

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Adjacencies** are neighboring Balancing Authorities that share a border and are interconnected.

**Affected System** is an electric system other than the Transmission Provider's Transmission System that may be affected by the proposed interconnection.

**Alternating Current (AC)** - An electric current that reverses its direction of flow periodically, AX is wave of electrons that flow back and forth through a conductor wire.

**Ancillary Services**<sup>1</sup>- Those services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the Transmission Provider's Transmission System in accordance with Good Utility Practice.

The Transmission Provider is required to provide and the Transmission Customer is required to purchase, the following Ancillary Services (i) Scheduling, System Control and Dispatch, and (ii) Reactive Supply and Voltage Control from Generation or Other Sources.

The Transmission Provider is required to offer to provide (or offer to arrange with the local Control Area operator as discussed below) the following Ancillary Services only to the Transmission Customer serving load within the Transmission Provider's Control Area:

**(i) Regulation and Frequency Response Service**, which is a commitment of on-line generation output capable of being raised and lowered to follow moment-by-moment changes in load,

**(ii) Energy Imbalance Service**, which is Service provided when a difference occurs between the scheduled and the actual delivery of energy to a load located within a Control Area over a single hour,

**iii) Operating Reserve – Spinning Service**, which is Service needed to serve load immediately in the event of a system contingency provided by generating units that are on-line and loaded at less than maximum output and by non-generation resources capable of providing this service, and,

**(iv) Operating Reserve- Supplemental Service**, which, unlike Spinning Service, is not immediately available to serve load, but can be called upon in a short period of time from on-line but unloaded generating units, by quick-start generation, or by interruptible load or other non-generation resources capable of providing this service.

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Note: This glossary of terms was assembled by the Transmission Workshop Planning Committee and is intended to be a supplemental tool for the OPUC Transmission Workshops.

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

The Transmission Customer serving load within the Transmission Provider's Control Area is required to acquire these Ancillary Services, whether from the Transmission Provider, from a third party, or by self-supply.

**Available Transfer Capability (ATC)** is the transfer capability remaining on a transmission provider's transmission system that is available for further commercial activity over and above already committed uses. A Transmission Providers calculates ATC for their system using its own assumptions and methodologies.

**Balancing Authority (BA)** is the responsible entity that integrates forecasted generation and transmission schedules ahead of time, maintains load-interchange-generation balance within the BAA and supports interconnection frequency in real time

**Balancing Authority Area (BAA)** is the collection of generation, transmission and loads within the metered boundaries of the BA. The BA maintains load-resource balance within this area. BAA has the same meaning as "Control Area." Responsibilities of the BA within the BAA:

1. match, at all times, the power output of the generators within the electric power system(s) and capacity and energy purchased from entities outside the electric power system(s), with the load within the electric power system(s);
2. maintain scheduled interchange with other Control Areas, within the limits of Good Utility Practice;
3. maintain the frequency of the electric power system(s) within reasonable limits in accordance with Good Utility Practice; and
4. provide sufficient generating capacity to maintain operating reserves in accordance with Good Utility Practice.

A BAA may be composed of generation-only, load-only, or generation and load. In the Western Electricity Coordinating Council's western interconnection, there are a number of generation-only BAAs, in which case the balancing function is performed by balancing the difference between scheduled and actual generation.

**Block Trade** is a power trade designed to deliver energy over multiple hours.

**Bonneville Power Administration (BPA)** is the Federal power marketing agency under the U.S. Department of Energy responsible for marketing wholesale electric power from 31 Federal dams and one non-Federal nuclear plant throughout Washington, Oregon, Idaho, and western Montana and portions of California, Nevada, Utah, and Wyoming. BPA also sells and exchanges power with utilities in Canada and California. As a government entity, BPA is not subject to the same Federal Energy Regulatory Commission (FERC) jurisdiction and standards as investor-owned, FERC-jurisdictional transmission providers. Although not required by FERC, BPA has voluntarily adopted an Open Access Transmission Tariff with certain modifications.

**Bonneville Power Administration's Transmission Service Request Study and Expansion Process (BPA TSEP)** is BPA's name for its cluster study process to manage and respond to long-term firm transmission requests on the BPA network. TSEP was formerly known as Network Open Season (NOS).

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Bulk Electric System (BES)** includes all Transmission Elements operated at 100 kV or higher and Real Power and Reactive Power resources connected at 100 kV or higher. This does not include facilities used in the local distribution of electric energy.

**California Independent System Operator (CAISO)** is a state chartered, non-profit Independent System Operator serving California. It oversees the operation of California's bulk electric power system, transmission lines, and electricity market generated and transmitted by its member utilities.

