GLOSSARY

G – Glossary [E]

Chapters

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History of changes

v2.2	**draft**	**24.06.2004**	**UCTE Secreteriat**	**glossary update**
v2.1	**draft**	**12.05.2004**	**UCTE Secretariat**	**new terms added**
v2.0	**draft**	**01.03.2004**	**OpHB-Team**	**minor changes, linguistic review**

Current status

This glossary is a growing list of terms[1], acronyms and units commonly used in the policies and appendices of the Operation Handbook. In order to identify common terms of this glossary when used in any document, all terms listed in this glossary shall be formatted in a "CAPITALISED" manner (but not written in capital letters).

This version of the document (version 2.2, level E, dated 24.06.2004) has "final " status.

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[1]: Additional terms to be included shall be submitted to the UCTE secretariat (✉Jakub.Fijalkowski@ucte.org) or to the secretary of the UCTE WG Operations & Security (✉jens.albrecht@rwe.com).

A. Glossary of terms

[UCTE ground rule for the co-ordination of the accounting and the organisation of the load-frequency control, 1999]
[Articles of association of the UCTE, 2001]
[NERC glossary of terms, 08.1996, ETSO Definitions of Transfer Capacities in liberalised Electricity Markets, 2001]

Term (Acronym) {Synonym} *(⇻References)*

Definition / explanation, CROSS-REFERENCE.

Accounting {Energy ~, ~ of Unintentional Deviations} *(⇻P2)*

After the EXCHANGE PROGRAMS have been validated during the scheduling phase, and taking into account the real-time observation of UNINTENTIONAL DEVIATIONS across a set of OBSERVATION LINES, ACCOUNTING is the organisational process implemented in order to:

- collect the provisional and the final values of the exchanged energy for each time interval;
- determine the UNINTENTIONAL DEVIATIONS of energy and set-up the corresponding COMPENSATION PROGRAMS for their offsetting during the following week.

Accounting Co-ordination *(⇻P2)*

ACCOUNTING CO-ORDINATION means a co-ordination service provided to the CONTROL BLOCKS, by the sites in charge of performing the ACCOUNTING CO-ORDINATION for the purpose of carrying out the ACCOUNTING. It consists of the following phases:

- acquisition and validation of the EXCHANGE PROGRAMS between the CONTROL BLOCKS during the scheduling phase;
- acquisition of the EMRs' values of TIE-LINES[2] among CONTROL BLOCKS to compute the provisional energy exchanges;
- real-time observation across the previously defined OBSERVATION LINES;
- computation of the provisional and final UNINTENTIONAL DEVIATIONS;
- computation of the COMPENSATION PROGRAMS for each CONTROL BLOCK.

If these tasks are performed at different locations, a very close co-operation must be ensured among the centres responsible for these activities.

Responsibility for correct ACCOUNTING remains with the co-ordinators of the individual CONTROL BLOCKS and CONTROL AREAS. Responsibility for this matter cannot be delegated to the ACCOUNTING CO-ORDINATION. The CONTROL BLOCKS and CONTROL AREAS are responsible for the resources required to provide the results of the ACCOUNTING. In order to be able to monitor and supervise the operation of their CONTROL BLOCK or CONTROL AREA, they all need to be equipped with a real-time data acquisition system.

The ACCOUNTING CO-ORDINATION is provided with the necessary data to enable some checking at a global level and to give extra confirmation to the co-ordinators of the CONTROL BLOCKS and CONTROL AREAS that no major mistake has gone undetected or that, if such an error should occur, it would not stay undetected for a long time.

Active Power

ACTIVE POWER is a real component of the apparent power, usually expressed in kilowatts (kW) or megawatts (MW), in contrast to REACTIVE POWER.

[2] Including virtual TIE-LINES that may exist for the operation of jointly owned power plants.

Adjacent Control Area {Adjacent System} *(⏩P1-B)*

An ADJACENT CONTROL AREA (or ADJACENT SYSTEM) is any CONTROL AREA (or system) either directly interconnected with or electrically close to (so as to be significantly affected by the existence of) another CONTROL AREA (or system).

Ancillary Services *(⏩P1)*

ANCILLARY SERVICES are Interconnected Operations Services identified as necessary to effect a transfer of electricity between purchasing and selling entities (TRANSMISSION) and which a provider of TRANSMISSION services must include in an open access transmission tariff.

