

Glossary of Electric Industry Terms

AB 117: Community Choice Aggregation legislation—*see CCA below.*

AB 1890: Legislation passed in California in 1996 which broke up the state's vertically integrated utilities by separating generation from transmission and from the distribution of power. Utilities were required to sell off their power plants (except for hydro and nuclear facilities) and to turn over control of their transmission lines to California's ISO.

AB 2006: A bill which passed the state legislature in 2004, but was vetoed by the governor. It divided customers into core and noncore groups. *See "core/noncore."*

Acre-foot: The quantity of water that would cover an acre of land to a height of one foot. It is equivalent to 325,900 gallons.

Affiliate: A company that is directly or indirectly owned or controlled by another company. Management and ownership of affiliates is often limited in the energy industry to prevent monopoly control in a given region.

Aggregators: Brokers of wholesale generation.

Ancillary services: The services other than energy that are required to maintain reliability.

Avoided cost: The cost a utility avoids by not having to generate a particular amount of power itself. This cost is less than the retail sales price of the power. Avoided cost was mandated to be paid to qualifying facilities (*see "QF"*) under the PURPA Act of 1978.

Baseload, base load, baseload demand: The minimum amount of power that a utility or distribution company must make available to its customers, or the amount of power required to meet minimum demands based on reasonable expectations of customer requirements.

Baseload plant: Baseload plants are the production facilities used to meet some or all of a given region's continuous energy demand, and to produce energy at a constant rate, usually at a low cost relative to other production facilities available to the system. Baseload plants in the U.S. and Canada are usually hydroelectric, nuclear and coal-fired plants

Biomass: Plant material, wood wastes, or agricultural wastes used as a fuel or energy source. In some parts of the U.S. fast-growing trees and grasses are being planted, often on damaged or erodible lands, as a renewable fuel source.

Btu: British thermal unit. The amount of thermal energy required to raise the temperature of one pound of water one degree F. at sea level.

Biofuel: Either a biomass material used in its natural state as a fuel to produce energy, or a fuel—liquid or gas—derived from biomass materials and used to produce energy.

Bulk power market: Sales and purchases of electricity among utilities; the wholesale market.

Bundled services: Situation in which energy is delivered to an end-user at one inclusive price per kWh, covering generation, transmission and distribution.

CAISO, California Independent System Operator: A not-for-profit public corporation established to operate and oversee operations of transmission systems to ensure the reliability of the grid in a nondiscriminatory manner.

Capacity: The rated continuous load-carrying ability, frequently expressed in megawatts (MW), of generation, transmission or other electrical components.

Capacity factor: The ratio of the average operating load over a period of time to the capacity rating of the unit during that same time period. For example, if a 500 MW unit operated at full

capacity for six months of the year, or at 250 MW for the entire year, it would have a 50 percent capacity factor.

CCA, Community Choice Aggregation: A relatively new option under which local communities are allowed to reject utility service and contract directly with non-utility generators.

CEC, California Energy Resources Conservation and Development Commission: Almost always called the California Energy Commission (CEC), an agency established in 1974 to forecast energy needs, license power plants, promote energy conservation and develop alternative energy resources.

CEOB, California Energy Oversight Board: A board created by the legislature in 1996 to oversee CAISO.

Cogeneration, cogen: The simultaneous production of two useful forms of energy, usually electricity and heat, from a single fuel source. The addition of cogeneration capability to generating facilities and industries that produce large amounts of heat energy increases energy efficiency by using what would otherwise be waste heat (usually steam or hot water) for heating, industrial use, agriculture or conversion into electricity.

Combined-cycle power plants: Twin-stage power plants. In the first stage, a gas (natural gas, gaseous coal, etc.) is used to run a gas turbine that produces electricity. In the second stage, the waste heat from the gas turbine and other processes is used to raise the pressure of steam, which in turn is used to generate additional power. By combining these stages, a combined-cycle plant maximizes the efficiency of fuel use.

Congestion: The physical and operational limitations on the transfer of electric power through transmission facilities.

