existing or new system. Most commonly, demonstration involves the construction and operation of a new electric technology interconnected with the electric utility system to demonstrate how it interacts with the system. This includes the impacts the technology may have on the system and the impacts that the larger utility system might have on the functioning of the technology.

**DENSITY:** The mass of a unit volume of a substance.

**(U.S.) DEPARTMENT OF ENERGY (US DOE):** The federal department established by the Department of Energy Organization Act to consolidate the major federal energy functions into one cabinet-level department that would formulate a comprehensive, balanced national energy policy. DOE's main headquarters are in Washington, D.C.

**DEPENDABLE CAPACITY:** The system's ability to carry the electric power for the time interval and period specified. Dependable capacity is determined by such factors as capability, operating power factor and portion of the load the station is to supply.

**DEPLETABLE ENERGY SOURCES:** 1) electricity purchased from a public utility 2) energy obtained from burning coal, oil, natural gas or liquefied petroleum gases.

**DEREGULATION:** The elimination of regulation from a previously regulated industry or sector of an industry.

**DERIVATIVES:** A specialized security or contract that has no intrinsic overall value, but whose value is based on an underlying security or factor as an index. A generic term that, in the energy field, may include options, futures, forwards, etc.

**DIESEL OIL:** Fuel for diesel engines obtained from the distillation of petroleum. It is composed chiefly of aliphatic hydrocarbons. Its volatility is similar to that of gas oil. Its efficiency is measured by cetane number.

**DIFFUSE RADIATION:** Solar radiation, scattered by water vapor, dust and other particles as it passes through the atmosphere, so that it appears to come from the entire sky. Diffuse radiation is higher on hazy or overcast days than on clear days.

**DIRECT ACCESS:** The ability of a retail customer to purchase commodity electricity directly from the wholesale market rather than through a local distribution utility.

**DIRECT CURRENT (DC):** Electricity that flows continuously in the same direction.

**DIRECT ENERGY CONVERSION:** Production of electricity from an energy source without transferring the energy to a working fluid or steam. For example, photovoltaic cells transform light directly into electricity. Direct conversion systems have no moving parts and usually produce direct current.

**DIRECT EXPANSION:** (refrigeration): Any system that, in operation between an environment where heat is absorbed (heat source), and an environment into which unwanted heat is directed (heat sink) at two different temperatures, is able to absorb heat from the heat source at the lower temperature and reject heat to the heat sink at the higher temperature. The cooling effect is obtained directly from a fluid called a refrigerant that absorbs heat at a low temperature and pressure, and transfers heat at a higher temperature and higher pressure.

**DIRECT RADIATION:** Radiation that has traveled a straight path from the sun, as opposed to diffuse radiation.

**DIRECT SOLAR GAIN:** Solar energy collected from the sun (as heat) in a building through windows, walls, skylights, etc.

**DIRECTLY CONDITIONED SPACE:** See conditioned space, directly.

**DISAGGREGATION:** The functional separation of the vertically integrated utility into smaller, individually owned business units (i.e., generation, dispatch/control, transmission, distribution). The terms "deintegration," "disintegration" and "delamination" are sometimes used to mean the same thing.

**DISPATCH:** The operating control of an integrated electric system to: Assign generation to specific generating plants and other sources of supply to effect the most reliable and economical supply as the total of the significant area loads rises or falls. Control operations and maintenance of high-voltage lines, substations and equipment, including administration of safety procedures. Operate the interconnection. Schedule energy transactions with other interconnected electric utilities.

**DISSOLVED GAS:** Natural gas that can be developed for commercial use, and which is found mixed with oil in naturally occurring underground formations.

**DISTRIBUTION:** The delivery of electricity to the retail customer's home or business through low voltage distribution lines.

**DISTRIBUTED ENERGY RESOURCES:** Small-scale power generation technologies (typically in the range of 3 to 10,000 kilowatts) located close to where electricity is used (for example, a home or business) to provide an alternative to or an enhancement of the traditional electric power system.

**DISTRIBUTED GENERATION:** A distributed generation system involves small amounts of generation located on a utility's distribution system for the purpose of meeting local (substation level) peak loads and/or displacing the need to build additional (or upgrade) local distribution lines.

**DISTRIBUTION SYSTEM (Electric utility):** The substations, transformers and lines that convey electricity from high-power transmission lines to ultimate consumers.

**DISTRIBUTION UTILITY (Disco):** The regulated electric utility entity that constructs and maintains the distribution wires connecting the transmission grid to the final customer. The Disco can also perform other services such as aggregating customers, purchasing power supply and transmission services for customers, billing customers and reimbursing suppliers, and offering other regulated or non-regulated energy services to retail customers. The "wires" and "customer service" functions provided by a distribution utility could be split so that two totally separate entities are used to supply these two types of distribution services.

**DIVESTITURE:** The stripping off of one utility function from the others by selling (spinning-off) or in some other way changing the ownership of the assets related to that function. Most commonly associated with spinning-off generation assets so they are no longer owned by the shareholders that own the transmission and distribution assets.

**DOSE:** The amount of ionizing radiation energy absorbed per unit mass of irradiated material at a specific location, such as a part of a human body.

**DOUBLE GLAZING:** Windows having two sheets of glass with an airspace between.

**DOWNSTREAM:** A term used in the petroleum industry referring to the refining, transportation and marketing side of the business.

**DRY BULB TEMPERATURE:** A measure of the sensible temperature of air.

**DRY HOLE:** A drilled well that does not yield gas and/or oil quantities or condition to support commercial production; also applied to gas that has been produced and from which liquid components have been removed.

**DRY STEAM:** The conventional type of geothermal energy used for electricity production in California. Dry steam captured at the earth's surface is used to run electric turbines. The principal dry steam resource area is the Geysers in Northern California; one of only two known areas in the world for dry steam: the other being Larderello, Italy.

**DUAL-DUCT SYSTEM:** A central plant heating , ventilation and air conditioning (HVAC ) system that produces conditioned air at two temperatures and humidity levels. The air is then supplied through two independent duct systems to the points of usage where mixing occurs.

**DUAL-FUEL or BI-FUEL VEHICLE:** refers to a vehicle capable of operating on two different fuels, in distinct fueling systems, such as compressed natural gas and gasoline.

**DUAL-PANED (double-glazed):** Two panes of glass or other transparent material, separated by a space.

**DUCT:** A passageway made of sheet metal or other suitable material used for conveying air or other gas at relatively low pressures.

**DUMP:** Excess hydropower that cannot be stored or conserved.

## E

**ECOLOGY:** The study of interrelationships of animals and plants to one another and to their environment.

**ECONOMIC EFFICIENCY:** A term that refers to the optimal production and consumption of goods and services. This generally occurs when prices of products and services reflect their marginal costs. Economic efficiency gains can be achieved through cost reduction, but it is better to think of the concept as actions that promote an increase in overall net value (which includes, but is not limited to, cost reductions).

**ECONOMIES OF SALE:** Economies of scale exist where the industry exhibits decreasing average long-run costs with size.

**ECONOMIZER AIR:** A ducting arrangement and automatic control system that allows a heating, ventilation and air conditioning (HVAC) system to supply up to 100 percent outside air to satisfy cooling demands, even if additional mechanical cooling is required.

**ECONOMIZER WATER:** A system which uses either direct evaporative cooling, or a secondary evaporatively cooled water loop and cooling coil to satisfy cooling loads, even if additional mechanical cooling is required.

**ECONOMY ENERGY (Electricity utility):** Electricity purchased by one utility from another to take the place of electricity that would have cost more to produce on the utility's own system.

**ECOSYSTEM:** The interacting system of biological community and its nonliving environment.

**EDISON, THOMAS ALVA:** The "father" of the American energy industry, Thomas Edison was an American inventor who was born in 1847 and died in 1931. He patented a total of 1,093 inventions: more than any other person in American history. Among the most important were the incandescent electric light bulb (1879), the phonograph (1877) and the movie projector (1893).

**EEI:** Edison Electric Institute. An association of electric companies formed in 1933 "to exchange information on industry developments and to act as an advocate for utilities on subjects of national interest."

**EER:** (Energy Efficiency Ratio) the ratio of cooling capacity of an air conditioning unit in Btus per hour to the total electrical input in watts under specified test conditions.

**EFFICACY, LIGHTING:** The ratio of light from a lamp to the electrical power consumed, including ballast losses, expressed as lumens per watt.

**EFFICIENCY:** The ratio of the useful energy delivered by a dynamic system (such as a machine, engine, or motor) to the energy supplied to it over the same period or cycle of operation. The ratio is usually determined under specific test conditions.

**ELCON:** Electricity Consumers Resources Council. ELCON is an association of 28 large industrial consumers of electricity. ELCON members account for over five percent of all electricity consumed in the United States. ELCON was formed in 1976 "to enable member companies to "work cooperatively for the development of coordinated, rational and consistent policies affecting electric energy supply and pricing at the federal, state, and local levels."

**ELECTRIC GENERATOR:** A device that converts a heat, chemical or mechanical energy into electricity.

**ELECTRIC RESISTANCE HEATER:** A device that produces heat through electric resistance. For example, an electric current is run through a wire coil with a relatively high electric resistance, thereby converting the electric energy into heat which can be transferred to the space by fans.

**ELECTRIC RADIANT HEATING:** A heating system in which electric resistance is used to produce heat which radiates to nearby surfaces. There is no fan component to a radiant heating system.

**ELECTRIC UTILITY:** Any person or state agency with a monopoly franchise (including any municipality), which sells electric energy to end-use customers; this term includes the Tennessee valley Authority, but does not include other Federal power marketing agency (from EPAct).

**ELECTRICITY:** A property of the basic particles of matter. A form of energy having magnetic, radiant and chemical effects. Electric current is created by a flow of charged particles (electrons).

**ELECTROLYSIS:** Breaking a chemical compound down into its elements by passing a direct current through it. Electrolysis of water, for example, produces hydrogen and oxygen.

**ELECTROMAGNETIC FIELDS (EMF):** Ordinary every day use of electricity produces magnetic and electric fields. These 60 Hertz fields (fields that go back and forth 60 times a second) are associated with electrical appliances, power lines and wiring in buildings.

**ELEMENT:** A substance consisting entirely of atoms of the same atomic number.

**ELEVATION:** 1) The height above sea level (altitude); 2) A geometrical projection, such as a building, on a plane perpendicular to the horizon.

**EMBEDDED COSTS EXCEEDING MARKET PRICES (ECEMP):** Embedded costs of utility investments exceeding market prices are: 1) costs incurred pursuant to a regulatory or contractual obligation; 2) costs that are reflected in cost-based rates; and 3) cost-based rates that exceed the price of alternatives in the marketplace. ECEMPs may become "stranded costs" where they exceed the amount that can be recovered through the asset's sale. Regulatory questions involve whether such costs should be recovered by utility shareholders and if so, how they should be recovered. "Transition costs" are stranded costs which are charged to utility customers through some type of fee or surcharge after the assets are sold or separated from the vertically-integrated utility. "Stranded

assets" are assets which cannot be sold for some reason. The British nuclear plants are an example of stranded assets which no one would buy. (Also referred to as Transition Costs.)

**EMERGENCY CORE COOLING SYSTEM (ECCS):** Equipment designed to cool the core of a nuclear reactor in the event of a complete loss of the coolant.

**EMISSION STANDARD:** The maximum amount of a pollutant legally permitted to be discharged from a single source.

**EMISSIVITY:** The property of emitting radiation; possessed by all materials to a varying extent.

**EMITTANCE:** The emissivity of a material, expressed as a fraction. Emittance values range from 0.05 for brightly polished metals to 0.96 for flat black paint.

**ENERGY:** The capacity for doing work. Forms of energy include: thermal, mechanical, electrical and chemical. Energy may be transformed from one form into another.

**ENERGY BUDGET:** A requirement in the Building Energy Efficiency Standards that a proposed building be designed to consume no more than a specified number of British thermal units (Btus) per year per square foot of conditioned floor area.

**ENERGY CHARGE:** The amount of money owed by an electric customer for kilowatt-hours consumed.

**ENERGY CONSUMPTION:** The amount of energy consumed in the form in which it is acquired by the user. The term excludes electrical generation and distribution losses.

**ENERGY EFFICIENCY:** Using less energy/electricity to perform the same function. Programs designed to use electricity more efficiently: doing the same with less. For the purpose of this paper, energy efficiency is distinguished from DSM programs in that the latter are utility-sponsored and financed, while the former is a broader term not limited to any particular sponsor or funding source. "Energy conservation" is a term which has also been used but it has the connotation of doing without in order to save energy rather than using less energy to do the same thing and so is not used as much today. Many people use these terms interchangeably.