**California-Oregon Intertie (COI)** is owned by the Bonneville Power Administration, Portland General Electric and PacifiCorp. The COI's capacity is currently 4800 MW. BPA owns the majority of the transmission capacity on the system and has responsibility for operating the COI. The COI consists of three 500 kilovolt transmission lines between Malin and Captain Jack substations in southern Oregon, and Round Mountain and Olinda substations in California.

COI Ownership Shares
BPA – 56.77 % of 4800 MW = 2725 MW
Portland General Electric-19.79 % of 4800 MW = 950 MW
PacifiCorp – 9.0 % of 4800 MW = 432 MW
Additional 693 MWs of 4800 MW owned by other utilities and marketing entities.

**Capacity Benefit Margin (CBM)** is the amount of firm transmission capability preserved by the Transmission Provider for load-serving entities, whose loads are located on that Transmission Provider's system, to enable access by the load-serving entities to generation from interconnected systems to meet generation reliability requirements.

**Cascading Power Failure** is an event when a part of the power grid fails, and shifts its power load to other elements in the grid. Overloaded, these elements also begin to shut down and shift their power load onto other elements, and so on. The resulting surge current can induce ongoing failures and take down an entire power system in a very short time, "cascading" through parts and systems like a ripple on a pond until the grid collapses.

**Clustering** is the process whereby a group of Interconnection Requests or Transmission Service Requests is studied together, instead of serially, for the purpose of conducting the studies to evaluate the need for any network upgrades.

**ColumbiaGrid** is a Regional Planning Organization formed in 2006 to improve the operational efficiency, reliability, and planned expansion of the Pacific Northwest transmission grid. The corporation itself does not own transmission, but its members and the parties to its agreements own and operate transmission facilities.

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Conditional Firm Transmission Service** is a type of Long-Term Firm transmission service for which there is a specified Number of Hours per year or specified System Condition in which the Transmission Provider can curtail the reservation prior to curtailing other Long-Term Firm service.

**Congestion** is a characteristic of the transmission system produced by a constraint on the optimum economic operation of the power system, such that the marginal price of energy to serve the next increment of load, exclusive of losses, at different locations on the transmission system is unequal.

**Congestion Revenue Rights (CRRs)** are financial instruments that enable rights holders to manage variability in congestion costs based on locational marginal pricing. CRRs are acquired primarily, although not solely, for offsetting integrated forward market congestion costs that occur in the day-ahead market.

**Consumer-owned Utility (COU)** is a nonprofit utility, owned by its members or consumers and operated within State law but essentially self-regulated by a board of directors elected from its membership. In Oregon, COUs include electric cooperatives, municipal electric utilities, and people's utility districts.

**Current** is the rate at which electrons flow through a circuit is defined as the current. If an electric circuit is likened to water flowing through a system of pipes, the current is analogous to the rate at which the water is flowing. Electric current is measured in amps.

**Curtailment** is a reduction in firm or non-firm transmission service in response to a transfer capability shortage as a result of system reliability conditions. Curtailment priorities are set by NERC as follows in this table:

Transmission Service Reservation Priorities		
Priority	Acronym	Name
0	NX	Next-hour Market Service
1	NS	Service over secondary receipt and delivery points
2	NH	Hourly Service
3	ND	Daily Service
4	NW	Weekly Service
5	NM	Monthly Service
6	NN	Network Integration Transmission Service from sources not designated as network resources
7	F	Firm Point-to-Point Transmission

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

	FN	Network Integration Transmission Service from Designated Resources
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**Direct Assignment Facilities** are facilities or portions of facilities that are constructed by the Transmission Provider for the sole use/benefit of a particular Transmission Customer or Generation Interconnection Customer requesting service under the Open Access Transmission Tariff. Direct Assignment Facilities shall be specified in the Service Agreement that governs service to the Transmission Customer or the Generation Interconnection Customer and shall be subject to Federal Energy Regulatory Commission approval. The costs of Direct Assignment Facilities will be allocated to an individual customer instead of being spread to all Transmission Customers.

**Direct Current (DC):** Electricity flowing continuously in one direction, the constant flow of electrons in a wire.

**Distribution Substation** is a substation made up of medium-voltage switchgear, transformers and low-voltage distribution equipment. It is used to transfer power from a medium-voltage electricity distribution system to a low-voltage distribution system that serves groups of domestic or industrial consumers.

**Dynamic Transfer** is a provision of the real-time monitoring, telemetering, computer software, hardware, communications, engineering, energy accounting (including inadvertent interchange), and administration required to electronically move all or a portion of the real energy services associated with a generator or load out of one Balancing Authority Area into another. A Dynamic Transfer can be either:

**Dynamic Schedule** a Dynamic Schedule: a telemetered reading or value that is updated in real time and used as a schedule in the AGC/ACE equation and the integrated value of which is treated as an after-the-fact schedule for Interchange accounting purposes.