Contingency: In a utility context, the disconnection or separation, planned or forced, of one or more components from the electric system. Examples are loss of a generation unit, loss of a transmission line, or a failure of any other single component of the system.

Control area: A region where the generating capacity is managed in order to balance load and maintain planned interchange schedules with other control areas. Seventy percent of California lies within the CAISO control area; Sacramento Municipal Utility District, Los Angeles Department of Water & Power and other control areas make up the rest of the state.

Core/noncore: Core customers are smaller customers as defined by a specified maximum peak demand. They are served by their local utility on a cost-based, fixed, average rate plan. Regulatory policy could permit industrial and large commercial noncore customers to choose between the cost-based plan, other plans that the utility might offer, or direct purchases from an independent power producer.

CPA, California Power and Conservation Authority: An agency created by AB 1890 to fund energy projects. It has been discontinued.

CPUC, California Public Utilities Commission: The state-level agency that regulates electric, gas, telecommunications, transportation and water utilities. Created by constitutional amendment in 1911.

Curtailed demand: A load that can be interrupted at the discretion of the utility or system operator in order to ensure the adequacy of power supplies during peak periods or emergencies. (Often called “interruptible demand.”) Generally involves large customers who sign “interruptible” contracts which give them lower rates, in return for their agreement to be interrupted if necessary to meet impending power shortages, which may occur on extremely hot summer afternoons.

Customer choice: The opportunity for retail consumers to purchase electricity or services from non-utility entities, also known as Direct Access.

Day-ahead market: The forward market for the supply of electric power at least 24 hours before delivery.

Decommissioning: The process of closing down a nuclear facility and reducing the residual radioactivity to a level that permits the release of the property and termination of the license. Nuclear power plants are required by the Nuclear Regulatory Commission (NRC) to set aside funds during operation for their eventual decommissioning costs.

Demand: Demand and load are used interchangeably when referring to energy requirements for a given customer or area. They are usually expressed in kilowatts rather than kilowatt-hours, since they represent the requirements of a customer or area at a particular moment in time (though in practice this “moment” may be the average of a short period; a few minutes up to an hour).

Demand charge, capacity charge: An additional billed amount that covers the difference between the maximum power a customer may need to have available and the energy that the customer uses most of the time. Many commercial and agricultural customers’ requirements vary greatly during a single day or operating cycle. Consequently they need to have substantially more power available at these peak periods than they actually use at other parts of the billing period. Demand charges, occasionally referred to as capacity charges, are typically calculated based on the difference between the customer’s peak energy use during the billing period and their nominal use (normal or hour-to-hour use) during the same period. Demand charges are not a means of gouging customers by charging for unused energy. Instead they are a means of insuring that customers can have larger-than-normal supplies of energy available to them at a moment’s notice.

Demand-side management (DSM): Modifying decisions related to the time of energy use in order to maximize energy efficiency, thus getting the most out of existing energy resources, whether electric or gas. DSM involves consumers’ changing their energy use habits and using energy-efficient appliances and equipment at off-peak hours.

Deregulation: Reduction or elimination of regulatory controls over an industry.

DG, Distributed generation: Small-scale power generation facilities (typically in the range of 3 to 10,000 kW) located close to where electricity is used (e.g., a home or business) to provide an alternative to or an enhancement of the traditional electric power system.

Direct access: The opportunity for retail consumers to purchase electricity or services from non-utility entities, also known as Customer Choice. Direct access was suspended by the CPUC in 2001.

Distribution: The local delivery of power by an electric utility.

Distribution system: The system of lower-voltage lines, transformers, and switches that connect the high-voltage electric transmission systems to customers.

Divestiture: The sale or transfer of control over such utility assets as power plants or transmission facilities.

DSM—*See demand-side management above.*

EI, Edison Electric Institute: An association of electric companies created in 1933 “to exchange information on industry developments and to act as an advocate for utilities on subjects of national interest.” The EEI acts as an information exchange for its members and a

public relations voice for the investor-owned electric industry as a whole.

EER, Energy Efficiency Rating: A value that expresses the relative efficiency of devices that consume electricity; commonly applied to appliances. EER is calculated by dividing the BTUs-per-hour of waste heat produced (all appliances do; no machine is 100 percent efficient in converting energy into work) by the number of watts used in producing that heat. The higher the EER, the greater the device's efficiency.