Apparent Power

APPARENT POWER is the product of voltage (in volts) and current (in amperes). It consists of a real component (ACTIVE POWER) and an imaginary component (REACTIVE POWER), usually expressed in kilovolt-amperes (kVA) or megavolt-amperes (MVA).

Already Allocated Capacity (AAC)

The ALREADY ALLOCATED CAPACITY is the total amount of allocated transmission rights, whether they are capacity or EXCHANGE PROGRAMS depending on the allocation method.

Area Control Error (ACE) *(⏩P1-B)*

The AREA CONTROL ERROR is the instantaneous difference between the actual and the reference value (measured total power value and scheduled CONTROL PROGRAM) for the power interchange of a CONTROL AREA (UNINTENTIONAL DEVIATION), taking into account the effect of the FREQUENCY BIAS for that CONTROL AREA according to the NETWORK POWER FREQUENCY CHARACTERISTIC of that CONTROL AREA and the overall FREQUENCY DEVIATION.

Automatic Generation Control (AGC) *(⏩P1-B)*

AUTOMATIC GENERATION CONTROL is an equipment that automatically adjusts the generation to maintain its generation dispatch, interchange schedule plus its share of frequency regulation. AGC is a combination of SECONDARY CONTROL for a CONTROL AREA / BLOCK and real-time operation of the generation dispatch function (based on generation scheduling). SECONDARY CONTROL is operated by the TSO, generation scheduling is operated by the respective generation companies (GENCOs).

Availability

AVAILABILITY is a measure of time during which a generating unit, transmission line, ANCILLARY SERVICE or another facility is capable of providing service, whether or not it actually is in service. Typically, this measure is expressed as a percentage available for the period under consideration.

Available Transfer Capacity (ATC)

AVAILABLE TRANSFER CAPACITY is a measure of the transfer capability remaining in the physical TRANSMISSION network for further commercial activity over and above already committed uses. AVAILABLE TRANSMISSION CAPACITY is the part of NTC that remains available after each phase of the allocation procedure for further commercial activity. ATC is defined by the following equation:

ATC = NTC- AAC

Black-start Capability *(⏩P3, ⏩P5)*

BLACK-START CAPABILITY is the ability of a generating unit to go from a shutdown condition to an operating condition and start delivering power without assistance from the electric system.

Capacity

CAPACITY is the rated continuous load-carrying ability of generation, transmission, or other electrical equipment, expressed in megawatts (MW) for ACTIVE POWER or megavolt-amperes (MVA) for APPARENT POWER.

Compensation program

Compensation of UNINTENTIONAL DEVIATIONS is performed by exporting to / importing from the interconnected system during the compensation period by means of schedules of constant power within the same tariff periods as when they occurred (COMP).

Consumption

See: DEMAND

Contingency *(⏩P3)*

CONTINGENCY is the unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch, or other electrical element. A CONTINGENCY also may include multiple components, which are related by situations leading to simultaneous component outages.

Control Area (CA) *(⏩P1-B)*

A CONTROL AREA is a coherent part of the UCTE INTERCONNECTED SYSTEM (usually coincident with the territory of a company, a country or a geographical area, physically demarcated by the position of points for measurement of the interchanged power and energy to the remaining interconnected network), operated by a single TSO, with physical loads and controllable generation units connected within the CONTROL AREA. A CONTROL AREA may be a coherent part of a CONTROL BLOCK that has its own subordinate control in the hierarchy of SECONDARY CONTROL.

Control Block (CB) *(⏩P1-B)*

A CONTROL BLOCK comprises one or more CONTROL AREAS, working together in the SECONDARY CONTROL function, with respect to the other CONTROL BLOCKS of the SYNCHRONOUS AREA it belongs to.

Control Area Operator *(⏩P2)*

A CONTROL AREA OPERATOR is the operator of a CONTROL AREA usually a TSO.

Control Block Operator *(⏩P2)*

The BLOCK OPERATOR is a single TSO that is responsible for SECONDARY CONTROL of the whole CONTROL BLOCK towards its interconnected neighbours / blocks, for ACCOUNTING of all CONTROL AREAS of that block, for organisation of the internal SECONDARY CONTROL within the block, and that operates the overall control of that block.

Control Program (CP)

(⏩P1-B, ⏩P2)

A CONTROL PROGRAM constitutes the SCHEDULE of the total programmed exchange of a CONTROL AREA / BLOCK, the sum of all EXCHANGE PROGRAMS and the COMPENSATION PROGRAM, that is used for SECONDARY CONTROL.

