Pursuant to Article 114\_\_\_\_\_\_\_\_\_\_ of the Energy Law (*Official Gazette of Montenegro no. 5/2016*) and Article 45 paragraph 1 point 15 of the By-Laws of the Montenegrin Electrical Transmission System JSC, the Board of Directors of the Company adopted as of \_\_\_\_\_\_\_\_\_\_\_

**RULES FOR ELECTRICITY TRANSMISSION SYSTEM OPERATION (GRID CODE)**

# GENERAL PROVISIONS

# Subject

##### Article 1

Rules for electricity transmission system operation (hereinafter referred to as the Rules) shall govern electricity transmission system operation (hereinafter referred to as the transmission system) in accordance with the Energy Law (hereinafter referred to as the Law) and Law on cross-border exchange of electricity and gas.

##### Article 2

These Rules shall establish:

1. Technical and other requirements for the connection of users to the transmission system,
2. Technical and other requirements for secure operation of electric power system with the aim of supplying consumers with electricity of the required quality,
3. General requirements for transmission system use,
4. Rules for the access to the transmission system,
5. Rules for system balancing,
6. Criteria for and the modalities of the provision of ancillary services,
7. Operation in emergency situations,
8. Technical and other requirements for the transmission system connection and operation in interconnection,
9. Modalities of the transmission system development planning,
10. Standard contracts which are concluded by transmission system operator (hereinafter referred to as the TSO) with transmission system users,
11. Functional requirements and accuracy classes of metering devices, as well as modalities of electricity metering,
12. Modalities of publication of data necessary for the market operation and for the provision of data to system operators,
13. Modalities of giving priority to the exploitation of domestic sources of primary energy for electricity generation where such obligation is stipulated by Energy Balance,
14. Modalities of giving priority in access and takeover of electricity generated from renewable sources and high efficiency cogeneration and
15. Manner of connecting power generation facilities to transmission system.

Conditions, criteria and requirements significant for electricity transmission system operation arising from operation in interconnection shall be governed by regulations in accordance with the Law on cross-border exchange in electricity and gas.

# Area of Implementation

##### Article 3

From the technical and technological point of view, these Rules shall apply to:

1. transmission system, and
2. parts of facilities and networks 110 kV and higher voltage levels owned or entitled to be used by transmission system users.

##### Article 4

These Rules shall be applied by TSO and transmission system users.

Within the meaning of these Rules transmission system users are:

1. Electricity producers whose generation facilities are connected to transmission system,
2. Electricity distribution system operators, including closed distribution system operators connected to transmission system,
3. End customers i.e. directly connected to transmission system (direct consumers),
4. Electricity suppliers,
5. Traders, mediators and agents on the electricity market, as well as market operator and electricity exchange in the capacity of person responsible for reporting transmission.

Users under paragraph 2 item 1, 2 and 3 of this Article are users connected to transmission system and users under paragraph 2 items 4 and 5 of this Article are other users.

# Terms and Abbreviations

##### Article 5

Unless the context or the purpose require otherwise, all terms defined in the Law shall have the same meaning as in these Rules.

##### Abbreviations

##### Article 6

The Abbreviations used in these Rules shall have the following meaning:

**ARS** Automatic Re-closure

**AGC** Automatic Generation Control

**CBA Cost Benefit Analysis**

**EPS** Electric Power System

**ENTSO-E** European Network of Transmission System Operators for Electricity

**GTC** Grid Transfer Capacity

**IEC** International Electro-technical Commission

**ISO** International Organization for Standardization

**DSO** Distribution System Operator

**TSO** Transmission System Operator

**MO** Market Operator

**SCADA** Supervisory Control and Data Acquisition – System for Real-Time Control

##### Terms

##### Article 7

Terms used in these Rules have the following meanings:

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| **Agency** | Energy Regulatory Agency |
| **Balancing** | The process which, by increasing or reducing the production and /or consumption of electrical energy in real time, maintain a balance between production and consumption in real time  E |
|  |  |
| **Balancing Energy** | Electricity ensured by TSO in order to balance the available electricity with the demand |
| **Balance Responsibility** | Responsibility of balance responsible parties for the deviation of their own plan of delivery and reception of electricity established by the exchange program and for unbalanced exchange program. |
| **Balance Responsible Entity** | Electricity market player (generator, supplier, trader or customer self-supplier ), who has the obligation to participate in the system of calculation of quantitative deviation of electricity delivery and reception from exchange programs, implemented by the market operator |
| **Balancing Market** | Market that is established and operated with the aim of sale and purchase of balance energy |
| **Balancing Group** | Association of balance responsible parties with the aim of joint account of deviations, which makes them the parties of settlement of the given balance group. Balance responsible parties associated in the balance group appoint the carrier of balance responsibility for the balance group |
| **No-voltage Start-up (Black-start)** | Capability of a generating unit to start-up from shutdown, return to the operational regime and start delivering the power when part of transmission system to which it is connected is without voltage |
| **Imbalance** | Deviation of EPS operation, balance group or balance responsible entity from the exchange program, i.e. the difference between the available energy (generation and import) and total demand (consumption, export and system losses) |
| **Direct Consumer** | End user directly connected to the transmission system |
| **Dispatcher** | Person i.e. responsible professional in the dispatching centre, authorized by TSO to give dispatching instructions |
| **Dispatch Instruction** | Instruction i.e. operations order issued by TSO (dispatcher) related to the operation of generation units, transmission and user systems, including the use of ancillary services |
| **Dispatch Centre TSO** | Centre for operational monitoring of transmission system operation and management |
| **Dispatch** | Control of power flows in the transmission system, including the exchange with other systems |

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| **Electric Power System** | In the technical sense, the set of generation facilities , transmission and distribution system elements (lines and transformers)and end users mutually connected so as to allow generation, transmission and distribution of electricity | | |
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| **Frequency Deviation** | Deviation of the real from the system frequency set | | |
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| **System Losses** | Active energy losses in transmission system elements | | |
| **Cold Reserve** | Generation unit made available to the central management by TSO, ready for operation and if required may be synchronized (made operational) within a certain period of time | | |
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| **Block Coordinator** | | Transmission system operator in charge of collection and adoption of exchange programs between control areas within the control block and the neighbouring control areas, as well as for the account of unintended deviations and compensation programs of control areas within the control block | |
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| **Transmission System User** | | Company, legal or physical person or entrepreneur who appearing as a producer, supplier ,trader ,DSO or end user uses transmission system | |
| **End User** | | Customer who buys the electricity for his own consumption | |
| **Customer** | | Physical or legal person who buys the electricity for his own consumption or for further sale | |
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| **Metering System** | | Equipment necessary for metering purposes located between the measuring point and the connection point to the telecommunication system | |
| **Metering Transformer** | | Voltage or current transformer | |
| **Metering Device** | | Meter i.e.device that measures and registers the generation, consumption and exchange of electricity | |
| **Voltage Level** | | Nominal voltage that determines and nominates the network. Standard voltage levels in the transmission system of Montenegro are 110 kV, 220 kV and 400 kV. | |
| **Voltage Transformer (VT)** | | Transformer used with metering devices and/or protection devices in which the voltage is in secondary winding, within the determined error margins, proportional to the voltage in the primary winding | |
| **Balance Responsibility Party** | | Balance responsible entity or balance responsibility party of the balance group | |
| **Renewable Energy Sources** | | Energy sources that are renewed totally or partially, especially the energy of water course, wind, non-accumulated solar energy, bio fuel, biomass, biogas, geothermal, hydrothermal and aero-thermal energy, energy of waves, tides, landfill gas, wastewater treatment gas | |

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| **Maintenance** | The overall operation aimed at maintaining permanent technical functionality of electric power systems. Maintenance include: inspections, revisions and overhauls |
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| **Distribution System Operator (DSO)** | Energy entity who performs the function of electricity distribution and who is responsible for the operation, exploitation, reliability, management, maintenance and development of distribution system in a particular area |
| **Transmission System Operator (TSO)** | Energy entity who performs the function of electricity transmission and who is responsible for the operation, exploitation, reliability, management, maintenance and development of the transmission system, dispatching, harmonization between the available electricity with the needs of ensuring system reserves, time harmonization between the supply and demand |
| **Market Operator (MT)** | Energy entity who is legally and functionally independent and responsible for the organization and management of the electricity market |
| **Load** | Consumption in EPS that has to be covered by the operation of generation units or by the electricity supplied from other systems through interconnectors |
| **Metering Data** | Data obtained from the metering system and/or processed data or substitute data used for settlement purposes |
| **Under-frequency Relay** | Electric metering relay that gets activated when the frequency reaches the value of relay settings |
| **Entire System Blackout/collapse**  **Consumer** | Situation in which all generation is stopped and there is no supply of electricity from other systems, which makes the whole system switched off, i.e. total no-voltage condition  End user i.e. a company, legal and physical person or entrepreneur that is the owner of the facility (or person to whom are transferred rights and obligations arising from the use of facility) connected to transmission system that takes over energy for his own needs |
| **Privileged Power Producer** | Producer who uses renewable energy sources or wastes or in an individual generation plant simultaneously produces energy and heat for remote heating and/or cooling or industrial needs, in economically appropriate way, in accordance with environmental protection regulations and who enjoys a special status in accordance with the Energy Law |

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| **Transmission (of Electricity)** | Transmission of electricity through high voltage interconnection transmission system from generation facilities to distribution system or to end user' installations directly connected to the transmission system (direct consumers) or to another transmission system, not including the supply | | |
| **Transmission System** | Installations at 110 kV, 110/x kV transformers and 110 kV overhead lines, as well as facilities, transformers and overhead lines of higher voltage level, up to the connection point of the system user to the transmission system, as well as facilities, telecommunication and information equipment and other infrastructure necessary for its operation | | |
| **Producer** | A company, legal or physical person or entrepreneur performing electricity generation activity | | |
| **User Development** | Change of needs of users towards TSO which, in some cases, requires a new Connection approval | | |
| **Control Area** | | The smallest part of EPS that has its own exchange power and frequency control system, usually coincides with the territory of states where the primary frequency control is carried out, capable of maintaining the power exchange at the given value; providing support in returning frequency to the given frames after disturbances; and in charge of preparation of unintended deviations compensation programs | |
| **Control Block** | | Several control areas that operate jointly in order to ensure exchange power and frequency control with respect to other control blocks | |
| **Rehabilitation** | | Replacement of installations, devices, plants and equipment, by which it is not changed the existing capacity | |
| **Reconstruction** | | Performing construction and other works on the existing facility by which is changed replacement of installations, devices, plants and equipment, by which it is changed the existing capacity. | |
| **Shipping Agent** | | An entity responsible for reporting transmission to TSO and persons responsible for monitoring the implementation of market transactions | |
| **Synchronous Zone** | | Area that includes control areas of one or more system operators within ENTSO-E which are synchronously interconnected | |
| **Synchronous Time** | | Synchronous time is the fictive time based on system frequency in a synchronous area, which was once set to astronomical time and whose hour frequency amounts to 60/50 of the system frequency. If synchronous time is ahead or behind compared to the astronomical time (time deviation), the system frequency is on average bigger/smaller than the nominal frequency of 50 Hz. | |
| **System Test** | | Tests which include simulated conditions or controlled implementation of irregular, unusual or extreme conditions on the whole system or on one of its parts | |
| **System Stability** | | Capability of EPS to maintain safety and stability during normal or disturbed operational regimes | |
| **Droop** | | Percentage value of system frequency drop that provokes a free action of primary frequency regulator for generator to change the generation from zero to full load | |
| **Current Transformer (CT)** | | Transformer used with metering and/or protection devices in which the current is in secondary winding, within the limits of predefined error, proportional and in phase with the current in primary winding | |
| **Actual Metering Point** | | Metering point, i.e. real point in which the electricity is metered | |
| **Connection Point** | | Agreed point of connection established between the transmission or user system (depending on the case) and the system user | |
| **Transit** | | | Transmission of electricity, not originating in Montenegro, from one state to the other or return to the state of origin through the territory of Montenegro |
| **Electricity Market Participant** | | | Legal or physical person registered for the sale or the purchase of electricity |
| **Interconnection Agreement** | | | Contract between TSO of Montenegro and TSOs of neighbouring systems on the joint parallel operation carried out through common, interconnection lines – interconnectors |
| **Management** | | | Planning or planned activity related to the system operation |
| **Demand Management** | | | Implementation of measures of power demand reduction in order to establish the balance in case of the active power lack in EPS |
| **Devices** | | | Any equipment that is used in high-voltage facilities or that makes the part of such facilities |
| **High Voltage** | | | Nominal voltage higher than 35 kV |
| **Exchange Program** | | | Daily, weekly and monthly work schedule i.e. document that establishes the operational plan of generation, exchange and consumption of electricity and power of balance responsibility parties, i.e. owners of licences and direct consumers |
| **Frequency Set-point** | | | Frequency established by TSO in accordance with ENTSO-E recommendations, as the desired operational system frequency |
| **Scheduled Voltage** | | | Voltage level that a generation unit in the transmission system has to reach in the connection point |

# Basic Principles

**Fairness and Non-Discrimination**

**Article 8**

TSO shall implement these Rules in a fair, non-discriminatory and transparent way.

Transmission system users shall use transmission system in accordance with these Rules.

If any entity or user has the obligation, but is unable to comply with any obligation contained in these Rules, they have the right to submit the request for exemption pursuant to the Article 210 of these Rules.

##### Information and Data Confidentiality Article 9

In the implementation of these Rules*,* TSO has the obligation to comply with the Rules of Confidentiality of Commercially Sensitive Information issued by the Agency.

Commercially sensitive data, as well as the data that may have effect on competitiveness are considered confidential. data of technical nature as a rule are not considered confidential.

Notwithstanding paragraph 2 herein the transmission system users determine the data related to technical characteristics and requirements for exploitation of their facilities, which are to be handled by TSO as confidential. These data are inserted in the agreement that regulates the exploitation of the facility of the transmission system user.

Information and data indicated by the transmission system user as confidential may be disclosed by TSO only upon a written approval of the user. Such written approval determines for which purpose the information or data may be disclosed. Such approval may not be of permanent character.

Data related to the operating capability, state of reservoirs, consumption, generation and exchange of electricity of each individual user shall be dealt with in accordance with the law governing the manner of providing electricity market transparency.

Basic information on the transmission system operation, including the basic information on disturbances and other emergency situations, are not considered confidential.

Data on the transmission system load shall be disclosed by TSO in the form that does not violate the confidentiality of information of the transmission system user.

For the purpose of ensuring technical preconditions for security analysis of electric power system operation, TSO exchanges corresponding data with the neighbouring transmission system operators, relevant data including commercially confidential or sensitive data.

# GENERAL REQUIREMENTS FOR TRANSMISSION SYSTEM USE

**Specific Provisions**

**Article 10**

General requirements for connection to TSO transmission system shall be regulated by these Rules pursuant to Article 114 paragraph 2 item 3 of the Law.

The general requirements under paragraph 1 of this Article include the basic rights and obligations of TSO and transmission system users, as well as standard contracts concluded by TSO with users, which constitute an integral part of these Rules in accordance with Article 114 paragraph 2 item 10 of the Law.

**Fundamental Rights and obligations**

**Fundamental Obligations of TSO**

**Article 11**

TSO shall ensure electricity transmission for the needs of transmission system users and shall manage transmission system complying with conditions specified by the licence and certificate in an impartial transparent and non-discriminatory way.

The right to transmission system use shall have users connected to system that have entered into connection and use agreements with TSO as well as other users under Article 4 paragraph 3 of these Rules that have fulfilled conditions stipulated by these Rules, TSO may not reject requests for connection of electricity generation facility or major industrial buyer based on future limitations of available system capacity or possible additional costs relating to necessary increase of system capacity.

**Guaranteed Transmission Parameters**

**Article 12**

TSO shall provide public service of electricity transmission at voltage levels 400kV, 220kV, 110kV, including low voltage sides of transformers 110/35kV, 110/20kV and 110/10kV owned by it.

TSO shall ensure the fulfilment of reliability criterion N-1 in all connection points of users to transmission system.

The guaranteed voltage range in transmission system is:

* 1. 380 - 420 kV for 400 kV voltage level, i.e. ±5% of nominal voltage,
  2. 198 - 242 kV for 220 kV voltage level, i.e. ±10% of nominal voltage,
  3. 99 - 121 kV for 110 kV voltage level, i.e. ±10% of nominal voltage.

Exceptionally, in case of system disturbances a short-term deviation from the range under paragraph 4 of this Article is allowed as stipulated by Article 1 paragraph 2 and Article 141 of these Rules.

TSO shall regulate exchange power with neighbouring electric power systems by keeping unintended deviations within the range -20MW to +20 MW

In cooperation with transmission system operators in the interconnection TSO shall ensure that the frequency of electric power system under normal conditions is 50,00 Hz and allowed deviation ±0,2 Hz.

Except transmission parameters defined in this Article, the minimum quality of supply, which should be fulfilled by the TSO, is determined by rules governing the minimum quality for electricity delivery and supply.

**Payment and Indemnification**

**Article 13**

Transmission system user shall pay for transmission system use as stipulated by the Law and the accompanying sublegal acts of the Agency and TSO.

System users shall be entitled to indemnification for the inadequacy of electricity transmission service in the manner and under the conditions stipulated in the Law and Rules governing minimum quality for delivery and supply of electricity.

**Obligation to conclude contract**

**Article 14**

TSO and user shall, enter into contracts on mutual rights and obligations stipulated by the Law and these Rules in writing:

TSO and user shall enter into contracts under paragraph 1 of this Article not later than:

* + 1. December 1st of the current year for contracts that shall enter into force on January 1st of the following year, or
    2. 15 days following the submission by TSO for other contracts.

TSO shall submit the contracts under paragraph 2 of this Article to the user not later than:

1. November 15th of the current year for contracts that shall enter into force on January 1st of the following year, or
2. 15 days prior to the beginning of contract implementation for other contracts.

Transmission system use without contracts concluded in accordance with these Rules is not allowed.

**Type of contracts and contracting parties**

**Article 15**

Contracts under Article 14 paragraph 2 item 1 shall be concluded for one year period and shall govern the following matters:

* + 1. transmission system use between TSO and supplier whose end users connected to transmission system, TSO and customer self-supplier connected to transmission system, TSO and producer connected to transmission system or TSO and DSO as the equivalent consumer for customers connected to distribution system;
    2. purchase of ancillary services and balance energy between TSO and service provider;
    3. purchase of electricity for covering transmission system losses between TSO and market participant that delivers electricity;
    4. right to access cross-border transmission capacity between TSO and interested energy entity.

Contracts under paragraph 1 of this Article may be concluded for a period shorter than one year in which case contracting parties shall comply with the deadlines set out in Article 14 paragraph 2 item 2 and paragraph 3 item 2 of herein Rules.

