

Grid 101 Glossary

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Term	Description
Abnormal configuration	Modification of the normal distribution circuit configuration to support abnormal operating conditions.
ADMS	Advanced Distribution Management System – Refers to the next generation of DMS (Distribution Management System). Compared to traditional DMS, ADMS includes advanced, modern features such as new analytic tools, advanced communication with grid devices and DERs, and other grid support functions and tools.
Circuit	A conductor or system of conductors through which an electric current is intended to flow.
Circuit constraint – studied and unstudied	Facility, equipment and/or device that is limiting the overall load serving capability of the distribution circuit. Typically, not all possible abnormal configurations are studied, which can lead to un-studied constraints.
Circuit mile	Measurement of the physical length on an electrical circuit, usually in reference to total line length of a circuit. For the purposes of this presentation, this is different from length of conductor on a circuit. Most circuits follow energy through multiple parallel conductors, so the length of the conductor may be double or triple the length in circuit miles.
Circuit Tie / Back-tie	A switch that connects two or more independent sources of power and are sometimes used to connect feeders for the purposes of re-routing power after sectionalizing a portion of a feeder circuit is isolated for maintenance work.
Conductor	Refers to the physical wire on an electrical system that is used to transport electrical energy, whether it is bare, covered, buried underground or attached to poles/towers.
CPUC	California Public Utilities Commission (CPUC) is a regulating authority over investor-owned electric and natural gas utilities in California.
DER	Distributed Energy Resources (DER) are resources connected to the distribution system that generate and store energy. Examples of DERs include: Energy Efficiency, Demand Response, Advanced Energy Storage, Distributed Generation, and Electric Vehicles.
DER grid service dispatch	Refers to a system operator actively calling upon a resource to perform in a certain way (e.g. to generate power, to reduce output, etc.). Can refer to a Day Ahead schedule or a real-time instruction. This is different from a “price-based response,” in which a resource elects to perform based on available prices but does not receive a specific instruction to perform in a specific manner.
DERM or DERMS	Distributed Energy Resource Management System (DERM or DERMS) is computer interface that allows controllability, visibility, and scheduling of DERs on the system.
Distribution	The portion of an electric system that delivers electric energy from transformation points on the transmission system to the customer. The distribution system is generally considered to be anything from the distribution substation fence to the customer meter.
DMS	Distribution Management System consists of software applications that provide monitoring & control of the distribution network.
Feeder	Set of conductors and associated equipment exiting the substation circuit breakers that service customers in a geographic area.
FERC	Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil.
Grid	The collection of physical infrastructure assets that connect generators to customers and enable the safe flow of electric power from one location to another.
(grid) Communication device	Equipment and/or devices that transmit and/or receive information between single or multiple devices. These can include radios that use wireless protocols or wired solutions like fiber optics.