**Pseudo-tie:** a functionality by which the output of a generating unit physically interconnected to the electric grid in a native BAA is telemetered to and deemed to be produced in an attaining BAA that provides BA services for and exercises BA jurisdiction over the generating unit.

**Dynamic Transfer Capability:** The capability of the transmission system to accommodate continuous ramping of a resource(s) over a pre-determined range, such that the control of the electrical output of such resources(s) can be varied from moment to moment by an entity other than the host utility/host Balancing Authority Area operator.

**Electromagnetic Fields (EMF)** is the combination of an electric field (around the charged particles) and the magnetic field (generated when the charged particles flow). All stationary charged particles are surrounded by an electric field (measured in volts/meter). Charged particles in motion (e.g., electrons in an electrical current) are also surrounded by a magnetic field (measured in amps/meter).

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Energy Imbalance Market (EIM)** is the real-time market to manage transmission congestion and optimize procurement of imbalance energy (positive or negative) to balance supply and demand deviations for the EIM Area through economic bids submitted by EIM Participating Resource Scheduling Coordinators in the fifteen-minute and five-minute markets.

**Energy Resource Interconnection Service** shall mean an Interconnection Service that allows the Interconnection Customer to connect its Generating Facility to the Transmission Provider's Transmission System to be eligible to deliver the Generating Facility's electric output using the existing firm or non-firm capacity of the Transmission Provider's Transmission System on an available basis. Energy Resource Interconnection Service in and of itself does not convey transmission service.

**Facilities Study** is an engineering study conducted by the Transmission Provider to determine the required modifications to the Transmission Provider's Transmission System, including the cost and scheduled completion date for such modifications that will be required to provide the requested transmission service. The Facilities Study is the second and final of the required studies completed to for transmission service requests.

**Federal Columbia River Power System (FCRPS)** is the power system constructed and operated by BPA and the hydroelectric dams constructed and operated by the U.S. Army Corps of Engineers and the Bureau of Reclamation in the Northwest.

**Federal Columbia River Transmission System (FCRTS)** is the electric transmission system in the Pacific Northwest built and operated by BPA for the FCRPS. Often referred to as the Federal transmission grid, or the BPA grid.

**Federal Energy Regulatory Commission (FERC)**, is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC also reviews proposals to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as licensing hydropower projects. The agency to which BPA submits its proposed power rate adjustments for approval.

**Feeder** is an overhead lines or cables that are used to distribute electrical power to consumers. Feeders connect distribution substations and consumers.

**Firm Point-To-Point Transmission Service** is Transmission Service that is reserved and/or scheduled between specified Points of Receipt and Delivery.

**Flexible Ramping Product** should enhance reliability and market performance through procuring flexible ramping capacity in the real-time market to help manage volatility and uncertainty of real-time imbalance demand.

**Flowgate (Cutplane):** Transmission lines and facilities owned by BPA on a constrained portion of BPA's internal network transmission grid or transmission lines and facilities owned by BPA and one or more neighboring transmission providers that are interconnected and the separately

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

owned facilities are operated in parallel in a coordinated manner, and each of the owners has an agreed upon allocated share of the transfer capability.

**Frequency Response Service** is necessary to provide for the continuous balancing of resources (generation and interchange) with load and for maintaining scheduled Interconnection frequency at sixty cycles per second (60 Hz). Service is accomplished by committing on-line generation whose output is raised or lowered (predominantly through the use of automatic generating control equipment) and by other non-generation resources capable of providing this service as necessary to follow the moment-by-moment changes in load.

**Fifteen Minute Market (FMM)** is a Real-Time market procedure conducted throughout the operating day in fifteen-minute increments prior to the Real-Time dispatch, to clear bids for Energy and Ancillary Services from imports and exports.

**Full Network Model (FNM)** is a computer-based model with detailed information for transmission network elements, and resources within a Balancing Authority Area. The FNM defines system parameters, price node and market scheduling limit mappings and includes planned network model updates.

**Grid Operator** is an entity that oversees the delivery of electricity over the grid to the customer, ensuring reliability and safety. A grid operator potentially could be independent of electric utilities or other suppliers.

**Independent Power Producer (IPP)** is a corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility.

**Integrated Resource Planning** means the energy utility's written plan satisfying the requirements of Oregon Public Utilities Commission Order Nos. 07-002, 07-047 and 08-339, detailing its determination of future long-term resource needs, its analysis of the expected costs and associated risks of the alternatives to meet those needs, and its action plan to select the best portfolio of resources to meet those needs.