Embedded cost: The total costs of all utility assets and ongoing charges incurred in providing and maintaining a supply of energy. Embedded costs most commonly refer to investments incurred in the past that allow an energy utility to produce or deliver energy in the present. The most common embedded cost is the capital cost of transmission, generation and distribution infrastructure (high-voltage corridors, power lines, transformers, substations and power plants).

EPRI, Electric Power Research Institute: Established in 1973 as an independent, nonprofit center for electricity and environmental research. Through its many clients in the United States and abroad, it is able to address the industry's many critical challenges related to generation, delivery and end-use, with a special focus on safe, reliable, cost-effective electricity and environmental stewardship.

ESP: Electric service providers

Electric utility: A privately held company, government agency, publicly owned body or other entity that meets three specific criteria. It must own and/or operate facilities for provision of a service directly related to providing electric energy, it must sell electric energy directly to end-use customers, and it must have the exclusive right to provide that service within a given area. Prior to deregulation, electric utilities were defined as providers of most or all electric services, including generation, transmission and distribution, billing, maintenance and ancillary services. Today an electric utility could mean an entity that provides just one of these services.

Emergency: Any abnormal system condition that requires immediate manual or automatic action to prevent loss of load, equipment damage or to restore system operations.

Energy charge, commodity charge: The amount of a customer's bill that reflects the actual energy used over the billing period.

FERC, Federal Energy Regulatory Commission: A federal agency within the U.S. Department of Energy that has jurisdiction over the rates and terms of service for interstate facilities and wholesale markets for electric utilities, non-utility generators and gas pipelines.

Forced outage: Unplanned interruption in electric service due to generator failures, power-line outages or other unplanned circumstances.

Forward contract: A contract in which the buyer is obligated to take delivery, and the seller is obligated to deliver a fixed amount of a commodity at a predetermined price on a specified future date, at which time payment is due in full.

Fuel cell: A device in which hydrogen, usually derived from a fuel such as natural gas or methanol, is converted directly and continuously into electric energy.

Generation: A process for the production of electric power; or one way of referring to the output of a power plant.

Geothermal Energy: Heat (thermal) energy stored in rock below the earth's surface. Technologies such as heat exchangers and heat pumps can convert this into usable energy. When geothermal energy takes the form of hot water, steam or hot compressed air, as it generally does, it

can be used to produce electricity in conventional steam turbine-generators.

GW, Gigawatt: A measure of power equal to one billion (10^9) watts. One gigawatt is 1000 megawatts (MW).

GWh, Gigawatt-hour: One gigawatt-hour equals one billion watts delivered or consumed in a 60-minute period.

Green energy: Generic term for any type of energy which is considered to have a lower environmental impact than fossil fuel-produced energy. The actual definition of green power is relative, and depends largely on where the term is applied and by whom. For example, Texas defines efficient natural gas generation as green power. In California green power is usually considered to be wind, solar, geothermal, biomass or hydroelectric with capacity of less than 30 MW. The term heavily overlaps and is generally interchangeable with “renewable energy.”

Grid: The high-voltage transmission network that transports large amounts of electricity from production facilities to end-use customers.

Grid management charge: A fee charged by the owner or operator of a transmission system as established by federal regulators.

Hybrid market: A wholesale power market divided between utility-owned and non-utility-owned generators.

IEPR, Integrated Energy Policy Report: Report produced every two years by the California Energy Commission as an overall planning tool. *See SB 1389.*

Independent Energy Producers: Non-utility owners and operators of power facilities. A trade association for such companies based in California.

Interruptible demand: *See “curtailable demand”*

IOU, Investor-owned utility: Utility company that is owned by private shareholders. Though privately owned, such companies are often referred to as *public utilities* because they serve the public with essential goods or services. The major electric IOUs in California are Pacific Gas & Electric (PG&E), Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E), plus the smaller non-California-based utilities Pacific Power and Light (PP&L) and Sierra Pacific. All IOU operations in California are regulated by the CPUC.