**ENERGY EFFICIENCY RATIO (EER):** See EER.

**ENERGY/FUEL DIVERSITY:** policy that encourages the development of energy technologies to diversify energy supply sources, thus reducing reliance on conventional (petroleum) fuels; applies to all energy sectors.

**ENERGY MANAGEMENT SYSTEM:** A control system (often computerized) designed to regulate the energy consumption of a building by controlling the operation of energy consuming systems, such as the heating, ventilation and air conditioning (HVAC), lighting and water heating systems.

**ENERGY RESERVES:** The portion of total energy resources that is known and can be recovered with presently available technology at an affordable cost.

**ENERGY RESOURCES:** Everything that could be used by society as a source of energy.

**ENERGY SECURITY/FUEL SECURITY:** policy that considers the risk of dependence on fuel sources located in remote and unstable regions of the world and the benefits of domestic and diverse fuel sources.

**ENHANCED GREENHOUSE EFFECT:** The natural greenhouse effect has been enhanced by anthropogenic emissions of greenhouse gases. Increased concentrations of carbon dioxide, methane, and nitrous oxide, CFCs, HFCs, PFCs, SF<sub>6</sub>, NF<sub>3</sub>, and other photochemically important gases caused by human activities such as fossil fuel consumption and adding waste to landfills, trap more infra-red radiation, thereby exerting a warming influence on the climate.

**ENTHALPY:** The quantity of heat necessary to raise the temperature of a substance from one point to a higher temperature. The quantity of heat includes both latent and sensible.

**ENTITLEMENT:** Electric energy or generating capacity that a utility has a right to access under power exchange or sales agreements.

**ENVIRONMENTAL PROTECTION AGENCY (EPA):** A federal agency created in 1970 to permit coordinated governmental action for protection of the environment by systematic abatement and control of pollution through integration or research, monitoring, standards setting and enforcement activities.

**EPA:** The Environmental Protection Agency. A federal agency charged with protecting the environment.

**EPAct:** The Energy Policy Act of 1992 addresses a wide variety of energy issues. The legislation creates a new class of power generators, exempt wholesale generators (EWGs), that are exempt from the provisions of the Public Utilities Holding Company Act of 1935 and grants the authority to FERC to order and condition access by eligible parties to the interconnected transmission grid.

**ESCO:** Efficiency Service Company: A company that offers to reduce a client's electricity consumption with the cost savings being split with the client.

**ETHANOL (also know as Ethyl Alcohol or Grain Alcohol, CH<sub>3</sub>CH<sub>2</sub>OH):** a liquid that is produced chemically from ethylene or biologically from the fermentation of various sugars from carbohydrates found in agricultural crops and cellulosic residues from crops or wood. Used in the United States as a gasoline octane enhancer and oxygenate, it increases octane 2.5 to 3.0 numbers at 10 percent concentration. Ethanol can also be used in higher concentration (E85) in vehicles optimized for its use.

**ETHYL TERTIARY BUTYL ETHER (ETBE):** an aliphatic ether similar to MTBE. This fuel oxygenate is manufactured by reacting isobutylene with ethanol. Having high octane and low volatility characteristics, ETBE can be added to gasoline up to a level of approximately 17 percent by volume. ETBE is used as an oxygenate in some reformulated gasolines.

**ETHYLENE:** A colorless gas that burns and is an oil refinery product.

**EV (ELECTRIC VEHICLE):** a vehicle powered by electricity, usually provided by batteries but may also be provided by photovoltaic (solar) cells or a fuel cell.

**EVAPORATIVE COOLING:** Cooling by exchange of latent heat from water sprays, jets of water, or wetted material.

**EXCEPTIONAL METHOD:** An approved alternative calculation method that analyzes designs, materials, or devices that cannot be adequately modeled using public domain computer programs. Two examples of exceptional methods are the controlled ventilation crawl space (CVC) credit and the combined hydronic space and water heating method.

**EXCHANGE (Electric utility):** Agreements between utilities providing for purchase, sale and trading of power. Usually relates to capacity (kilowatts) but sometimes energy (kilowatt-hours).

**EXEMPT WHOLESALE GENERATOR (EWG):** Created under the 1992 Energy Policy Act, these wholesale generators are exempt from certain financial and legal restrictions stipulated in the Public Utilities Holding Company Act of 1935.

**EXFILTRATION:** Air flow outward through a wall, building envelope, etc.

**EXHAUST:** Air removed deliberately from a space, by a fan or other means, usually to remove contaminants from a location near their source.

**EXPORTS (Electric utility):** Power capacity or energy that a utility is required by contract to supply outside of its own service area and not covered by general rate schedules.

**EXTRA HIGH VOLTAGE (EHV):** Voltage levels higher than those normally used on transmission lines. Generally EHV is considered to be 345,000 volts or higher.

## F

**FAHRENHEIT:** A temperature scale in which the boiling point of water is 212 degrees and its freezing point is 32 degrees. To convert Fahrenheit to Celsius, subtract 32, multiply by 5, and divide the product by 9. For example: 100 degrees Fahrenheit:  $100 - 32 = 68$ ;  $68 \times 5 = 340$ ;  $340 / 9 = 37.77$  degrees Celsius.

**FAN COIL:** A component of a heating, ventilation and air conditioning (HVAC) system containing a fan and heating or cooling coil, used to distribute heated or cooled air.

**FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA):** The federal agency in charge of disaster recovery in locations that have been declared disaster areas by a state's Governor and the President of the United States.

**FEDERAL ENERGY REGULATORY COMMISSION (FERC):** An independent regulatory commission within the U.S. Department of Energy that has jurisdiction over energy producers that sell or transport fuels for resale in interstate commerce; the authority to set oil and gas pipeline transportation rates and to set the value of oil and gas pipelines for ratemaking purposes; and regulates wholesale electric rates and hydroelectric plant licenses.

**FEED-IN TARIFF:** A renewable energy policy that typically offers a guarantee of payments to project owners for the total amount of renewable electricity they produce; access to the grid; and stable, long-term contracts.

**FENESTRATION:** In simplest terms, windows or glass doors. Technically fenestration is described as any transparent or translucent material plus any sash, frame, mullion or divider. This includes windows, sliding glass doors, French doors, skylights, curtain walls and garden windows.

**FIRM ENERGY:** Power supplies that are guaranteed to be delivered under terms defined by contract.

**FISSION:** A release of energy caused by the splitting of an atom's nucleus. This is the energy process used in conventional nuclear power plants to make the heat needed to run steam electric turbines.

**FISSIONABLE MATERIAL:** A substance whose atoms can be split by slow neutrons. Uranium-235, plutonium-239 and uranium-233 are fissionable materials.

**FLARE GAS:** Unwanted natural gas that is disposed of by burning as it is released from an oil field.

**FLAT PLATE:** A device used to collect solar energy. It is a piece of metal painted black on the side facing the sun, to absorb the sun's heat.

**FLEXIBLE FUEL VEHICLE (FFV):** a vehicle that can operate on either alcohol fuels (methanol or ethanol) or regular unleaded gasoline or any combination of the two from the same tank.

**FLUE GAS:** Gas that is left over after fuel is burned and which is disposed of through a pipe or stack to the outer air.

**FLUIDIZED BED COMBUSTION:** A process for burning powdered coal that is poured in a liquid-like stream with air or gases. The process reduces sulfur dioxide emissions from coal combustion.

**FLUORESCENT LAMP:** A tubular electric lamp that is coated on its inner surface with a phosphor and that contains mercury vapor whose bombardment by electrons from the cathode provides ultraviolet light which causes the phosphor to emit visible light either of a selected color or closely approximating daylight.

**FLUOROCARBON GASES:** Propellants used in aerosol products and refrigerants that are believed to be causing depletion of the earth's ozone shield. See CFCs.

**FOOTCANDLE:** A unit of illuminance on a surface that is one foot from a uniform point source of light of one candle and is equal to one lumen per square foot.

**FORCED AIR UNIT (FAU):** A central furnace equipped with a fan or blower that provides the primary means for circulation of air.

**FOSSIL FUEL:** Oil, coal, natural gas or their by-products. Fuel that was formed in the earth in prehistoric times from remains of living-cell organisms.

**FRACTIONAL DISTILLATION:** the process of refining crude oil into various oil products. The various products are separated out in the order of their boiling points.

**FRAMING EFFECTS:** The effect of framing (wood or metal studs, joists, beams, etc.) on the overall U-value of a wall, roof, floor, window or other building surface. Framing generally increases the U-Value and decreases the R-Value of insulated surfaces.

**FRAMING PERCENTAGE:** The area of actual framing in an envelope assembly divided by the overall area of the envelope assembly. This percentage is used to calculate the overall U-value of an assembly.

**FREQUENCY:** The number of cycles which an alternating current moves through in each second. Standard electric utility frequency in the United States is 60 cycles per second, or 60 Hertz.

**FUEL:** A substance that can be used to produce heat.

**FUEL CELL:** A device or an electrochemical engine with no moving parts that converts the chemical energy of a fuel, such as hydrogen, and an oxidant, such as oxygen, directly into electricity. The principal components of a fuel cell are catalytically activated electrodes for the fuel (anode) and the oxidant (cathode) and an electrolyte to conduct ions between the two electrodes, thus producing electricity.

**FUEL GAS:** Synthetic gas used for heating or cooling. It has less energy content than pipeline-quality gas.

**FUEL OIL:** Petroleum products that are burned to produce heat or power.

**FUEL REPROCESSING (Nuclear):** The means for obtaining usable, fissionable material from spent reactor fuel.

**FUEL ROD (Nuclear):** A long slender tube that holds fissionable material (fuel) for nuclear reactor use. Fuel rods are assembled into bundles called fuel elements or assemblies, which are loaded individually into the reactor core.

**FUSION ENERGY:** A power source, now under development, based on the release of energy that occurs when atoms are combined under the most extreme heat and pressure. It is the energy process of the sun and the stars.

## G

**GALLON:** A unit of volume. A U.S. gallon has 231 cubic inches or 3.785 liters.

**GAS:** Gaseous fuel (usually natural gas) that is burned to produce heat energy. The word also is used, colloquially, to refer to gasoline.

**GAS UTILITY:** any person engaged in, or authorized to engage in, distributing or transporting natural gas, including, but not limited to, any such person who is subject to the regulation of the Public Utilities Commission.

**GASIFICATION:** The process where biomass fuel is reacted with sub- stoichiometric quantities of air and oxygen usually under high pressure and temperature along with moisture to produce gas which contains hydrogen, methane, carbon monoxide, nitrogen, water and carbon dioxide. The gas can be burned directly in a boiler, or scrubbed and combusted in an engine-generator to produce electricity. The three types of gasification technologies available for biomass fuels are the fixed bed updraft, fixed bed downdraft and fluidized bed gasifiers. Gasification is also the production of synthetic gas from coal.

**GASOHOL:** In the United States, gasohol (E10) refers to gasoline that contains 10 percent ethanol by volume. This term was used in the late 1970s and early 1980s but has been replaced in some areas of the country by terms such as E-10, Super Unleaded Plus Ethanol, or Unleaded Plus.

**GASOLINE:** A light petroleum product obtained by refining oil, and used as motor vehicle fuel.

**GAS SYNTHESIS:** A method producing synthetic gas from coal. Also called the FISCHER-TROPSCH PROCESS.

**GENERAL LIGHTING:** Lighting designed to provide a substantially uniform level of illumination throughout an area, exclusive of any provision for special visual tasks or decorative effects.

**GENERATION COMPANY (GENCO):** A regulated or non-regulated entity (depending upon the industry structure) that operates and maintains existing generating plants. The Genco may own the generation plants or interact with the short term market on behalf of plant owners. In the context of restructuring the market for electricity, Genco is sometimes used to describe a specialized "marketer" for the generating plants formerly owned by a vertically-integrated utility.

**GENERATION DISPATCH AND CONTROL:** Aggregating and dispatching (sending off to some location) generation from various generating facilities, providing backups and reliability services. Ancillary services include the provision of reactive power, frequency control, and load following. (Also see "Power Pool" and "Poolco" below.)

**GEOHERMAL ELEMENT:** an element of a county general plan consisting of a statement of geothermal development policies, including a diagram or diagrams and text setting forth objectives, principles, standards, and plan proposals, including a discussion of environmental damages and identification of sensitive environmental areas, including unique wildlife habitat, scenic, residential, and recreational areas, adopted pursuant to Section 65303 of the Government Code.

**GEOHERMAL ENERGY:** Natural heat from within the earth, captured for production of electric power, space heating or industrial steam.

**GEOHERMAL GRADIENT:** The change in the earth's temperature with depth. As one goes deeper, the earth becomes hotter.

**GEOHERMAL STEAM:** Steam drawn from deep within the earth.

**GIGAWATT (GW):** One thousand megawatts (1,000 MW) or, one million kilowatts (1,000,000 kW) or one billion watts (1,000,000,000 watts) of electricity.