**Interconnection Facilities Study** is a study conducted by the Transmission Provider or a third party consultant for the Interconnection Customer to determine a list of facilities (including Transmission Provider's Interconnection Facilities and Network Upgrades as identified in the Interconnection System Impact Study), the cost of those facilities, and the time required to interconnect the Generating Facility with the Transmission Provider's Transmission System.

**Interconnection Feasibility Study** shall mean a preliminary evaluation of the system impact and cost of interconnecting the Generating Facility to the Transmission Provider's Transmission System.

**Interconnection Queue (serial queued process)** is a queue based on first-come first-served, in which Transmission Providers assign sequential queue positions to customers with a valid interconnection request on the Transmission Provider's system. Interconnection studies are conducted for each generator by the order in which they are found in the queue, with each

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

interconnection study required to account for projects in the interconnection queue ahead of the project being studied.

**Interconnection System Impact Study** is an engineering study that evaluates the impact of the proposed interconnection on the safety and reliability of Transmission Provider's Transmission System and, if applicable, an Affected System.

**Interconnection Request** shall mean an Interconnection Customer's request, in the form outlined in the Transmission Provider's Open Access Transmission Tariff, to the Standard Large Generator Interconnection Procedures (LGIP applies to facilities larger than 20MW) or Standard Small Generator Interconnection Procedures (SGIP applies to facilities smaller than 20MW), to interconnect a new Generating Facility, or to increase the capacity of, or make a Material Modification to the operating characteristics of, an existing Generating Facility that is interconnected with the Transmission Provider's Transmission System.

**Inverter** is an electrical device for converting direct current (DC) into alternating current (AC). Equipment commonly used on solar and wind power generators.

**Investor-owned Utility (IOU)** is a utility owned by private investors.

**Legacy Contracts (Grandfathered Agreements)** are long-term agreements that predate certain FERC Orders (usually, pre-888) establishing competitive or open access markets. These agreements, on a case-by-case basis, may be treated differently by FERC.

**Load** in electrical terms is the power consumed by a device or a circuit. Load is also used to describe the total of all electricity consumers in a power system.

**Load Forecast** is a forecast of the total amount of power needed to be by an electric system at a point in time.

**Long-Term Firm Point-To-Point Transmission Service** is Firm Point-To-Point Transmission Service with a term of one year or more. Only Long-Term Firm Point-to-Point reservations with a term of five years or more come with renewal (Rollover Rights) rights.

**Locational Marginal Pricing** is a way for wholesale electric energy prices to reflect the value of electric energy at a specific time at different locations, accounting for the patterns of load, generation, and the physical limits of the transmission system.

**Loop Flow** is inadvertent transmission of power through an unnecessary diversion in the transmission network. It is undesirable because it serves no purpose and incurs losses.

**Market Hub** is a defined point, usually a geographical location or region, where multiple participants trade services (in effect, a micro-market that forms prices). An active trading site used by publishers of price indexes.



## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Market Operator** is an independent entity charged exclusively with the function of clearing and settling bids and offers in the most economic and reliable fashion to maintain generation and load balance.

**Merchant Function** are employees actively involved in the day-to-day sale of energy, capacity, demand response, transmission rights and any related virtual transactions.

**Market Power** is the ability of any market participant with a large market share to significantly control or affect price by withholding production from the market, limiting service availability, or reducing purchases.

**Mid-Columbia (Mid-C)** is a set of projects which includes the following hydropower dams: Wells (Douglas PUD), Rocky Reach (Chelan PUD), Rock Island (Chelan PUD), Wanapum (Grant County PUD) and Priest Rapids (Grant County PUD). Mid-C Hub incorporates the Mid-Columbia participants' projects, including transmission, to facilitate market transactions among the Mid-Columbia participants. Northwest Hub is BPA's Mid-C market hub. It includes the following BPA facilities in the Mid-C area: Vantage Substation, Midway Substation, Sickler Substation, Columbia Substation and Valhalla Substation. It operates as a composite point with BPA Transmission as the Balancing Authority/Transmission Owner/Transmission Operator. FERC recognizes "Mid-Columbia" as an electric trading hub in the Northwest.

**Montana Intertie** refers to the 500 kilovolt and 230 kilovolt transmission line(s) from the Colstrip generating plants to Garrison substation in Montana. Jointly built by BPA and the Colstrip Project's Montana Intertie Users.

**Native Load Customers** are the wholesale and retail power customers of the Transmission Provider on whose behalf the Transmission Provider, by statute, franchise, regulatory requirement, or contract, has undertaken an obligation to construct and operate the Transmission Provider's system to meet the reliable electric needs of such customers.