ISO, Independent System Operator: A not-for-profit corporation established to operate and oversee operations of transmission systems to ensure the reliability of the grid in a nondiscriminatory manner. (Often, as in this report, referred to as ‘CAISO,’ CA representing “California.”)

KW, Kilowatt: A measure of electric power equal to one thousand watts.

KWh, Kilowatt-hour: A measure of electric power consumption equal to one kilowatt delivered or consumed in a 60-minute period.

Life-cycle costs: The total costs of building, operating, maintaining and decommissioning a facility over its life span. Includes *all* costs, such as fabricating and transporting the materials to build the plant, and at the end transporting the remnants for disposal.

LNG, Liquefied Natural Gas: Natural gas that has been converted to a liquid by cooling it to -260 degrees Fahrenheit, reducing its volume to 1/600th of its gaseous state and greatly facilitating shipping and storage.

Load: When referring to an electric circuit or an energy generation system, load is the amount

of power delivered along the entire circuit or between specific points on the system. Load for a residential bathroom circuit at a given moment might be 1,650 watts, consisting of 1,500 watts for a hair dryer and 150 watts for lighting. Load is also used in the energy industry as the moment-to-moment measurement of power requirement in the entire system. In this context, load is the real measurement of customer demand for energy. Load can also refer to any electrical device consuming energy in a circuit. For example, a single household is a load on the municipal distribution system, a switched-on clock radio is a load on a household circuit, and so forth.

Load following: Load is the amount of electric power required at any specified point or points on a system at any given time. The ISO is responsible for seeing that the power is available to meet the load, which varies constantly due to changes in demand or generation availability. Hydro plants are excellent load-following resources, as they can be put on line with very little start-up time. Some fuel-burning plants are almost always kept on line as “spinning reserve,” ready to be brought up to full power very quickly.

Load forecast: Forecast of how much electricity will be used on an hourly basis over a period of time.

Load-serving entity: A company or person that delivers electricity to end-users or intermediate-facilities along the transmission/distribution route.

Market clearing price: The price at a location at which supply equals demand; all demand at or above this price has been satisfied, and all supply at or below this price has been purchased.

Market power: Does not refer to *electric* power, but to the ability (power) a company may have due to its size or other circumstances to establish or affect prices for electricity (or other commodity).

Mcf: One thousand cubic feet; a measure of natural gas.

MMcf: One million cubic feet.

MW, Megawatt: A measure of power equal to one thousand kilowatts, or one million watts, of electricity.

Merchant plant: A power generation facility that operates in wholesale markets without a long-term contractual commitment for its entire output; a power plant not subject to state regulation of rates.

Municipal utility (Muni): A utility owned by and subject to the jurisdiction of a municipality, as opposed to state or federal authority.

Negawatt (n): A megawatt of power that is not needed because of installed energy efficiency measures. Energy saved through use of more efficient appliances, instruments, or buildings, or through altered use patterns such as lowering the thermostat in winter and raising the thermostat in summer. The term is associated with conservation activist Amory Lovins of the Rocky Mountain Institute.

Net metering: Under net metering, when an in-house generator is producing more power than the customer needs for its own purposes, the excess power is put back into the grid, and the electric meter in effect runs backwards. When in-house output is insufficient, power will be taken off the grid to supplement it, and the meter will run forward. Over a given billing period, the customer may be paid for a net input into the system, or pay for a net withdrawal from the system—either way the customer is provided value for power produced.

Oligopoly: A market condition in which sellers are so few that the actions of any one of

them will materially affect price and have a measurable impact on competitors.

ORA, Office of Ratepayer Advocates: A subdivision within the California Public Utilities Commission which is charged with representing ratepayers. From this perspective, it reviews and analyzes applications for rate changes and makes recommendations to the CPUC.

Peak load: The maximum demand for electric power during a stated period. A producer may also use this term to refer to the maximum demand for power that determines the generating capacity needed by that producer.

Peaking plant or “peaker”: Power plant that is run only at peak demand times. It is usually less efficient, thus producing more expensive power, and may also be more polluting.