In case purchases under paragraph 1 item 2 and 3 are performed through electricity exchange, contractual relations specified by the exchange operation regulations shall apply.

In case the right of access to cross-border transmission capacity is exercised through the coordinated capacity allocation office or through market interconnection mechanism, contractual relations agreed at the regional level shall apply.

The contract under Article 14 paragraph 2 item 2 shall govern the matters of connection to transmission system and shall be concluded for indefinite period of time between TSO and the owner of the facility which is being connected.

**Standard Contracts**

**Article 16**

In order to ensure transparency of providing electricity transmission public service and equal treatment of system user, TSO shall establish in these Rules standard contracts governing the matters under Article 15 herein:

* + 1. Contract on connection to transmission system for the matters under Article 15 paragraph 5;
    2. Contract on transmission system use for the matters under Article 15 paragraph 1 item 1;
    3. Contract for purchasing ancillary services and balance energy for the matters under Article 15 paragraph 1 item 2;
    4. Contract for purchasing electricity for covering transmission system losses for the matters under Article 15 paragraph 1 item 3;
    5. Contract on access to transmission system with the aim of using cross-border transmission capacity for the matters under Article 15 paragraph 1 item 4.

Standard contracts under paragraph 1 of this Article are described in Appendix 4 herein.

**Contract Conclusion Initiative**

**Article 17**

Initiative for concluding connection agreement under Article 16 paragraph 1 item 1 is initiated by the owner of the facility by submitting a request for contract conclusion in the form given in Appendix 6.

Initiative for concluding agreement on use under Article 16 paragraph 1 item 1 is initiated by the user connected to transmission system by submitting a request for contract conclusion in the form given in Appendix 5 set by TSO.

Where the user connected to transmission system under paragraph 2 of this Article is end user that is not a customer – self-supplier, the request under paragraph 2 of this Article shall on his behalf be submitted by his supplier.

Initiative for concluding agreement under Article 16 paragraph 1 item 3 and 4 is initiated by TSO through purchase procedure.

The contract under Article 16 paragraph 1 item 5 shall be concluded after auctions for cross-border capacity allocation have been performed pursuant to herein Rules.

The user connected to transmission system shall submit the requests under paragraph 2 of this Article to TSO at least 3 days prior to the expiration of the deadline under Article 14 paragraph 3.

If the user connected to transmission system or his supplier fails to submit a request within the deadline under paragraph 6 of this Article, TSO shall submit a contract on use filled in according to available data (Appendix 7) to the user connected to transmission system for signature.

If the owner of the facility fails to submit the request under paragraph 1 within the deadline under Article 14 paragraph 3 item 2, or in case of an expiry of the connection agreement validity period of already connected user, TSO shall submit the connection agreement filled in according to available data to the owner, i.e. the user connected to transmission system for signature.

**Other Contracts**

**Article 18**

Before starting to use the system, transmission system user shall enter into a contract governing the matters of his balance responsibility as stipulated by Market Rules.

# TRANSMISSION SYSTEM DEVELOPMENT PLANNING

**Specific Provisions**

##### Planning Principle

##### Article 19

Transmission system development includes:

1. Construction of new transmission system elements,
2. Reinforcement of existing transmission system elements (reconstructions and capacity upgrade),
3. Development and modernization of protection system and remote control and monitoring system, and
4. Application of new technological solutions in the field of electricity transmission.

Transmission system development planning is done based on the assessment of needs and conditions in which the operation of this system will be carried out in the forthcoming period, in order to determine the measures to ensure the normal operation of the electric power system.

Planned construction, reconstruction and upgrading of transmission facilities must ensure the preconditions for the development of generation and distribution capacities, electricity market development and reliable and high quality of supply of electricity for the forecasted level of demand.

In the process of transmission system development planning, TSO collects necessary information on transmission system users. In the process of development plan implementation, TSO has the right to request the adjustment of facilities of transmission system users if required by the plan.

##### Planning-related Rights and Obligations of TSO Article 20

1. TSO shall:
2. establish a transmission system development plan (hereinafter referred to as development plan) in accordance with the Energy Development Strategy and the Action Plan, and Rules for developing and monitoring the implementation of ten-year development plans of electricity transmission system, as well as with development plans of neighbouring transmission systems, updated at least every three year and submit it to the Agency for approval;
3. establish investment plans for system needs in accordance with the ten-year transmission system development plan and spatial plan-related documents, and submit them to the Agency for approval; and
4. publish the approved plans on its web site.

##### Planning Period

##### Article 21

The development plan shall be developed for a ten-year period. The investment plan is an integral part of the development plan as a separate unit.

Investment plan shall be developed for the period of one year or for the period equal to the duration of regulatory period set by the Agency.

# Implementation and Competencies

##### Planning Subject Article 22

TSO is competent for the planning of transmission system development, composed of 110 kV facilities, 110/x kV transformers and 110 kV overhead lines, as well as facilities, transformers and lines on higher voltage level, up to the connection point of system users and facilities, telecommunication and information equipment and other infrastructure necessary for its operation.

##### Participation in Planning

##### Article 23

TSO carries out the planning of transmission system.

Beside TSO, the existing users connected to the transmission system and potential users of transmission system shall take part in the planning process.

Users have the obligation to inform TSO of any change significant for the transmission system development planning.

TSO shall harmonize relevant components of development plan with transmission system operators in the region and at the level of ENTSO-E as stipulated by the rules of that association.

Development planning is the activity open to the participation of interested public.

# Planning Objectives

##### Article 24

The objective of transmission system development planning is:

1. To select information obtained from system users and interested public and establish reliable starting data from which, based on the set criteria, it is necessary to carry out further planning,
2. To make a comprehensive overview of transmission system development and relevant components of electric power system for a given period of time,
3. To establish necessary changes in the transmission system (list, location and basic characteristics of transmission facilities to be reconstructed, upgraded, constructed or decommissioned, including interconnection lines),
4. To ensure conditions for the implementation of forecast and planned electricity transmission, as well as reliable and secure transmission system operation,
5. To create conditions to satisfy needs for electricity exchanges on the market,
6. To ensure economic transmission system use with guaranteed transmission parameters stipulated herein and create conditions for further system development with minimum negative environmental impact.

# Planning Criteria

##### Article 25

When planning transmission system development the following criteria must be fulfilled:

* + 1. Transmission system development plan must be based on technical and economic criteria taking in account current load of transmission system elements and generation in power plants, as well as future needs of distribution systems and transmission system users, including the generation facilities that are already connected or will be connected to the transmission system in the respective planning period;
    2. Dimensions of the transmission system must be in accordance with (n-1) security criterion. Consequences of multiple disturbances that take place in the transmission system are not taken in account in transmission system development planning and must be limited by applying corresponding strategies for defence against major disturbances and strategies for the restoration of supply (defence plan); and
    3. Transmission system must be planned so as to ensure the maintenance of static and transient stability, as well as the required voltage conditions. In that aim, TSO may request the producer to adjust characteristics and parameters of load-frequency control system of generation units that are relevant from the point of view of stability, and also may request direct consumers to adjust characteristics and parameters of their consumption especially with respect to electricity quality (higher harmonics, flickers) and power factors (cos ).

The planning process of development activities in the area of transmission system development begins with the collection, selection and analysis of the following basic data:

1. Forecast of increases of electricity demand and its geographic distribution,
2. Location and consumption of new direct consumers connected to the transmission system,
3. Location and capacity of new generation facilities,
4. Forecast of electricity exchanges with other neighbouring countries, and
5. Development programs of other transmission systems of interest in the neighbourhood.

In order to analyse the target year in the future, one or more probable operational scenarios for transmission system are identified, in accordance with the above mentioned basic data, and based on that, a reference scenario with planned network topology is established in order to identify possible problems in system operation and define needs for reinforcements which could help resolve identified problems.

For the purpose of identification of possible problems and transmission system planning, TSO uses the following planning criteria:

1. Technical criteria and constraints for normal operating conditions,
2. Technical criteria and constraints for disturbed operating conditions,
3. Allowed short-circuit currents criterion, and
4. Criteria for introduction of new transmission system elements and reconstruction of existing ones.

**Technical Criteria and Constraints for Normal Operating Conditions**

##### Article 26

Normal operating conditions mean system operation with forecast demand, corresponding engagement of generation capacities (minimum, maximum and typical regime) and all transmission system elements that are in operation.

For normal operating conditions, the following constraints of transmission system operation are defined:

1. Overload of a transmission system element occurs if its load exceeds 80% of thermal limit (thermal current). Thermal currents represent the limiting factor for transmission system elements. This constraint is defined as the temperature of heating of conductor during the flowing of the current, which causes the melting of conducting material or the reduction of distance between the conductor and earth below allowed limits and must be applied separately for both summer and winter season for weather conditions characteristic of Montenegro;
2. Allowed voltage range:
   * 380 - 420 kV for 400 kV voltage level, i.e. ±5% of nominal voltage,
   * 198 - 242 kV for 220 kV voltage level, i.e. ±10% of nominal voltage,
   * 99 - 121 kV for 110 kV voltage level, i.e. ±10% of nominal voltage.

Technical planning criteria in normal operating conditions imply that in conditions under paragraph 1 of this Article, the forecast electricity transmission to connection points of users does not lead to the exceeding of constraints under paragraph 2 of this Article and endangering of guaranteed transmission parameters set out herein.

### Technical Criteria and Constraints for Disturbed Operating Conditions

##### Article 27

Disturbed operating conditions mean system operation in any condition in which the system goes from normal operating conditions by unavailability of one transmission system element.

The analysis of N-1 security criterion allows the identification of problems (critical configurations or configurations that are unacceptable from the aspect of security and reliability of system operation), and offers possible solutions for transmission system reinforcement in order to eliminate identified problems.

The security criterion (n-1) is met if the tripping of any transmission system element due to a fault does not:

* 1. Disturb limit values of operational magnitudes determined for the transmission system (operating voltages, voltage range, levels of short-circuit currents) and equipment load (current load) which could jeopardize the security of system operation or provoke damages or reduce life expectancy of equipment;
  2. Provoke permanent interruptions in supply, whether the reserve in supply through distribution voltage levels or user systems exists or not;
  3. Provoke cascade outages in the system due to the activation of protection system of element that was not directly affected by the fault, with the risk of further spreading of disturbance;
  4. Provoke loss of stability in generation units; or
  5. Create the need to limit or eventually terminate electricity delivery in connection points of users.

For disturbed operating conditions, the following constraints are defined:

* 1. Overload of a transmission system element occurs if its load exceeds 100% of thermal limit. Under certain circumstances (in case of construction of major facilities of transmission system which bring to elimination of several identified problems in the system), during disturbed operating conditions TSO, during the planning process, may allow, but only for a short period of time (until the completion of construction of such major facility), higher thermal load of elements in order to avoid excessive dimensioning of the network and to reduce costs;
  2. Under disturbed operating conditions, in cases of disturbances in electric power system, i.e. major failures of generation and transmission facilities, bigger voltage deviations than those defined for normal operating conditions are allowed.

Technical planning criteria in disturbed operating conditions imply that in conditions under paragraph 1 of this Article, the forecast electricity transmission to connection points of users does not lead to violation of criteria under paragraph 3 of this Article, the exceeding of constraints under paragraph 4 of this Article and endangering of guaranteed transmission parameters set out herein.

### Criterion of Permissible Short-circuit Currents

##### Article 28

Sizing of the equipment in transmission facilities of TSO and facilities of transmission system users must be such so as to comply with calculated values of short-circuit currents. In case of a short circuit, the stable operation of electric power system must not be jeopardized.

Planned maximum values of short-circuit currents must not exceed 95% of breaking capacity of switching equipment which at that moment is installed in existing transmission system facilities, neither of standardized value of breaking capacity of the equipment available on the market for facilities planned for construction.

Calculation of short circuit currents is carried out according to the IEC standard 60909.

Calculations of short circuit currents are carried out for connection status of transmission system, defined in the following way:

1. All generators are connected to the system;
2. All neighbouring systems are connected to the system (interconnection lines are in operation); and
3. All busbar systems are connected.

Exceptionally, the calculation of short-circuit currents may be done with separated busbars, that is:

1. For busbars whose separated operation is anticipated by the instructions for the operation of transmission facilities due to technical characteristics of installed equipment; or
2. In cases when the connection of busbar system generates extreme criteria for the choice of equipment and in the transmission system there are no technical preconditions for such operation.

Short-circuit currents are tested during the preparation of the Transmission System Development Plan for all transmission system elements (including the HV end of user’s facility).

Short-circuit currents are calculated during the drafting of the Transmission System Development Plan for a five-year period, taking into consideration the planned development of transmission system as well as the planned development of generation for the same period.

Short-circuit currents can be also calculated upon an explicit request of the transmission system users.

If TSO evaluates that values of short-circuit currents in the future period (due to the development of electric power system) may jeopardize existing installed equipment in transmission facilities and facilities of transmission system users, TSO undertakes measures in (its) transmission facilities and, together with transmission system users, makes adjustment of measures that need to be applied in users’ facilities. These measures primarily include the preparation of the plan for replacement of affected equipment, determination of new connection status of transmission network and users’ facilities, and establishment of real-time monitoring of short-circuit currents.

### Criteria for Installation of New System Elements and Reconstruction of Existing Ones

##### Article 29

Optimal criterion for the choice of new transmission system elements (overhead lines and substations) is the combination of compliance with technical (requirement related to the maintenance of voltage and the load of network elements), security (n-1) security criterion), spatial planning and economic (choice of the most economical solution) criteria.

In accordance with this, TSO carries out the planning and takes the decision on installation of new system elements and reconstruction of existing ones for reference years on the basis of adopted:

1. Criteria for construction of new system elements,
2. Criteria for reconstruction of existing elements,
3. Criteria for technical evaluation of system elements planned for construction/reconstruction,
4. Spatial planning criteria, and
5. Economic criteria.

##### Criteria for Construction of New System Elements and

##### Reconstruction of the Existing Ones

##### Article 30

If the existing transmission system is unable to ensure the required level of security and quality in exploitation, i.e. when the secure operation of transmission system users is jeopardized, it is necessary to plan the construction of new elements (and/or reconstruction of the existing ones) in the following cases:

1. In case when it has been established that technical criteria and constraints for the system operation under normal or disturbed conditions (N-1) are disturbed, it is necessary to plan reinforcements of the transmission system;
2. In cases when the level of reliability of operation of transmission system users determined by the corresponding regulations is disturbed;
3. In case of the need for encouraging development of electricity market which requires the increase of internal and cross-border transmission capacities;
4. When substation is supplied with power from one node and via one line, for each substation it is necessary to ensure the supply from at least two nodes or through two lines from one node, the level of reliability of which is made satisfactory thanks to the construction of new line or cable;
5. For each substation equipped with only one power transformer it is necessary to plan the installation of the second transformer, so that the priority is given to the facilities with less developed medium voltage network and higher demand that remain without the supply. The criterion for installation of the second transformer is the following:
6. For substations with the backup supply from distribution system of more than 50%, installation of the second transformer is planned when the load in the said substation reaches 80% of the value of installed power of the existing transformer;
7. In case when the peak load in substation reaches 60% of installed power of existing transformers (for normal topology), it is planned either to increase the transformation power or to construct a new facility.

In case any of the conditions under paragraph 1 of this Article is fulfilled, TSO shall establish a list of new elements, the construction (and/or reconstruction) of which can ensure the required level of security and quality in system exploitation.

##### Rehabilitation of Existing System Elements

##### Article 31

Reconstruction of transmission system elements includes:

1. Replacement of power transformers with transformer of the same capacity,
2. Reconstruction of overhead lines, and
3. Reconstruction of substations.

The replacement of other equipment and minor reconstruction/replacement works are the subject of annual investment plans.

Priority lists for replacement and reconstruction of particular elements are made on the basis of:

1. Expected exploitation age of equipment/transmission system element, and
2. Reliability of work of transmission system element.

##### Criteria for Technical Evaluation of Transmission System Elements Planned for Construction/Reconstruction

**Article 32**

For the projects included in the list referred to in Article 30 paragraph 2, TSO shall carry out the following analyses and calculations:

1. Steady-state analysis of load flow and voltage profile (normal operating conditions),
2. Analysis of load on lines and transformers,
3. Analysis of voltage reactive conditions,
4. Analysis of active and reactive power generation,
5. Calculation of transmission system losses,
6. Load flow and security analysis for unavailability of system elements ((n-1) security criterion), and
7. Dynamic stability analysis.

On the basis of this analysis, system elements from the list are ranked according to the technical contribution to the security and reliability of system operation (contribution to reliability, robustness and reduction of losses in the system, transmission capacity increase).

##### Spatial Planning Criteria Article 33

For projects included in the list under Article 30 paragraph 2 of these Rules TSO shall after analysis of applicable spatial planning documentation determine the possibilities for the construction of new transmission system elements, define corridors for the construction of overhead lines (cable installation) and possible most suitable locations for the construction of transformer stations, i.e. establish necessary amendments to existing spatial planning documentation and initiate the procedure for amending the documentation in accordance with the law.

##### Economic Criteria Article 34

Besides security criteria related to the transmission system, TSO evaluates options in the development plan from the economic point of view, comparing evaluated investment costs with the corresponding gain in the sense of reduction of overall system costs (including generation, transmission and distribution costs) borne by the user connected to transmission system.

The basic criterion for the planning of transmission system is minimization of total (investment and exploitation) costs, whilst satisfying security criterion for the operation of EPSand preserving the service quality

TSO makes the choice of new transmission system facilities and extension/reinforcement of the existing ones by comparing alternatives, and the priority is given to:

1. construction/extension of facilities in areas where the system reliability is lower, i.e. the expected value of non-delivered electricity is higher,
2. facilities whose total cost of construction/extension/reinforcement is the lowest,
3. extension/reinforcement of existing facilities instead of constructing new ones, if the centre of consumption has remained unchanged,
4. new facilities in case the centre of consumption has been displaced which directly reduces the distribution system losses,
5. type solutions with the aim of reducing maintenance and exploitation costs (less spare parts, maintenance equipment, teams of technicians), and
6. facilities the construction of which is faster thanks to a faster return of investment profits.

If it is possible to carry out an evaluation, it should include congestion costs, trends on electricity market, possibilities for increase of export/import levels with other countries, system losses and possible risk of supply suspension to consumers.

According to the analyses, the elements in the list from Article 30 paragraph 2 are ranked according to social and economic criteria defined in CBA Methodology of ENTSO-E.