Grid mod	Grid Modernization. The DRP proceeding established the following definition: “A modern grid allows for the integration of DERS while maintaining and improving safety and reliability. A modern grid facilitates the efficient integration of DERs into all stages of distribution system planning and operations to fully utilize the capabilities that the resources offer, without undue cost or delay, allowing markets and customers to more fully realize the value of the resources, to the extend cost-effective to ratepayers, while ensuring equitable access to the benefits of DERs. A modern grid achieves safety and reliability of the grid through technology innovation to the extent that is cost-effective to ratepayers relative to other legacy investments of a less modern character.” (CPUC Decision 18-03-023, OP 1, p 33.)
Grid Topology	Refers to how assets on the grid are connected together. I.e., how lines and substations connect to form mesh networks or radial systems
Intelligent sensor	A device installed on the grid that measures a physical property and records, indicates, or provides specific information (e.g., voltage, current flow, power flow, etc.) necessary for effective planning and grid operations.
Intelligent switch	A physical device that opens and closes to facilitate load transfers/reconfigurations of the system. Intelligent switches have advanced features like voltage/current/power sensors, can operate remotely from the grid operations control centers, and/or can operate autonomously based on specific settings installed in their control systems.
Interconnection	The physical plant and equipment required to facilitate the transfer of electric energy between two or more entities. It can consist of a substation, an associated transmission or distribution line, and communications facilities or only a simple electric power feeder.
IOU	Investor-owned utility (IOU) is a publicly traded utility that operates both Bulk power and Distribution for a specified region (e.g., PG&E, SCE, SDG&E).
ISO / CAISO	California Independent System Operator Corporation (ISO) is a federally regulated entity that coordinates regional transmission to ensure non-discriminatory access to bulk energy system and maintains the reliability of the transmission system. The California ISO (CAISO) is responsible for the transmission system covering the service areas of the IOUs in California, as well as a small part of Nevada.
kV	Kilovolt (kV) is a unit of potential energy equivalent to 1,000 volts. Example 12 kV = 12,000 volts.
Lines	The physical wires over which power flows. A single “line” may actually consist of multiple physical wires. Each wire is referred to as a conductor.
Load profile / altered load profile	Graph of the variation in the electrical load versus time. A load profile will vary according to customer type, amount of demand usage, generation output, temperature, and holiday season.
Load Transfer	Completing physical switching of the system to move customers fed from one circuit to an adjacent circuit that has adequate capacity to serve them. This can be done annually to balance loading on circuits across the system or can be done during outage conditions to move customers from a circuit currently experiencing outage to a circuit that still has power.
Major projects organization	A group that provides organization of resources responsible for the work execution (budgeting, scheduling and constructing) of a project on the electrical system from initial need identification to physical completion in the field. Major projects typically refer to larger projects with long lead times, e.g. new substations or new transmission lines.
Masked load	Refers to the actual load served by the grid and interconnected DER in a specific location or area. The load is considered “masked” from the perspective of the grid itself since a portion of the load in the area is being served by DER, and not by the circuit or substation. If/when DER cease/reduce production, the load they previously served must be served by the local grid.
“Mesh” Network	System architecture of electrical components via interconnecting conductors that provide redundancies to ensure there are alternate paths for electrons to flow. Primarily applies to

	transmission but may apply to certain portions of the distribution system. Note: the term “network” or “networked” commonly refers to a <i>mesh</i> network. This is distinct from the common English usage of “network.” A portion of the grid that is “Radial” (see definition below) will not generally be referred to as a “network” even though it might seem to be consistent with the common definition of “network”
MW	Megawatts are used to measure the amount electric power flowing through a piece of equipment, i.e. the amount of energy delivered in a given unit of time. Used to measure ratings of transmission and substation equipment. 1 MW = 1,000,000 watts.
NERC	North American Electric Reliability Corporation. The federal non-profit agency responsible for developing and reinforcing Reliability Standards for the bulk electric system (i.e., the transmission system) spanning the continental United States, Canada and northern portion of Baja California, Mexico. NERC implements its mandate (in part) through various regional organizations to which NERC delegates authority.
Normal configuration	Distribution circuit configuration that is primarily operated during non-emergency conditions.
Planned program	Planned programs are documented steps/procedures used by Grid Operations and Field Crews to safely facilitate modification and/or maintenance of the grid. For example, a planned program will be created when a circuit needs to be reconfigured to isolate a segment of the system to safely replace a distribution pole. Operators and field crews ensure that customer interruptions are minimized to as small of a section as possible through switching and transferring load to adjacent circuitry. They will then deenergize the portion of the circuit being worked on to ensure a safe work location. Once the work is complete, operators and field crew will again coordinate for additional switching procedures to return customers that had been temporarily transferred to adjacent circuits, i.e., returning the grid to its normal configuration.
Pnode	Pricing Node on the CAISO energy market. A single network Node or subset of network Nodes where a physical injection or withdrawal is modeled and for which a Locational Marginal Price is calculated and used for financial settlements.
Protection device	Typically a fuse or circuit breaker. Device interrupts the flow of power to a section of a circuit when an abnormal condition is present, such as a wire on the ground or a component that has failed in operation. These devices operate quickly to prevent further damage to the system and to protect workers and the general public.
Radial system / Radial circuit	Refers to a set of assets with only a single point of connection to the rest of the grid. Therefore, power has only a single path to flow to the assets. Most distribution lines are radial, meaning if there is an outage on the line, all customers downstream of the outage will also lose power, until the outage is repaired or the grid is reconfigured to implement a load transfer.
Radialized Network	SCE only. Refers to the unique grid configuration of SCE’s subtransmission systems. There are dozens of distinct subtransmission radialized networks in SCE’s system. Within each one, the substations and lines within the radialized network form a mesh network with multiple paths that power may flow. However, each radialized network has only a single point of connection to the bulk transmission system. For this reason, each entire subtransmission network is considered <i>radial</i> relative to the transmission system - hence, “radialized network”. While these assets form dozens of mesh networks, because each shares only a single point with the transmission mesh, they are not considered part of the transmission system. For regulatory purposes, they are considered distribution.
Reconfiguration	See “Load Transfer”
SCADA	Supervisory Control and Data Acquisition (SCADA) is a network of devices that provide controllability and data to control centers. For example, SCADA circuit breakers provide real time load, voltage, and other measurements, as well as the ability to operate remotely via from control centers.