**GIGAWATT-HOUR (GWH):** One million kilowatt-hours of electric power.

**GLAZING:** A covering of transparent or translucent material (typically glass or plastic) used for admitting light.

**GLOBAL CLIMATE CHANGE:** The term 'climate change' is sometimes used to refer to all forms of climatic inconsistency, but because the Earth's climate is never static, the term is more properly used to imply a significant change from one climatic condition to another. In some cases, climate change' has been used synonymously with the term, 'global warming'; scientists however, tend to use the term in the wider sense to also include natural changes in climate. See also Enhanced Greenhouse Effect. (EPA)

**GREENHOUSE EFFECT:** The effect produced as greenhouse gases allow incoming solar radiation to pass through the Earth's atmosphere, but prevent most of the outgoing infra-red radiation from the surface and lower atmosphere from escaping into outer space. This process occurs naturally and

has kept the Earth's temperature about 59 degrees F warmer than it would otherwise be. Current life on Earth could not be sustained without the natural greenhouse effect. (EPA). See Global Climate Change.

**GREENHOUSE EFFECT (relating to buildings):** The characteristic tendency of some transparent materials (such as glass) to transmit radiation with relatively short wavelengths (such as sunlight) and block radiation of longer wavelengths (such as heat). This tendency leads to a heat build-up within the space enclosed by such a material.

**GREENHOUSE GAS:** Any gas that absorbs infra-red radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), halogenated fluorocarbons (HCFCs), ozone (O<sub>3</sub>), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs). (EPA)

**GRID:** The electric utility companies' transmission and distribution system that links power plants to customers through high power transmission line service (110 kilovolt [kv] to 765 kv); high voltage primary service for industrial applications and street rail and bus systems (23 kv-138 kv); medium voltage primary service for commercial and industrial applications (4 kv to 35); and secondary service for commercial and residential customers (120 v to 480 v). Grid can also refer to the layout of a gas distribution system of a city or town in which pipes are laid in both directions in the streets and connected at intersections.

**GROSS AREA:** The area of a surface including areas not belonging to that surface (such as windows and doors in a wall).

**GROSS NATIONAL PRODUCT (GNP):** The total market value of the goods and services produced by a nation before deduction or depreciation charges and other allowance for capital consumption and is widely used as a measure of economic activity.

## H

**H-COAL PROCESS:** A means of making coal cleaner so it will produce less ash and less sulfur emissions.

**HSPF:** See HEATING SEASONAL PERFORMANCE FACTOR.

**HEAT BALANCE:** The outdoor temperature at which a building's internal heat gain (from people, lights and machines) is equal to the heat loss through windows, roof and walls.

**HEAT CAPACITY:** The amount of heat necessary to raise the temperature of a given mass one degree. Heat capacity may be calculated by multiplying the mass by the specific heat.

**HEAT ENGINE:** An engine that converts heat to mechanical energy.

**HEAT GAIN:** an increase in the amount of heat contained in a space, resulting from direct solar radiation, heat flow through walls, windows, and other building surfaces, and the heat given off by people, lights, equipment, and other sources.

**HEAT LOSS:** A decrease in the amount of heat contained in a space, resulting from heat flow through walls, windows, roof and other building surfaces and from ex-filtration of warm air.

**HEAT PUMP:** An air-conditioning unit which is capable of heating by refrigeration, transferring heat from one (often cooler) medium to another (often warmer) medium, and which may or may not include a capability for cooling. This reverse-cycle air conditioner usually provides cooling in summer and heating in winter.

**HEAT RATE:** A number that tells how efficient a fuel-burning power plant is. The heat rate equals the Btu content of the fuel input divided by the kilowatt-hours of power output.

**HEAT STORM:** Heat storms occur when temperatures exceed 100 degrees Fahrenheit over a large area for three days in a row. Normal hot temperatures cause electricity demand to increase during the peak summertime hours of 4 to 7 p.m. when air conditioners are straining to overcome the heat. If a hot spell extends to three days or more, however, nighttime temperatures do not cool down, and the thermal mass in homes and buildings retains the heat from previous days. This heat build-up causes air conditioners to turn on earlier and to stay on later in the day. As a result, available electricity supplies are challenged during a higher, wider peak electricity consumption period.

**HEAT TRANSFER:** Flow of heat energy induced by a temperature difference. Heat flow through a building envelope typically flows from a heated, or hot area to a cooled, or cold area.

**HEATING DEGREE DAY:** A unit that measure the space heating needs during a given period of time.

**HEATING LOAD:** The rate at which heat must be added to a space in order to maintain the desired temperature within the space.

**HEATING VALUE:** The amount of heat produced by the complete combustion of a given amount of fuel.

**HEAVY WATER:** A type of hydrogen atom that may be used as fuel for fusion power plants. Also called DEUTERIUM, it is found in abundance in the seas.

**HEDGING CONTRACTS:** Contracts which establish future prices and quantities of electricity independent of the short-term market. Derivatives may be used for this purpose. (See Contracts for Differences, Forwards, Futures Market, and Options.)

**HELIOCHEMICAL:** Using solar radiation to cause chemical reactions.

**HELIO THERMAL:** A process that uses the sun's rays to produce heat.

**HERTZ:** A unit of electromagnetic wave frequency that is equal to one cycle per second.: It is named after Henrich R. Hertz.

**HIGH-SULFUR COAL:** Coal whose weight is more than one percent sulfur.

**HORSEPOWER (HP):** A unit for measuring the rate of doing work. One horsepower equals about three-fourths of a kilowatt (745.7 watts).

**HOT:** (Colloquial): The word is sometimes used to describe electric utility lines that are carrying electric currently. It also is used to refer to anything that is highly radioactive.

**HOT DRY ROCK:** A geothermal resource created when impermeable, subsurface rock structures, typically granite rock 15,000 feet or more below the earth's surface, are heated by geothermal energy. The resource is being investigated as a source of energy production.

**HSPF (Heating Seasonal Performance Factor):** A measure of heating efficiency for the total heating output of a central air-conditioning heat pump. Efficiency is derived according to federal test methods by using the total Btus during its normal usage period for heating divided by the total electrical energy input in watt-hours during the same period.

**HVAC (Heating Ventilation and Air Conditioning):** A system that provides heating, ventilation and/or cooling within or associated with a building.

**HYDROELECTRIC POWER:** Electricity produced by falling water that turns a turbine generator. Also referred to as HYDRO.

**HYDROELECTRIC SPILL GENERATION:** Hydroelectric generation in existence prior to January 1, 1998, that has no storage capacity and that, if backed down, would spill. This term also refers to a hydro resource that has exceeded or has inadequate storage capacity and is spilling, even though generators are operating at full capacity.

**HYBRID VEHICLE:** Usually a hybrid EV, a vehicle that employs a combustion engine system together with an electric propulsion system. Hybrid technologies expand the usable range of EVs beyond what an all-electric-vehicle can achieve with batteries only.

**HYDRONIC HEATING:** A system that heats a space using hot water which may be circulated through a convection or fan coil system or through a radiant baseboard or floor system.

**HYDROTHERMAL SYSTEMS:** Underground reservoirs that produce either dry steam or a mixture of steam and water.

**HYGAS:** A process that uses water to help produce pipeline-quality gas from coal.

## I

**IMBALANCE ENERGY:** The real-time change in generation output or demand requested by the ISO to maintain reliability of the ISO-controlled grid. Sources of imbalance energy include regulation, spinning and non-spinning reserves, replacement reserve, and energy from other generating units that are able to respond to the ISO's request for more or less energy.

**ILEV (Inherently Low Emission Vehicle):** Term used by federal government for any vehicle that is certified to meet the California Air Resources Board's Low Emission Vehicle (LEV) standards for non-methane organic gases and carbon monoxide, ULEV standards for nitrogen oxides and does not emit any evaporative emissions.

**IMPORTS (Electric utility):** Power capacity or energy obtained by one utility from others under purchase or exchange agreement.

**IMPOUNDMENT:** A body of water confined by a dam, dike, floodgate or other artificial barrier.

**INCANDESCENT LAMP:** An electric lamp in which a filament is heated by an electric current until it emits visible light.

**INDEPENDENT POWER PRODUCER:** An Independent Power Producer (IPP) generates power that is purchased by an electric utility at wholesale prices. The utility then resells this power to end-use customers. Although IPPs generate power, they are not franchised utilities, government agencies or QFs. IPPs usually do not own transmission lines to transmit the power that they generate.

**INDIGENOUS ENERGY RESOURCES:** Power and heat derived from sources native to a state or country. These include geothermal, hydro, biomass, solar and wind energy. The term usually is understood to include cogeneration facilities.

**INDIRECTLY CONDITIONED SPACE:** See conditioned space, indirectly.

**INFILTRATION:** The uncontrolled inward leakage of air through cracks and gaps in the building envelope, especially around windows, doors and duct systems.

**INFILTRATION BARRIER:** A material placed on the outside or the inside of exterior wall framing to restrict inward air leakage, while permitting the outward escape of water vapor from the wall cavity.

**INFRASTRUCTURE:** generally refers to the recharging and refueling network necessary to successful development, production, commercialization and operation of alternative fuel vehicles, including fuel supply, public and private recharging and refueling facilities, standard specifications for refueling outlets, customer service, education and training, and building code regulations.

**INJECTION:** (Petroleum): Forcing gas or water into an oil well to increase pressure and cause more oil to come to the surface. See THERMALLY ENHANCED OIL RECOVERY.

**IN-SITU COMBUSTION:** An experimental means of recovering hard-to-get petroleum by burning some of the oil in its natural underground reservoir. Also called FIREFLOODING.

**IN-SITU GASIFICATION:** Converting coal into synthetic gas at the place where the coal is found in nature.

**INSOLATION:** The total amount of solar radiation (direct, diffuse, and reflected) striking a surface exposed to the sky.

**INSULATION, THERMAL:** A material having a relatively high resistance of heat flow and used principally to retard heat flow. See R-VALUE.

**INTERCHANGE (Electric utility):** The agreement among interconnected utilities under which they buy, sell and exchange power among themselves. This can, for example, provide for economy energy and emergency power supplies.

**INTERCONNECTION (Electric utility):** The linkage of transmission lines between two utilities, enabling power to be moved in either direction. Interconnections allow the utilities to help contain costs while enhancing system reliability.

**INTERESTED PARTY:** any person whom the commission finds and acknowledges as having a real and direct interest in any proceeding or action carried on, under, or as a result of the operation of, this division.

**INTERNAL COMBUSTION ENGINE:** An engine in which fuel is burned inside the engine. A car's gasoline engine or rotary engine is an example of a internal combustion engine. It differs from engines having an external furnace, such as a steam engine.

**INTERRUPTIBLE SERVICE (Electric utility):** Electricity supplied under agreements that allow the supplier to curtail or stop service at times.

**INTERTIE:** A transmission line that links two or more regional electric power systems.

**INTEGRATED RESOURCE PLANNING(IRP):** A public planning process and framework within which the costs and benefits of both demand- and supply-side resources are evaluated to develop the least-total-cost mix of utility resource options. In many states, IRP includes a means for considering environmental damages caused by electricity supply/transmission and identifying cost-effective energy efficiency and renewable energy alternatives. IRP has become a formal process prescribed by law in some states and under some provisions of the Clean Air Act amendments of 1992.

**INTEGRATED RESOURCE PLANNING PRINCIPLES:** The underlying principles of IRP can be distinguished from the formal process of developing an approved utility resource plan for utility investments in supply- and demand-side resources. A primary principle is to provide a framework for comparing a variety of supply- and demand-side and transmission resource costs and attributes outside of the basic provision (or reduction) of electric capacity and energy. These resources may be owned or constructed by any entity and may be acquired through contracts as well as through direct investments. Another principle is the incorporation of risk and uncertainty into the planning analysis. The public participation aspects of IRP allow public and regulatory involvement in the planning rather than the siting stage of project development.

**IPP: INDEPENDENT POWER PRODUCER.** An private entity that operates a generation facility and sells power to electric utilities for resale to retail customers.

**ISO: INDEPENDENT SYSTEM OPERATOR.** A neutral operator responsible for maintaining instantaneous balance of the grid system. The ISO performs its function by controlling the dispatch of flexible plants to ensure that loads match resources available to the system.

## J

**JOULE:** A unit of work or energy equal to the amount of work done when the point of application of force of 1 newton is displaced 1 meter in the direction of the force. It takes 1,055 joules to equal a British thermal unit. It takes about 1 million joules to make a pot of coffee.