# Input and Basic Data

##### Article 35

In the process of transmission system development planning, TSO takes into consideration the following data and information:

1. Data on demand trends per area,
2. Forecasts of electricity balance,
3. Development of existing, and projects for new electricity facilities, planned by the users in

Montenegro and operators of neighbouring transmission systems, as defined in their development plans,

1. Need for rationalization in system planning,
2. Any possible disturbance conditions in the system that may occur during the operation

as well as needs ensuing from such situations,

1. Issued Connection approvals of new users to the transmission system, and
2. Other legal, environmental and safety regulations.

##### Forecast of Electricity and Power Demand Article 36

Basic input data necessary for the demand forecast are:

1. Actual values of energy demand (MWh) and peak power (MW), for the period of at least five previous years, with special attention paid to values in characteristic regimes of winter and summer peak and off-peak,
2. Requests for connection and/or increase of connected power of direct consumers connected to transmission system,
3. Forecast of demands of distribution system per connection points submitted by DSO at the request of TSO

Forecast of increase of electricity and peak power demand in EPS of Montenegro relevant for the transmission system planning must be fully in line with the Strategy of Energy Development of Montenegro.

##### Data on Energy Sources Article 37

With regard to energy sources, TSO plans transmission system development based on:

1. data on existing power plantswhich include the existing parameters specified by the connection agreement and possible changes due to planned revitalization, extension/downgrading of generation capacities or decommissioning of generation units;
2. data on planned power plants which are determined by the corresponding energy development strategy or request for connection approval if such request has been already submitted to TSO.

Data on energy sources from neighbouring systems connected to the transmission system of Montenegro are collected at the level of basic data and, depending on the influence, are taken in consideration in appropriate way in definition of basic scenarios of operation of the planned transmission system of Montenegro.

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##### Forecast of Electricity Import/Export Article 38

As the basis of the forecast of potential surpluses/deficiencies of electricity in Montenegro are planned scenarios of development of generation facilities and demand increases for the period for which the transmission system development planning is carried out. Based on this data, TSO carries out the analysis of potential surpluses/deficiencies in EPS of Montenegro according to the Strategy of Energy Development and evaluates total exchanges with neighbouring systems.

Based on analysis referred to in item 1 herein and evaluation of the situation on the regional electricity market, probable exchanges on interconnection lines are established.

In the process of transmission system development planning, TSO evaluates projects with the aim of increasing transmission capacity of interconnection lines with electric power systems of neighbouring countries, in order to in an adequate manner meet increasing needs for electricity market operation development.

Needs for development of interconnection links are duly considered (identified) by TSO together with system operators of neighbouring countries.

##### Environmental and Technical Needs for System Rationalization Article 39

TSO plans transmission system development taking into consideration the deed for system rationalization, safeguarding and improving the quality of service provision with the aim of preserving the environment, taking also into consideration geographic and environmental specific features of the area anticipated for the routes or locations of electric power facilities.

Projects that include the dismantling of parts of lines or facilities that have reached the end of their operational age and that are no longer considered necessary for the security of system operation, or which limit possibilities of constructing new transmission system elements must be included in activities related to transmission system planning.

##### Critical States due to Disturbances in System Operation

##### Article 40

In order to confirm that development objectives determined in the previous development plan have been reached, TSO carries out the analysis of disturbances that have occurred in previous years and their consequences.

TSO carries out the collection of data on frequency and duration of faults and other unavailability of transmission system elements. All data on identified critical states and circumstances during disturbances are examined by TSO in order to include, if necessary, new solutions in the development plan.

##### Transparency of Planning Process

##### Article 41

Within the preparatory activities on drafting the development plan and to ensure the corresponding level of mutual harmonization of transmission system development plans with the plans of other energy entities and interested public, TSO allows a continuous receipt of proposals and suggestions to amend the existing or develop future planning documents.

For the purpose of coordination of future activities and harmonization of development plans, TSO regularly publishes updated available data relevant for the transmission system development, which at that moment are in his possession (Strategy of Energy Development, opinions on possibilities for connection, public media etc.). Parties interested in getting connected to the transmission system may at any time submit to TSO their proposals and comments.

1. TSO shall take into consideration all proposals, suggestions and comments received until the date of commencement of preparation of development plan.
2. At the beginning of preparation of development plan, TSO shall submit the following collected data to competent entities for confirmation or comments:
3. To electricity producers:
   * Available data on planned replacement of equipment, extension/downgrading of generation capacities or decommissioning of existing generation capacities and
   * Available data on new generation units (installed capacity, primary energy source, geographic location, dynamics of construction);
4. To the distribution system operator:
   * Forecast of demand increase in characteristic regimes relevant for the planning per distribution area,
   * Geographic distribution of forecasted demand on existing and planned substations in accordance with statistical data from the past and available information on displacement of centres of consumption,
   * Data on planned changes of capacities in existing transmission system transformer stations,
   * Data on planned construction and connection of new substations, dynamics of their construction and location in accordance with available data on geographic distribution of load and in accordance with spatial planning documentation that is in force, and
   * Available information on installation (replacement) of equipment in facilities of users that may be relevant for the quality, security and reliability of operation of the entire transmission system;
5. To end users directly connected to the transmission system:
   * Current data on planned extension/downgrading of peak demand or decommissioning of parts of facilities for existing users and
   * Current data on new facilities (peak demand, geographic location of facility, dynamics of construction);
6. To operators of neighbouring transmission systems:
   * Data on development plans, relevant to neighbouring transmission systems, are harmonized by TSO at the level of regional working groups;
7. To state and local self-government bodies competent for the preparation of spatial planning documentation:
   * Data on planned construction and connection of new transformer stations, dynamics of their construction and location in accordance with available data on geographic distribution of load.

If entities in paragraph 4 of this Article fail to submit objections on, or modifications of data within 30 days from the day of the submission of data, the data are considered verified.

By publishing the transmission system development plan on the official web site, after the Agency has approved it, TSO makes all necessary information, relevant for the development of transmission system of Montenegro, transparent to users and operators of neighbouring systems.

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# Development Plan

##### Article 42

On the basis of input data as defined herein by applying criteria set out herein, TSO shall specify in development plan the activities to be taken in the planning period to fulfil planning objectives.

Development plan shall be determined for a ten-year period and is dynamically split by years for the first five years, while its integral part, as a separate unit, is the investment plan which includes the period of first three years with a determined implementation dynamics.

Development plan contains basic development guidelines in the period immediately after the first five years of the planning period.

##### Article 43

Transmission system development plan contains:

1. Overview of existing situation;

* Overview of existing transmission system elements (overhead lines, transformers and cables, including technical data);
* Evaluation of condition of transmission system elements (age, upgrade feasibility, as well as the future of certain facilities in the sense of their decommissioning) and their exploitation age:
* Statistical data on faults and the time of their duration for overhead lines and network transformers in last five years;

1. Demand forecast for particular points of electricity delivery from the transmission system:

* Demand forecast is made in at least three scenarios (high, medium and law) according to different methodologies, which serve to choose a reference growth curve, based on the analysis of obtained results for the examined consumption point and its characteristics,
* Development plan for consumption of direct consumers,
* Demand model (according to active and reactive power) is prepared in all existing and planned connection points, which at the same time represents the geographic distribution of load forecast for each year of the examined period, taking in consideration development plans of distribution areas and connection of direct consumers;

1. Generation development plan for the planning period:

* Basic operational characteristics of existing generation facilities in characteristic regimes,
* Development plan of conventional generation sources (definition of possible modalities for connection),
* Development plan of renewable generation sources (definition of possible modalities for connection)
* Import/export forecast in accordance with scenarios of generation and demand development,

Technical aspects of commissioning of new generation units - Transmission system development planning:

* Load forecast of transmission system elements on the basis of planned characteristic scenarios of transmission system operation in normal regime and using the (n-1) security criterion,
* Analysis of voltage profile in characteristic scenarios of system operation,
* Analysis of transmission system losses,
* Definition of necessary system reinforcements and/or modifications of topological structure of transmission system with anticipated time dynamics of construction,
* Necessary upgrading and replacement of transmission system elements and equipment in facilities (reconstructions, replacement of primary and secondary equipment, extension of transformer stations capacity, etc.) with anticipated time dynamics of construction,
* Analysis of development of transmission capacities that may be made available to users;

1. Short-circuit analysis:

* Calculation of short-circuit currents for each node of 110 kV voltage level and higher,
* Analysis of possible future short-circuit currents from the aspect of installed switching equipment in transmission facilities and facilities of transmission system users;

1. Dynamic stability analysis (as needed, at least once in three years):

* Transient stability analysis of generation units,
* Small-disturbances stability analysis;

1. Proposed investment plan with annual elaborate on investments for the first half of the planning period.

# Investment Plan

##### Article 44

On the basis of the system needs, TSO shall specify in investment development plan a time framework for the implementation of development projects.

Investment development plan is dynamically arranged per year, and in the first year per quarter.

Investment plan contains the total values of planned investments, values per year, commencement and completion of the implementation.

Investment plan must be harmonized with development plan.

# REQUIREMENTS FOR CONNECTION TO THE TRANSMISSION SYSTEM

##### Connection requirements

##### Article 45

Requirements for connection to transmission system contain minimum technical, constructive, organizational, financial and operational conditions and obligations to be met by the users already connected to the transmission system or persons submitting a request for connection to transmission system.

In addition to these requirements, criteria and requests for connection of new users or change of technical parameters of the existing connector are laid down by other general acts in accordance with the Law:

* + 1. regulation governing the connection of consumers to transmission system, as adopted by the Government of Montenegro (hereinafter referred to as the Government),
    2. regulation governing the connection of direct current high voltage DC cables, as adopted by the Government ;
    3. regulation governing the connection of electricity generation facilities proposed by TSO and adopted by the Agency
    4. regulation determining the amount of charge for connection to transmission system, as proposed by TSO and adopted by the Agency,

##### General requirements

##### Article 46

Requirements for connection to the transmission system are applied to all transmission system users, regardless of whether the connector is used for electricity withdrawal or delivery.

Requirements referred to in paragraph 1 herein are defined according to the following criteria:

1. a new or modified existing connection of the user to the transmission system must not cause negative effects on transmission system or power system or on any system user, and any user cannot be exposed to negative effects following its connection to the transmission system;
2. all transmission system users shall be treated equally and in non-discriminatory way.

Requirements for connection to the transmission system represent technical basis for preparation of connection study, issuance of connection approval and conclusion of connection agreement.

##### Responsible parties

##### Article 47

Responsible parties for implementation of requirements for connections to the transmission system are TSO and transmission system users including:

1) Electricity producers,

2) Owners of interconnection lines subject to exemption from provisions for transmission system access,

3) Distribution system operators (DSO), and

4) customers directly connected to the transmission system and operators of closed distribution system connected to the transmission system

**Transmission system connector**

**Article 48**

1. Connector to transmission system is a group of elements ensuring electrical link between connecting facility and transmission system element to which the user is being connected.
2. Transmission system element under paragraph 1 of this Article is the existing or the planned part of transmission system or connector of other user which has been already connected, which after connection of new user will gain the character of public infrastructure in accordance with the law.
3. Users connectors are part transmission system in accordance with the Law.

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##### Connection procedure

##### Article 49

In the course of procedure for connection of the user to the transmission system, TSO shall:

1. give opinion on connection possibilities,
2. take decision on setting amount of connection fee,
3. issue connection approval,
4. issue interim connection permit for trial operation,
5. enter into connection agreement.

**Opinion on connection possibilities**

**Article 50**

At the request of the Ministry competent for construction and in line with request of the entity intending to construct an energy facility, TSO gives its opinion on options for connection to the transmission system.

Request for opinion on connection possibilities must include important data on construction facility, and is submitted by filling in the form given by TSO (Appendix 1).

Opinion on connection possibilities includes:

1. opinion on connection adequacy of the energy facility to transmission system and proposal for optimal connection voltage level,
2. preliminary assessment of facility’s influence on electric power system operation, and
3. possible connection points taking account of existing condition of the transmission system, construction dynamics of the facility subject to opinion on connection and most recent transmission system development plans.

In case of changes of system conditions, changes made to planning documents or circumstances significantly affecting the assumptions available at the time of delivery of opinion, TSO reserves the right to define new connection point to the transmission system, make addendum to opinion on connection adequacy and carry out preliminary assessment of facility’s influence on power system operation, taking into account previously issued opinion and reducing changes as much as necessary.

Opinion on the possibility on connection shall be issued within one year period.

**Connection Fee**

**Article 51**

1. Connection fee shall be set in accordance with the methodology governing setting of fee for connection to transmission system.

**Connection approval**

**Article 52**

For every construction of the new connection to the transmission system or modification of the existing one in terms of technical parameters, entity planning the construction or the modification must acquire connection approval issued by TSO.

Interested physical or legal entity shall submit request for connection approval in the form given by TSO (Appendix 2)*.*

Data, namely technical parameters included in the request for connection approval must be harmonized with revised preliminary design.

TSO issues connection approval for the facility if there are no technical constraints in the transmission system operation and if devices and installations of the facility to be connected comply with the requirements defined herein*.*

Connection approval to the transmission system for the facility includes:

1. connection requirements, including location of connection, voltage level and power of connector,
2. modality, technical requirements and connection deadline, and
3. point and modality of metering delivered electricity and amount of connection fee set in accordance with methodology governing setting of fees for connection to transmission system.

In addition to the said items and in accordance with the law connection approval may include also modalities, requirements and deadline for takeover of the infrastructure by TSO which has been built by the system user at his own expense.

In case of connection requests for production or other energy facilities which require preparation of system studies, TSO in the course of issuance of connection approval prepares connection study whose conclusions represent the basis for issuance of the approval.

The connection approval shall be issued within 3 years for the implementation of the connector in accordance with the issued conditions. In case connection is not implemented within 3 years from the issuance of the approval, TSO shall at the request of the user consider a possibility to extend the deadline for connection.

**Connection Study Article 53**

Connection study shall be prepared in accordance with technical requirements laid down by these Rules and sublegal acts under Article 45 herein.

With the aim of defining optimal connection conditions included in the study, TSO conducts all necessary analyses (load flow analyses, security analyses, reactive power control, short circuit analyses, dynamic stability, etc.) to verify parameters of transmission system operation in relation to predefined limits to ensure connection and operation of user’s facility without negative effects on the transmission system and endangering normal operation of the facility.

In the course of connection study preparation, TSO may request from the user detailed simulation model of the facility with the aim to conduct all necessary analyses to verify compliance with the requirements defined herein and in order to prepare different system stability studies during entire user connection to the transmission system.

Pursuant to the request referred in paragraph 3 of this Article, the user delivers detailed simulation model of the facility in appropriate format predefined by TSO which must include actual response of the facility in static and dynamic simulations in connection point.

Every connection to the transmission system must be sized and constructed to enable TSO to control the system which is in his possession in line with n-1 security criteria.

Connection study may include several connection options. In preparing the study TSO must ensure that the proposed options for the connection are harmonized as much as possible with the approved transmission system development plan.

In case the results of analyses show unacceptable conditions of transmission system operation in connection point in relation to predefined operation of the user’s facility, TSO defines appropriate actions in the connection study that have to be implemented to achieve compliance of user’s facility.

In case the connection of a new or modification of the existing facility requires extension, reinforcements or any other technical modifications in the transmission system, all necessary additional measures must be clearly defined and specified within the connection study.

TSO issues connection approval to the transmission system taking into account the conclusions contained in the connection study.

**Project Documentation Approval**

**Article 54**

Within 30 days as of the date of request submission, TSO shall approve the revised investment- technical documentation (preliminary design i.e. main design), if it is developed for the facility or part of the facility that has influence on transmission system operation and required to the user for obtaining construction permit.

**Connection Permit Issue**

**Article 55**

Prior to the trial operation (if the trial operation is required by the law governing the construction of the facility) TSO on user’s request issues interim permit for connection during trial operation.

TSO issues interim connection permit during trial operation on the grounds of professional assessment on compliance with requirements within connection approval.

Interim connection permit is valid only during trail operation.

Minimum for the duration of the trial operation and if required by TSO for the whole time of connection to the transmission system, the user has the obligation to install a device which enables recording of generator’s dynamic response and monitoring of electricity quality parameters in the connection point.

Setting of the device for dynamic response recording and parameters monitoring is agreed between the user and TSO.

The user shall test during the trial operation compliance of operation of the generation facility concerned with technical connection requirements stipulated by provision under Article 45 paragraph 3 item 3.

General and technical requirements for testing compliance of generation facility operation shall be specified by TSO in the Procedure for testing compliance of generation facility operation and published on its website.

Assessment of compliance with requirements of the connection approval is taken down in the minutes by the committee appointed by TSO.

Any discrepancies shell be kept in the minutes and eliminated within the period mutually agreed between the user and TSO.

TSO issues a final connection approval based on the test results ad conclusions of expert committee on compliance of user’s facility operation with the required technical connection requirements.

**Connection Agreement**

**Article 56**

Connection agreement concluded between TSO and transmission system user regulates technical, legal, economic and financial requirements for connection to the transmission system, specification of future ownership relations, and future relationship related to operation and maintenance of connection.

Connection agreement must be concluded prior to the permanent energizing of the facility. An interim connection agreement must be concluded prior to the issue of interim connection permit.

TSO has the obligation to deliver a draft agreement to the applicant requesting conclusion of connection agreement within 15 days prior to the date of permanent energizing of the facility.

Technical requirements for connection included in the draft connection agreement are determined in compliance with provisions of these Rules relating to connection to the transmission system and in line with requirements defined in transmission system connection approval of the user/applicant.

Connection agreement is a standard agreement ensuring equal treatment of all transmission system users which is contained in Appendix 4 herein.

Contract components directly related to the user and applicable to each user are:

1. Details of facility owner;
2. Approved connection power;
3. Notes resulting from:

* technical documentation review by TSO,
* assessment on compliance with requirements defined in connection approval as a result of conducted tests, trail operation of the facility and technical inspection,
* exploitation permit for the facility,
* required metering equipment of accounting metering points, and
* certificate by TSO on capability for energizing the connector.

**Modifications and Control of Connection Technical Parameters**

**Article 57**

Planned modifications of the components within the user’s facility that influence transmission system operation as well as all other changes in connection agreement arising from changes in technical parameters must be specified and agreed in Annex to connection agreement.

Complete technical documentation relating to modification referred in paragraph 1 of the Article shall be submitted in time to TSO, prior to modification.

TSO must notify the user in time if the additional testing of user’s facility is required.

**General Transmission System Connection Technical Requirements**

**Connection Point**

**Article 58**

Connection points of the user to transmission system are determined by TSO in accordance with relevant operating regimes of the transmission system, installed power, mode of connecting facility’s operation as well as with interests of the user.

The user may be connected to transmission system at voltage level 400kV, 220kV and 110kV.