Petroleum coke: Petroleum coke is a by-product of the oil refining process. Its high heating value and low ash content tend to result in lower transportation cost relative to coal. On the other hand, its high sulfur content, low volatile matter, and high metal content tend to make petroleum coke an unattractive fuel. However, its increasing supply and declining prices are hard to ignore, and several qualifying facilities in California are now using it.

Photovoltaic cell: A solid-state device for generating electricity, commonly made from a silicon alloy. When sunlight is absorbed by the cell, electrons are dislodged from the material's atoms. The front and back surfaces of the cell become charged, much like a battery, and when they are linked, a current is created. Because photovoltaic cells generate direct current and most commercial applications use alternating current, an inverter is needed to convert the output to alternating current. **Photovoltaics** (often “PV”) is a related term used to refer either to the study of photovoltaic energy or to the equipment required to produce photovoltaic energy.

Power marketers: Companies or individuals that buy and sell electricity on a wholesale basis subject to the jurisdiction of federal regulators.

Power pool: Interconnected electric systems that coordinate operations and/or provide a centralized spot market for power purchases and sales.

PUHCA, Public Utility Holding Company Act: A federal law enacted in 1935 to regulate and limit the operations of corporations that own and operate utilities in multiple jurisdictions. The 2005 federal Energy Bill calls for its repeal.

PURPA, Public Utility Regulatory Policy Act: A federal law passed in 1978 to encourage less reliance on oil and natural gas by requiring electric utilities to purchase power from independent energy producers operating cogeneration facilities or using renewable resources, such as wind, solar, biomass and geothermal. *See “avoided cost.”*

Public goods charge, public benefits charge, public program charge: Monies collected by the investor-owned utilities for renewable energy, research and development, public-interest research and development, and low-income energy assistance.

QE, Qualifying facility: A power plant, as specified under PURPA, that is eligible to sell its output at a price equivalent to what it would otherwise cost the utility to produce or purchase new generation. (*See “avoided cost.”*) During the 1980s and 1990s, the CPUC ordered the IOUs to pay incentive rates to most qualifying facilities.

Real time pricing: A method of pricing energy based on either the actual market value or the utility's cost for energy at the time when it is used. Off-peak energy is typically less expensive than on-peak energy. When real-time pricing is applied, customers who use most of their energy at night when demand is low will be charged a lower rate than customers who use

most of their energy during the day, when the utility's energy costs are higher.

Regulation: Rules and policies established at the state or federal level to control the costs or service offerings by certain companies and entities.

Reliability: Refers to the adequacy and security of electric transmission networks and/or generation facilities. *Adequacy* measures the ability to provide sufficient power to customers at all times; *security* refers to the ability of the system to withstand unexpected disturbances and breakdowns.

Reliability Must Run (RMR): A term the California ISO applies to plants that it considers must be available to meet reliability requirements.

Renewable energy: See "green energy."

Renewable energy certificates (RECs): Marketable or tradeable commodity affidavits that represent defined amounts of renewable energy. A system for marketing RECs was proposed in SB 107 of 2005.

Restructuring: Altering the traditional relationship between utilities, markets and regulatory bodies, which may involve some form of deregulation of utility costs or service offerings, or by subjecting regulated entities to competitive forces.

Retail competition: Allowing providers of electricity and other services to compete directly with utilities to serve customers.

RPS, Renewable Portfolio Standard: Refers to legislation requiring utilities to have a defined percentage of their generation in renewable sources such as wind, solar and some categories of hydro. **SB 1078** requires investor-owned utilities to increase investment in renewable energy one percent annually, up to a total of 20 percent renewables by 2017; **SB 107** is legislation proposed in 2005 to accelerate this schedule to 2010. In the most recent Energy Action Plan, the CPUC, CEC and CAISO have called for 20 percent renewables in 2010.

RTO, Regional Transmission Organization: The owner or operator of transmission systems covering a broad, usually multi-state region.

Rural electric cooperative: Consumer-owned rural electric generation, transmission and distribution system that supplies electricity to consumers in rural areas. Rural Electric Cooperatives serve some 75 percent of the land area and operate half of all of the miles of electric lines in the United States, averaging five consumers per mile of line compared with an average of 35 consumers per mile of line for other utilities.