Co-ordination centre (CC)

The CO-ORDINATION CENTRE is responsible for acquiring and validating the EXCHANGE PROGRAMMES among the CONTROL BLOCKS during the scheduling phase, acquiring the energy meter readings values of TIE-LINES among the CONTROL BLOCKS to compute the UNINTENTIONAL DEVIATIONS and the COMPENSATION PROGRAM to be carried out the following week in order to offset said UNINTENTIONAL DEVIATIONS. This task is shared among the CO-ORDINATION CENTRES UCTE North in Brauweiler and UCTE South in Laufenburg.

Curtailment

CURTAILMENT means a reduction in the scheduled capacity or energy delivery.

Defence Plan

(⏩P5)

The DEFENCE PLAN summarises all technical and organisational measures taken to prevent the propagation or deterioration of a power system incident in order to avoid a collapse.

Demand {Consumption}

DEMAND is the rate at which electric power is delivered to or by a system or part of a system, generally expressed in kilowatts (kW) or megawatts (MW), at a given instant or averaged over any designated interval of time. DEMAND should not be confused with LOAD (a LOAD is usually a device).

Disturbance

DISTURBANCE is an unplanned event that produces an abnormal system condition.

Droop of a Generator

(⏩P1-A, ⏩A1-A)

The DROOP OF A GENERATOR is one of the parameters set on the primary speed controller of a GENERATING SET (generator and turbine). It is equal to the quotient of the relative quasi-steady-state FREQUENCY OFFSET on the network and the relative variation in power output from the generator associated with the action of the PRIMARY CONTROLLER. This ratio without dimension is generally expressed as a percentage.

Electrical Energy

ELECTRICAL ENERGY is a measure of the generation or use of electric power by a device integrated over a period of time; it is expressed in kilowatt-hours (kWh), megawatt-hours (MWh), or gigawatt-hours (GWh).

Electric System Losses

ELECTRIC SYSTEM LOSSES are total electric energy losses in the electric system. The losses consist of TRANSMISSION, transformation, and distribution losses between supply sources and delivery points. Electric energy is lost primarily due to heating of transmission and distribution elements.

Electronic Highway (EH) *(⏩P6)*

The ELECTRONIC HIGHWAY represents a secure, fast, reliable and highly available communication infrastructure for real-time and non-real-time data exchanges between TSOs.

Energy Meter Readings (EMRs) *(⏩P2)*

ENERGY METER READINGS are performed (in addition to those for internal lines, transformers, generators and LOADS) for actual energy exchanges on TIE-LINES[3] between CONTROL BLOCKS (of CONTROL AREAS) to carry out the ACCOUNTING function (e.g.: to compute, together with scheduled exchanges, the UNINTENTIONAL DEVIATIONS for each time interval).

Exchange Program (CAX, CBX) *(⏩P2)*

An EXCHANGE PROGRAM represents the total scheduled energy interchange between two CONTROL AREAS (CAX) OR BETWEEN CONTROL BLOCKS (CBX).

Exchange Schedule (CAS, CBS) *(⏩P2)*

An EXCHANGE SCHEDULE defines an agreed transaction with regard to its size (megawatts), start and end time, RAMP PERIOD and type (e.g. firmness); it is required for delivery and receipt of power and energy between the contracting parties and the CONTROL AREA(S) (CAS) or between control areas and control blocks (CBS) involved in the transaction.

Frequency

see: SYSTEM FREQUENCY

Frequency Bias

see: NETWORK POWER FREQUENCY CHARACTERISTIC

Frequency Control

See: PRIMARY CONTROL.

Frequency Deviation *(⏩P1)*

FREQUENCY DEVIATION means a departure of the actual SYSTEM FREQUENCY from the set value frequency.

Frequency Offset *(⏩P1-D)*

FREQUENCY OFFSET is the difference between the actual and the nominal value of the SYSTEM FREQUENCY in order to correct the SYNCHRONOUS TIME (TIME CONTROL); it is not identical with FREQUENCY DEVIATION.

Generation

GENERATION is the rate at which a GENERATION SET delivers electric power to a system or part of a system, generally expressed in kilowatts (kW) or megawatts (MW), at a given instant or averaged over any designated interval of time, see also: DEMAND.