Exceptionally, the user may be connected to transmission system at middle voltage (10kV or 35 kV) level provided the connection point is insulator with middle voltage side of transformer 110/x kV belonging to transmission system operator.

**Connected power and maximum available power in connection point**

**Article 59**

Connected power is the power required by the user from TSO in the connection procedure and represents permanently allowed power by which the user may withdraw energy from the system or deliver energy into the system following the guaranteed transmission parameters.

The connected power of user’s transmission system connector may not be less than 10MVA.

The limitation under paragraph 2 of this Article shall not apply to users with more connection points whose total connected power exceeds 30MVA and in case of connection of line facilities of public road infrastructure.

Maximum available power in connection point is the maximally allowed exchange power in connection point, defined in Appendix 7 herein, that does not require further development of the system in order to permanently preserve the guaranteed transmission parameters.

TSO shall determine powers under paragraph 4 of this Article for each connection point in a separate decision annually within September of the current year for the following year.

**Interoperability**

**Article 60**

With the aim of electricity delivery or withdrawal, user’s facility must be connected to transmission system connection point through system element with the possibility of disconnection (switching equipment).

Where in accordance with connection requirements the user construct a substation which is under his authority, equipment in that facility must be sized and adjusted so that the facility operates in line with current regulations and technological standards.

**Connection Principles**

**Article 61**

In accordance with transmission system topology and operational requirements, connection of user facility with the transmission system can be performed:

1. By connection to existing or planned transmission line in accordance with the in/out principle or
2. By direct connection to busbars in existing or planned substation (switching station).

TSO, within the procedure of issuing the Connection Approval, specifies configuration of the substation (busbars number, number of transmission and transformer bays) including the associated switching equipment.

Associated switching equipment considers the following:

1. breakers, with appropriate technical characteristics, which allow selective disconnection of the lines, transformers and busbar systems in user’s plant,
2. disconnectors (line and busbar for lines, busbar for transformers and busbar coupling), and
3. earthing blades (transmission line bay, 400 kV transformer bay, and for 400 kV busbars).

Configuration of the facility that is connected to the transmission system, is specified by TSO according to the data which is submitted by the user and considering typical configuration of the facilities which are connected to the transmission system.

In that sense, TSO is considering the following aspects:

1. proposal of the facility’s single line diagram submitted by the user,
2. operational characteristics of the facility,
3. regular operational procedures,
4. possibility of alternating supply of the user’s facility from the distribution or other systems, and
5. consumption, i.e. load diagram of the facility during the normal operation for consumer, or production diagram in the case when user is the electric energy producer.

**Reactive Power Exchange**

**Article 62**

hen active power is taken from the transmission system of TSO, user must maintain in accordance with standards, a power factor of 0.95 (inductive) to 1 at the connection point to transmission system.

The conditions of the exchange of reactive power outside limits laid down in paragraph 1 are regulated by the Methodology for setting prices for provision of ancillary and system services

**Facility Control**

**Article 63**

The operation of electrical facilities covers all technical and organisational activities that are necessary to keep the facilities functional and safe and provide safe handling with switching equipment.

User connected to the transmission system shall provide own control centre of electric power equipment in the facility.

Control centre from paragraph 2 herein shall act according to instructions received from the competent system control centre of TSO.

Control centre of the transmission system user must be permanently in operation and available to TSO.

Operative personnel of the control centre of transmission system user must be qualified for operating and access to the HV switchgear.

Authorized person of transmission system user responsible for handling with switching equipment must be available to the system control centre of TSO in any moment.

**Neutral Point Treatment**

**Article 64**

The neutral point treatment in the transmission system is within the competence of TSO.

TSO shall prescribe a corresponding technical specification for grounding the neutral point on voltage levels owned by TSO transmission system, and thereby those neutral points belonging to the system of user.

On 110 kV and higher voltage level, neutral points of transformers and other devices belonging to the plant of the user must have the possibility for grounding.

The method of grounding neutral point on relevant voltage levels belonging to TSO transmission system in the part of the system belonging to the user must be analysed in detail in each individual case, and it is an integral part of the connection approval.

**Maintenance**

**Article 65**

Owners of elements of the plant connected to the transmission system shall maintain them in accordance with the existing level of technological development in order to guarantee accurate operation of the plant in line with this *Code* and connection agreement.

Safety-relevant elements of the plant such as circuit breakers, batteries and relay devices must be inspected regularly according to the maintenance plan, adopted by the user with approval of TSO.

**Specific Technical Requirements**

**Connection of Consumers**

**Article 66**

Specific technical requirements for connection of consumers to the transmission system are determined by the provision regulating connection of consumers to the transmission system, adopted by the Government in accordance with the Law on Cross-Border Exchange of Electricity and Natural Gas.

**Connection of Generating Facilities**

**Article 67**

Specific technical requirements for connection of generating facilities, including also renewable energy sources, to the transmission system are determined by the provision regulating connection of producers to the transmission system, determined by the TSO and approved by the Agency in accordance with Article 112 paragraph 1 item 33 of the Law on Cross-Border Exchange of Electricity and Natural Gas.

**Connection Realization**

**Insulation Coordination and Uninterruptible Supply**

**Article 68**

Insulation coordination of all circuit breakers, disconnectors, grounding rods, power transformers, voltage and current transformers, surge arresters, insulators, neutral point grounding equipment, condensers, VF dampers and jointing equipment in facilities of TSO and facilities of users, must be in accordance with IEC standards.

Uninterruptible power supply through batteries must be ensured for all electric devices of auxiliary consumption such as control, communication, protection, measuring devices and control systems of switching equipment in facilities belonging to TSO and facilities of users.

**Protection System**

**Article 69**

System protection concept and settings at the interfaces between TSO and the user is determined by TSO in such a way that risks to neighbouring systems or facilities cannot arise.

Protection systems and circuit breakers must be provided at the connection point.

The user shall be responsible for the reliable protection system in his facilities.

To ensure constant functional capability, the protective devices of TSO and those of the transmission system user should be examined at regular intervals.

Record of the protection inspections and their results must be available to TSO and user.

Significant changes of the protective devices and their settings have to be agreed in time between TSO and the user.

All necessary information for fault clearance must be exchanged between TSO and the user.

Protection concept realized by transmission system user at the connection point must be the same as the TSO concept with regard to triggering times, availability, redundancy etc. When selecting his protection concepts, the user must take into account the following:

* + 1. TSO specifies the permissible back-up protection triggering time at the grid connection point,
    2. TSO’s backup protection concept cannot guarantee 100% protection of the transmission system user plant, particularly not for the faults on the low voltage side of the transformers (on the user’s side),
    3. For the purpose of fulfilling the 5-step under-frequency plan which is an integral part of the defence plan, TSO can demand the use of frequency relays at the grid connection point and can stipulate their settings, and
    4. Fault clearance times much longer than 150 ms can result only in the event of failure of a protective device or of a circuit breaker.

**Real-time Data Exchange**

**Article 70**

Transmission system user should provide and make available to TSO the following real–time data:

* + 1. information on switching equipment status (circuit breakers, disconnectors, earthing switches and tap changers),
    2. measured values of basic parameters (current, voltage, frequency, active power, reactive power),
    3. information regarding protection, control and alarm devices, and
    4. other data of interest depending on the specificity of transmission system user being connected.

The user shall ensure transmission of the aforementioned data to TSO’s control centre and the compatibility with system used by the TSO.

The manner of data exchange from paragraph 1 herein and their scope are an integral part of the Connection Contract.

**Metering Equipment**

**Article 71**

Metering systems installed on the electricity connection points (hereafter metering points) during connection realization must be built and operate in accordance with these *Rules*.

TSO shall determine the location on which the metering system shall be installed, taking care about the need that it is as close as possible to the property boundary between TSO and transmission system user.

1. **METERING SYSTEMS**

**Special Provisions**

**Article 72**

TSO shall determine in these *Rules* the manner of measuring electricity in transmission system, functional requirements and accuracy class of metering devices, based on Article 114 paragraph 2 item 11 of the Law.

Provisions of the *Rules* related to metering systems establish rights and obligations of TSO, market players and transmission system users and define equipment and procedures for the purpose of:

* + 1. metering in electricity delivery/withdrawal points,
    2. reading and data collection on executed metering from electricity meters, and
    3. processing and distribution of data necessary for the electricity market operation.

Metering data are used for needs of calculating transmission system use, settlement of measured values and for the establishment of the level of transmission system exploitation, scope and quality of ancillary services and imbalance and for implementation of incentive measures of privileged producers.

**Objectives**

**Article 73**

Provisions of the *Rules* related to the metering establish conditions and obligations the aim of which is to:

* + 1. ensure necessary metering data and establish the procedure for their exchange between relevant energy undertakings,
    2. define values that need to be measured and requirements related to metering accuracy,
    3. define minimum conditions for metering and registration of measured quantities of electricity, used for the settlement of contracts on electricity exchange, transmission system use, calculation of imbalance and ancillary services,
    4. establish responsibilities related to acquisition, installation, testing, maintenance and control of metering systems,
    5. establish alternative calculation values in case of inaccuracy of metering data.

**Implementation**

**Responsible Parties**

**Article 74**

Parties responsible for metering and exchange of metering data are TSO and users connected to the transmission system.

**Ownership of metering system element**

**Article 75**

The metering system consists of:

* + 1. instrument transformers,
    2. metering device (meter),
    3. data logger,
    4. communication devices and
    5. communication links.

TSO is the owner and has the obligation to carry out the installation, maintenance, control(inspection) and testing of all metering devices (meters) for the purpose of registration of active and reactive energy flows which are the integral part of metering systems in points of separation of transmission system with users, as well as on interconnectors, including also appropriate data loggers and communication system.

Instrument transformers can be property of user connected to the transmission system or owned by TSO.

**Access to Metering Systems Article 76**

User connected to the transmission system shall allow to TSO access to the facility or the part of the facility owned by the user, in order to fulfil obligations determined by the law.

In cases when the metering system is located in the facility or in the part of the facility of user, the party responsible for installation, maintenance and compliance with the requested accuracy class of instrument transformers is the user.

**Obligations of TSO Related to Metering Data Article 77**

TSO has the obligation to collect and make available to market operator, DSO and owners of supply and generation licenses, and the metering data including, but not limited to generation dispatch lists, metering at the point of energy delivery, data related to the operation and exploitation of balancing energy and provision of ancillary services, etc., which they need to carry out accounts, settlements etc.

TSO has the obligation to publish, in the corresponding format, metering data laid down by the Rulebook on data adopted by the Government of Montenegro, which governs TSO’s obligations in terms of manner of submission and publishing data relevant for the electricity market.

The procedure of metering on interconnectors is regulated by contracts on interconnection with operators of neighbouring systems.

**General Requirements**

**Article 78**

Basic principles for the definition of requirements related to metering systems are the following:

1. each point of separation of transmission system and user connected to the transmission system must be equipped with a corresponding metering system,
2. each metering point on interconnection line as a minimum requirement must have account and control metering device (it is possible to install current transformer with two metering cores with same characteristics),
3. accuracy of metering systems and values measured in every network node are determined in accordance with the type of metering point (account or other metering points),
4. TSO is responsible for installation and maintenance of metering devices in all metering points in the transmission system,
5. transmission system user may have the possibility to install alternative metering device,
6. TSO is responsible for installation, maintenance, regular control and testing (inspection) of metering transformers if the metering point is located in the part of the system in its ownership,
7. user is responsible for installation, maintenance, regular control and gauging of metering transformers located in the part of the system in his ownership,
8. user and TSO must ensure that the accuracy of metering systems complies with technical requirements on metering accuracy specified by these *Rules*,
9. metering systems must be safe, registered with TSO, approved for use by the competent institution and capable of providing data for electronic transfer to the metering database,
10. data on metered electricity must be kept and made available during dispatching and settlement phases,
11. data on metered electricity are measured in units kWh-kilowatt-hour (active) and kvar- kiloVarhour (reactive),
12. metering data used for contractual settlement, transmission system exploitation, system balancing and ancillary services become valid when TSO verifies their validity,
13. metering data must be kept in the metering database,
14. TSO must define the procedure for registration and prepare the metering register, in order to facilitate the implementation of the *Rules* to users and electricity market players with respect of:
    * new metering systems,
    * change of existing metering systems, and
    * disconnection of metering systems, including provision of information on metering systems.
15. All metering systems must comply with standards contained in the *Rules*, or those which the

*Rules* makes reference to.

1. In case of unavailability of metering systems or determined fault in their operation, TSO shall determine corresponding replacement data, to be used instead of the missing one.

**Technical Requirements**

**General Technical Requirements**

**Article 79**

In each metering point as the minimum requirement must exist one metering system capable of registering active and reactive energy consumption each 15 minutes with the possibility of remote and local meter reading.

In metering points on interconnection lines, the minimum requirements are the installation of current transformers equipped with two metering cores, one for the connection of accounting metering device (meter) and another for connection of control metering device.

For each connection of users to 400 kV, 220 kV and 110 kV networks it is necessary to ensure meterings of active and reactive energy for both directions:

* + 1. reception/import (MWh),
    2. delivery/export (MWh),
    3. reception/import (Mvarh), and
    4. delivery/export (Mvarh).

**Standards for Metering Devices (Meters) Article 80**

Metering devices for active energy must comply with the following standards:

* + 1. IEC Standard 62053-22 – Static metering systems for active power metering (accuracy class 0.2S and 0.5S) or
    2. IEC Standard 62053-11 – Electromechanical metering systems for active power metering (accuracy class 0.5, 1 and 2)

Metering devices of reactive energy must comply with the IEC standard 62053-23 (accuracy class 2.0).

**Accuracy Class of Instrument Transformers Article 81**

Certificates on testing of voltage transformers (VT) and current transformers (CT) must be, at any moment and under any circumstances, made available to TSO when the metering system is located in user’s facility.

Minimum accuracy class of metering systems are presented in the Table [1](#bookmark138):

***Table 1 – Minimum Accuracy Class of Metering Systems***

|  |  |  |
| --- | --- | --- |
| **TYPE** | **Accuracy Class of Connections** | |
| **Accounting and Control Metering Points** | **Other metering points** |
| **Current transformers** | **0,2S** | **0,5S/0,5** |
| **Voltage transformers** | **0,2** | **0,5** |
| **Active energy meters** | **0,2S** | **0,5S/0,5** |
| **Reactive energy meters** | **2** | **2** |

**Total Metering Accuracy Article 82**

Total metering accuracy must be in accordance with the Table [2](#bookmark141):

***Table 2 – Total Metering Accuracy***

|  |  |  |  |
| --- | --- | --- | --- |
| **Current, as percentage of nominal current** | **Power factor** | **Limits of metering error** | |
| **Accounting and control metering points** | **Other metering points** |
| **Active energy** | | | |
| **20% to 120%** | **1** | **± 0,5%** | **± 1,6%** |
| **5% to 20%** | **1** | **± 0,5%** | **± 1,6%** |
| **1% to 5%** | **1** | **± 0,7%** | **± 2,1%** |
| **20% to120%** | **0,5 ind. to 0,8cap.** | **± 1,0%** | **± 2,5%** |
| **Reactive energy** | | | |
| **10% to 120%** | **0** | **± 4,0%** | **± 4,0%** |
| **10% to 120%** | **0,866 ind. to 0,866 cap.** | **± 5,0%** | **± 5,0%** |

**Locations of Metering Points**

**Metering Point and Electricity Delivery/Withdrawal Point Article 83**

Metering point represents the physical place (point) in the system where the devices for the metering of electricity are installed and in which the electricity withdrawn from or delivered to TSO is metered.

The point of delivery/withdrawal of electricity is the place in which TSO delivers and the user (DSO or direct consumer) withdraws the electricity from the transmission system, or the place in which the producer delivers and TSO withdraws the electricity.

Electricity delivery/withdrawal point is located at the border of delimitation of capital assets of TSO and user.

Delivery/withdrawal point and metering point must be determined by the connection contract.

TSO defines the location of metering point that is the location in which the metering system will be installed.

Metering point is, by rule, located in the electricity delivery/withdrawal point, unless disabled by specific connection conditions, which is provided by individual connection contracts.

All defined metering points must comply with the criteria of total accuracy metering laid down by these *Rules.*

Metering points can be located in facilities owned by:

1) TSO,

2) Electricity producer,

* + 1. Distribution system operator (DSO), or
    2. Direct consumers

The user has the obligation to ensure that the metering point is located as close as possible to the delivery/withdrawal point (basic criterion). When this is not possible, or when the compliance with this condition incurs significant costs, delivery point and measuring point do not need to coincide.

When the delivery/withdrawal point and metering point do not coincide (for instance when they are not at the same voltage level, or if they are at the same voltage level but are so distant from each other that electricity losses cannot be neglected), wherever necessary, TSO shall perform correction of metering data for the value of electricity losses in elements of transmission (user) system should be carried out, from the delivery/withdrawal point to the metering point (reducing to the delivery/withdrawal point). Reduction of metering to the delivery/withdrawal point is performed by multiplying the measured value and correction factor determined by TSO, and is integral part of the account process.

**Generating Facilities Article 84**

Metering point for electricity delivered by the generating facility to the transmission system is located, according to the basic criterion, in the part of the system owned by the user in the vicinity of delivery/withdrawal point, i.e. border of delimitation of ownership of fixed assets. The exact location of metering point as well as the distribution of responsibilities on the location shall be determined in the connection process.

TSO is responsible for installation, maintenance, regular verification and testing of the main (accounting) metering device (meter) and corresponding communication equipment.

The transmission system user is responsible for the installation, maintenance, verification and testing of the rest of the metering system equipment.

The producer may install its own control alternative metering device that has to be carried out through a special current instrument transformer or through a joint metering transformer equipped with two metering cores dedicated to the connection of accounting and alternative metering device.

**Electricity Distribution System Article 85**

Electricity delivered or taken over by TSO to the distribution system is measured in feeder cell (bay) of the low-voltage side of 110/x kV transformer owned by DSO.

IDSO is responsible for the installation, maintenance, regular verification and testing(inspection)of metering systems (not including metering devices) whereas TSO is always responsible for metering devices (meters).

DSO may install his own alternative metering device that has to be carried out through a special current metering transformer or through a joint metering transformer equipped with two metering cores dedicated to the connection of accounting and alternative metering device.

**Direct Consumers**

**Article 86**

The metering point of electricity delivered from the transmission system to the direct consumer is located, according to the basic criterion, in the part of the system owned by the user in the vicinity of delivery/withdrawal point or the point of delimitation of ownership of fixed assets. The exact location of metering point as well as the distribution of responsibilities on the location shall be determined in the connection process

TSO is responsible for installation, maintenance, regular certification and testing of the main (accounting) metering device, i.e. meter and corresponding communication equipment.