SB 1389: Legislation passed in 2002 requiring the CEC, with participation of the other relevant state agencies, to prepare an extensive assessment of the state's energy trends and needs on a biennial basis. This assessment has become the biennial IEPR, with an update that is prepared in the alternate years. After approval or amendment by the governor, this report becomes the state's energy policy.

Scheduling coordinator: An entity authorized to submit a balanced generation or demand schedule on behalf of one or more generators, and one or more end-users customers.

Service territory: The geographic area in which a regulated utility operates.

Settlement: A financial process of billing and payments for market transactions.

Solar-thermal power: Electric power produced by using lenses and reflectors to concentrate the heat of the sun. Because the heat can be stored, these power plants can generate power whenever it is needed, even after the sun has set.

Spot power: Electricity that is bought or sold on a near-term basis, usually from one hour to one day before delivery.

Substation: An assemblage of equipment including switches, transformers and other equipment needed to switch, change or regulate the voltage of electricity. Substations are commonly found in residential and industrial areas, where one or more high voltage lines feeds into the station, transformers step down the voltage, and lower-voltage distribution lines feed out to serve customers in the surrounding area. (Small transformers on poles, or underground, perform one final reduction of voltage to the proper level for home appliances and other uses.)

Supplier: A company or entity that sells electricity to utilities or customers using either its own generation and delivery facilities or those of another entity.

Tariff, tariff schedule: A document filed with the appropriate regulatory authority specifying lawful rates, charges, rules and conditions under which the utility provides services to parties.

Tax credit or tax incentive: A given percentage of a cost which can be deducted by taxpayers from their net tax. To qualify for the tax credit, items or systems purchased must satisfy requirements specified in the authorizing law.

Title 24, Part 6, of the California Code of Regulations: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically; the 2005 Title 24 standards will supersede the 2001 standards in October 2005.

Transition period: The period of time to allow utilities an opportunity to recover costs prior to a loosening of rate regulation or introduction of full competition. Under California restructuring law, this period was defined as January 1, 1998 through December 31, 2001, or until cost recovery was completed.

Transmission: The process of transporting electricity over high-voltage wires from the source of generation to the point of consumption or, more usually, to a substation for voltage reduction and further distribution.

Transmission congestion: Power flows that cannot be physically accommodated by the system.

Transmission owner: An entity owning transmission facilities or having contractual rights to use transmission facilities that are used to transmit and distribute power from suppliers.

Unplanned outages: Unscheduled outages of generation, transmission or distribution facilities. Another term for forced outages.

Vertically integrated utility: A utility company that owns and operates its generating plants, transmission lines and distribution lines and can supply end-users with a bundled service. *See entry at "bundled services"*

Voltage support: Maintenance of voltage within acceptable limits despite changes in power flow.

Wheeling: The use of the transmission facilities of one system to transmit power and energy from or to another system, or both.

Watt: A small, standard unit of electric power, defined as one ampere at one volt at unity power factor.

WECC, Western Electricity Coordinating Council: The entity that coordinates planning for the transmission grid linking the western states.

Note: The sources for many of these definitions are: Energy Vortex dictionary to be found at <http://www.energyvortex.com/energydictionary/energyvortex.htm>, and the glossary provided in *The Soul of the Grid* by Arthur J. O'Donnell, iUniverse, Inc., 2021 Pine Lake Road, Suite 100, Lincoln, NE 68512, www.iuniverse.com

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THE ENERGY INDUSTRIES in the United States, and particularly in California, are in a state of flux. While there seem to be moments of equilibrium, change seems to be the dominant trend overall. Thus there is little literature that addresses the current situation. The members of the Energy Committee who prepared this study kit have read the trade press literature, attended state agency meetings and workshops, and spoken individually with many of the leaders in the energy arena to supplement the material that is found in the bibliography. Most references in the bibliography are staff reports prepared as input for the California Energy Commission's biennial Integrated Energy Policy reports. These reports may be obtained on the commission's Web site.

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