## K

**KEROSENE:** Certain colorless, low-sulfur oil products that burn without producing much smoke.

**kBtu :** One-thousand (1,000) Btus.

**KILOVOLT (kv):** One-thousand volts (1,000). Distribution lines in residential areas usually are 12 kv (12,000 volts).

**KILOWATT (kW):** One thousand (1,000) watts. A unit of measure of the amount of electricity needed to operate given equipment. On a hot summer afternoon a typical home, with central air conditioning and other equipment in use, might have a demand of four kW each hour.

**KILOWATT-HOUR (kWh):** The most commonly-used unit of measure telling the amount of electricity consumed over time. It means one kilowatt of electricity supplied for one hour.

## L

**LANDFILL GAS:** Gas generated by the natural degrading and decomposition of municipal solid waste by anaerobic microorganisms in sanitary landfills. The gases produced, carbon dioxide and methane, can be collected by a series of low-level pressure wells and can be processed into a medium Btu gas that can be burned to generate steam or electricity.

**LASER:** A very intense, uniform beam of electromagnetic radiation. Acronym for Light Amplification by Stimulated Emission of Radiation.

**LATENT HEAT:** A change in the heat content that occurs without a corresponding change in temperature, usually accompanied by a change of state (as from liquid to vapor during evaporation).

**LATENT LOAD:** The cooling load caused by moisture in the air.

**LATITUDE:** The angular distance north or south of the equator, measured in degrees of arc.

**LAYOFF (Electric utility):** Excess capacity of a generating unit, available for a limited time under the terms of a power sales agreement.

**LAY UP:** Lay up is another term for cold storage and describes the status of equipment (such as a power plant) that has been placed in storage ("mothballed") for latter use.

**LEADED GASOLINE:** Gasoline containing tetraethyl lead, an important constituent in antiknock gasoline. Leaded gasoline is no longer sold in the United States.

**Light-emitting diode (LED):** A semiconductor diode that emits light when a voltage is applied to it and that is used in a variety of applications including commercial, residential and traffic signal lighting.

**LOAD:** An end-use device or customer that receives power from the electric system.

**LOAD CENTERS:** A geographical area where large amounts of power are drawn by end-users.

**LIFE-CYCLE COST:** Amount of money necessary to own, operate and maintain a building over its useful life.

**LIFE EXTENSION:** A term used to describe capital expenses which reduce operating and maintenance costs associated with continued operation of electric utility boilers. Such boilers usually have a 40 year operating life under normal circumstances.

**LIFELINE RATES:** Rates charged by a utility company for the low income, the disadvantaged and senior citizens. The rates provide a discount for minimum necessary utilities, such as electricity requirements of typically 300 to 400 kilowatt/hours per month.

**LIGHT WATER REACTOR (LWR):** A nuclear power unit that uses ordinary water to cool its core. The LWR may be a boiling water reactor or a pressurized water reactor.

**LIGNITE:** Brownish black coal having qualities in between those of bituminous coal and peat. The texture of the original wood often is visible in lignite.

**LIQUEFACTION:** The process of making synthetic liquid fuel from coal. The term also is used to mean a method for making large amounts of gasoline and heating oil from petroleum.

**LIQUEFIED GASES:** Gases that have been or can be changed into liquid form. These include butane, butylene, ethane, ethylene, propane and propylene.

**LNG (LIQUEFIED NATURAL GAS):** Natural gas that has been condensed to a liquid, typically by cryogenically cooling the gas to minus 260 degrees Fahrenheit (below zero).

**LPG (LIQUEFIED PETROLEUM GAS):** A mixture of gaseous hydrocarbons, mainly propane and butane that change into liquid form under moderate pressure. LPG or propane is commonly used as a fuel for rural homes for space and water heating, as a fuel for barbecues and recreational vehicles, and as a transportation fuel. It is normally created as a by-product of petroleum refining and from natural gas production.

**LIQUID BRINE:** A type of geothermal energy resource that depends on naturally occurring hot water solution found within the earth. Technology for this novel energy source is being developed in the Salton Sea area in Southern California.

**LOAD:** The amount of electric power supplied to meet one or more end user's needs.

**LOAD:** An end-use device or an end-use customer that consumes power. Load should not be confused with demand, which is the measure of power that a load receives or requires.

**LOAD DIVERSITY:** The condition that exists when the peak demands of a variety of electric customers occur at different times. This is the objective of "load molding" strategies, ultimately curbing the total capacity requirements of a utility.

**LOAD FACTOR:** A percent telling the difference between the amount of electricity a consumer used during a given time span and the amount that would have been used if the usage had stayed at the consumer's highest demand level during the whole time. The term also is used to mean the percentage of capacity of an energy facility: such as power plant or gas pipeline: that is utilized in a given period of time.

**LOADING FACTOR:** Ratio of actual electricity consumed and total potential consumption. Used when analyzing electricity consumption in a large population. A loading factor of 0.5 means that 50% of homes are consuming all of the electricity they are able or that, on average, all of the homes are only consuming 50% of the power they have the potential to consume.

**LOAD MANAGEMENT:** Steps taken to reduce power demand at peak load times or to shift some of it to off-peak times. This may be with reference to peak hours, peak days or peak seasons. The main

thing affecting electric peaks is air-conditioning usage, which is therefore a prime target for load management efforts. Load management may be pursued by persuading consumers to modify behavior or by using equipment that regulates some electric consumption.

**LOOP FLOW:** The difference between scheduled and actual power flows on electric transmission lines.

**LOSSES (Electric utility):** Electric energy or capacity that is wasted in the normal operation of a power system. Some kilowatt-hours are lost in the form of waste heat in electrical apparatus such as substation conductors. LINE LOSSES are kilowatts or kilowatt-hours lost in transmission and distribution lines under certain conditions.

**LOW-E:** A special coating that reduces the emissivity of a window assembly, thereby reducing the heat transfer through the assembly.

**LOW EMISSION VEHICLE (LEV):** a vehicle certified by the California Air Resources Board to have emissions from zero to 50,000 miles no higher than 0.075 grams/mile (g/mi) of non-methane organic gases, 3.4 g/mi of carbon monoxide, and 0.2 g/mi of nitrogen oxides. Emissions from 50,000 to 100,000 miles may be slightly higher.

**LOW-SULFUR COAL:** Coal having one percent or less of sulfur by weight.

**LOW-SULFUR OIL:** Oil having one percent or less of sulfur by weight.

**LUMEN:** A measure of the amount of light available from a light source equivalent to the light emitted by one candle.

**LUMENS/WATT:** A measure of the efficacy of a light fixture; the number of lumens output per watt of power consumed.

**LUMEN MAINTENANCE CONTROL:** An electrical control device designed to vary the electrical consumption of a lighting system in order to maintain a specified illumination level.

**LUMINAIRE:** A complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply.

**LUX:** A unit of illumination equal to the direct illumination on a surface that is everywhere one meter from a uniform point source of one candle; a unit of illumination that is equal to one lumen per square meter. Also see footcandle.

## M

**M85:** a blend of 85 percent methanol and 15 percent unleaded regular gasoline, used as a motor fuel.

**M100:** 100 percent (neat) methanol used as a motor fuel in dedicated methanol vehicles, such as some heavy-duty truck engines.

**MAGMA:** The molten rock and elements that lie below the earth's crust. The heat energy can approach 1,000 degrees Fahrenheit and is generated directly from a shallow molten magma resource and stored in adjacent rock structures. To extract energy from magma resources requires drilling near or directly into a magma chamber and circulating water down the well in a convection-type system.

**MAGNETO HYDRO DYNAMICS (MHD):** A means of producing electricity directly by moving liquids or gases through a magnetic field.

**MAJOR NATURAL GAS PRODUCER:** any person who produces natural gas in amounts determined by the commission as having a major effect on energy supplies.

**MAJOR MARKETER:** any person who sells natural gas or oil in amounts determined by the commission as having a major effect on energy supplies. **MAJOR OIL PRODUCER:** means any person who produces oil in amount determined by the commission as having a major effect on energy supplies.

**MANUFACTURED GAS:** Gas produced by certain processes from oil, coal or coke.

**MARGINAL COST:** In the utility context, the cost to the utility of providing the next (marginal) kilowatt-hour of electricity, irrespective of sunk costs.

**MARKETER:** An agent for generation projects who markets power on behalf of the generator. The marketer may also arrange transmission, firming or other ancillary services as needed. Though a marketer may perform many of the same functions as a broker, the difference is that a marketer represents the generator while a broker acts as a middleman.

**MARKET-BASED PRICE:** A price set by the mutual decisions of many buyers and sellers in a competitive market.

**MARKET CLEARING PRICE:** The price at which supply equals demand. The Day Ahead and Hour Ahead Markets.

**MARKET PARTICIPANT:** An entity, including a Scheduling Coordinator, who participates in the energy marketplace through the buying, selling, transmission, or distribution of energy or ancillary services into, out of, or through the ISO-controlled grid.

**MASTER FILE:** A file maintained by the PX for use in bidding and bid evaluation protocol that contains information on generating units, loads, and other resources eligible to bid into the PX.

**MARSH GAS:** A common term for gas that bubbles to the surface of the water in a marsh or swamp. It is colorless, odorless and can be explosive.

**MCF:** One thousand cubic feet of natural gas, having an energy value of one million Btu. A typical home might use six MCF in a month.

**MEGAWATT (MW):** One-thousand kilowatts (1,000 kW) or one million (1,000,000) watts.

**MEGAWATT HOUR (MWh):** One-thousand kilowatt-hours, or an amount of electrical energy that would supply 1,370 typical homes in the Western U.S. for one month. (This is a rounding up to 8,760

kWh/year per home based on an average of 8,549 kWh used per household per year [U.S. DOE EIA, 1997 annual per capita electricity consumption figures]).

**METER:** A device for measuring levels and volumes of a customers gas and electricity use.

**METHANE:** A light hydrocarbon that is the main component of natural gas and marsh gas. It is the product of the anaerobic decomposition of organic matter, enteric fermentation in animals and is one of the greenhouse gases. Chemical formula is CH<sub>4</sub>.

**METHANOL (also known as Methyl Alcohol, Wood Alcohol, CH<sub>3</sub>OH):** a liquid formed by catalytically combining carbon monoxide (CO) with hydrogen (H<sub>2</sub>) in a 1:2 ratio, under high temperature and pressure. Commercially it is typically made by steam reforming natural gas. Also formed in the destructive distillation of wood.

**METHYL TERTIARY BUTYL ETHER (MTBE):** an ether manufactured by reacting methanol and isobutylene. The resulting ether has a high octane and low volatility. MTBE is a fuel oxygenate and is permitted in unleaded gasoline up to a level of 15 percent. It is one of the primary ingredients in reformulated gasolines.

**MICROWAVE:** Electromagnetic radiation with wavelengths of a few centimeters. It falls between infrared and radio wavelengths on the electromagnetic spectrum. The radio wave beam can deliver electrical energy over long distances.

**MIL:** One-tenth of one cent \$0.001.

**MINIMUM GENERATION:** Generally, the required minimum generation level of a utility systems thermal units. Specifically, the lowest level of operation of oil-fired and gas-fired units at which they can be currently available to meet peak load needs.

**MONOPOLY:** The only seller with control over market sales.

**MONOPSONY:** The only buyer with control over market purchases.

**MTBE (METHYL TERTIARY-BUTYL ETHER):** A clean- burning oxygenate with high octane and low volatility added to unleaded gasoline to reduce carbon monoxide emissions.

**MUNICIPAL ELECTRIC UTILITY:** A power utility system owned and operated by a local jurisdiction.

**MUNICIPAL SOLID WASTE:** Locally collected garbage, which can be processed and burned to produce energy.

**MUNICIPALIZATION:** The process by which a municipal entity assumes responsibility for supplying utility service to its constituents. In supplying electricity, the municipality may generate and distribute the power or purchase wholesale power from other generators and distribute it.

**MUNICIPAL UTILITY:** A provider of utility services owned and operated by a municipal government.

## N

**NARUC:** the national association of regulatory utility commissioners. An advisory council composed of governmental agencies of the fifty States, the District of Columbia, Puerto Rico and the Virgin Islands engaged in the regulation of utilities and carriers. "The chief objective is to serve the consumer interest by seeking to improve the quality and effectiveness of public regulation in America."

**NASUCA:** The National Association of Utility Consumer Advocates. NASUCA includes members from 38 states and the District of Columbia. It was formed "to exchange information and take positions on issues affecting utility rates before federal agencies, Congress and the courts."

**NATURAL GAS:** Hydrocarbon gas found in the earth, composed of methane, ethane, butane, propane and other gases.

**NATURAL GAS VEHICLE:** vehicles that are powered by compressed or liquefied natural gas.

**NATURAL MONOPOLY:** A situation where one firm can produce a given level of output at a lower total cost than can any combination of multiple firms. Natural monopolies occur in industries which exhibit decreasing average long-run costs due to size (economies of scale). According to economic theory, a public monopoly governed by regulation is justified when an industry exhibits natural monopoly characteristics.