The transmission system user is responsible for the installation, maintenance, certification and testing of the rest of the metering system equipment.

Direct consumer may install his own alternative metering device that has to be carried out through a special current instrument transformer or through a joint metering transformer equipped with two metering cores dedicated to the connection of accounting and alternative metering device.

**Metering Systems**

**Article 87**

Metering system is composed of the elements from Article 75 paragraph 1 herein.

Not including instrument transformers, components of the metering system have to be located in a clean and dry place.

**Instrument Transformers**

**Article 88**

Current transformers (CT) and voltage transformers (VT) have to comply with the technical requirements and accuracy class laid down by Article 81 of *these Rules*.

Owner of instrument transformers, part of metering systems in the transmission system, shall submit to TSO their technical characteristics, including the details on overload probability, which must be submitted for their insertion in the metering register.

**Current transformers (CT) Article 89**

In each metering point there must be two sets of current transformers or one current transformer with two or more secondary windings in accordance with IEC standards 60044-1 and accuracy class in accordance with Article 81 of these *Rules*.

One set of current transformers, that is, one metering core must be used exclusively for the supply of accounting metering device. Current transformers that supply alternative metering devices, where they are installed, may be used also for other purposes, complying with criteria related to total metering accuracy from the Article [82](#bookmark140) of these *Rules.*

For the purposes of insertion in the metering register, the system user shall submit a document on performed testing of accuracy class to TSO.

**Voltage Transformers (NT) Article 90**

In every metering point must be two sets of voltage transformers, or one voltage transformer with two or more secondary windings, in accordance with the IEC standard 60044-2 and with accuracy class in accordance with Article [81](#bookmark137) of these *Rules.*

The drop of voltage in the secondary winding, which supplies metering devices, must not exceed 0,25% of the nominal voltage. Secondary winding of voltage transformers that supply alternative metering devices, where they are installed, may be used also for other purposes, satisfying the criteria related to the total accuracy metering from Article [82](#bookmark140) of these *Rules.*

For the purposes of insertion in the metering register, the system user has the obligation to submit to TSO a document on voltage transformer testing, in which are presented errors of the overall operational load for each winding of voltage transformer used for electricity metering, and performer testing of accuracy class.

Total load of each secondary winding of voltage transformer must not exceed its nominal load.

**Metering Devices**

**Article 91**

Devices for the metering of active and reactive energy must fulfil all conditions stated in the Article [80](#bookmark135) of these *Rules.*

All metering devices must possess stable metering registers of total energy for each metered quantity. Metering register must contain sufficient number of number places for readings in order to avoid the resetting of register to zero during the normal reading period.

Metering devices that provide data for different data loggers for this purpose must have two terminals for each metered value.

All metering devices must be labelled by a unique number (identification number). This data, together with technical characteristics and specifications, must be made available to TSO for their insertion in the metering register.

**Data logger**

**Article 92**

Each data logger must have such capacity to receive all metered values that have been sent to it for the period of at least 45 (forty-five) days of 15-minute data.

Data logger must be regularly controlled. Metering data are collected on a daily basis.

For each data logger must be ensured a secure and continuous supply with a separate cut-out fuse for each device.

The same condition from the previous paragraph applies if the location of the communication device for data logger is distant from the data logger.

Data logger must be installed with an alarm signal in a visible place, which gets activated in case of interruption of supply to the device.

**Data Storage Article 93**

Metering systems must be capable to be protected from deletion of data stored in the memory.

Metering data logger must ensure the following:

* + 1. in case of interruption of supply to data logger, the device must protect all data stored by that moment,
    2. values of energy and demand at the moment when interruption of supply to data logger occurs as well as their zero values after the elimination of the problem with supply must be indicated, so that the system for metering collection could identify them, and
    3. until the reestablishment of the supply to data logger, the time, calendar and all data must be supported for 45
    4. days without external supply.

**Communication Link**

**Article 94**

For the purpose of data transmission from metering devices to data loggers, it is necessary to provide a corresponding link.

The communication may be realized through: optical cable, copper pairs, GSM and radio link.

**Communication Equipment**

**Article 95**

It is necessary to ensure that each data logger can be controlled locally and remotely from separated ports.

Metering equipment must be installed in such way that readings and reprogramming of metering data from metering systems are possible only through local or remote access with corresponding level of security.

During the reading process, if necessary, the following data reading should be enabled:

* + 1. Values of electricity exchanges, pursuant to the Article 79 of the *Rules*, if necessary, and
    2. alarm indication.

**Local Access Article 96**

Each data logger, it is necessary should have a reading port, in order to allow the connection of the local data terminal, such as PC, for the following purposes:

* + 1. putting in operation, maintenance and error detection,
    2. transfer of metering data in case of communication error, and
    3. adjustment of time when it cannot be carried out remotely or automatically.

**Remote Reading Article 97**

Each data logger must be equipped with an internal or external communication equipment, such as modem or radio transmitter, which supports the data exchange for local and remote monitoring, in accordance with the IEC standard 62056-21. A communication link must be ensured for the acquisition of metering data through the metering collection system, and for the purposes of TSO.

Remote access by TSO for the purpose of metering data reading is carried out at least once a day.

All parties must ensure reserved circuits for the reception of metering data. TSO is responsible for the provision and coverage of rental costs of communication link.

Reading of data from metering devices and programming of parameters must be allowed only through the access at a corresponding level of protection.

Communication between data logger and system for metering collection must include corresponding devices and mechanisms for error tests.

TSO determines technical specifications for the format of transfer of data, protocols, devices, as well as mechanisms for error controls and level of protection.

**Metering Systems Certification and Testing**

**Metering Systems Protection**

**Article 98**

After the installation and putting in operation, all equipment of metering systems have to be closed and protected with a seal in accordance with the agreed procedure. The seal must be positioned in such way so that the inside part of metering devices cannot be accessed by anyone without breaking the seal.

**General Conditions of Testing and Certification**

**Article 99**

TSO is responsible for verification, revision and confirmation of specifications of metering systems, he approves testing and programs for putting in operation the metering equipment, controls the results and monitors the testing and certification of metering devices and instrument transformers. By a method of random sample, TSO carries out periodic revisions of metering systems, in order to confirm their compliance with these *Rules*.

TSO must have unlimited access to metering devices for their control, data verification and system revision.

transmission system user has the obligation to inform TSO of all changes of parameters of existing metering systems which he intends to carry out. The user cannot make planned changes without prior approval of TSO.

Windings of metering transformers and parts of metering systems must be secured and protected.

Metering systems must be tested and certified in accordance with standards determined by the competent institutions and must fulfil criteria related to overall metering accuracy from the Article [82](#bookmark140) of these *Rules*. For all network devices must be ensured separate blocks of terminals for testing, with the aim to facilitate the testing and certification.

Testing device must be located as close as possible to metering devices to which it refers.

**Metering Devices Control Article 100**

All metering devices must be gauged, tested and certified before the beginning of their commercial use (initial testing and certification), in accordance with specifications and laid down technical characteristics.

Testing and certification may be carried out by competent person or institution.

Results of tests and certificate on testing and certification must be made available to TSO for the purposes of control and insertion in the metering register.

All metering devices must be regularly tested and certified, in specific time intervals and as needed.

All metering devices must be tested for accuracy at the moment of initial putting in operation.

Tests are also carried out in specific time intervals in order to establish whether metering devices operate within determined error limits, as specified in the Article [82](#bookmark140) of these Rules

Dates and results of all tests must be submitted to TSO for their insertion in the metering register.

From time to time, as needed, beside these, special tests can be requested.

Timetable of testing and subsequent testing and certification is carried out in accordance with the Metrology Law and its sub-legal acts.

If control of the metering device confirmed it accuracy, it is considered that the device worked properly during the entire period preceding to the control.

**Instrument Transformers Control**

**Article 101**

New metering transformers must be controlled before they are put in operation (initial control) in accordance with specifications and technical characteristics, determined by the competent authority. Results of testing and confirmation of controls must be made available to TSO for the purpose of their verification and insertion in the metering register.

It is necessary to carry out periodic controls of metering transformers, namely for current and voltage transformers every 12 years, for capacity voltage transformers every 5 years, or earlier if an evident fault occurs.

If control of the instrument transformer confirmed it accuracy, it is considered that the device worked properly during the entire period preceding to the control.

**Data Loggers Control**

**Article 102**

New data loggers must be controlled before the beginning of commercial use at any location, in accordance with specifications and technical characteristics laid down by these *Rules*.

Periodic controls are not requested for data loggers, unless an evident fault occurs.

**Visit to Location Article 103**

TSO shall for all locations ensure visits to locations on a yearly level with the purpose of metering reading register and control of metering place.

The difference between advancement of metering register from the metering device for the period and the total sum of consecutive readings for the same time period, must not exceed the tolerance limit of 0,1 %, otherwise TSO shall write a report on fault and to take measures for its elimination.

Visit to location is also carried out in order to verify whether the metering system or related equipment have been subject to any damage or falsification, especially of the seal, and whether there is a likelihood for it to happen.

**Metering Devices Errors Article 104**

In case TSO finds out, or he gets informed of the existence of, or probability for an error on the metering device, he has the obligation to investigate and eliminate the problem, i.e. to order to the party responsible for metering to investigate and eliminate the problem with the metering device within 48 hours after becoming aware of the problem.

If the inspection test or metering system revision, carried out in accordance with the Article [99](#bookmark170) paragraph 1 of these *Rules* shows that the error is higher than as specified in the Article [82](#bookmark140) of these *Rules,* and TSO does not have the information on the moment when the error occurred, it is considered that the error has occurred in the middle of the period from the moment of the last test or revision, in accordance with the law when it has been asserted that the metering system complies with requirements related to accuracy, and the moment when the error was detected.

In case of detected error, TSO shall ensure for the purpose of account replacement data for the corresponding period in accordance with the Article 112 of these Rules.

**Requests for Shortcoming Elimination Article 105**

TSO shall inform the user about the noted shortcomings in the metering system owned by the user within 24 hours.

The user shall eliminate shortcomings in the part of metering system referred to in paragraph 1 of Article herein within five days from the day of receiving notification from the TSO

If it is not possible to eliminate the shortcoming from paragraph 2 herein within the prescribed deadline, replacement data from Article 112 herein shall be used for needs of account, where the user keeps the right to suspend use of the system until the shortcoming is eliminated.

**Metering Database Management**

**Metering Database Article 106**

The metering database is the place where technical and administration data relevant for all metering points are kept. Metering database consists of:

* + 1. metering register and
    2. metering data.

TSO is responsible for update, maintenance and administration of database metering register, as well as for its security and confidentiality. Users connected to the transmission system shall inform TSO of any change within their competence that affect metering data.

**Metering Register Article 107**

Metering register is the part of metering database where permanent information related to the metering system are kept.

The purpose of the metering register is to facilitate:

* + 1. registration of network nodes and metering points,
    2. verification of fulfilment of all technical requirements of metering systems, and
    3. revision and control of changes of registered information.

The user has the obligation to submit to TSO for each metering transformer in his ownership relevant data and technical characteristics.

**Metering Register Information Article 108**

Metering register must contain the minimum of data – information related to:

* + 1. network node and metering place (point),
    2. metering system equipment,

**Identification Number of Metering Point Article 109**

Every metering point must have its identification number. Identification number determines in a unique way the place (point) of metering and it is composed of 16 characters:

* + 1. first two characters represent the identification of the state and are determined by TSO in coordination with externally connected parties and relevant subjects, such as ENTSO-E;
    2. the letter “Z“ is for identification of the code as the identification code of the metering point;
    3. next 3 characters or capital letters represent the identification number of the network, which TSO allocates to system users as unique identification code;
    4. next 12 numbers or capital characters represent the identification code of the metering point and are allocated to each metering point individually, with a unique identification code for each metering point. Some characters may be allocated to determine the type of metering system (ex. generation, distribution operator, direct consumer etc.);
    5. the last character is anticipated for control of accuracy of EIC code in accordance with standards of assigning ENTSO-E EIC codes.

Capital letters in identification number can be one of the following: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z and “-“.

**Metering Data Article 110**

Metering data include all metered, collected and calculated values of metering used for the purposes of calculation. Metering data are kept in the database.

TSO is responsible for the collection of data from the metering point, by using specific protocols of data transmission and he has to confirm them, process them, and insert them in the metering database and make them secure for the purposes of settlement of market transactions and the collection of fees for system use.

The user must ensure a reliable operation of communication link and remote data transmission from the metering device to the metering database.

If, for any reason, the remote data reading (or collection) is not feasible, TSO and the user must ensure the data acquisition by local examination. If neither this is feasible, TSO must recur to other means (ex. SCADA system) for collection of evaluated data.

Metering data include:

* + 1. original, time-dependent values of active and reactive electricity collected from metering systems,
    2. values calculated by TSO on the basis of original data,
    3. evaluated and changed or replaced data in case of erroneous or lost data, and
    4. data and values used for accounting purposes.

**Data Confirmation Article 111**

TSO is responsible for verification of data validity, as well as for replacement of data in case of errors or data losses, for whichever reason this has happened.

When collecting updated daily data, the following conditions must be fulfilled:

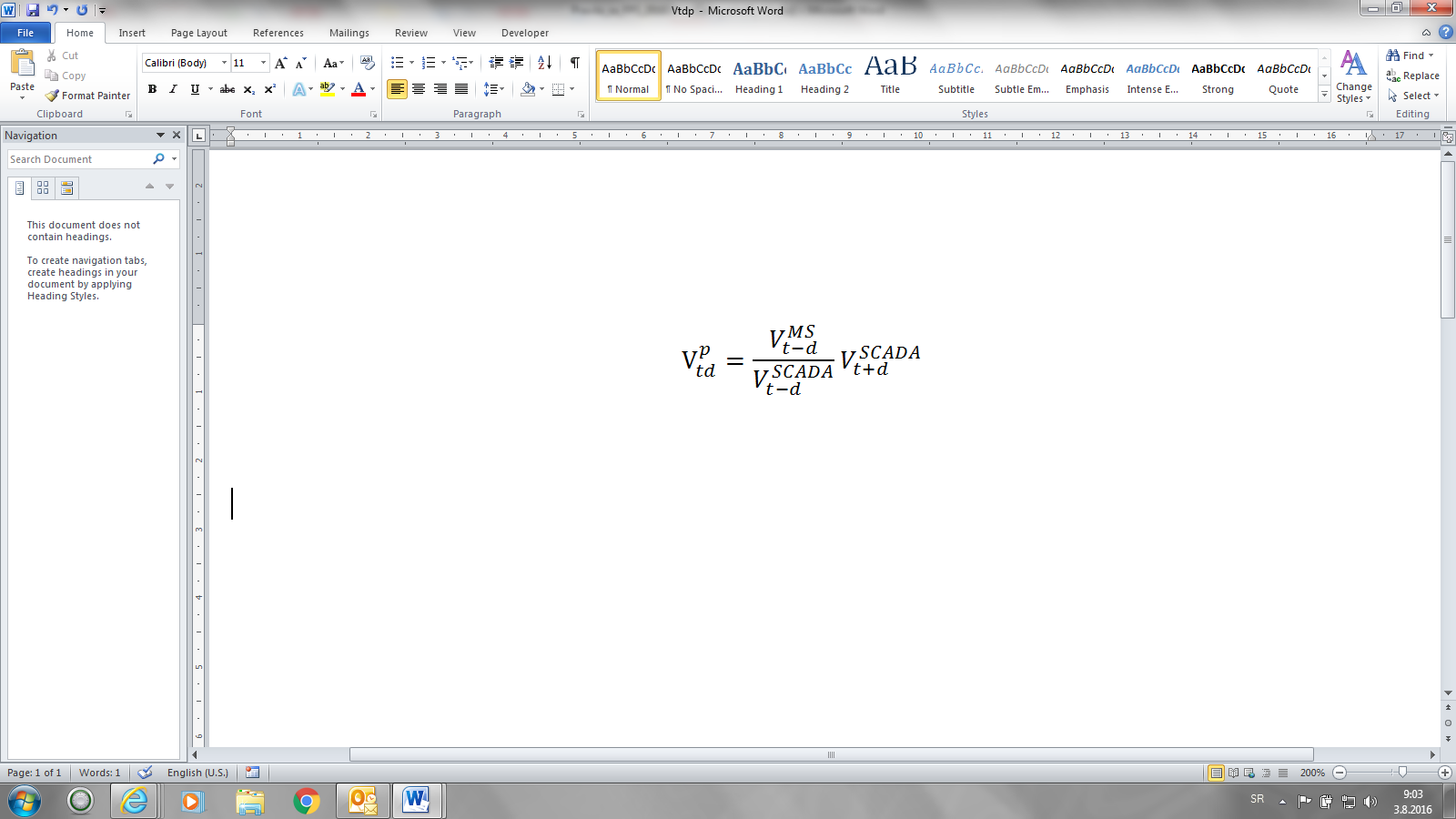
* + 1. if data from data logger are not accessible, no data has been collected, the alarm gets activated and the identification begins. Collection process – data acquisition is performed automatically and it is controlled by the TSO on a daily basis,
    2. if there is no communication with data logger, the alarm gets activated and the fault identification begins
    3. time synchronisation of all devices in the metering system is performed automatically and checked by the TSO at least once a week,
    4. if the time on data logger is different from the expected one for more than 10 seconds, but less than 1 (one) minute, the time on data logger is corrected by means of data collection system. In case of major differences, the alarm gets activated and the fault identification begins, and
    5. if TSO identifies any of the above mentioned faults, he must inform the user within 24 hours after the fault detection.

If there is a discrepancy between the metering system data and database, the party affected by this discrepancy must, in cooperation with TSO, find the most appropriate way to eliminate quickly the reason for discrepancy and agree measures to be taken to prevent discrepancies to happen in the future.

TSO is responsible for examination and elimination of all errors and malfunctions in the metering system. TSO must inform the user of any fault in metering system data, occurred as the consequence of incidents in the metering system.

**Data Replacement Article** **112**

1. In the event of unavailability of accounting metering data or error in accordance with 104 of these Rules, it shall be considered data from control metering devices. In case of unavailability of data from metering devices, or failure in accordance with Article 104 of these Rules, TSO performs calculation of values of missing data.
2. In case of unavailability of data from SCADA system, TSO shall determine the calculated value from paragraph 1 herein in the following manner:



where is:

Vptd - calculated value of the accounting metering data, for the period of interruption duration *d*, from the moment of occurrence of the error or commencement of unavailability *t*

VMSt-d - value of the accounting metering data measured on the metering system in the period of interruption duration *d* before the moment of occurrence of mistake or commencement of unavailability *t*

VSCADAt-d - value of the accounting metering data registered on SCADA system in the interruption duration *d* before the moment of occurrence of the error of commencement of unavailability *t*

VSCADAt+d - value of the accounting metering data registered on SCADA system in the period of interruption duration *d* before the moment of occurrence of the error or commencement of unavailability *t*

In the event that data from paragraph 2 herein are not available, TSO shall determine the calculated value starting from the assumption that the user took over the electricity equal to the three-day average from the period preceding the occurrence of the error or commencement of unavailability of metering data, reduced to the accounting period, with daily diagram of power corresponding to the average diagram from the same period.