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[3] Including virtual tie-lines that may exist for the operation of jointly owned power plants.

Generation Set (⏩P1)

A GENERATION SET is a set of machines consisting of a generator (and its driving apparatus) and a turbine of a generation unit.

Inadvertent Deviation

see UNINTENTIONAL DEVIATION.

Interconnected System

An INTERCONNECTED SYSTEM is a system consisting of two or more individual electric systems that normally operate in synchronism and are physically connected via TIE-LINES, see also: SYNCHRONOUS AREA.

Interconnection

An INTERCONNECTION is a transmission link (e.g. TIE-LINE or transformer) which connects two CONTROL AREAS.

Intra-Control-Area Transaction

An INTRA-CONTROL-AREA TRANSACTION is a transaction carried out from one or more generating sources to one or more delivery points where all the sources and delivery points are entirely located within the metered boundaries of the same CONTROL AREA.

Island (⏩P1)

An ISLAND represents a portion of a power system or of several power systems that is electrically separated from the main INTERCONNECTED SYSTEM (separation resulting e.g. from the disconnection / failure of transmission system elements).

K-Factor (⏩P1-B)

The K-FACTOR is a value, usually given in megawatts per Hertz (MW/Hz), which is normally determined for a (single) CONTROL AREA / BLOCK; it defines the FREQUENCY BIAS of that CONTROL AREA for SECONDARY CONTROL (especially to assure the functionality of the NETWORK CHARACTERISTIC METHOD); it is not to be confused with the NETWORK POWER FREQUENCY CHARACTERISTIC.

Load

LOAD means an end-use device or customer that receives power from the electric system. LOAD should not be confused with DEMAND, which is the measure of power that a load receives or requires. LOAD is often wrongly used as a synonym for DEMAND.

Load-Frequency Control (LFC)

See: SECONDARY CONTROL

Load-Shedding (⏩P1, ⏩P3)

LOAD-SHEDDING is the disconnection of LOAD from the synchronous electric system, usually performed automatically, to control the SYSTEM FREQUENCY in emergency situations.

Loop Flows

See: PARALLEL PATH FLOWS.

Metering

METERING describes the methods of applying devices that measure and register the amount and direction of electrical quantities with respect to time.

Minute Reserve {15 Minute Reserve}

See: TERTIARY CONTROL RESERVE

N-1 Criterion *(⏩P3)*

The N-1 CRITERION is a rule according to which elements remaining in operation after failure of a single network element (such as transmission line / transformer or generating unit, or in certain instances a bus-bar) must be capable of accommodating the change of flows in the network caused by that single failure.

Net Transfer Capacity (NTC)

The NET TRANSFER CAPACITY is defined as:

NTC = TTC-TRM

The NET TRANSFER CAPACITY is the maximum total EXCHANGE PROGRAM between two ADJACENT CONTROL AREAS compatible with security standards applicable in all CONTROL AREAS of the SYNCHRONOUS AREA, and taking into account the technical uncertainties on future network conditions.

Network Characteristic Method *(⏩P1-B)*

The properties required for SECONDARY CONTROL are produced by the NETWORK CHARACTERISTIC METHOD. The purpose of SECONDARY CONTROL is to move the overall FREQUENCY DEVIATION and POWER DEVIATION of the CONTROL AREA / BLOCK considered towards zero.

The NETWORK CHARACTERISTIC METHOD (to be applied to all CONTROL AREAS in the same way and at the same time) assures the control of two variables at the same time with one set-point value, as long as the NETWORK POWER FREQUENCY CHARACTERISTIC is used.

Network Power Frequency Characteristic *(⏩P1-B, ⏩A1-A)*

The NETWORK POWER FREQUENCY CHARACTERISTIC defines the sensitivity, given in megawatts per Hertz (MW/Hz), usually associated with a (single) CONTROL AREA / BLOCK or the entire SYNCHRONOUS AREA, that relates the difference between scheduled and actual SYSTEM FREQUENCY to the amount of generation required to correct the power imbalance for that CONTROL AREA / BLOCK (or, vice versa, the stationary change of the SYSTEM FREQUENCY in case of a disturbance of the generation-load equilibrium in the CONTROL AREA without being connected to other CONTROL AREAS); it is not to be confused with the K-FACTOR. The NETWORK POWER FREQUENCY CHARACTERISTIC includes all active PRIMARY CONTROL and SELF-REGULATION OF LOAD and changes due to modifications in the generation pattern and the DEMAND.