**NCSL:** The National Conference of State Legislatures. A national advisory council which provides services to state legislatures "by bringing together information from all states to forge workable answers to complex policy questions."

**NGV (NATURAL GAS VEHICLE):** vehicles that are powered by compressed or liquefied natural gas.

**NATURAL GASOLINE:** A mixture of liquids extracted from natural gas and suitable for blending with ordinary oil-derived gasoline.

**NET-ZERO ENERGY:** Producing as much energy on an annual basis as one consumes on site, usually with renewable energy sources such as photovoltaics or small-scale wind turbines.

**NEUTRON:** An uncharged particle found in the nucleus of every atom except that of hydrogen.

**NEWTON:** A unit of force. The amount of force it takes to accelerate one kilogram at one meter per second per second.

**NON-DEPLETABLE ENERGY SOURCES:** Energy which is not obtained from depletable energy sources.

**NONRESIDENTIAL BUILDING::** any building which is heated or cooled in its interior, and is of an occupancy type other than Type H, I, or J, as defined in the Uniform Building Code, 1973 edition, as adopted by the International Conference of Building Officials.

**NON-FIRM ENERGY:** Electricity that is not required to be delivered or to be taken under the terms of an electric purchase contract.

**NOPR:** A Notice of Proposed Rule-making. A designation used by the FERC for some of its dockets.

**NOx:** Oxides of nitrogen that are a chief component of air pollution that can be produced by the burning of fossil fuels. Also called nitrogen oxides.

**NRTA:** Northwest Regional Transmission Association. A subregional transmission group within the Western Regional Transmission Association.

**NUCLEAR ENERGY:** Power obtained by splitting heavy atoms (fission) or joining light atoms (fusion). A nuclear energy plant uses a controlled atomic chain reaction to produce heat. The heat is used to make steam run conventional turbine generators.

**NUCLEAR REGULATORY COMMISSION (NRC):** An independent federal agency that ensures that strict standards of public health and safety, environmental quality and national security are adhered to by individuals and organizations possessing and using radioactive materials. The NRC is the agency that is mandated with licensing and regulating nuclear power plants in the United States. It was formally established in 1975 after its predecessor, the Atomic Energy Commission, was abolished.

**NUG:** A non-utility generator. A generation facility owned and operated by an entity who is not defined as a utility in that jurisdictional area.

## O

**OAPEC:** Acronym for Organization of Arab Petroleum Exporting Countries founded in 1968 for cooperation in economic and petroleum affairs. See OPEC.

**OBLIGATION TO SERVE:** The obligation of a utility to provide electric service to any customer who seeks that service, and is willing to pay the rates set for that service. Traditionally, utilities have assumed the obligation to serve in return for an exclusive monopoly franchise.

**OCEAN THERMAL GRADIENT (OTG):** Temperature differences between deep and surface water. Deep water is likely to be 25 to 45 degrees Fahrenheit colder. The term also refers to experimental technology that could use the temperature differences as a means to produce energy.

**OCCUPANCY SENSOR:** A control device that senses the presence of a person in a given space, commonly used to control lighting systems in buildings.

**OCTANE:** A rating scale used to grade gasoline as to its antiknock properties. Also any of several isometric liquid paraffin hydrocarbons, C<sub>8</sub>H<sub>18</sub>. Normal octane is a colorless liquid found in petroleum boiling at 124.6 degrees Celsius.

**OCTANE RATING:** A measure of a gasoline's resistance to exploding too early in the engine cycle, which causes knocking. The higher the rating, the lower the chance of premature ignition.

**OFF-ROAD:** Any non-stationary device, powered by an internal combustion engine or motor, used primarily off the highways to propel, move, or draw persons or property, and used in any of the following applications: marine vessels, construction/farm equipment, locomotives, utility and lawn and garden equipment, off-road motorcycles, and off-highway vehicles.

**OHM:** A unit of measure of electrical resistance. One volt can produce a current of one ampere through a resistance of one ohm.

**OIL SHALE:** A type of rock containing organic matter that produces large amounts of oil when heated to high temperatures.

**Once-through cooling:** Water that is withdrawn from a source, circulated through the heat exchangers, and then returned to a water body at a higher temperature.

**OLIGOPOLY:** A few sellers who exert market control over prices.

**OPEC:** Acronym for Organization of Petroleum Exporting Countries founded in 1960 for unify and coordinate petroleum policies of the members. Headquarters is in Vienna, Austria.

**OPTIONS:** An option is a contractual agreement that gives the holder the right to buy (call option) or sell (put option) a fixed quantity of a security or commodity (for example, a commodity or commodity futures contract), at a fixed price, within a specified period of time. May either be standardized, exchange-traded, and government regulated, or over-the-counter customized and non-regulated.

**ORIENTATION:** the position of a building relative to the points of a compass.

**ORIGINAL EQUIPMENT MANUFACTURER (OEM):** refers to the manufacturers of complete vehicles or heavy-duty engines, as contrasted with remanufacturers, converters, retrofitters, up-fitters, and re-powering or rebuilding contractors who are overhauling engines, adapting or converting vehicles or engines obtained from the OEMs, or exchanging or rebuilding engines in existing vehicles.

**OUTAGE (Electric utility):** An interruption of electric service that is temporary (minutes or hours) and affects a relatively small area (buildings or city blocks). See BLACKOUT.

**OUTER CONTINENTAL SHELF (OCS):** The submerged lands extending from the outer limit of the historic territorial sea (typically three miles) to some undefined outer limit, usually a depth of 600 feet. In the United States, this is the portion of the shelf under federal jurisdiction. See CONTINENTAL SHELF.

**OUTSIDE AIR:** Air taken from outdoors and not previously circulated through the HVAC system.

**OVER GENERATION:** A condition that occurs when total PX participant demand is less than or equal to the sum of regulatory must-take generation, regulatory must-run generation, and reliability must-run generation.

**OVERHANG:** Any horizontal projection that serves as a shading element for a window.

**OXYGENATE:** a term used in the petroleum industry to denote octane components containing hydrogen, carbon and oxygen in their molecular structure. Includes ethers such as MTBE and ETBE and alcohols such as ethanol or methanol. The oxygenate is a prime ingredient in reformulated gasoline. The increased oxygen content given by oxygenates promotes more complete combustion, thereby reducing tailpipe emissions.

**OZONE:** A kind of oxygen that has three atoms per molecule instead of the usual two. Ozone is a poisonous gas, but the ozone layer in the upper atmosphere shields life on earth from deadly ultraviolet radiation from space. The molecule contains three oxygen atoms (O<sub>3</sub>).

## P

**PARALLEL PATH FLOW:** As defined by NERC, this refers to the flow of electric power on an electric system's transmission facilities resulting from scheduled electric power transfers between two other electric systems. (Electric power flows on all interconnected parallel paths in amounts inversely proportional to each path's resistance.)

**PARTIAL LOAD:** An electrical demand that uses only part of the electrical power available.

**PARTICULATE MATTER (PM):** Unburned fuel particles that form smoke or soot and stick to lung tissue when inhaled. A chief component of exhaust emissions from heavy-duty diesel engines.

**PASSIVE SOLAR ENERGY:** Use of the sun to help meet a building's energy needs by means of architectural design (such as arrangement of windows) and materials (such as floors that store heat, or other thermal mass).

**PASSIVE SOLAR SYSTEM:** A solar heating or cooling system that uses no external mechanical power to move the collected solar heat.

**PBR: PERFORMANCE-BASED REGULATION:** Any rate-setting mechanism which attempts to link rewards (generally profits) to desired results or targets. PBR sets rates, or components of rates, for a period of time based on external indices rather than a utility's cost-of-service. Other definitions include light-handed regulation which is less costly and less subject to debate and litigation. A form of rate regulation which provides utilities with better incentives to reduce their costs than does cost-of-service regulation.

**PEAKER:** A nickname for a power generating station that is normally used to produce extra electricity during peak load times.

**PEAK LOAD OR PEAK DEMAND:** The electric load that corresponds to a maximum level of electric demand in a specified time period.

**PEAK LOAD:** The highest electrical demand within a particular period of time. Daily electric peaks on weekdays occur in late afternoon and early evening. Annual peaks occur on hot summer days.

**PEAK LOAD POWER PLANT:** A power generating station that is normally used to produce extra electricity during peak load times.

**PEAKING UNIT:** A power generator used by a utility to produce extra electricity during peak load times.

**PEAT:** A heterogeneous mixture of partly decomposed organic matter that has accumulated in a water saturated environment over a very long period of time. Peat geologically is considered a very young form of coal and has a heating value of 6,600 Btu/pound in situ.

**PETROCHEMICALS:** Chemicals made from oil.

**PETRODOLLARS:** Money paid to other countries for oil imported to the United States.

**PADD (PETROLEUM ADMINISTRATION FOR DEFENSE DISTRICTS):** The United States is divided by the U.S. Department of Energy into five PADD regions for planning purposes. The states within PADD V are Alaska, Arizona, California, Hawaii, Nevada, Oregon and Washington, which are linked closely by their oil supply network. Since very little petroleum product is export outside the district, PADD V is essentially a self-contained oil supply system with Alaska and California the main producers and California refining the majority of the crude oil consumed in the PADD.

**PERM:** The measurement of water vapor through different materials measured in perm-inch (mass of water vapor moving through a unit area in unit time).

**PETROLEUM:** Oil as found in its natural state under the ground.

**PHOTOCELL:** A device that produces an electric reaction to visible radiant energy (light).

**PHOTOSYNTHESIS:** A process by which green plants change carbon dioxide into oxygen and organic materials. The energy for this process comes from sunlight.

**PHOTOVOLTAIC CELL:** A semiconductor that converts light directly into electricity.

**PIPELINE:** A line of pipe with pumping machinery and apparatus (including valves, compressor units, metering stations, regulator stations, etc.) for conveying a liquid or gas.

**POOLCO:** Poolco refers to a specialized, centrally dispatched spot market power pool that functions as a short-term market. It establishes the short-term market clearing price and provides a system of long-term transmission compensation contracts. It is regulated to provide open access, comparable service and cost recovery. A poolco would make ancillary generation services, including load following, spinning reserve, backup power, and reactive power, available to all market participants on comparable terms. In addition, the Poolco provides settlement mechanisms when differences in contracted volumes exist between buyers and sellers of energy and capacity.

**PORTFOLIO MANAGEMENT:** The functions of resource planning and procurement under a traditional utility structure. Portfolio management can also be defined as the aggregation and management of a diverse portfolio of supply (and demand-reduction) resources which will act as a hedge against various risks that may affect specific resources (i.e., fuel price fluctuations and certainty of supply, common mode failures, operational reliability, changes in environmental regulations, and the risk of health, safety, and environmental damages that may occur as a result of operating some supply resources). Under a more market-driven power sector with a "power-pool" or POOLCO wholesale market structure, a portfolio manager would: aggregate and manage a diverse portfolio of spot-market purchases, contracts-for-differences, futures contracts and other market-hedging-type contracts and mechanisms.

**PCBs (POLYCHLORONATED BIPHENYLS):** A group of organic compounds used in the manufacture of plastics and formerly used as a coolant in electric transformers. In the environment, PCBs are highly toxic to aquatic life. They persist in the environment for long periods of time and are biologically accumulative.

**POWER:** Electricity for use as energy.

**POWER AUTHORITIES:** Quasi-governmental agencies that perform all or some of the functions of a public utility.

**POWER PLANT (Note: Two separate words, not one word.):** A central station generating facility that produces energy.

**POWER PLANT ENTRAINMENT:** A situation where small organisms carried along with the water drawn into the power plant are subjected to thermal, physical, or chemical stresses.

**POWER POOL:** An entity established to coordinate short-term operations to maintain system stability and achieve least-cost dispatch. The dispatch provides backup supplies, short-term excess sales, reactive power support, and spinning reserve. Historically, some of these services were provided on an unpriced basis as part of the members' utility franchise obligations. Coordinating short-term operations includes the aggregation and firming of power from various generators, arranging exchanges between generators, and establishing (or enforcing) the rules of conduct for wholesale transactions. The pool may own, manage and/or operate the transmission lines ("wires") or be an independent entity that manages the transactions between entities. Often, the power pool is not meant to provide transmission access and pricing, or settlement mechanisms if differences between contracted volumes among buyers and sellers exist.

**POWER POOL:** Two or more interconnected utilities that plan and operate to supply electricity in the most reliable, economical way to meet their combined load.

**PPM (PARTS PER MILLION):** The unit commonly used to represent the degree of pollutant concentration where the concentrations are small.

**PREFERRED DAY-AHEAD SCHEDULE:** A Scheduling Coordinator's preferred schedule for the ISO day-ahead scheduling process.