**Data Access and Security Article** **113**

TSO is the owner of metering register and for security reasons he is the only one to have direct access to metering register. The parties who have the right to ask for data from the metering register are:

* + 1. users connected to the transmission system,
    2. market operator,
    3. suppliers,
    4. holders of balance responsibility, and
    5. the Agency.

At the written request by any of the abovementioned parties, TSO approves the access to the metering register data.

These data are made available for the purpose of verification testing, disputes, inspection and certification or any other reason in accordance with applicable regulation.

Data are made available by electronic way, not later than 7 (seven) days from the date of reception of written request.

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These data are made available for the purpose of verification testing, disputes, certification r some other reason, in accordance with valid regulations.

Data are made available by electronic way, not later than 7 (seven) days from the date of reception of written request.

All metering data located in metering systems must be protected from the unauthorized local or remote access by electronic way, with a corresponding protection system.

**Documentation Article 114**

The metering register must contain the exact list of identified and registered delivery points and metering points, as well as other related components, settings and parameters. Any eventual change of components, settings and parameters may be executed exclusively upon information and coordination with TSO.

Design, technical specifications and connection diagrams of metering systems must be duly documented.

These documents must be made available at any moment to transmission system users, as well as to TSO for the purposes of insertion in metering register.

1. **TRANSMISSION SYSTEM OPERATION**

**Specific Provisions**

**Article 115**

In order to ensure conditions for a secure and stable transmission system operation, these *Rules* determines:

* 1. technical and other requirements for a secure transmission system functioning, in accordance with Article 114 paragraph 2 item 2 of the Law,
  2. rules for system balancing and criteria and manner of providing ancillary services, in accordance with Article 114 paragraph 2 items 5 and 6 of the Law,
  3. manner of operation in emergency situations, in accordance with Article 114 paragraph 2 item 7 of the Law,
  4. technical requirements for connecting and functioning of transmission system in interconnection, in accordance with Article 114 paragraph 2 item 8 of the Law,
  5. manner of publishing data needed for market functioning and giving data to transmission system operators, in accordance with Article 114 paragraph 2 item 12 of the Law,
  6. manner of giving priority to use of domestic sources of primary energy for electricity generation, in case when such obligation is determined by the energy balance, as well as the manner of giving priority in access and taking over of electricity produced from renewable sources and high-efficiency cogeneration, in accordance with Article 114 paragraph 2 items 13 and 14 of the Law.

**Transmission System Operation Planning**

**Forecasts and Plans**

**Article 116**

Transmission system operation planning implies planning activities carried out before real-time control, namely:

* + 1. preparation of annual forecast of transmission system operation,
    2. preparation of annual plan of transmission system operation,
    3. preparation of quarterly disconnection plan,
    4. preparation of monthly disconnection plan,
    5. preparation of weekly disconnection plan,
    6. preparation of daily plan of electric power system operation.

**Operation Planning Objectives**

**Article 117**

The aim of transmission system operation planning referred to in Article 116 shall be:

* + 1. balancing of planned production of generators with forecasted demand at the level of transmission (including losses), whilst ensuring sufficient generation reserve, taking in consideration outages of particular generation units, parts of transmission system as well as parts of system users’ systems;
    2. fulfilment of required system security standards and quality in supplying consumers with electricity; and
    3. establishment of procedures that allow TSO to carry out harmonization and optimization of generation programs and planned disconnections - interruptions in transmission system, without jeopardizing secure and stable operation of the electric power system, i.e. quality electricity supply to consumers.

**Long-Term Forecast of Transmission System Operation**

**Article 118**

Long-term forecast of transmission system operation is prepared for needs of providing inputs for preparation of long-term energy balance in accordance with the Law and preparation of TSO business plans.

TSO shall prepare the long-term forecast of transmission system operation every year, for a period not shorter than the duration of the regulatory period determined by the Agency, by 01 June of the year preceding the commencement of the period for which the forecast is performed.

Long-term forecast of transmission system operation shall contain:

* + 1. forecast of maximum needed powers in the system,
    2. forecast of transmission system losses,
    3. forecast of electricity transit and
    4. forecast of needs for ancillary services.

**Submission of Data for Needs of Long-Term Forecast**

**Article 119**

For needs of preparing the forecast from Article 118 herein, users connected to the transmission system shall submit the planned maximum power of exchange by connection points and total exchanged energy, on monthly level for each year of the forecast period, at latest by 01 May of the year preceding the commencement of the period for which the forecast is performed.

**Annual Plan of Electric Power System Operation Article 120**

TSO shall prepare the annual plan of transmission system operation by December 15 in the year that precedes the year for which the plan is prepared.

Annual plan of transmission system operation must be agreed with the annual electric power balance determined by the Government and with the disconnection plan determined on regional level, and it shall mandatory contain the following:

* + 1. planned maximum power demand in the system,
    2. planned transmission system losses,
    3. planned electricity transit,
    4. planned needs for ancillary services,
    5. disconnection plan of transmission system elements,
    6. estimate of transmission system adequacy,
    7. estimate of available cross-border transmission capacities.

**Disconnection Planning**

**Article 121**

TSO prepares quarterly, monthly, weekly and daily disconnection plans of elements at 400, 220 and 110 kV voltage levels within the transmission system. Transmission system users prepare disconnection plans for elements in parts of the system under their competence and submit them to TSO.

TSO prepares final disconnection plans of elements of electric power system in coordination with transmission system users and neighbouring TSOs.

Disconnection plans include works in no-load conditions, in accordance with regulations which define general safety operational measures, on elements of electric power facilities at 400 kV, 220 kV and 110 kV voltage levels, as well as those elements of lower voltage levels that are integral part of these elements (secondary and tertiary transformer, transformer neutral point etc.) and other works that require disconnection of electric power system elements.

In preparation of disconnection plans, TSO has the obligation to harmonize outages in transmission system with operations plans of generation units in order to maintain the conditions or normal, or at least secure operation during the disconnection.

Disconnections due to implementation of approved investment plans of TSO and transmission system users must be included in disconnection plans.

More specific procedures for the preparation of disconnection plans, issuing of approvals for disconnection of electric power system elements and implementation of basic measures for security of working sites on elements of electric power system facilities, as well as the type, form and content of documents (requests, approvals, etc.) based on which disconnection is approved, are determined by TSO in cooperation with transmission system users.

**Duration of Regular Disconnections Article 122**

For duration of disconnection during the year for maintenance, the following values are adopted:

***Maximum duration of disconnection for overhead lines***

|  |  |
| --- | --- |
| Description of OHL | Maximum disconnection duration |
| Single 110 kV OHL, for each 10 km | 1 day |
| Single 220 kV OHL, for each 10 km | 1.1 day |
| Single 400 kV OHL, for each 10 km | 1.25 days |
| Double OHL | Time for single OHL x 1.2 |
| Each crossing of OHL over water courses | 1 additional day |

***Table 3 – Maximum duration of disconnection for other electric power system elements***

|  |  |
| --- | --- |
| Description of EPS element | Maximum disconnection duration |
| Busbar system | 1 day |
| 110 / x kV transformer | 3 days |
| 220 / x kV transformer | 5 days |
| 400 / x kV transformer | 6 days |
| All types of bays | 3 days |

Regular maintenance works on block-transformers and other elements in the part of the system that belongs to the user whose disconnection is necessary during the overhaul of the respective generation unit must be carried out during the overhaul of that generating unit.

**Annual Disconnection Plan**

**Article 123**

Annual disconnection plan is prepared by months and it is part of the annual plan of transmission system operation.

Annual disconnection plan is based on:

* + 1. draft plan of revisions and overhauls of electricity transmission facilities and plants,
    2. draft plan of revisions and overhauls of generation capacities and related switching substations, and
    3. harmonized annual disconnection plan of overhead lines and transformers relevant for the normal operation of ENTSO-E interconnection in the region of South-eastern Europe.

TSO shall determine through an internal regulation the manner of preparing the annual disconnection plan.

Requests for the change of date of disconnection of elements of 220 kV and 400 kV voltage levels, anticipated by the annual plan, may be submitted by transmission system users to TSO at latest by the 25th day of the month M-2 for the month M.

Requests for the change of date of disconnection of elements of 110 kV voltage level, anticipated by the annual plan, may be submitted by transmission system users to TSO at latest by the 20th day of the month M–1 for the month M.

Requests for the change of date of maintenance of generation facilities anticipated by the annual plan, may be submitted to TSO at latest by the 20th day of the month M – 2 for the month M.

**Quarterly Disconnection Plan**

**Article 124**

TSO shall prepare the quarterly disconnection plan by days and submit it to the Agency for their information.

The quarterly disconnection plan is prepared based on the annual disconnection plan and changes of the annual plan that, in case they affect the availability of the system to the user, are harmonized with that user.

The quarterly disconnection plan is prepared at latest by the 25th of the month preceding the commencement of the subject quarter.

**Monthly Disconnection Plan Article 125**

Monthly disconnection plan is prepared for each day.

Monthly disconnection plan is prepared based on the annual disconnection plan and changes of the annual plan that, in case they affect the availability of the system to the user, are harmonized with that user.

Monthly disconnection plan is prepared at latest by the 25th day of the month M – 1 for the month M.

**Weekly Disconnection Plan Article 126**

Weekly disconnection plan is prepared for each day and each hour.

Weekly disconnection plan established in the monthly disconnection plan for the week to which the weekly plan is referred, is corrected in accordance with approved requests for extension of deadline for the execution of works that are already under way, requests for the execution of works that have been postponed on the basis of orders of TSO management centres and requests for disconnection due to a real or potential fault or request for intervention works, as well as new disconnection periods for postponed or extended works.

In case that disconnections planned in the weekly disconnection plan may lead to the limited operation of generation capacities (availability of particular generators, i.e. limitation of minimum and maximum generation), which are not included in the monthly disconnection plan, TSO asks the approval of transmission system users for such operational regime, by Wednesday at 15:00 h of the current week for the following week.

Transmission system user shall reply to the abovementioned request of TSO by Thursday at 12:00 h.

Weekly disconnection plans are prepared at latest by Friday at 12:00 h of the current week for the following week.

**Daily Disconnection Plan Article 127**

Daily disconnection plan is prepared based on the weekly plan complemented with approved requests that are the consequence of current problems in transmission system exploitation.

**Submission and Approval of Disconnection Requests**

**Article** **128**

TSO shall stipulate the procedure of submission and approval of disconnection requests, whose integral part is also the form for submission of disconnection request.

The user connected to the transmission system shall update regularly the list of persons authorized for submission of disconnection request.

Transmission system users have the obligation to submit to TSO the disconnection request due to planned works by Wednesday at 15:00 h of the current week for the following week.

Disconnection approval for purposes of planned works is issued by TSO to the party that made the request by Friday at 12:00 h of the current week, for disconnections planned for the following week.

Urgent disconnections are the consequence of the need to prevent possible emergency situations that might threaten the security of the personnel in affected facility, or in any way jeopardize the security of operation of transmission system elements or facilities, electric power system of Montenegro and neighbouring electric power systems.

Request for urgent disconnection or transmission system element or facility is submitted immediately after the problem that might cause the abovementioned consequences is identified. TSO gives his response to the request in the shortest possible time.

**Security Analysis**

**Article 129**

The aim of electric power system operations planning is to maintain the maximum security of supply and reliability of electric power facilities and plants. In the process of operations planning, it is necessary to take in consideration the compliance with (n-1) security criterion.

The outage is defined as the outage of one or more system elements that cannot be foreseen.

The principle of (n-1) security criterion in operations planning (as well as in the real-time operation) implies the following requirements:

* + 1. In the planning process, TSO must ensure that in all operating conditions a single outage (not including simultaneous tripping of both systems on two-system lines) of any system unit (generation unit, transformers, overhead lines, reactive power compensation units etc.) does not lead to operational constraints in its own and/or in neighbouring control areas (exceeding of current, voltage values etc.) neither to provoke suspension of electricity supply;
    2. In case of the outage of some system element, even though such outage did not jeopardize the system operation, TSO must adjust system configuration so that the compliance with (n-

1. criterion is restored in the shortest period of time, because the outage of another element at the time of intervention after the first outage may jeopardize the integrity of the entire electric power system;
   * 1. TSO may from time to time deviate from (n-1) security criterion if such thing is necessary due to the maintenance works or works on system construction, provided that DSOs and system users affected by such deviation are duly informed of it;
     2. In order to maintain the compliance with (n-1) security criterion during intervention works on system elements, TSO may interrupt commercial transactions and temporarily change the planned operation of plants, respecting the principle of minimum costs and minimum non- compliance with electricity market principles;
     3. (n-1) security criterion is maintained in cooperation with neighbouring systems, depending on previous agreements between responsible parties. This includes disconnection planning of elements that have influence on the operation of neighbouring systems, as well as exchange of all necessary information and data necessary for calculations based on (n-1) criterion;
     4. In verification of compliance with (n-1) security criterion, TSO has the obligation to take in consideration allowed loads or overloads of system elements, as determined by protection device settings on such elements; and

In the planning of measures for compliance with (n-1) security criterion, TSO is guided by technical and economic factors, taking in consideration the probability of examined event, its consequences, costs of its prevention, as well as costs of activation of protection measures for prevention of disturbance spreading in the system. TSO must carry out calculations of N-1 security in order to evaluate consequences of the outage of his own area of responsibility, according to the N situation. N situation is determined through load flow calculations based on the corresponding set of data obtained during the planning process. TSO must carry out N-1 simulations for all outages from the previously defined list of outages (DACF procedure).

**Daily Plans of Power System Operation**

**Article** **130**

Basis for controlling the electricity transmission system in real time represents the daily plan of electric power system operation, which is prepared based on the information submitted by the market operator and transmission system users and previously adopted plans.

Daily plan of electric power system operation is prepared in hour resolution and it shall mandatory contain:

1. list of reported electricity transmission, by users,
2. total available and allocated cross-border transmission capacity, by borders,
3. list of engagement of facilities providing ancillary services,
4. daily disconnection plan.

**Cross-border Transmission Capacity Planning**

**Article** **131**

Cross-border transmission capacities are planned on the basis of the following input data:

1. Plan of consumption of active electricity in the electric power system of Montenegro and electric power systems in the region;
2. Plan of generation of active electricity in facilities connected to transmission system, or facilities connected to distribution system if the sum of installed capacities of generation units exceeds 5 MW, of cumulatively for facilities connected to distribution system, the sum of installed capacities of which does not exceed 5 MW, for the electric power system of Montenegro and generation plans in electric power systems in the region;
3. Plan of procurement and supply of active electricity at the level of the electric power system of Montenegro and in electric power systems in the region; and
4. Disconnection plans of transmission system elements in Montenegro and countries in the region.

All plans from paragraph 1 herein are referred to harmonized representative operational regimes and include data on active and reactive power, voltage levels and network topology, necessary for the formation of convergent mathematical model of the electric power system.

Data for the electric power system of Montenegro necessary for calculation/evaluation of values of cross-border capacities are provided by TSO through above described planning procedure. The way in which data are exchanged with TSOs in the region is defined by TSO through corresponding contracts on calculation of cross-border capacities or through agreements at the regional level.

Value of cross-border transmission capacities are harmonized with the corresponding neighbouring TSO in manner and within deadlines determined by the regulations for operation in interconnection.

Calculation of capacity is performed at least on annual, monthly and daily level.

TSO may assign the power for calculation of cross-border transmission capacities to a joint body established at the regional level.

**System Balancing and Ancillary Services**

**Provision of Ancillary Services**

**Article 132**

Ancillary services are services of transmission system users that allow system operation to TSO within prescribed frameworks.

Provisions of the *Grid Code*, related to the ancillary services, establish technical characteristics and requirements which energy entities – providers of the services must fulfil in order to provide ancillary services necessary for electric power system operation taking into account all planned disconnections, outages upon faults and requirement for preservation of frequency and voltage stability in the system.

Procedures, manner of determining and location of costs for the provision of the ancillary services are determined within the “Methodology for setting prices and conditions for provision of ancillary and services of electricity transmission system balancing” and Rules for the operation of the balancing market.

**Types and Purpose of Ancillary Services**

**Article 133**

Ancillary services imply:

1. frequency control and power flow control (primary, secondary and tertiary control),
2. delivery of balancing energy,
3. delivery of compensation programs,
4. delivery of energy to cover losses in the transmission system
5. voltage control, and
6. system restoration management after blackout situations in the EPS.

**Frequency control**

**Article 134**

Frequency control is carried out in accordance with criteria determined by the determined provision regulating the issue of system operation, which is adopted by the Government.

Frequency control is performed by:

* 1. automatic engagement of primary control reserve, i.e. reserve for maintaining frequency (FCR), which represents action of turbine speed governors after deviation of frequency from nominal value, due to imbalance in generation and consumption in synchronously connected systems;
  2. automatic engagement of secondary control reserve, i.e. reserve for recovery of frequency (aFRR), which enables realization of the determined program of exchange between the control areas, taking over of frequency control from primary control and accordingly release of activated primary reserve, frequency control on the set-point, and adjustment of synchronous time;
  3. manual engagement of tertiary control reserve, i.e. reserve for recovery of frequency (mFRR) or replacement reserve (RR), which enables release of band of the engaged aFRR.

**Reserve Dimensioning**

**Article 135**

TSO shall perform reserve dimensioning from Article 134 paragraph 2 herein, in accordance with the provision from Article 134 paragraph 1, in cooperation with other transmission system operators within ENTSO-E.

The amount of reserves, based on TSO proposal determined in manner from paragraph 1 herein, is determined by the energy balance adopted by the Government.

**Common Reserve**

**Article 136**

The control area Montenegro may, in order to optimize operation, form a regulation block with one or more neighbouring control areas.

Operation of the control block and obligations of members are regulated by a separate agreement.

Control block common reserve dimensioning is performed in accordance with the provision adopted by the Government in accordance with the Law on Cross-Border Exchange of Electricity and Natural Gas and these Rules.

**Synchronous Time Adjustment**

**Article 137**

Within frequency control, TSO receives instructions for adjustment of synchronous time from the synchronous zone coordinator, which are communicated as change in frequency set-point value to be maintained in a determined period. TSO shall use these values in order to change operational points of AGC.