**National Environmental Policy Act of 1969(NEPA)** is federal law that requires federal agencies to prepare a "detailed statement" for proposed major actions which significantly affect the quality of the human environment. The statement must include the environmental impacts of the proposed action, alternatives to the proposed action, and any adverse environmental impacts which cannot be avoided should the proposal be implemented. Agencies were required to prepare environmental analyses, with input from the state and local governments, Indian tribes, the public, and other federal agencies, when considering a proposal for a major federal action.

**NEPA Process** begins when a project proponent files a permit application with a federal agency requiring the federal agency to take a federal action. These actions are defined in the Code of Federal Regulation. The environmental review under NEPA can involve three different levels of analysis (study): 1) Categorical Exclusion, 2) Environmental Assessment/Finding of No Significant Impact, 2) Environmental Impact Statement. The NEPA Process requires NEPA-related studies for projects impacting Federal lands and facilities.

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Network Customer** is an entity receiving transmission service pursuant to the terms of the Transmission Provider's Network Integration Transmission Service (NITS).

**Network Integration Transmission Service (NITS)** is Transmission Service that allows the Network Customer to integrate, economically dispatch and regulate its current and planned Network Resources to serve its Network Load in a manner comparable to that in which the Transmission Provider utilizes its Transmission System to serve its Native Load Customers. Network Integration Transmission Service also may be used by the Network Customer to deliver economy energy purchases to its Network Load from non-designated resources on an as-available basis without additional charge. Transmission service for sales to non-designated loads will be provided pursuant to the applicable terms and conditions of the Tariff.

**Network Load** is the load that a Network Customer designates for Network Integration Transmission Service under the provisions of the Tariff. The Network Customer's Network Load shall include all load served by the output of any Network Resources designated by the Network Customer. A Network Customer may elect to designate less than its total load as Network Load but may not designate only part of the load at a discrete Point of Delivery. Where an Eligible Customer has elected not to designate a particular load at discrete points of delivery as Network Load, the Eligible Customer is responsible for making separate arrangements according to provisions of the Tariff for any Point-To-Point Transmission Service that may be necessary for such non-designated load.

**Network Resource Interconnection Service** shall mean an Interconnection Service that allows the Interconnection Customer to integrate its Generating Facility with the Transmission Provider's Transmission System (1) in a manner comparable to that in which the Transmission Provider integrates its generating facilities to serve native load customers; or (2) in an Regional Transmission Organization or Independent System Operator with market based congestion management, in the same manner as Network Resources. Network Resource Interconnection Service in and of itself does not convey transmission service.

**Network Resource (NR)** is any designated generating resource owned, purchased, or leased by a Network Customer under the Network Integration Transmission Service Tariff. Network Resources do not include any resource, or any portion thereof, that is committed for sale to third parties or otherwise cannot be called upon to meet the Network Customer's Network Load on a non-interruptible basis.

**Network Upgrade** is any modification or addition to transmission-related facilities that are integrated with and support the Transmission Provider's overall Transmission System for the general benefit of all users of such Transmission System.

**Nomogram** is a chart showing the relationship between multiple variables, in the case of transmission lines, it depicts the maximum transmission capability when transmission lines interact with each other. The nomogram establishes the maximum combined capability when the transmission lines interact and is used to help determine the allocation of that capacity to the transmission providers.

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Non-Firm Point-To-Point Transmission Service** is Point-To-Point Transmission Service under the Tariff that is reserved and scheduled on an as-available basis and is subject to Curtailment or Interruption as set forth in the Tariff. Non-Firm Point-To-Point Transmission Service is available on a stand-alone basis for periods ranging from one hour to one month.

**Non-Simultaneous Transfer Capability** is the capability in megawatts of a circuit or path to transfer power reliably and in accordance with prescribed reliability criteria independent of concurrent flows on other circuits or paths.

**Non-Wires Alternatives (NWA)** are solutions to meet load demand that are not traditional poles and wires projects. Non-Wires Alternatives are achieved through advances in grid management and distributed energy resources (DER) technologies.

**North American Electric Reliability Corporation (NERC)** is a not-for-profit international regulatory authority whose mission is to assure the effective and efficient reduction of risks to the reliability and security of the transmission grid. NERC develops and enforces Reliability Standards; annually assesses seasonal and long-term reliability; monitors the bulk power system through system awareness; and educates, trains, and certifies industry personnel. NERC's area of responsibility spans the continental United States, Canada, and the northern portion of Baja California, Mexico. NERC is the electric reliability organization (ERO) for North America, subject to oversight by the Federal Energy Regulatory Commission (FERC) and governmental authorities in Canada. NERC's jurisdiction includes users, owners, and operators of the bulk power system.

**Northern Intertie** are those BPA facilities associated with the interconnection between BPA and Canadian utility BC Hydro. .