Observation Line *(⏩P2)*

An OBSERVATION LINE is a conventional border line separating a part of the SYNCHRONOUS ZONE from the rest of the system for the purpose of real-time error detection and preliminary calculation of UNINTENTIONAL DEVIATIONS. It must run along the borders of CONTROL BLOCKS and must not split any CONTROL BLOCK.

Offsetting of Unintentional Deviations *(⏩P2)*

OFFSETTING OF UNINTENTIONAL DEVIATIONS describes a procedure applied to carry out the compensation in energy of UNINTENTIONAL DEVIATIONS through a corresponding energy EXCHANGE SCHEDULE; the energy is to be delivered to (or imported from) the rest of the system during the following week according to the standards.

Observation of Unintentional Deviations

The on-line OBSERVATION OF UNINTENTIONAL DEVIATIONS is performed in an autonomous and independent way by each CONTROL BLOCK according to the standards established.

A second level exists through real-time observation of UNINTENTIONAL DEVIATIONS across previously defined OBSERVATION LINES. This function allows to improve the detection, as early as possible, of any error concerning on-line telemeasurements (TMs), any misunderstanding which may occur in setting the EXCHANGE PROGRAMS, etc., in order to implement without delay the appropriate corrective actions. This function may be performed in one or more locations which must then closely co-operate .

Operating Policies

OPERATING POLICIES constitute the doctrine developed for INTERCONNECTED SYSTEMS operation; they form the main part of the Operation Handbook. Each doctrine consists of criteria, standards, requirements, guides, and instructions, and applies to all CONTROL AREAS / BLOCKS / TSOS.

Operating Procedures

OPERATING PROCEDURES are a set of policies, practices, or system adjustments that may be automatically or manually implemented by the system operator within a specified time frame to maintain the operational integrity of the INTERCONNECTED SYSTEMS.

Parallel Path Flows {loop flows, circulating power flows, unscheduled power flows}

PARALLEL PATH FLOWS describe the difference between the scheduled and actual power flow, assuming zero inadvertent interchange, on a given transmission path in a meshed grid.

Power System

The POWER SYSTEM comprises all generation, consumption and network installations interconnected through the network.

Power Deviation *(⏩P1)*

A POWER DEVIATION is a power deficit (negative value) or a surplus (positive value) in a CONTROL AREA / BLOCK of the SYNCHRONOUS AREA[4], usually measured at the borders of the area, with respect to the CONTROL PROGRAM.

Primary Control {Frequency Control, Primary Frequency Control} *(⏩P1-A, ⏩A1-A)*

PRIMARY CONTROL maintains the balance between GENERATION and DEMAND in the network using turbine speed governors. PRIMARY CONTROL is an automatic decentralised function of the turbine

[4] Power exchanges over DC-connections are not included in the calculation of the power deviation, they are considered to be either an injection or a load in the CONTROL AREA connected.

governor to adjust the generator output of a unit as a consequence of a FREQUENCY DEVIATION / OFFSET in the SYNCHRONOUS AREA:

- PRIMARY CONTROL should be distributed as evenly as possible over units in operation in the SYNCHRONOUS AREA;
- the global PRIMARY CONTROL behaviour of an interconnection partner (CONTROL AREA / BLOCK), may be assessed by the calculation of the equivalent droop of the area (basically resulting from the DROOP OF ALL GENERATORS and the SELF-REGULATION OF THE TOTAL DEMAND).

By the joint action of all interconnected undertakings, PRIMARY CONTROL ensures the operational reliability for the power system of the SYNCHRONOUS AREA.

Primary Control Power *(⏩P1-A)*

PRIMARY CONTROL POWER is the power output of a GENERATION SET due to PRIMARY CONTROL.

Primary Control Range *(⏩P1-A)*

The PRIMARY CONTROL RANGE is the range of adjustment of PRIMARY CONTROL POWER, within which PRIMARY CONTROLLERS can provide automatic control, in both directions, in response to a FREQUENCY DEVIATION. The concept of the PRIMARY CONTROL RANGE applies to each generator, each CONTROL AREA / BLOCK, and the entire SYNCHRONOUS AREA.