Service drop	Refers to the physical wire that connects a customer's main service panel to a distribution transformer on the grid.
Smart inverter	An inverter is a device that converts Direct Current (DC) to Alternating Current (AC). Typically, this is used to convert the DC power provided by solar panels into AC power that can be interconnected directly with the grid. A smart inverter has communication capabilities as well as advanced features which modify the output of the inverter to improve integration with the grid.
Standards	Documents that provide requirements, specifications, guidelines, or characteristics that can be used consistently to ensure materials, products, processes and services are fit for their purpose.
Step-up / Step-down	Refers to transformers. Transformers that increase voltage (e.g., from 12 kV to 115 kV) are "step-up" transformers. Vice versa, those that decrease voltage (e.g., from 66 kV to 16 kV) are step-down transformers.
Substation	A facility on the electrical system, that transforms voltage from one level to another.
Subtransmission	SCE only. Refers to most 66 kV and 115 kV lines; these assets are considered CPUC-jurisdictional and thus technically in the category of distribution for regulatory purposes.
T-D Interface	Transmission / Distribution Operations Jurisdictional boundaries. An important demarcation point that determines various operational and regulatory roles and responsibilities.
Transformer	A device that transfers electric energy from alternating current circuit to one or more other circuits, either increasing (stepping up) or reduction (stepping down) the voltage. In the context of distribution systems, transformers connect the primary distribution circuit to a secondary distribution circuit or consumer's service circuit. Distribution transformers are usually rated on the order of 5–500 kVA.
Transmission	An interconnected system of electric transmission lines and associated equipment for the movement or transfer of electric energy in bulk between points of supply and points for delivery.
Two-way power flow	Historically, the flow of power on the distribution grid has been one-way, from the large generators on the bulk transmission system through the transmission grid, down through the distribution system and out to customers. As DERs continue to grow on the system, particularly on the distribution system, power flow has begun to flow in the opposite direction under certain conditions – from the customer back to the distribution system and potentially up to the transmission system. This is referred to as two-way power flow.
Unplanned outage	Unplanned outages are outages that are not planned in advance such as those caused by weather, third parties, equipment failures, etc. They are unexpected and are facilitated through the action of protective devices on the grid, such as fuses or circuit breakers.
WECC	Western Electricity Coordinating Council. Non-profit regional organization that is responsible for the oversight of reliability for the Western Interconnection; this authority is delegated to WECC by NERC and approved by the FERC.