**Northern Tier Transmission Group (NTTG)** is a group of transmission providers and customers that are actively involved in the sale and purchase of transmission capacity of the power grid that delivers electricity to customers in the Northwest and Mountain States. Transmission owners serving this territory work in conjunction with state governments, customers, and other stakeholders to improve the operations of and chart the future for the grid that links all of these service territories.

**Northwest Power and Conservation Council (Council)** is an eight-member council, established by the Pacific Northwest Electric Power Planning and Conservation Act. Comprised of two voting members from the four Northwestern states—Washington, Oregon, Idaho, and Montana. Helps guide BPA and the region with planning for conservation and generation resources and for protection, mitigation, and enhancement of fish and wildlife in the Columbia River Basin.

**Northwest Power Pool (NWPP)** facilitates the sharing, assessment, reporting and training that enables its members to achieve the reliable operation of the electric power system serving the Northwestern U.S., British Columbia and Alberta. Smaller, principally non-generating utilities in the region participate indirectly through the member system with which they are interconnected.

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**N-1** is used in transmission system planning to model contingencies for reliability. N-1 refers specifically to a sequence of events consisting of the initial loss of a single generator or transmission component.

**N-2** is used in Transmission system planning to model contingencies for reliability. N-2 refers specifically to a sequence of events consisting of the initial loss of two generator or transmission components.

**Open Access Same-Time Information System (OASIS)** is the information system and standards of conduct contained in Part 37 of the Federal Energy Regulatory Commission's regulations and all additional requirements implemented by subsequent Federal Energy Regulatory Commission orders dealing with OASIS.

**Open-Access Transmission Tariff (OATT)** requires that all public utilities (IOUs) that own, control or operate facilities used for transmitting electric energy in interstate commerce to have on file open access non-discriminatory transmission tariffs that contain minimum terms and conditions of non-discriminatory service, and permits public utilities and transmitting utilities to seek recovery of legitimate, prudent and verifiable stranded costs associated with providing open access and Federal Power Act section 211 transmission services.

**Operating Reserves – Spinning Reserve Service** is needed to serve load immediately in the event of a system contingency. Spinning Reserve Service may be provided by generating units that are on-line and loaded at less than maximum output and by non-generation resources capable of providing this service.

**Operating Reserves – Supplemental Reserve Service** is needed to serve load in the event of a system contingency; however, it is not available immediately to serve load but rather within a short period of time. Supplemental Reserve Service may be provided by generating units that are on-line but unloaded, by quick-start generation or by interruptible load or other non-generation resources capable of providing this service.

**Outage Management System (OMS)** is a computer system used by operators of electric distribution systems to assist in restoration of power.

**Pacific Direct Current Intertie (PDCI)** is the 846-mile long direct current transmission line connecting the Northwest at The Dalles, Oregon, with the Pacific Southwest at Sylmar, California, near Los Angeles. At each end, a converter station changes alternating current to direct current and back.

**Path Rating** is the maximum path rating in MW that has been demonstrated to WECC through study results or actual operation, whichever is greater. For a path with transfer capability limits that vary seasonally, it is the maximum of all the seasonal values.

**Peak Demand** is the maximum load demand that has occurred on the electric grid over a specific amount of time.

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Point of Delivery** is a location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction leaves or a Load-Serving Entity receives its energy.

**Point of Receipt** is a location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction enters or a generator delivers its output.

**Point to Point (PTP)** is the reservation and transmission of capacity and energy on either a firm or non-firm basis from the Point(s) of Receipt (POR) to the Point(s) of Delivery (POD).

**Power Flow Study** is a numerical analysis of the flow of electric power in an interconnected system. A power-flow study usually uses simplified notations such as a one-line diagram and per-unit system, and focuses on various aspects of AC power parameters, such as voltages, voltage angles, real power and reactive power. It analyzes the power systems under normal and contingency conditions.

**Power Losses** generally refers to electrical energy that is lost to inefficiencies in transmission, distribution, or in the use of electricity. As electricity flows through a conductor, individual electrons collide with the atoms of the conductor and transfer energy to them, causing them to heat up. This heat is lost to the atmosphere in the form of thermal radiation. Some power is also lost to electromagnetic radiation. Losses in an electricity distribution system depend on the length of the cable (the longer the cable, the greater the losses); the conductivity of the material (higher resistance means greater losses) and the cross-sectional area of the cable. Therefore, to minimize losses, power should be transmitted at the highest practical voltage. This reduces the current and therefore the amount of power lost in transmission.

**Power Marketing Administrations (PMA)** are the four federal Power Marketing Administrations (PMAs) that operate electric systems and sell the electrical output of federally owned and operated hydroelectric dams in 33 states, including the Bonneville Power Administration (BPA) and various regions of the Western Area Power Administration (WAPA).