Primary Control Reserve *(⏩P1-A)*

The PRIMARY CONTROL RESERVE is the (positive / negative) part of the PRIMARY CONTROL RANGE measured from the working point prior to the disturbance up to the maximum PRIMARY CONTROL POWER (taking account of a limiter). The concept of the PRIMARY CONTROL RESERVE applies to each generator, each CONTROL AREA / BLOCK, and the entire SYNCHRONOUS AREA.

Primary Controller *(⏩P1-A)*

The PRIMARY CONTROLLER is a decentralised / locally installed control equipment for a GENERATION SET to control the valves of the turbine based on the speed of the generator (for synchronous generators directly coupled to the electric SYSTEM FREQUENCY); see PRIMARY CONTROL.

The insensitivity of the PRIMARY CONTROLLER is defined by the limit frequencies between which the controller does not respond. This concept applies to the complete primary controller-generator unit. A distinction is drawn between unintentional insensitivity associated with structural inaccuracies in the unit and a dead band set intentionally on the controller of a generator.

Primary Frequency Control

See: PRIMARY CONTROL

Pseudo-Tie-Line

See: VIRTUAL TIE-LINE.

Reactive Power

REACTIVE POWER is an imaginary component of the apparent power. It is usually expressed in kilo-vars (kVAr) or mega-vars (MVAr). REACTIVE POWER is the portion of electricity that establishes and sustains the electric and magnetic fields of alternating-current equipment. REACTIVE POWER must be supplied to most types of magnetic equipment, such as motors and transformers and causes reactive losses on transmission facilities. REACTIVE POWER is provided by generators, synchronous condensers, or electrostatic equipment such as capacitors, and directly influences the electric system voltage. The REACTIVE POWER is the imaginary part of the complex product of voltage and current.

Ramp Period *(⏩P1-B)*

The RAMP PERIOD is the time between ramp start and end times, usually expressed in minutes and applied to SCHEDULES.

Reliability[5] *(⏩P3)*

RELIABILITY describes the degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. RELIABILITY on the transmission level may be measured by the frequency, duration, and magnitude (or the probability) of adverse effects on the electric supply / transport / generation. Electric system RELIABILITY can be addressed by considering two basic and functional aspects of the electric system:

- **Adequacy** — The ability of the electric system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.
- **Security** — The ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.

Secondary Control {Load-Frequency-Control} *(⏩P1-B, ⏩A1-B)*

SECONDARY CONTROL is a centralised automatic function to regulate the generation in a CONTROL AREA based on SECONDARY CONTROL RESERVES in order

- to maintain its interchange power flow at the CONTROL PROGRAM with all other CONTROL AREAS (and to correct the loss of capacity in a CONTROL AREA affected by a loss of production) and, at the same time,
- (in case of a major FREQUENCY DEVIATION originating from the CONTROL AREA, particularly after the loss of a large generation unit) to restore the frequency in case of a FREQUENCY DEVIATION originating from the CONTROL AREA to its set value in order to free the capacity engaged by the PRIMARY CONTROL (and to restore the PRIMARY CONTROL RESERVES).

In order to fulfil these functions, SECONDARY CONTROL operates by the NETWORK CHARACTERISTIC METHOD. SECONDARY CONTROL is applied to selected generator sets in the power plants comprising this control loop. SECONDARY CONTROL operates for periods of several minutes, and is therefore dissociated from PRIMARY CONTROL. This behaviour over time is associated with the PI (proportional-integral) characteristic of the SECONDARY CONTROLLER.

Secondary Control Range *(⏩P1-B)*

The SECONDARY CONTROL RANGE is the range of adjustment of the secondary control power, within which the SECONDARY CONTROLLER can operate automatically, in both directions at the time concerned, from the working point of the secondary control power.

Secondary Control Reserve *(⏩P1-B)*

The positive / negative SECONDARY CONTROL RESERVE is the part of the SECONDARY CONTROL RANGE between the working point and the maximum / minimum value. The portion of the SECONDARY CONTROL RANGE already activated at the working point is the SECONDARY CONTROL POWER.

Secondary Controller *(⏩P1-B)*

A SECONDARY CONTROLLER is the single centralised TSO-equipment per CONTROL AREA / BLOCK for operation of SECONDARY CONTROL.

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[5] To a great extent, the overall RELIABILITY of the electric power supply (for customers being connected to the distribution grid), that is usually measured, is defined by the RELIABILITY of the power distribution instead of the transmission or generation.