**Balancing**

**Article** **138**

In order to control power of exchange with neighbouring systems, TSO shall perform system balancing by:

1. engaging leased system reserves,
2. purchasing or selling electricity on balancing energy market,
3. purchasing or selling electricity based on contracts with other transmission system operators.

All electricity producers are obliged to submit to TSO, along with generation plans, offers for engagement of remaining generation capacities.

TSO shall decide based on the power plant generation plan and requirements for secure system operation from which generating units it shall provide balancing energy, taking account of minimum cost principle.

If it cannot provide sufficient balancing energy, in order to ensure reliable operation of the transmission system and protection of other users, TSO may require from the user responsible for such deviation curtailment of its total consumption for the amount of inadmissible deviation. TSO may apply this solution only if user responsible for deviation can be unmistakeably identified.

If the user from paragraph 4 is not able or refuses to proceed in accordance with of TSO requirements, TSO is entitled to disconnect the user from the system.

If the needed balancing energy cannot be provided differently, TSO is entitled to implement emergency consumption curtailment in accordance with Article 165 of these *Rules.*

System balancing costs shall be charged to transmission system user responsible of deviation, in manner laid down by the Market Rules.

**Compensation programs**

**Article 139**

In order to regulate cumulative of undesired deviations of exchange power with other systems, TSO shall implement compensation programs by purchasing or selling corresponding electricity volumes, in accordance with corresponding instructions received from the competent coordination at interconnection level.

**Voltage Control**

**Article 140**

Voltage control within specified limits is a service intended for secure and quality supply of electricity, which is responsibility of TSO.

The voltage must be kept throughout the whole system within specified limits for following reasons:

* 1. voltage value compatibility with nominal equipment values,
  2. to keep voltage value of end users within agreed limits,
  3. to guarantee system reliability and to avoid voltage collapse, and
  4. to maintain static stability.

TSO and all system users participate in voltage control.

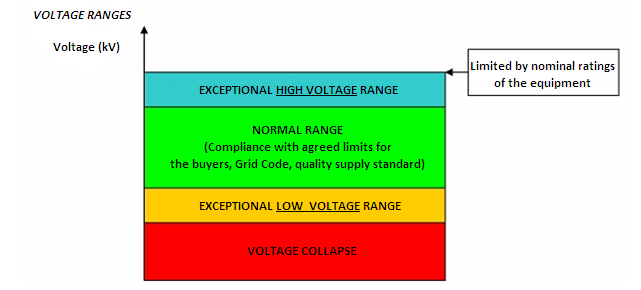
Border parts of neighbouring systems also impact the voltage level, therefore TSO shall perform voltage control in coordination with system operators controlling the other end of interconnection overhead lines.

**Permissible Voltage Levels**

**Article 141**

Permissible voltage ranges are:

* 1. normal voltage range,
  2. extremely low voltage limits,
  3. extremely high voltage limits,



***Figure 1 – Principle of defining voltage limits***

Values of permissible voltage ranges per voltage level, in Montenegrin transmission system in normal and disturbed operation are presented in the table below.

***Permissible voltage ranges in transmission system***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Voltage level | Voltage range in normal operation [kV] | | Exceptional short-term low voltage range permissible in disturbed operation [kV] | Exceptional short-term high voltage range permissible in disturbed operation [kV] |
| 110 | 99 | 121 | 93.5 – 99 | 121 – 126.5 |
| 220 | 198 | 242 | 187 - 198 | 242 - 253 |
| 400 | 380 | 420 | 360 - 380 | 420 - 440 |

**Reactive Power Control**

**Article 142**

TSO controls reactive power flow in the system with the goal of minimal reactive power losses.

Reactive power exchange on interconnection lines must be maintained within limits defined by ENTSO-E recommendations:

* + 1. on 400 kV lines in range ± 100 Mvar and
    2. on 220 kV lines in range ± 50 Mvar.

TSO is responsible for balanced reactive power control to maintain voltage in permissible limits in all system facilities. Therewith, TSO must have at disposal devices for reactive power compensation and units capable of reactive power production in connected plants, which is provided by signing appropriate contracts. These devices must have required technical characteristics in order to ensure compliance with defined voltage ranges and agreed voltage parameters.

Each generating unit, in accordance with technical characteristics, must operate in defined operational range with different power factor according to the requirements determined by provisions from Article 45 paragraph 4 of these *Rule*s. Each generating unit is obliged to submit to TSO the generator capability chart including also details of potential limitations in operation.

All direct consumers shall withdraw reactive power/energy with power factor no less than 0.95. Terms for withdrawal of reactive power/energy with power factor less than 0.95 are regulated by contract on transmission system use in accordance with the corresponding act of the Agency.

**Selection of Measures for Reactive Power Control**

**Article 143**

Selection of reactive power supplier is based on technical criteria, minimum cost principle and providing availability of reactive power in particular parts of the system.

In order to ensure satisfactory voltage profile in the system and to keep sufficient reactive energy reserve, TSO carries out following control actions i.e. issues following instructions to transmission system users:

* 1. Decrease or increase of generating unit reactive power generation (MVAr) at the connection point to transmission system. The instruction is mandatory if it was given in accordance with the generator capability chart,
  2. Scheduled voltage levels of generating units which must be achieved in the connection point with the transmission system,
  3. Change of transformer transmission ratio,
  4. Switching on/off of plants for compensation of reactive power,
  5. Voltage reduction use,
  6. Network topology change, and
  7. Request to distributions and direct consumers to achieve withdrawal of electricity with reactive power factor of 0.95.

**Power System Restoration after Blackout**

**Article 144**

No-load (independent) start-up capability of the generating unit is defined as capability of generating unit disconnected from the system to return to the operation and start delivering power without assistance from the electric power system.

No-load start-up capability (“black start”) of generating unit is an ancillary service activated by provider and carried out by order of TSO.

“Black start” capable generating units must be always available and keep up to date procedures for no-load start-up, as well personnel trained to execute these procedures.

According to the needs, TSO signs contract(s) for ancillary services with generating units capable of no-load start-up, i.e. system restoration after black out without voltage assistance from outside.

No-load start-up capability of units providing these services is tested at least once in three years.

**Electric Power System Control**

**Control Principles**

**Article 145**

TSO carries out electric power system control in line with the following principles:

1. preservation of EPS normal operation which means operation points of system parameters are far from predefined limits with sufficient security margin,
2. utilization of all available measures for fast removal of potential disturbances, reduction of their consequences and to bring the power system back in normal operation,
3. ensure reliable in-take /delivery of electricity of predefined quality to transmission system users,
4. optimal utilization of available transmission capacities, and
5. minimum cost principle in EPS operation

Electric power system control in real time considers realization of planned operational regimes taking account of general principles referred to in paragraph 1 of this Article while all participants of electricity market have the possibility to change their initial plans if necessary.

The most important responsibilities in electric power system control consider system control (frequency stability, voltage stability, implementation of defence measures and power system restoration), supervision of system static and transient stability and control of switching operations.

**Control activities under Normal Operating Condition**

**Article 146**

Control under normal operating condition considers execution of following activities:

1. supervision of power system operation in line with agreed daily plan;
2. provision of services of frequency control and voltage control by instructions for activation of ancillary services; and
3. communication between the operator in TSO’s Dispatch centre, operating technicians in transmission system and user’s facilities, and neighbouring transmission system operators with the following goals:
   * supervision of power system operation,
   * supervision of primary and secondary equipment condition and ancillary facilities in transmission system,
   * performing manipulations with switching equipment,
   * choice of control regime, local or remote,
   * registering the quantities of operational parameters, alarm and position signals, protection signals and noise level,
   * coordination of departments for control and maintenance, and
   * exchange of other data necessary for control.

**Supervision of power system operation**

**Article 147**

With the aim of passing the decisions permitting realization of the daily operation plan as well as control of EPS in line with general principles stated in Article 146 TSO has following information at disposal in real time:

1. system frequency,
2. voltage values on bus bars in the transmission network facilities,
3. active and reactive power flows in the transmission system and transmission system user’s facilities (important for transmission system operation),
4. area control error
5. indication signals and alarms in transmission and transmission system user’s facilities,
6. generation units active and reactive power,
7. status of the switching equipment,
8. positions of tap changers on control power transformers, and
9. alarms and signals validating measured values, protective devices operation, communication status, etc.

Supervision of operational parameters of EPS is carried out using SCADA systems in TSO’s Dispatch centre, local systems for control and supervision in TSO’s and user’s facilities as well as with the help of information received by other means of communication with transmission system facilities, user’s facilities and operators of neighbouring systems.

**Instructions**

**Article 148**

TSO’s Dispatch centre responsible for transmission system control is authorized to issue general instructions to system users permitting control of switching operations in the system.

TSO’s Dispatch centre issues dispatching instruction during control under normal operating conditions to:

1. operate switching equipment in the transmission system,
2. activate ancillary services,
3. switch on/off and control use of the equipment for reactive power/energy compensation (capacitors/reactors/SVCs/adjustment of transformer tap position).

Instruction is issued by word of mouth; instruction must be recorded on voice recorder or confirmed in written form, or any other way in line with internal procedures of TSO and with agreement regulating the operation of the facility and concluded between TSO and transmission system user.

Operating technicians in transmission system and user’s facilities have the responsibility to carry out the instruction issued by TSO Dispatch centre.

Exceptionally, in case of instruction issued by TSO’s Dispatch centre that may bring into peril to the persons or compromise the facility, the subordinate personnel in terms of system control (operating technicians in transmission facilities and/or staff in control centres of transmission system users) doesn’t have the obligation to carry out such an order and shall provide a justification for failing to do it. On the other hand, such personnel is free to propose control actions to the competent TSO’s control centre based on available data and information, bearing every responsibility for the accuracy of such data.

**Intra-day Modifications of the Daily Power System Operation Plan**

**Article 149**

In case of request made by market participants, i.e. balance responsible entity for intra-day modification of any part of the plan comprised in daily power system operation plan prepared in line with Article 130 of these *Rules*, TSO verifies whether such modification:

1. jeopardizes preconditions for a normal power system operation,
2. interferes with electricity market activities, and
3. jeopardizes transmission system access for another transmission system user

If it is proved that such modification request violates one of the criteria stated above, such modification is refused by TSO and TSO shall seek in collaboration with responsible party other means to deal with the problems that calls for the Daily operational plan modifications.

Intra-day modification is performed in accordance with rules prescribing intra-day allocation of cross-border capacities on borders of the control area determined by the TSO together with neighbouring transmission system operators.

In case of significant modifications, i.e. deviation from plans of consumption, production or reduction in transmission capacities availability, which may lead to or have already led to disturbances, TSO may independently modify the Daily power system operation plan by activation of ancillary services.

**Execution of Works in Transmission Network Article 150**

Disconnection of components in EPS for works is carried out on the basis of disconnection confirmation issued by TSO upon disconnection requests and in line with daily plan and emergency disconnections.

Procedures governing execution of works in transmission system comprise following activities:

1. information exchange in line with Article 128 of these *Rules* about any planned or emergency works, i.e. necessary operational manipulations in TSO’s or user’s facilities which may be important for responsible parties in order to avoid undesired consequences for safe operation of EPS and supply of the users as well;
2. Instructions issued by TSO’s Dispatch centre for execution of manipulations in line with Article ---- of these *Rules*,
3. Confirmation of executed manipulation by the operating technician on duty in transmission system and user’s facilities, and
4. Instructions issued by TSO’s Dispatch centre or operating technician on duty in transmission system and user’s facilities for execution of works on lines, following confirmation of executed manipulations providing secure execution of works.

**Notification on Execution of Works in Transmission System**

**Article 151**

To ensure stable operation of EPS and to avoid possible undesired consequences for transmission system operation as well as for user’s operation, it is necessary to ensure timely and reliable information exchange about all disconnections (planned or emergency) in the system.

TSO informs system users in case of execution of works or manipulations in TSO’s transmission system and which may bring consequences for transmission system user’s operation.

User must inform TSO of any planned works or manipulations in the user’s facility of part thereof which may compromise secure operation of the power system or operation of other users. In accordance with notification received from the user TSO notifies other users as well as operators of neighbouring transmission systems in line with ENTSO-E guidelines on joint operation in the interconnection.

Notification under paragraph 3 of this Article should comprise the following data:

1. exact name of the element in EPS, subject to execution of works/manipulation,
2. description of works/manipulation,
3. approximate time for starting and completing the works/manipulations, and
4. warning/notice about possible consequences for secure operation of EPS and safety and quality of user’s supply.

**Internal Procedures Governing Execution of Works in Transmission Network Article 152**

TSO by its internal regulation governs the procedures for the performance of works in part of transmission system under TSO responsibility:

1. Giving instructions and modality of their delivery,
2. description of confirmation content about executed manipulation and modality of its delivery, and
3. Giving permits for execution of works and description of its content.

In case of execution of works or manipulations in part of transmission system under responsibility of the user, all procedures stated above are predefined in scope of the Connection contract.

TSO, as well as any other transmission system user must have their own Guideline and/or Instructions for safety measures necessary for implementation during execution of works in power system. This document additionally defines procedures for work safety which must be enforced in case of execution of works in transmission or user’s system.

Coordination of protection measures during works between users and TSO are predefined in scope of the Connection contract.

**Communication and Technical Control System Operation Article 153**

Via its communication system TSO enables continuous communication with the transmission network users, electricity market participants, other transmission system operators in compliance with the provisions of the ENTSO- E Operating Handbook (Policy 6 – Communication infrastructure).

All communication with operational staff in TSO’s Dispatch centre related to operation control are performed over the phone connected to automatic call recorder.

In TSO’s Dispatch centre are archived all sent and received faxes, e-mails, written mail and other means of correspondence.

Transmission system users ensure continuous information exchange with TSO’s Dispatch centre in line with provisions predefined in Article 70*.*

All communication systems must have appropriate backup in case of failure.

In case of failure of communication system, procedure is envisaged which is agreed in scope of Connection contract in the part defining transmission system user’s facility operation

Technical system must be designed and used in a way allowing TSO to carry our all its duties concerning transmission system control.

TSO’s Control centres must have access to clear and precisely indicated transmission network parameters. These parameters must be presented in real-time.

TSO have the obligation of storing the transmission system parameters with a view to analyse power system performance, generation unit behaviour and to report on power system performance.

Any generator committed to secondary control must be integrated in a related measuring-control circuit which send real-time signals for the design of regulation control area.

In case of temporary unavailability of the Dispatch centre, backup Dispatch centre shall take over its functions which shall have at its disposal related documentation and SCADA signals.

TSO and transmission system user have the obligation to keep their communication and transmission system control equipment in proper operating conditions.

Maintenance works of communication and transmission system control equipment must be planned in the manner to avoid any interference with secure transmission system operation. The planning process of the maintenance works is carried out in collaboration with the system users and neighbouring transmission system operator.

Transmission system users submit to TSO’s technical control system any real time information required for the execution of control activities in compliance with these *Rules*.

Transmission system user must have all the documentation relating to communication and transmission network control equipment installed in its facility. At the request of TSO, transmission system user must make these documents available to TSO.

In case of communication and/or transmission network control equipment fault, the transmission system user has the obligation to inform TSO thereof forthwith.

**Data Acquisition Article 154**

TSO collects the data required for planning and analysis of the power system operation over specified time profiles important for the planning of power system operation, as follows:

1. hourly exchange along interconnection lines,
2. hourly generation of active and reactive energy of all power plants,
3. hourly consumption of distribution customers, i.e. data on energy delivered to DSO via transformers 110/X kV,
4. hourly consumption of direct consumers,
5. level of the accumulation and inflows in the hydro power plants,
6. level of coal reserves and heavy fuel-oil for thermal power plants,
7. information related to element’s outages in the system with the reason and recorded time of the outage, duration time of interrupted supply to specific consumption area,
8. information related to power plant’s outages stating the reason and recorded time of the outage,
9. voltage values in the relevant transmission network facilities, and
10. other relevant data for power system planning and analysis.

The system users have to obligation to submit to TSO all above data referring to their respective facilities in the manner and form specified by TSO.

**Operation in Emergency Situations**

**Obligations in emergency situations**

**Article 155**

Procedures and plans for power EPS operation in exceptional conditions relate to system operation in disturbed (emergency) states and they are the basis for creation of technical and organizational preconditions in order to ensure secure operation of Montenegrin power system in disturbed (emergency) conditions and prevent propagation of the incidents and mitigate the consequences with the help of all relevant energy entities.

TSO shall secure operation of the Montenegrin EPS wherewith all the users connected to the transmission system are required to facilitate implementation of measures in the scope of their competence, and that TSO has available.

In addition, TSO must comply with the measures passed by the Government in accordance with the Energy Law.

Obligation of TSO is to define internal operational procedures in disturbed (emergency) states within the documents “Defence plan of electric power system of Montenegro” and “Plan of recovery of operation of electric power system of Montenegro after blackout”. The mentioned documents comprise planning of the following activities:

1. Supervision and preventive measures in order to restore normal operation of the EPS from the disturbed operational conditions which may lead to contingencies in local system and propagation of disturbance towards rest of the interconnection;
2. Determination of predefined set of measures for system defence and prevention of disturbance propagation enforced by execution of dispatchers’ instructions or by automatic response of protection devices in case of critical states in EPS; and
3. System integrity restoration process in order to ensure electricity supply to customers and to return the system in normal operational state.

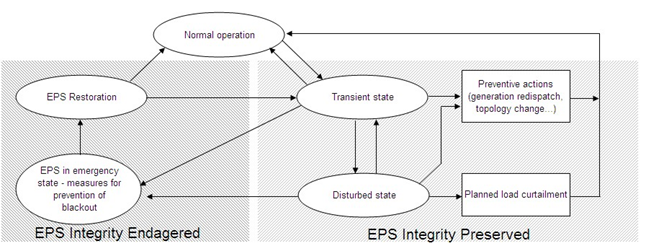
**Operation States of EPS**

**Article 156**

Any deviation from the predefined limits describing system operation shall be considered disturbed operation regime.

Power system can operate in five characteristic operational states:

1. Normal state – operating points of physical values which describe system operation are far enough from predefined limits and there is sufficient security margin in system operation, all users are supplied with electricity of defined quality, (n-1) security criterion is satisfied;
2. Transient state – disturbed system operation, close to security limits, defence measures are required to restore the system to normal operation and they are defined within defence plan and comprise changes in exchange programs, re-dispatch of generation units, topology changes or transfer of allocated transmission capacity rights on interconnection lines;
3. Disturbed state – operating points are at or outside the limits, insecure system operation with system integrity preserved but violated (n-1) security criterion, fast actions as controlled load curtailment are required to restore the system to normal or transient state;
4. Emergency state – preventive and remedial measures are not timely undertaken or they are without results, system integrity is jeopardized with possible blackouts and system splitting on number of “islands” in the interconnections, defence measures as automatic load curtailment, disconnection of lines etc. are required to support operation most of the system and prevent complete blackout; or
5. Restoration state – propagation of the disturbance is stopped, system integrity restoration in order to ensure electricity supply of disconnected end customers, transition to normal and transient state.