**Production Cost Modeling** is the process of allocating required load demand between available generation units such that the cost of operation is minimized. Production Cost Models use various inputs to forecast the expected amount of electricity produced by different power generation units and the expected cost of producing that electricity for a given power generation system.

**Public Utility Regulatory Act of 1978 (PURPA)** is a United States Act passed as part of the National Energy Act. It was meant to promote energy conservation (reduce demand) and promote greater use of domestic energy and renewable energy (increase supply). The law was created in response to the 1973 energy crisis. The Act was intended to encourage market creation for power from non-utility power producers, increase efficiency by making use of cogeneration, end promotional rate structures, encourage the development of hydroelectric power and promote the conservation of electric energy and natural gas. Although a Federal law, PURPA's implementation was left to the individual states.

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Qualifying Facilities (QFs)** a class of generating facility that are self-designated by the generator developer utilizing rules established under PURPA. These facilities fall into two categories: qualifying small power production facilities and qualifying cogeneration facilities.

**Queue Position** shall mean the order of a valid Interconnection Request or Transmission Service Request, relative to all other pending valid requests, that is established based upon the date and time of receipt of the valid request by the Transmission Provider.

**Real-Time Dispatch (RTD)** is the optimization of Ancillary Services and Imbalance Energy resources to dispatch and determine Locational Margin Pricing for the operating hour.

**Redirects** allow Transmission Customers to request an alternate Point of Receipt and/or Point of Delivery for any confirmed Point-to-Point Firm Transmission Service reservation. The Transmission Customer may request a redirect for a portion or all of the time period of the original request, so long as the redirect request represents a multiple of an offered service product.

**Resource Adequacy (RA)** requires Load Serving Entities to demonstrate that they have procured sufficient capacity to serve peak load, and some measure more, to ensure system reliability under most conditions. Resource committed to provide RA undertakes a “must-offer” obligation to bid or self-schedule its capacity into the CAISO market.

**Regional Planning Organization (RPO)** is a regional transmission planning group responsible for meeting FERC requirements for regional coordination in transmission planning. An RPO is not responsible for operation.

**Regional Transmission Organization (RTO)** is a voluntary organization of electric transmission owners, transmission users and other entities approved by the Federal Energy Regulatory Commission to efficiently coordinate electric transmission planning (and expansion), operation and use on a regional (and interregional) basis. Operation of transmission facilities by the RTO must be performed on a non-discriminatory basis.

**Regulating Reserves** are the amount of reserve responsive to Automatic Generation Control, which is sufficient to provide normal regulating margin.

**Reliability Coordinator** is the entity that is the highest level of authority who is responsible for the Reliable Operation of the Bulk Electric System, has the Wide Area view of the Bulk Electric System, and has the operating tools, processes and procedures, including the authority to prevent or mitigate emergency operating situations in both next-day analysis and real-time operations. The Reliability Coordinator has the purview that is broad enough to enable the calculation of Interconnection Reliability Operating Limits, which may be based on the operating parameters of transmission systems beyond any Transmission Operator’s vision.

**Remedial Action Scheme (RAS)** is a scheme designed to detect predetermined System conditions and automatically take corrective actions that may include, but are not limited to,

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

adjusting or tripping generation (MW and Mvar), tripping load, or reconfiguring a System(s). RAS accomplish objectives such as:

- Meet requirements identified in the NERC Reliability Standards;
- Maintain Bulk Electric System (BES) stability;
- Maintain acceptable BES voltages;
- Maintain acceptable BES power flows;
- Limit the impact of Cascading or extreme events.

**Revenue Requirement** refers to the revenue that a regulated utility needs to earn in a test year to provide adequate service to its customers and a fair return for its shareholders.

**Residual Unit Commitment (RUC)** is the process for committing resources that will be needed for the next day. These committed resources must be ready to generate electricity and have procured capacity to reliably solve differences between the delta between forecast and demand.

**Rollover Rights** are ongoing rights granted to transmission customers to renew or “rollover” their transmission service agreements, this service is applicable to firm point to point service with a term of 5 years or longer.

**Security Constrained Economic Dispatch (SCED)** is the operation of generation facilities to produce energy at the lowest cost to reliably serve consumers, recognizing any operation limits of generation and transmission facilities.

**Security Constrained Unit Commitment (SCUC)** is the committing of energy units while respecting limitations of both the transmission system and unit operating characteristics.

**Secondary Network Service** provides that Network Customer may use the Transmission Provider's Transmission System to deliver energy to its Network Loads from resources that have not been designated as Network Resources. Such energy shall be transmitted, on an as-available basis, at no additional charge. Secondary service shall not require the filing of an Application for Network Integration Transmission Service under the Tariff. However, all other requirements of the Tariff (except for transmission rates) shall apply to secondary service. Deliveries from resources other than Network Resources will have a higher priority than any Non-Firm Point-To-Point Transmission Service under the Tariff.