**PREFERRED HOUR-AHEAD SCHEDULE:-** A Scheduling Coordinator's preferred schedule for the ISO hour-ahead scheduling process.

**PREFERRED SCHEDULE:** The initial schedule produced by a Scheduling Coordinator that represents its preferred mix of generation to meet demand. The schedule includes the quantity of output (generators) and consumption (loads), details of any adjustment bids, and the location of each generator and load. The schedule also specifies the quantities and location of trades between the Scheduling Coordinator and all other Scheduling Coordinators, and is balanced with respect to generation, transmission losses, load, and trades.

**PRESSURIZED WATER REACTOR (PWR):** A nuclear power unit cooled by water that is pressurized to keep it from boiling when it reaches high temperatures.

**PRIMARY FUEL:** Fuel consumed in the original production of energy, before conversion takes place.

**PROGRAMMABLE CONTROLLER:** A device that controls the operation of electrical equipment (such as air conditioning units and lights) according to a preset time schedule.

**PROPANE:** A gas that is both present in natural gas and refined from crude oil. It is used for heating, lighting and industrial applications. See also LPG.

**PROVIDER OF LAST RESORT:** A legal obligation (traditionally given to utilities) to provide service to a customer where competitors have decided they do not want that customer's business.

**PUBLIC INTEREST GOALS:** Public interest goals of electric utility regulation include: 1) inter- and intra-class and intergenerational equity; 2) the equal treatment of equals (horizontal equity); 3) balancing long- and short-term goals that have the potential to affect intergenerational balance; 4) protecting against the abuse of monopoly power; and 5) general protection of the health and welfare of the citizens of the state, nation, and world. Environmental and other types of social costs are subsumed under the equity and health and welfare responsibilities.

**PUHCA:** The Public Utility Holding Company Act of 1935. This act prohibits acquisition of any wholesale or retail electric business through a holding company unless that business forms part of an integrated public utility system when combined with the utility's other electric business. The legislation also restricts ownership of an electric business by non-utility corporations.

**PUMPED HYDROELECTRIC STORAGE:** Commercial method used for large-scale storage of power. During off-peak times, excess power is used to pump water to a reservoir. During peak times, the reservoir releases water to operate hydroelectric generators.

**PURPA:** The Public Utility Regulatory Policy Act of 1978. Among other things, this federal legislation requires utilities to buy electric power from private "qualifying facilities," at an avoided cost rate. This avoided cost rate is equivalent to what it would have otherwise cost the utility to generate or purchase that power themselves. Utilities must further provide customers who choose to self-generate a reasonably priced back-up supply of electricity.

**PURPA:** The Public Utilities Regulatory Policies Act of 1978 (PURPA) is implemented by the Federal Energy Regulatory Commission and the California Public Utilities Commission (CPUC). Under PURPA each electric utility is required to offer to purchase available electric energy from cogeneration and small power production facilities.

## Q

**QUAD:** One quadrillion ( $10^{15}$  or 1,000,000,000,000,000) British thermal units (Btus). An amount of energy equal to 170 million barrels of oil. Total U.S. consumption of all forms of energy is (in the 1990s) about 83 quads in an average year.

**QUALIFYING FACILITY:** A cogenerator or small power producer which under federal law, has the right to sell its excess power output to the public utility.

**QUALIFYING FACILITY:** QFs are non-utility power producers that often generate electricity using renewable and alternative resources, such as hydro, wind, solar, geothermal or biomass (solid waste). QFs must meet certain operating, efficiency, and fuel-use standards set forth by the Federal Energy Regulatory Commission (FERC). If they meet these FERC standards, utilities must buy power from them. QFs usually have long-term contracts with utilities for the purchase of this power, which is among the utility's highest-priced resources.

**QUALIFYING FACILITY (QF):** Under PURPA, QFs were allowed to sell their electric output to the local utility at avoided cost rates. To become a QF, the independent power supplier had to produce electricity with a specified fuel type (cogeneration or renewables), and meet certain ownership, size, and efficiency criteria established by the Federal Energy Regulatory Commission.

## R

**R-VALUE:** A unit of thermal resistance used for comparing insulating values of different material. It is basically a measure of the effectiveness of insulation in stopping heat flow. The higher the R-value number, a material, the greater its insulating properties and the slower the heat flow through it. The specific value needed to insulate a home depends on climate, type of heating system and other factors.

**RAD:** A unit of measure of absorbed radiation. Acronym for radiation absorbed dose. One rad equals 100 ergs of radiation energy per gram of absorbing material.

**RADIANT BARRIER:** A device designed to reduce or stop the flow of radiant energy.

**RADIANT ENERGY:** Energy transferred by the exchange of electromagnetic waves from a hot or warm object to one that is cold or cooler. Direct contact with the object is not necessary for the heat transfer to occur.

**RADIATION:** The flow of energy across open space via electromagnetic waves such as light. Passage of heat from one object to another without warming the air space in between.

**RANKINE CYCLE:** The steam-Rankine cycle employing steam turbines has been the mainstay of utility thermal electric power generation for many years. The cycle, as developed over the years uses superheat, reheat and regeneration. Modern steam Rankine systems operate at a cycle top temperature of about 1,073 degrees Celsius with efficiencies of about 40 percent.

**RATE-BASING:** refers to practice by utilities of allotting funds invested in utility Research Development Demonstration and Commercialization and other programs from rate-payers, as opposed to allocating these costs to shareholders.

**RAW FUEL:** Coal, natural gas, wood or other fuel that is used in the form in which it is found in nature, without chemical processing.

**REAL-TIME MARKET:** The competitive generation market controlled and coordinated by the ISO for arranging real-time imbalance energy.

**REAL-TIME PRICING:** The instantaneous pricing of electricity based on the cost of the electricity available for use at the time the electricity is demanded by the customer.

**REACTOR:** A device in which a controlled nuclear chain reaction can be maintained, producing heat energy.

**RECOOL:** The sensible cooling of air that has been previously heated by HVAC systems serving the same building.

**RECLAIMED OIL:** Lubricating oil that is processed to be used over again.

**RECOVERED ENERGY:** Reused heat or energy that otherwise would be lost. For example, a combined cycle power plant recaptures some of its own waste heat and reuses it to make extra electric power.

**RECOVERY EFFICIENCY:** (Thermal efficiency) In a water heater, a measure of the percentage of heat from the combustion of gas which is transferred to the water as measured under specified test conditions.

**REFINER:** means any person who owns, operates, or controls the operations of one or more refineries.

**REFINERY:** A facility that separates crude oil into varied oil products. The refinery uses progressive temperature changes to separate by vaporizing the chemical components of crude oil that have different boiling points. These are distilled into usable products such as gasoline, fuel oil, lubricants and kerosene.

**REFORMULATED GASOLINE (RFG):** A cleaner-burning gasoline that has had its compositions and/or characteristics altered to reduce vehicular emissions of pollutants.

**REFRIGERANT:** A fluid such as freon that is used in cooling devices to absorb heat from surrounding air or liquids as it evaporates.

**RDF (REFUSE DERIVED FUEL):** The fuel component of municipal solid waste (MSW), which is the by-product of shredding MSW to a uniform size, screening out oversized materials and isolating ferrous material in magnetic separation. The resulting RDF can be burned as a fuel source.

**REGULATION:** The service provided by generating units equipped and operating with automatic generation controls that enables the units to respond to the ISO's direct digital control signals to match real-time demand and resources, consistent with established operating criteria.

**REGULATORY MUST-RUN GENERATION:** Utilities will be allowed to generate electricity when hydro resources are spilled for fish releases, irrigation, and agricultural purposes, and to generate power that is required by federal or state laws, regulations, or jurisdictional authorities. Such requirements include hydrological flow requirements, irrigation and water supply, solid-waste generation, or other generation contracts in effect on December 20, 1995.

**REGULATORY MUST-TAKE GENERATION:** Utilities will be allowed to generate electricity from those resources identified by the CPUC: that are not subject to competition. These resources will be scheduled with the ISO on a must-take basis. Regulatory Must-Take Generation includes QF generating units under federal law, nuclear units and pre-existing power-purchase contracts that have minimum-take provisions.

**REID VAPOR PRESSURE (RVP):** a standard measurement of a liquid's vapor pressure in pounds per square inch at 100 degrees Fahrenheit. It is an indication of the propensity of the liquid to evaporate.

**RELIABILITY:** Electric system reliability has two components: adequacy and security. Adequacy is the ability of the electric system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and unscheduled outages of system facilities. Security is the ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system facilities.

**RELIABILITY MUST-RUN GENERATION:** The ISO will allow utilities to generate power that is needed to ensure system reliability. This includes generation:

- Required to meet the reliability criteria for interconnected systems operation.
- Needed to meet load (demand) in constrained areas.
- Needed to provide voltage or security support of the ISO or of a local area.

**RELIABILITY MUST RUN UNIT:** In return for payment, the ISO may call upon the owner of a generating unit to run the unit when required for grid reliability.

**REHEAT:** The heating of air that has been previously cooled either by mechanical refrigeration or economizer cooling systems.

**RENEWABLE ENERGY:** Resources that constantly renew themselves or that are regarded as practically inexhaustible. These include solar, wind, geothermal, hydro and wood. Although particular geothermal formations can be depleted, the natural heat in the earth is a virtually inexhaustible reserve of potential energy. Renewable resources also include some experimental or less-developed sources such as tidal power, sea currents and ocean thermal gradients.

**RENEWABLE RESOURCES:** Renewable energy resources are naturally replenishable, but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Some (such as geothermal and biomass) may be stock-limited in that stocks are depleted by use, but on a time scale of decades, or perhaps centuries, they can probably be replenished. Renewable energy resources include: biomass, hydro, geothermal, solar and wind. In the future they could also include the use of ocean thermal, wave, and tidal action technologies. Utility renewable resource applications include bulk electricity generation, on-site electricity generation, distributed electricity generation, non-grid-connected generation, and demand-reduction (energy efficiency) technologies.

**REREGULATION:** The design and implementation of regulatory practices to be applied to the remaining regulated entities after restructuring of the vertically-integrated electric utility. The remaining regulated entities would be those that continue to exhibit characteristics of a natural monopoly, where imperfections in the market prevent the realization of more competitive results, and where, in light of other policy considerations, competitive results are unsatisfactory in one or more respects. Re-regulation could employ the same or different regulatory practices as those used before restructuring.

**RESEARCH AND DEVELOPMENT (R&D):** Research is the discovery of fundamental new knowledge. Development is the application of new knowledge to develop a potential new service or product. Basic power sector R&D is most commonly funded and conducted through the Department of Energy (DOE), its associated government laboratories, university laboratories, the Electric Power Research Institute (EPRI), and private sector companies.

**RESERVE:** The extra generating capability that an electric utility needs, above and beyond the highest demand level it is required to supply to meet its users needs.

**RESERVE GENERATING CAPACITY:** The amount of power that can be produced at a given point in time by generating units that are kept available in case of special need. This capacity may be used when unusually high power demand occurs, or when other generating units are off-line for maintenance, repair or refueling.

**RESERVE MARGIN:** The differences between the dependable capacity of a utility's system and the anticipated peak load for a specified period.

**RESIDENTIAL BUILDING:** means any hotel, motel, apartment house, lodging house, single and dwelling, or other residential building which is heated or mechanically cooled.

**RESIDUE:** any organic matter left as residue, such as agricultural and forestry residue, including, but not limited to, conifer thinnings, dead and dying trees, commercial hardwood, noncommercial hardwoods and softwoods, chaparral, burn, mill, agricultural field, and industrial residues, and manure.

**RESISTANCE (ELECTRICAL):** The ability of all conductors of electricity to resist the flow of current, turning some of it into heat. Resistance depends on the cross section of the conductor (the smaller the cross section, the greater the resistance) and its temperature (the hotter the cross section, the greater its resistance).

**RESISTANCE (THERMAL):**The reciprocal of thermal conductance. See R-VALUE.

**RESOURCE EFFICIENCY:** The use of smaller amounts of physical resources to produce the same product or service. Resource efficiency involves a concern for the use of all physical resource sand materials used in the production and use cycle, not just the energy input.

**RESTRUCTURING:** The reconfiguration of the vertically-integrated electric utility. Restructuring usually refers to separation of the various utility functions into individually-operated and:owned entities.

**RETAIL COMPETITION:** A system under which more than one electric provider can sell to retail customers, and retail customers are allowed to buy from more than one provider. (See also direct access)

**RETAIL MARKET:** A market in which electricity and other energy services are sold directly to the end-use customer.

**RETORTING:** The heating of oil shale to get the oil out from it.

**RETROFIT:** broad term that applies to any change after the original purchase, such as adding equipment not a part of the original purchase. As applied to alternative fuel vehicles, it refers to conversion devices or kits for conventional fuel vehicles. (Same as after-market)

**RTG:** A Regional Transmission Group. A voluntary organization of transmission owners,users, and other entities interested in coordinating transmission planning, expansion, operation,and use on a regional and inter-regional basis. Such groups are subject to FERC approval.