Security Limits {Operating Security Limits} *(⏩P3)*

SECURITY LIMITS define the acceptable operating boundaries (thermal, voltage and stability limits). The TSO must have defined SECURITY LIMITS for its own network. The TSO shall ensure adherence to these SECURITY LIMITS. Violation of SECURITY LIMITS for prolonged time could cause damage and/or an outage of another element that can cause further deterioration of system operating conditions.

Self-Regulation of Load *(⏩P1-A)*

The SELF-REGULATION OF LOAD is defined as the sensitivity of consumers' demand to variations in the SYSTEM FREQUENCY (a decrease of the SYSTEM FREQUENCY results in a decrease of the LOAD), generally expressed in % / Hz.

Stability *(⏩P3)*

STABILITY is the ability of an electric system to maintain a state of equilibrium during normal and abnormal system conditions or disturbances.

- **Small-Signal Stability** — The ability of the electric system to withstand small changes or disturbances without the loss of synchronism among the synchronous machines in the system while having a sufficient damping of system oscillations (sufficient margin to the border of stability).
- **Transient Stability** — The ability of an electric system to maintain synchronism between its parts when subjected to a disturbance of specified severity and to regain a state of equilibrium following that disturbance.

Supervisory Control and Data Acquisition (SCADA)

SUPERVISORY CONTROL AND DATA ACQUISITION is a system of remote control and telemetry used to monitor and control the electric system.

Synchronous Area *(⏩P1)*

A SYNCHRONOUS AREA is an area covered by INTERCONNECTED SYSTEMS whose CONTROL AREAS are synchronously interconnected with CONTROL AREAS of members of the association. Within a SYNCHRONOUS AREA the SYSTEM FREQUENCY is common on a steady state. A certain number of SYNCHRONOUS AREAS may exist in parallel on a temporal or permanent basis. A SYNCHRONOUS AREA is a set of synchronously INTERCONNECTED SYSTEMS that has no synchronous interconnections to any other INTERCONNECTED SYSTEMS, see also: UCTE SYNCHRONOUS AREA.

Synchronous Time *(⏩P1-D)*

SYNCHRONOUS TIME is the fictive time based on the SYSTEM FREQUENCY in the SYNCHRONOUS AREA, once initialised on UTC time and with the clock frequency being 60/50 of the SYSTEM FREQUENCY. If the SYNCHRONOUS TIME is ahead / behind of the UTC time (TIME DEVIATION), the SYSTEM FREQUENCY has on average been higher / lower than the nominal frequency of 50 Hz. TIME CONTROL action will return a TIME DEVIATION to zero again.

System Frequency {Frequency} *(⏩P1, ⏩A1-A)*

SYSTEM FREQUENCY is the electric frequency of the system that can be measured in all network areas of the SYNCHRONOUS AREA under the assumption of a coherent value for the system in the time frame of seconds (with minor differences between different measurement locations only).

Tertiary Control *(⏩P1-C, ⏩A1-C)*

TERTIARY CONTROL is any (automatic or) manual change in the working points of generators (mainly by re-scheduling), in order to restore an adequate SECONDARY CONTROL RESERVE at the right time.

Tertiary Control Reserve {Minute Reserve} *(⏩P1-C)*

The power which can be connected (automatically or) manually under TERTIARY CONTROL, in order to provide an adequate SECONDARY CONTROL RESERVE, is known as the TERTIARY CONTROL RESERVE or MINUTE RESERVE. This reserve must be used in such a way that it will contribute to the restoration of the SECONDARY CONTROL RANGE when required.

The restoration of an adequate SECONDARY CONTROL RANGE may take, for example, up to 15 minutes, whereas TERTIARY CONTROL for the optimisation of the network and generating system will not necessarily be complete after this time.

Tie-Line *(⏩P1)*

A TIE-LINE is a circuit (e.g. a transmission line) connecting two or more CONTROL AREAS or systems of an electric system.

Time Deviation *(⏩P1-D)*

The TIME DEVIATION normally is the time integral of the FREQUENCY DEVIATION. In practice, an electrical clock that follows the SYSTEM FREQUENCY is compared with the astronomical time (UTC).

Time Control *(⏩P1-D, ⏩A1-D)*

TIME CONTROL is a control action carried out to return an existing TIME DEVIATION between SYNCHRONOUS TIME and UTC time to zero.