**Simultaneous Transfer Capability** is the capacity in megawatts of a transmission circuit or path to transfer power reliably and in accordance with prescribed reliability criteria in concert with other interacting circuits, paths or generators.

**Short-Term Firm Point-To-Point Transmission Service** is Firm Point-To-Point Transmission Service under the Tariff with a term of less than one year.

**Stability Study** is a numerical analysis of the behavior of the electric power system in response to a transient disturbance. A stability study usually evaluates various aspects of AC power parameters, such as voltages, voltage angles, frequency and machine rotor angles during fault conditions and the short period of time immediately following clearing of a fault.

## OPUC Transmission Workshops – Glossary of Common Transmission Terms

**Substations** are key installations in the power grid. They house equipment for the protection and control of electrical power transmission and distribution, including power transformers, switchgear and measuring equipment.

**System Impact Study (SIS)** is an assessment by the Transmission Provider of (i) the adequacy of the Transmission System to accommodate a request for either Firm Point-To-Point Transmission Service or Network Integration Transmission Service and (ii) whether any additional costs may be incurred in order to provide transmission service. This is the first of the studies required for a customer to obtain new transmission service.

**System Operating Limit (SOL)** is an adjustment to the TTC of a posted transmission path during the Scheduling and Operating Horizons for seasonal system performance and power flows and or variations in dispatch and load patterns, as well as when the system is in an abnormal operating state, such as during forced or planned line outages. During periods when an SOL value is required, the transmission path scheduling limit will be the SOL instead of the TTC. SOL represents the reliability limit of a transmission path at the point in time and for the duration of the system abnormality.

**Time-of-Use Rates** better align the price of energy with the cost of energy at the time it is produced. Lower rates during partial-peak and off-peak hours offer an incentive for customers to shift energy use away from more expensive peak hours, which can reduce strain on the electric grid.

**Transmission Reliability Margin (TRM)** is the amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change.

**Transmission Service Queue** is maintained on OASIS by the Transmission Provider. It is the repository for Transmission Service Requests made by Transmission Customers to the Transmission Providers for transmission services offered by Transmission Providers subject to the terms of each Transmission Provider's OATT.

**Transmission Service Request** is a request made through OASIS for services needed to move energy from a Point of Receipt to a Point of Delivery provided to Transmission Customers by Transmission Providers.

**Total Transfer Capability (TTC)** is the amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines (or paths) between those areas under specified system conditions.

**Transmission Planning** under the OATT requires that each Transmission Provider shall establish a coordinated, open and transparent planning process with its Network and Firm Point-to-Point Transmission Customers and other interested parties, including the coordination of such planning with interconnected systems within its region, to ensure that the Transmission System is



## OPUC Transmission Workshops – Glossary of Common Transmission Terms

planned to meet the needs of both the Transmission Provider and its Network and Firm Point-to-Point Transmission Customers on a comparable and nondiscriminatory basis. The Transmission Provider's coordinated, open and transparent planning process shall be provided as an attachment to the Transmission Provider's Tariff. Attachment K to the OATT outlines processes for local, regional, interregional coordination, and interconnection wide planning.

**Volt** is a unit of measure for electromotive force (EMF), the electrical potential between two points. Using a common plumbing analogy, voltage is similar to water pressure and current is analogous to flow (e.g. liters per minute). For transmission the term kilovolt (1,000 volts) is commonly used.

**Voltage Support** is provided by generating units or static equipment capable of producing or absorbing reactive power. This is done to maintain voltages on transmission systems for reliability.

**Western Electricity Coordinating Council (WECC)** promotes Bulk Electric System reliability in the Western Interconnection. WECC is the Regional Entity responsible for compliance monitoring and enforcement. WECC is under the authority of the North American Electric Reliability Corporation, but it develops standards specific to the Western region.

**WECC Path** is a designated path defined as a facility(ies) between systems or internal to a system for which schedules and/or actual flows can be monitored for reliability purposes. Paths are often referred to as "cut planes".

**WECC Preschedule** is defined as day or days-ahead balancing of Interchange Schedules between entities within the Western Interconnection. Daily Assessment Data is, also, exchanged during prescheduling. This data exchange concerns loads, resources and other intra BA information that a BA or RC needs to perform studies, fulfill requirements in NERC standards and assure its system is balanced.

**Wheeling** is the transfer of electrical power through transmission and distribution lines from one utility's service area to another's. Wheeling can occur between two adjacent utilities, or between utilities in different states. Wheeling across transmission systems is generally referred to as wholesale wheeling which is the sale and delivery of energy among buyers and sellers in the wholesale market to parties who take delivery of the energy on the transmission system.