**RULES OF CONDUCT:** Rules set in advance to delineate acceptable activities by participants,particularly participants with significant market power.

## S

**SAE VISCOSITY NUMBER:** A system established by the Society of Automotive Engineers for classifying crankcase oils and automotive transmission and differential lubricants according to their viscosities.

**SCHEDULING COORDINATOR:** Scheduling coordinators (SCs) submit balanced schedules and provide settlement-ready meter data to the ISO. Scheduling coordinators also:

- Settle with generators and retailers, the PX and the ISO
- Maintain a year-round, 24-hour scheduling center
- Provide non-emergency operating instructions to generators and retailers
- Transfer schedules in and out of the PX. (The PX is a marketplace. As bids are accepted, power is being bought and sold. Once a bid is accepted, the power sold is "transferred out" of the PX, since it is no longer available. Power that is available for sale is "transferred in" to the PX. These transfers may also take place directly between the buyer and seller, without involvement of the PX.)

The PX is considered a scheduling coordinator.

**SE (Seasonal Efficiency):** a measure of the percentage of heat from the combustion of gas and from associated electrical equipment which is transferred to the space being heated during a year under specified conditions.

**SECURITIZE:** The aggregation of contracts for the purchase of the power output from various energy projects into one pool which then offers shares for sale in the investment market. This strategy diversifies project risks from what they would be if each project were financed individually, thereby reducing the cost of financing. Fannie Mae performs such a function in the home mortgage market.

**SEER (Seasonal Energy Efficiency Ratio):** The total cooling output of a central air conditioning unit in Btus during its normal usage period for cooling divided by the total electrical energy input in watt-hours during the same period, as determined using specified federal test procedures.

**SELF-GENERATION:** A generation facility dedicated to serving a particular retail customer, usually located on the customer's premises. The facility may either be owned directly by the retail customer or owned by a third party with a contractual arrangement to provide electricity to meet some or all of the customer's load.

**SELF-SERVICE WHEELING:-** Primarily an accounting policy comparable to net-billing or running the meter backwards. An entity owns generation that produces excess electricity at one site, that is used at another site(s) owned by the same entity. It is given billing credit for the excess electricity (displacing retail electricity costs minus wheeling charges) on the bills for its other sites.

**SENSIBLE HEAT:** Heat that results in a temperature change.

**SERVICE AREA:** any contiguous geographic area serviced by the same electric utility.

**SET POINT:** Scheduled operating level for each generating unit or other resource scheduled to run in the Hour-ahead Schedule.

**SETTLEMENT:** The process of financial settlement for products and services purchased and sold. Each settlement involves a price and quantity. Both the ISO and PX may perform settlement functions.

**SHADING:** 1) The protection from heat gains due to direct solar radiation; 2) Shading is provided by (a) permanently attached exterior devices, glazing materials, adherent materials applied to the

glazing, or an adjacent building for nonresidential buildings, hotels, motels and highrise apartments, and by (b) devices affixed to the structure for residential buildings.

**SHADE SCREEN:** A screen affixed to the exterior of a window or other glazed opening, designed to reduce the solar radiation reaching the glazing.

**SHADING COEFFICIENT:** the ratio of solar heat gain through a specific glazing system to the total solar heat gain through a single layer of clear, double-strength glass.

**SIDE FINS:** Vertical shading elements mounted on either side of a glazed opening that blocks direct solar radiation from the lower, lateral portions of the sun's path.

**SITE:** any location on which a facility is constructed or is proposed to be constructed.

**SITE ENERGY:** The energy consumed at a building location or other end-use site.

**SKYLIGHT:** Any opening in the roof surface which is glazed with a transparent or translucent material.

**SKY TEMPERATURE:** The equivalent temperature of the clouds, water vapor, and other atmospheric elements that make up the sky to which a surface can radiate heat.

**SMOG:** Originally "smog" meant a mixture of smoke and fog. The definition has expanded to mean air that has restricted visibility due to pollution. Pollution formed in the presence of sunlight is called photochemical smog. According to the U.S. EPA, smog is "a mixture of pollutants, principally ground-level ozone, produced by chemical reactions in the air involving smog-forming chemicals. A major portion of smog-formers come from burning of petroleum-based fuels such as gasoline. Other smog-formers, volatile organic compounds, are found in products such as paints and solvents. Smog can harm health, damage the environment and cause poor visibility. Major smog occurrences are often linked to heavy motor vehicle traffic, sunshine, high temperatures and calm winds or temperature inversion (weather condition in which warm air is trapped close to the ground instead of rising). Smog is often worse away from the source of the smog-forming chemicals, since the chemical reactions that result in smog occur in the sky while the reacting chemicals are being blown away from their sources by winds."

**SOLAR CELL:** A photovoltaic cell that can convert light directly into electricity. A typical solar cell uses semiconductors made from silicon.

**SOLAR COLLECTOR:** A component of an active or passive solar system that absorbs solar radiation to heat a transfer medium which, in turn, supplies heat energy to the space or water heating system.

**SOLAR ENERGY:** Heat and light radiated from the sun.

**SOLAR ENERGY RESEARCH INSTITUTE (SERI):**- Established in 1974 and funded by the federal government, the institute's general purpose is to support U.S. Department of Energy's solar energy program and foster the widespread use of all aspects of solar technology, including photovoltaics, solar heating and cooling, solar thermal power generation, wind ocean thermal conversion and biomass conversion.

**SOLAR HEAT GAIN:** Heat added to a space due to transmitted and absorbed solar energy.

**SOLAR HEAT GAIN FACTOR:** An estimate used in calculating cooling loads of the heat gain due to transmitted and absorbed solar energy through 1/8"-thick, clear glass at a specific latitude, time and orientation.

**SOLAR HEATING AND HOT WATER SYSTEMS:** Solar heating or hot water systems provide two basic functions: (a) capturing the sun's radiant energy, converting it into heat energy, and storing this heat in insulated storage tank(s); and (b) delivering the stored energy as needed to either the domestic hot water or heating system. These components are called the collection and delivery subsystems.

**SOLAR IRRADIATION:** The amount of radiation, both direct and diffuse, that can be received at any given location.

**SOLAR POWER:** Electricity generated from solar radiation.

**SOLAR RADIATION:** Electromagnetic radiation emitted by the sun.

**SOLAR SATELLITE POWER:** A proposed process of using satellites in geosynchronous orbit above the earth to capture solar energy with photovoltaic cells, convert it to microwave energy, beam the microwaves to earth where they would be received by large antennas, and changed from microwave into usable electricity.

**SOLAR THERMAL POWER PLANT:** means a thermal powerplant in which 75 percent or more of the total energy output is from solar energy and the use of backup fuels, such as oil, natural gas, and coal, does not, in the aggregate, exceed 25 percent of the total energy input of the facility during any calendar year period.

**SOLAR THERMAL:** The process of concentrating sunlight on a relatively small area to create the high temperatures needs to vaporize water or other fluids to drive a turbine for generation of electric power.

**SOURCE ENERGY:** All the energy used in delivering energy to a site, including power generation and transmission and distribution losses, to perform a specific function, such as space conditioning, lighting, or water heating. Approximately three watts (or 10.239 Btus) of energy is consumed to deliver one watt of usable electricity.

**SPECIAL CONTRACTS:** Any contract that provides a utility service under terms and conditions other than those listed in the utility's tariffs. For example, an electric utility may enter into an agreement with a large customer to provide electricity at a rate below the tariffed rate in order to prevent the customer from taking advantage of some other option that would result in the loss of the customer's load. This generally allows that customer to compete more effectively in their product market.

**SPECIFIC HEAT:** In English units, the quantity of heat, in Btu, needed to raise the temperature of one pound of material one degree Fahrenheit.

**SPLIT-THE-SAVINGS (Electric Utility):** The basis for settling economy-energy transactions between utilities. The added costs of the supplier are subtracted from the avoided costs of the buyer, and the difference is evenly divided.

**STANDBY LOSS:** A measure of the losses from a water heater tank. When expressed as a percentage, standby loss is the ratio of heat loss per hour to the heat content of the stored water above room temperature. When expressed in watts, standby loss is the heat lost per hour, per square foot of tank surface area.

**STEADY STATE EFFICIENCY:** A performance rating for space heaters; a measure of the percentage of heat from combustion of gas which is transferred to the space being heated under specified steady state conditions.

**STEAM ELECTRIC PLANT:** A power station in which steam is used to turn the turbines that generate electricity. The heat used to make the steam may come from burning fossil fuel, using a controlled nuclear reaction, concentrating the sun's energy, tapping the earth's natural heat or capturing industrial waste heat.

**STIRLING ENGINE:** An external combustion engine that converts heat into useable mechanical energy (shaftwork) by the heating (expanding) and cooling (contracting) of a captive gas such as helium or hydrogen.

**STORAGE TYPE WATER HEATER:** A water heater that heats and stores water at a thermostatically controlled temperature for delivery on demand.

**STRANDED BENEFITS:** Public interest programs and goals which could be compromised or abandoned by a restructured electric industry. These potential "stranded benefits" might include: environmental protection, fuel diversity, energy efficiency, low-income ratepayer assistance, and other types of socially beneficial programs.

**STRATEGIC PETROLEUM RESERVE:** The strategic petroleum reserve consists of government owned and controlled crude oil stockpiles stored at various locations in the Gulf Coast region of the country. These reserves can be drawn down in response to severe oil supply disruptions. The target is to have a reserve of 750 million barrels of oil. Use of the reserve must be authorized by the President of the United States.

**SUBSTATION:** A facility that steps up or steps down the voltage in utility power lines. Voltage is stepped up where power is sent through long-distance transmission lines. It is stepped down where the power is to enter local distribution lines.

**SUNK COST:** In economics, a sunk cost is a cost that has already been incurred, and therefore cannot be avoided by any strategy going forward.

**SUPERCONDUCTOR:** A synthetic material that has very low or no electrical resistance. Such experimental materials are being investigated in laboratories to see if they can be created at near room temperatures. If such a superconductor can be found, electrical transmission lines with no little or no resistance may be built, thus conserving energy usually lost in transmission. Superconductors could also have uses in computer chips, solid state devices and electrical motors or generators.

**SUPERTANKER:** A very large ship designed to transport more than 500,000 deadweight tonnage of oil.

**SUPPLY BID:** A bid into the PX indicating a price at which a seller is prepared to sell energy or ancillary services.

**SUPPLY-SIDE:** Activities conducted on the utility's side of the customer meter. Activities designed to supply electric power to customers, rather than meeting load through energy efficiency measures or on-site generation on the customer side of the meter.

**SURPLUS:** (Electric utility) Excess firm energy available from a utility or region for which there is no market at the established rates.

**SUSTAINED ORDERLY DEVELOPMENT:** A condition in which a growing and stable market is identified by orders that are placed on a reliable schedule. The orders increase in magnitude as previous deliveries and engineering and field experience lead to further reductions in costs. The reliability of these orders can be projected many years into the future, on the basis of long-term contracts, to minimize market risks and investor exposure. (See also "Commercialization.")

**SYNCHROPHASORS:** Precise grid measurements available from monitors called phasor measurement units (PMUs). PMU measurements are taken at high speed (typically 30 observations per second; compared to one every 4 seconds using conventional technology.) Each measurement is time-stamped according to a common time reference. Time stamping allows synchrophasors from different utilities to be time-aligned (or "synchronized") and combined together, providing a precise and comprehensive view of the entire interconnection. Synchrophasors enable a better indication of grid stress and can be used to trigger corrective actions to maintain reliability. (Source: North American Synchro Phasor Initiative)

**SYNCRUDE:** Synthetic crude oil made from coal or from oil shale.

**SYNFUEL:** Synthetic gas or synthetic oil. Fuel that is artificially made as contrasted to that which is found in nature. Synthetic gas made from coal is considered to be more economical and easier to produce than synthetic oil. When natural gas supplies in the earth are being depleted, it is expected that synthetic gas will be able to be used widely as a substitute fuel.

**SYNGAS:** Synthetic gas made from coal.

**SYSTEM:** A combination of equipment and/or controls, accessories, interconnecting means and terminal elements by which energy is transformed to perform a specific function, such as climate control, service water heating, or lighting.

**SYSTEM INTEGRATION (OF NEW TECHNOLOGIES):** The successful integration of a new technology into the electric utility system by analyzing the technology's system effects and resolving any negative impacts that might result from its broader use.