Total Transfer Capacity (TTC)

TOTAL TRANSFER CAPACITY is the maximum EXCHANGE PROGRAM between two ADJACENT CONTROL AREAS that is compatible with operational security standards applied in each system (e.g. GridCodes) if future network conditions, generation and load patterns are perfectly known in advance.

Transmission

TRANSMISSION is the transport of electricity on the extra-high or high-voltage network (transmission system) for delivery to final customers or distributors. Operation of TRANSMISSION includes as well the tasks of system operation concerning the management of energy flows, reliability of the system and availability of all necessary system services / ANCILLARY SERVICES.

Transmission Reliability Margin (TRM)

The TRANSMISSION RELIABILITY MARGIN is a security margin that copes with uncertainties on the computed TTC values arising from:

- UNINTENTIONAL DEVIATIONS of physical flows during operation due to the physical functioning of SECONDARY CONTROL
- Emergency exchanges between TSOs to cope with unexpected unbalanced situations in real-time
- Inaccuracies, e. g. in data collection and measurements

Transmission System Operator (TSO)

A TRANSMISSION SYSTEM OPERATOR is an company that is responsible for operating, maintaining and developing the transmission system for a CONTROL AREA and its INTERCONNECTIONS.

UCTE Synchronous Area *(⏩P1)*

A UCTE synchronous area is a part of a SYNCHRONOUS AREA covered by INTERCONNECTED SYSTEMS / TSOs which are members of the association. Different UCTE SYNCHRONOUS AREAS may exist in parallel on a temporal or permanent basis.

Unintentional Deviation {Inadvertent Deviation} *(⏩P1-B)*

In the SECONDARY CONTROL function, the UNINTENTIONAL DEVIATION is the difference between the actual energy exchange that has taken place in a given time interval (unintended physical power exchange of a CONTROL AREA) and the scheduled CONTROL PROGRAM of a CONTROL AREA (or a CONTROL BLOCK), without taking into account the effect of the frequency bias (see: AREA CONTROL ERROR), following the sign convention.

Virtual Tie-Line {Pseudo-Tie-Line} *(⏩P1-B)*

A VIRTUAL TIE-LINE represents a telemetered reading or value that is updated in real-time and used as a TIE-LINE flow in the AGC/ACE equation but for which no physical tie or energy metering actually exists. The integrated value is used as a metered MWh value for interchange ACCOUNTING purposes.

B. List of Acronyms

AAC	Already Allocated Capacity
ACE	Area Control Error
AGC	Automatic Generation Control
ATC	Available Transmission Capacity
BRP	Balance Responsible Party
CA	Control Area
CAS	Control Area Schedule
CAX	Control Area Exchange
CB	Control Block
CBS	Control Block Schedule
CBX	Control Block Exchange
CC	Control Centre
CCS	Co-ordination Centre Schedule
CoC	Co-ordination Centre
CP	Control Program
DACF	Day Ahead Congestion Forecast
EH	Electronic Highway
EIC	ETSO Identification Code
EMR	Energy Meter Reading
ESS	European Scheduling System
ET	Tie-line Flows
EVT	Virtual Tie-line Flows
GENCO	Generation Company
GMT	Greenwich Mean Time
GPS	Global Positioning System
HV	High Voltage
LFC	Load-Frequency Control
NTC	Net Transfer Capacity
OpHB	Operation Handbook
PI	Proportional-Integral
SCADA	Supervisory Control and Data Acquisition
SVC	Static Var Compensator
TM	Tele-measurement
TSO	Transmission System Operator
TRM	Transmission Reliability Margin
TTC	Total Transfer Capacity
UCTE	Union for the Co-ordination of Transmission of Electricity
UD	Unintentional Deviation
UHV	Ultra High Voltage
UTC	Universal Time Co-ordinated
WAMS	Wide Inter-Area Measurement System

C. List of Units

A	ampere
d	day
GW	gigawatt (1.000.000.000W)
GWh	gigawatt-hour
h, hrs	hour
Hz	hertz (1/s)
kV	kilovolt (1000V)
kVA	kilovoltampere
kVAr	kilovars
kW	kilowatt (1000W)
kWh	kilowatt-hour
mHz	milli-hertz (1/1000 Hz)
min	minute
ms	milli-second (1/1000 s)
MVA	megavolt-ampere
MVAr	mega-vars
MW	megawatt (1.000.000W)
MWh	megawatt-hour
s, sec	second
TW	terawatt (1.000.000.000.000W)
V	volt
W	watt