## T

**TAKING:** Reducing the value of someone's property through government action without just compensation.

**TAKE-OUT POINT:** The metering points at which a metered entity takes delivery of energy.

**TAR SANDS:** Sedimentary rocks containing heavy oil that cannot be extracted by conventional petroleum recovery methods.

**TAX CREDITS:** Credits established by the federal and state government to assist the development of the alternative energy industry.

**TAME (TERTIARY AMYL METHYL ETHER):** another oxygenate that can be used in reformulated gasoline. It is an ether based on reactive C5 olefins and methanol.

**TARIFF:** A document, approved by the responsible regulatory agency, listing the terms and conditions, including a schedule of prices, under which utility services will be provided.

**TASK LIGHTING (task-oriented lighting):** Lighting designed specifically to illuminate one or more task locations, and generally confined to those locations.

**TEMPERATURE:** Degree of hotness or coldness measured on one of several arbitrary scales based on some observable phenomenon (such as the expansion).

**THERM:** One hundred thousand (100,000) British thermal units (1 therm = 100,000 Btu).

**THERMAL BREAK (thermal barrier):** An element of low heat conductivity placed in such a way as to reduce or prevent the flow of heat. Some metal framed windows are designed with thermal breaks to improve their overall thermal performance.

**THERMAL (ENERGY) STORAGE:** A technology that lowers the amount of electricity needed for comfort conditioning during utility peak load periods. A buildings thermal energy storage system might, for example, use off-peak power to make ice or to chill water at night, later using the ice or chilled water in a power saving process for cooling during the day. See THERMAL MASS.

**THERMAL MASS:** A material used to store heat, thereby slowing the temperature variation within a space. Typical thermal mass materials include concrete, brick, masonry, tile and mortar, water, and rock or other materials with high heat capacity.

**THERMAL POWER PLANT:** any stationary or floating electrical generating facility using any source of thermal energy, with a generating capacity of 50 megawatts or more, and any facilities appurtenant thereto. Exploratory, development, and production wells, resource transmission lines, and other related facilities used in connection with a geothermal exploratory project or a geothermal field development project are not appurtenant facilities for the purposes of this division. Thermal powerplant does not include any wind, hydroelectric, or solar photovoltaic electrical generating facility.

**THERMALLY ENHANCED OIL RECOVERY (TEOR):** Injection of steam to increase the amount of petroleum that may be recovered from a well.

**THERMODYNAMICS:** A study of the transformation of energy into other manifested forms and of their practical applications. The three laws of thermodynamics are:

- Law of Conservation of Energy: energy may be transformed in an isolated system, but its total is constant
- Heat cannot be changed directly into work at constant temperature by a cyclic process
- Heat capacity and entropy of every crystalline solid becomes zero at absolute zero (0 degrees Kelvin)

**THERMOSTAT:** An automatic control device designed to be responsive to temperature and typically used to maintain set temperatures by cycling the HVAC system.

**THERMOSTAT, SETBACK:** A device, containing a clock mechanism, which can automatically change the inside temperature maintained by the HVAC system according to a preset schedule. The heating or cooling requirements can be reduced when a building is unoccupied or when occupants are asleep.

**TLEV (TRANSITIONAL LOW EMISSION VEHICLE):** a vehicle certified by the California Air Resources Board to have emissions from zero to 50,000 miles no higher than 0.125 grams/mile (g/mi) of non-methane organic gases, 3.4 g/mi of carbon monoxide, and 0.4 g/mi of nitrogen oxides. Emissions from 50,000 to 100,000 miles may be slightly higher.

**TON OF COOLING:** A useful cooling effect equal to 12,000 Btu hours.

**TRANSMITTANCE:** The time rate of heat flow per unit area under steady conditions from the air (or other fluid) on the warm side of a barrier to the air (or fluid) on the cool side, per unit temperature difference between the two sides.

**TIDAL POWER:** Energy obtained by using the motion of the tides to run water turbines that drive electric generators.

**TIME-OF-USE (TOU) RATES:** The pricing of electricity based on the estimated cost of electricity during a particular time block. Time-of-use rates are usually divided into three or four time blocks per twenty-four hour period (on-peak, mid-peak, off-peak and sometimes super off-peak) and by seasons of the year (summer and winter). Real-time pricing differs from TOU rates in that it is based on actual (as opposed to forecasted) prices which may fluctuate many times a day and are weather-sensitive, rather than varying with a fixed schedule.

**TIME-OF-USE METER:** A measuring device that records the times during which a customer uses various amounts of electricity. This type of meter is used for customers who pay time-of-use rates.

**TIME-OF-USE RATES:** Electricity prices that vary depending on the time periods in which the energy is consumed. In a time-of-use rate structure, higher prices are charged during utility peak-load times. Such rates can provide an incentive for consumers to curb power use during peak times.

**TRADING DAY:** The 24-hour period beginning at midnight and ending at the following midnight.

**TRANSFER (Electric utility):** To move electric energy from one utility system to another over transmission lines.

**TRANSFORMER:** A device, which through electromagnetic induction but without the use of moving parts, transforms alternating or intermittent electric energy in one circuit into energy of similar type in another circuit, commonly with altered values of voltage and current.

**TRANSMISSION:** Transporting bulk power over long distances.

**TRANSMISSION-DEPENDENT UTILITY:** A utility that relies on its neighboring utilities to transmit to it the power it buys from its suppliers. A utility without its own generation sources, dependent on another utility's transmission system to get its purchased power supplies.

**TRANSMISSION OWNER:** An entity that owns transmission facilities or has firm contractual right to use transmission facilities.

**TRANSMITTING UTILITY (TRANSCO):** This is a regulated entity which owns, and may construct and maintain, wires used to transmit wholesale power. It may or may not handle the power dispatch and coordination functions. It is regulated to provide non-discriminatory connections, comparable service and cost recovery. According to EPAct, any electric utility, qualifying cogeneration facility, qualifying small power production facility, or Federal power marketing agency which owns or operates electric power transmission facilities which are used for the sale of electric energy at wholesale. (See also "Generation Dispatch & Control" and "PowerPool.")

**TURBINE GENERATOR:** A device that uses steam, heated gases, water flow or wind to cause spinning motion that activates electromagnetic forces and generates electricity.

## U

**UA:** A measure of the amount of heat that would be transferred through a given surface or enclosure (such as a building envelope) with a one degree Fahrenheit temperature difference between the two sides. The UA is calculated by multiplying the U-Value by the area of the surface (or surfaces).

**UDC:** Utility distribution company. An entity that owns a distribution system for the delivery of energy to and from the ISO-controlled grid, and that provides regulated, retail service to eligible end-use customers who are not yet eligible for direct access, or who choose not to arrange services through another retailer.

**UNCONDITIONED SPACE:** A space that is neither directly nor indirectly conditioned space, which can be isolated from conditioned space by partitions and/or closeable doors.

**ULEV (ULTRA-LOW EMISSION VEHICLE):** a vehicle certified by the California Air Resources Board to have emissions from zero to 50,000 miles no higher than 0.040 grams/mile (g/mi) of non-methane organic gases, 1.7 g/mi of carbon monoxide, and 0.2 g/mi of nitrogen oxides. Emissions from 50,000 to 100,000 miles may be slightly higher

**ULTRAHIGH VOLTAGE TRANSMISSION:** Transporting electricity over bulk-power lines at voltages greater than 800 kilovolts.

**UNBUNDLING:** Disaggregating electric utility service into its basic components and offering each component separately for sale with separate rates for each component. For example, generation, transmission and distribution could be unbundled and offered as discrete services.

**UNIVERSAL SERVICE:** Electric service sufficient for basic needs (an evolving bundle of basic services) available to virtually all members of the population regardless of income.

**UNLEADED GASOLINE:** Gasoline that has had tetraethyl lead removed in conformance with federal and state regulations.

**UPGRADE (Electric utility):** Replacement or addition of electrical equipment resulting in increased generation or transmission capability.

**UPRATE (Electric utility):** An increase in the rating or stated measure of generation or transfer capability.

**UPSTREAM:** A term used in the petroleum industry referring to the exploration and production side of the business. This includes pipelines but production before reaching the refinery.

**URANIUM:** A radioactive element, found in ores, of which atoms can be split to create energy.

**URANIUM ENRICHMENT:** The process of increasing the percentage of pure uranium above the levels found in naturally occurring uranium ore, so that it may be used as fuel.

**UTILITY:** A regulated entity which exhibits the characteristics of a natural monopoly. For the purposes of electric industry restructuring, "utility" refers to the regulated, vertically-integrated electric company. "Transmission utility" refers to the regulated owner/operator of the transmission system only. "Distribution utility" refers to the regulated owner/operator of the distribution system which serves retail customers.

**U-value or U-factor:** A measure of how well heat is transferred by the entire window: the frame, sash and glass: either into or out of the building. U-value is the opposite of R-value. The lower the U-factor number, the better the window will keep heat inside a home on a cold day.

## V

**VAV System (Variable Air Volume System):** A mechanical HVAC system capable of serving multiple zones which controls the temperature maintained in a zone by controlling the amount of heated or cooled air supplied to the zone.

**VAPOR BARRIER:** A material with a permeance of one perm or less which provides resistance to the transmission of water vapor.

**VENTILATION:** The process of supplying or removing air by natural or mechanical means to or from any space. Such air may or may not have been conditioned or treated.

**VERTICAL INTEGRATION:** An arrangement whereby the same company owns all the different aspects of making, selling, and delivering a product or service. In the electric industry, it refers to the historically common arrangement whereby a utility would own its own generating plants, transmission system, and distribution lines to provide all aspects of electric service.

**VISIBLE LIGHT TRANSMITTANCE:** The ratio of visible light transmitted through a substance to the total visible light incident on its surface.

**VOLT:** A unit of electromotive force. It is the amount of force required to drive a steady current of one ampere through a resistance of one ohm. Electrical systems of most homes and office have 120 volts.

**VOLTAGE OF A CIRCUIT (Electric utility):** The electric pressure of a circuit, measured in volts. Usually a nominal rating, based on the maximum normal effective difference of potential between any two conductors of the circuit.

**VOLUMETRIC WIRES CHARGE:** A type of charge for using the transmission and/or distribution system that is based on the volume of electricity that is transmitted.

## W

**WARRANTY:** A seller's guarantee to purchaser that product is what it is represented to be and, if it is not, that it will be repaired or replaced. Within the context of vehicles, refers to an engine manufacturer's guarantee that the engine will meet "certified" engine standards at 50,000 miles or the engine will be replaced. Retrofits may generally void an engine warranty.

**WATER HEATER:** An appliance for supplying hot water for purposes other than space heating or pool heating.

**WATT:** A unit of measure of electric power at a point in time, as capacity or demand. One watt of power maintained over time is equal to one joule per second. Some Christmas tree lights use one watt. The Watt is named after Scottish inventor James Watt and is capitalized when shortened to w and used with other abbreviations, as in kWh.

**WATT-HOUR:** One watt of power expended for one hour. One thousandth of a kilowatt-hour.

**WEATHERSTRIPPING:** Specially designed strips, seals and gaskets installed around doors and windows to limit air leakage.

**WET-BULB TEMPERATURE:** The temperature at which water, by evaporating into air, can bring the air to saturation at the same temperature. Wet-bulb temperature is measured by a wet-bulb psychrometer.

**WHEELING:** The transmission of electricity by an entity that does not own or directly use the power it is transmitting. Wholesale wheeling is used to indicate bulk transactions in the wholesale market, whereas retail wheeling allows power producers direct access to retail customers. This term is often used colloquially as meaning transmission.

**WHOLE HOUSE FAN:** A system capable of cooling a house by exhausting a large volume of warm air when the outside air is cool.

**WHOLESALE COMPETITION:** A system whereby a distributor of power would have the option to buy its power from a variety of power producers, and the power producers would be able to compete to sell their power to a variety of distribution companies.

**WHOLESALE POWER MARKET:** The purchase and sale of electricity from generators to resellers (who sell to retail customers) along with the ancillary services needed to maintain reliability and power quality at the transmission level.

**WHOLESALE TRANSMISSION SERVICES:** The transmission of electric energy sold, or to be sold, at wholesale in interstate commerce (from EPCRA).

**WOBBE INDEX:** A measure of the amount of heat released by a gas burner with a constant orifice, equal to the gross calorific value of the gas in British thermal units per cubic foot at standard temperature and pressure divided by the square root of the specific gravity of the gas. The index is an indicator of the quality of the fuel gas.

**WIRES CHARGE:** A broad term which refers to charges levied on power suppliers or their customers for the use of the transmission or distribution wires.

## X

**X-RAY:**A type of electromagnetic radiation having low energy levels.

**XENON:**A heavy gas used in specialized electric lamps.

**XYLOID COAL:**Brown coal or lignite mostly derived from wood.

## Y

## Z