***System operation states and possible transits from one state to another***

**Security margin**

**Article 157**

Operational security margin is determined with the goal of early identification of possibility for a transition to disturbed system operation. Security margin violation is defined as violation of necessary security reserve namely significant convergence of parameters describing system operation to the limits especially elements of significant importance for secure operation of the overall interconnection whose outages can violate system integrity. Violation of required security margin implies operation state in which:

1. Voltage values are close to minimum/maximum values, or
2. Loadings of the elements don’t meet N-1 security criterion.

Limits of voltage values are minimum and maximum voltage values in permissible range in normal operation.

Loading margins are:

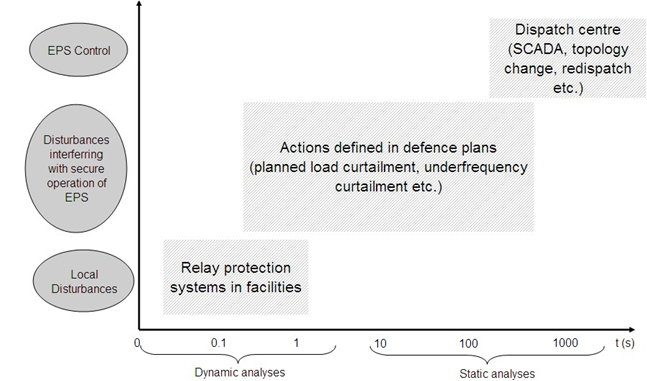
1. for production units – generation unit nominal power;
2. for lines – maximum allowed loading defined by thermal load, voltage profile and stability limit, for lines which have a protection from overload a short-term allowed overload is also taken into account (overcurrent protection from overload steps settings, signalling and disconnection depending on time settings);
3. for transformers – transformer nominal power, taking into account short-term transformer overload (overcurrent protection steps settings, signalling and disconnection depending on time settings);
4. for bays – continuous permissible loading of bus bar coupler or switching and measuring equipment in the bay;
5. for bus bars – continuous permissible bus bar loading;
6. for reactive power compensation units – unit loading at actual operational voltage.

**Defence Measures**

**Article 158**

TSO shall establish preventive and corrective measures as well as automatic actions depending on speed of disturbance propagation (time domain) to coordinate and harmonize of local system protection operation in facilities with SCADA system for operational control within the document “Defence plan of electric power system of Montenegro”.

Measures stated paragraph 1 of this Article are shown in the figure below:



***Illustration of defence plan actions in relation to system relay protection and Dispatch control centre in time domain***

**Operation plans in case of disturbances**

**Article 159**

TSO prepares the following internal plans which define procedures in disturbed operation depending on disturbance intensity as well as state and condition of the EPS:

1. Protection system operation plan – measures activated automatically to remove disturbance and prevent their propagation, it is updated if needed,
2. Preventive action plan and system operation supervision – dispatching actions, generation rescheduling, monitoring of area important for secure operation of Montenegrin EPS, identification of system state and potential threats, preventive measures, it is updated if needed,
3. Load curtailment plan – application of corrective measures to reduce disturbance consequences, it is updated annually and
4. System restoration plan after blackout (reconnection of the EPS after partial or complete blackout), it is updated if needed.

**Protection System Operation Plan**

**Article 160**

TSO prepares the internal Plan for protection system operation to ensure continuous state control and operation of all power system elements and to react selectively on every fault occurrence or irregular operational regimes.

Protection system plan comprises:

1. Principles and protection system design,
2. Technical criteria which must be implemented in the equipment, and
3. Assignment of responsibilities and obligations between TSO and users.

In every moment TSO must have at disposal up to date documentation related to types and protection devices settings which are utilized in its own facilities and in transmission system user’s facilities.

TSO coordinates protection system operation taking account of maximal allowed time of fault clearance which will not lead to violation of system transient stability.

In cases when analyses of transient disturbances show shortage in transient stability reserve due to inadequate protection response in any part of the 400, 220 and 110 kV transmission system including user’s facilities, TSO utilizes measures in scope of its authority in order to remove identified irregularities in shortest time frame.

In scope of Plan for protection system operation TSO implements and utilizes plan for element protection settings from overloads to ensure efficient protection of the lines and belonging high voltage equipment from permanent deformation due to thermal stressing and timely reporting about possible violations of security margin and reliable operation of Montenegrin EPS.

Plan for protection system operation is revised and updated every year taking account of physical limitations of the equipment and planned operational regimes of the system.

**Plan for Preventive Measures for Disturbance Elimination**

**Article 161**

In the process of long-term development planning, modernization, management, maintenance and operation planning, TSO undertakes all measures to eliminate disturbances in Montenegrin EPS.

Within the document “Defence plan of electric power system of Montenegro”, TSO shall prepare an internal plan for preventive dispatching actions for disturbance elimination which comprises:

1. Criteria for identification of system operation state (identification of violated normal system operation parameters),
2. Identification of the events on regional level which may result in emergency system state, and
3. Definition of preventive measures for system fast restoration to normal operation state.

**Control in case of violations of normal operation parameters**

**Article 162**

In case of violated parameters of normal system operation, on the basis of available information TSOs Dispatch control centre registers occurrence of disturbance and its characteristics and defines adequate control actions to eliminate or limit disturbance propagation.

**Control measures in case of disturbances in the system**

**Article 163**

In case of disturbance in the system TSO has the obligation to undertake in shortest time frame all necessary control measures which are at disposal to prevent disturbance propagation and to restore the system in normal operation state taking account of time domain of disturbance occurrence. These measures consider removal of long term disturbances and comprise:

* 1. Attempt to reclose transmission system elements that underwent outages,
  2. Dispatch actions in the system (network topology change),
  3. Cancelling planned disconnections in transmission system and stopping the works in progress,
  4. Activation of tertiary reserve,
  5. Utilization of voltage control measures,
  6. Change of power plant schedule plan (re-dispatch),
  7. Change (cancellation or reduction) of existing electricity exchange (if the results of previous actions are not sufficient to remove disturbance), and
  8. Other predefined measures which don’t comprise load curtailment.

In execution of stated measures, TSO applies minimum cost principle with minimum violation of electricity market principles (to the extent possible).

**Recognising disturbed regimes**

**Article 164**

According to ENTSO-E guidelines TSO has the obligation to prepare defence plan of EPS by which utilization is possible to identify in advance disturbed states in own area and in the region which may lead to further critical violations of operation parameters in the interconnection or its parts, and also determine set of preventive measures to impede propagation of respective identified disturbances in the interconnection thus reducing the consequences.

In accordance with regional approach in recognizing potential dangers possibly present in the interconnection and considering growing number of interconnection lines which increases mutual dependence of the systems, TSO must take into account influence of neighbouring transmission systems on its own.

Taking into account ENTSO-E guidelines TSO performs periodical calculations and defines part of interconnection with influence on Montenegrin power system (observability area) which will be supervised by SCADA system in view of secure operation of Montenegrin EPS and the overall interconnection.

In addition, regional technical and organizational coordination is carried out with the goal of providing all necessary information about observability area from neighbouring transmission system operators.

**Load Curtailment Plans**

**Article 165**

After all available measures are utilized in order to avoid application of load curtailment plan, TSO can temporarily impose electricity supply constraint to the user or instruct his disconnection from the transmission system in accordance with predefined plan to maintain or restore predefined system security level in following cases:

1. Natural catastrophes (force majeure),
2. Potential risk to security and stability of EPS,
3. Network congestions or the risks for overloading EPS component
4. Failures in the transmission system
5. Interconnection splitting risk (island operation),
6. Violation of static or dynamic stability of the system,
7. Violation of system frequency stability,
8. Unacceptable local or intersystem oscillations in interconnection ,
9. Maintenance, repairs or constructions parts of the system which violate secure operation of the system, or
10. Lack (imbalance) of active power in the system.

TSO prepares load curtailment plan which comprise following plans:

1. Voltage curtailment plan,
2. Emergency electricity delivery curtailment plan, and
3. Automatic under-frequency load-shedding plan.

TSO decides which type of plan is utilized depending on assessment of operational characteristics of the system and possible consequences for EPS, which may lead to potential propagation of the disturbance.

TSO timely notifies transmission system users about planned and expected curtailment in electricity delivery except in cases when it is not possible due to required fast response needed for prevention of partial or total EPS blackout.

If the transmission system user refuses to implement load curtailment measures as instructed, TSO has the right to disconnect the whole facility owned by the transmission user or its parts if possible.

**Plan for Voltage Curtailment**

**Article 166**

Voltage curtailment is operating voltage reduction in the user’s systems with goal to limit active power delivery.

Voltage curtailments are implemented in 220/110 kV and 110/X kV facilities. Every facility of the user connected to transmission system must be capable to implement voltage curtailment.

In case of possible occurrence of the overload or voltage collapse which may be remedied by voltage curtailment measures, TSO gives instruction for change of transformer’s tap changer position in appropriate parts of the system.

Voltage curtailment plan is revised and updated every year in accordance with planned parameters and characteristics of the consumption (power factor) as well as planned operational regimes of the system.

**Plan for Emergency Electricity Delivery Curtailment**

**Article 167**

Following unexpected active power deficiency in the power system, as a whole or its individual parts it is necessary to utilize emergency load curtailments to avoid possible larger disturbance, operation with unacceptable low voltages or possible reduced frequency. In addition, emergency curtailment can be utilized to reduce overloading of parts of the system including particular nodes in the network.

TSO prepares emergency curtailment plan until 1st December of the current year for the following year with the predefined amount of load in MW, which must be included in plan of every transmission system user (DSO and direct customers) taking account of planned level of consumption in characteristic regimes. TSO submits the Plan to the transmission network users who are required to implement it if instructed.

There are three types of emergency electricity delivery curtailment plan utilization:

1. Immediate emergency electricity delivery curtailment,
2. Urgent emergency electricity delivery curtailment, and
3. Long-term emergency electricity delivery curtailment.

Type and the level of the curtailment to be applied by TSO depend on state and condition of the EPS which require utilization of electricity delivery curtailment.

**Immediate Emergency Electricity Delivery Curtailment Article 168**

Immediate emergency electricity delivery curtailment is utilized in case of necessity for very fast response (minute time frame) to prevent further deterioration of the system state blackout of EPS.

Immediate emergency electricity delivery curtailments are implemented by TSO’s instruction for immediate disconnection of large facilities with necessary extent of curtailment (220/110 kV and 110 /x kV transformers, 110 kV radial lines, part or total consumption of direct consumers and the like) in respective consumption area and within the necessary extent by applying the Emergency electricity delivery curtailment plan .

**Urgent Emergency Electricity Delivery Curtailment Article 169**

Urgent emergency electricity delivery curtailment is utilized following implementation of immediate electricity delivery curtailments, that is when immediate danger of larger disturbance is passed, in order to achieve greater level of selectivity by more even redistribution of curtailments on larger number of customers and to enable to a certain degree connection of users previously disconnected.

According to system state and by dispatcher judgment, this type of curtailment can be utilized without previous implementation of immediate emergency electricity delivery curtailments. Application of Emergency electricity delivery curtailment plan, including direct consumers and consumption of all distribution areas, power curtailment (in required level) is implemented by disconnection of transformers or appropriate number of feeders in 110/x kV substations. Direct consumers stop their production process or part thereof. User has the obligation to reduce consumption for required amount no later than 15 minutes upon instruction issued by TSO.

End users with discontinued electricity delivery following implementation of this type of curtailment can be without electricity supply in continuous period no longer than two hours. TSO prepares the Plan for urgent emergency electricity delivery curtailment in consultations with transmission system users.

The Plan for urgent emergency electricity delivery curtailment is applied by DSOs and certain direct consumers following TSO instruction.

TSO informs users about reasons and duration of urgent emergency electricity delivery curtailment measures.

Completion of urgent emergency electricity delivery curtailment utilization and return to normal operating regime is implemented upon instruction issued by TSO.

**Long-term Emergency Electricity Delivery Curtailment**

**Article 170**

Long-term emergency electricity delivery curtailment is implemented in situations when EPS state requires load curtailment of customers more than two hours. These curtailments are utilized according permanent, predefined plan which determines sequence and level of customers consumption required for disconnection. This type of curtailment takes consideration of the selectivity as much as possible and it is implemented by disconnections on 35 kV and 10 kV voltage level.

DSO and direct consumers shall prepare their plans in accordance with Emergency Electricity Delivery Curtailment Plan delivered from TSO.

AWhen applying the long-term emergency curtailment plan, disconnections of direct consumers are implemented so as not to cause general danger or greater material damage.

Long-term emergency electricity delivery curtailment is implemented upon enforcing Government decisions in line with Energy Law.

**Automatic Under-frequency Load-shedding Plan**

**Article 171**

Frequency stability is related to the ability of a power system to keep steady frequency in permissible operating limits following a severe disturbance resulting in a significant imbalance between production and consumption.

In large interconnected power systems, as Continental ENTSO-E interconnection part of which is Montenegrin EPS, scenarios of system frequency drop are most commonly associated with situations following splitting of systems into islands with imbalances between production and consumption. Stability in this case is a question of whether each island will reach a state of stable operating equilibrium with minimum interruptions in electricity delivery to customers. Likewise, it is of utmost importance to maintain and stabilize frequency value above the limit of 47.5 Hz below which disconnection of generation units takes place, which is achieved by the under-frequency protection system.

TSO prepares the Plan for under-frequency load shedding considering as much as possible requirement for minimum level of disconnected customers form one side, and fulfilment of minimum criterion for solidarity and harmonization of under-frequency protection systems on regional level as recommended in ENTSO-E guidelines.

Under-frequency protection is carried out through 5 steps, depending on frequency drop level, presented in the table below

***Actions of Under-frequency protection system***

|  |  |  |  |
| --- | --- | --- | --- |
| **Step** | **Frequency** | **Shed Load (%)** | **Cumulative shed load (%)** |
| **I** | 49,0 | 5 | 5 |
| **II** | 48,8 | 10 | 15 |
| **III** | 48,6 | 10 | 25 |
| **IV** | 48,4 | 10 | 35 |
| **V** | 48,2 | 15 | 50 |

The amount, namely percentage of load to be shed automatically in stepwise protection is determined according to maximal registered system load in previous year.

It is necessary to periodically harmonize defined plan (at least once a year) between TSO, DSO and direct consumers. Harmonization considers submission of data by transmission system users which comprise the list of distribution feeders (or parts of the facility of the end user) suggested for disconnection in line with amount in MW predefined by expected level of customer consumption in the year of plan implementation. CGES verifies submitted data, suggested level of consumption to be shed predefined by the plan and delivers to transmission system users agreed plan and they have the obligation for its implementation by installation (and setting) of under-frequency protection systems. If users do not deliver a list of feeders they propose for disconnection, or do not perform installation or setting of under-frequency relays, TSO may install and set under-frequency relays into corresponding 110 kV transformer bays. The Plan for under-frequency load shedding is revised and updated by TSO every year for the following year.

Procurement, installation, maintenance and setting of under-frequency relays is the responsibility of the facility owners in which relays are installed.

Following every action of under-frequency protection system all users whose facilities have relays installed, prepare written reports describing protection actions (number of activated relays, individual or total disconnected power, duration and the like) and submit them to TSO who organizes collective analyses.

**Plan for Power System Restoration (“Black start”)**

**Article 172**

TSO shall issue and update the Plan for power system restoration following blackout which represents general strategy for power system restoration immediately after partial or complete system blackout.

he Plan for power system restoration after blackout establishes instructions for treatment with all relevant entities included in restoration process, with the goal to restore the system securely and as soon as possible. Considering that operational capability(readiness) and availability of the plants and transmission system capacity are not always the same, TSO has the obligation to continuously supervise power system operation in real time and thereby define relevant procedures for restoration which take account of actual operating condition of the power system.

The Plan for power system restoration shall regulate in particular:

1. Restoration priority,
2. Availability of capacities utilized in restoration, and
3. Guidelines and instructions provided by TSO to transmission system users who must consistently comply with them.

The Plan for power system restoration after blackout is revised and updated at least once in 5 years. TSO reviews and updates the plan in case of connection of a new generation unit to the power system, and if there is a change in the system which may influence this plan.

TSO has the obligation to cover in detail general strategy for power system restoration as part of the plan for system restoration which includes the following:

1. Supply restoration priorities,
2. Available capacities for restoration of normal operation state,
3. Instructions TSO issues to DSO, electricity producers, as well as to other users, who must comply with them,
4. Guidelines for manipulations on certain production and transmission facilities handled by the operational personnel following system blackout, and
5. Communication with authorized management within TSO, government authorities, media etc.

Procedures for restoration of the power system must be defined by TSO with special attention to:

1. process of system restoration, when system frequency must remain controllable and large transient regimes must be avoided. With these goals, it is necessary in this phase to carefully consider possibility to utilize protection for curtailment,
2. validity of settings change i.e. protection management in periods with significant deviations of system parameters namely with system parameters on low level,
3. voltages, that during system restoration must be in permissible limits,
4. capability of the generation units for production of reactive power used for initial system restoration as well as capability other generation units used in system restoration process must be sufficient to provide voltage control. Utilization of other devices for reactive energy control must be planned also (e.g. devices for reactive power compensation installed direct customers),
5. number of circuit breaker switching, during system restoration process, must be within operational capabilities of every facility in periods of electricity delivery curtailment, and
6. balance of load and minimal allowed production of synchronized generation units must be satisfied in each step of system restoration.

During asynchronous operation of the system parts without complete or partial blackout, based on the current situation TSO gives instructions to certain users to adjust production or consumption, in order to enable reconnection i.e. resynchronization of the island. TSO notifies the users upon synchronization.

In cases when part of the system with connected generation unit is disconnected from rest of the system and there are no capacities for synchronization with rest of the transmission system, electricity producer must upon TSOs instruction to disconnect all generation units from the system but to keep the in standby (in rotation) to perform resynchronization after conditions are met and upon instructions issued by TSO.

DSO, power plants and all other affected users, must comply TSO guidelines during power system restoration, even in case they oppose respective parts of the Plan for power system restoration after blackout, so far as their utilization doesn’t represent a threat to personnel or equipment.

When process of power system restoration is completed and normal operation is restored, TSO notifies the users that functioning of the power system is normalized.

TSO prepares the Plan for power system restoration after blackout which comprise:

1. Plan for power system restoration without external source of voltage and
2. Plan for power system restoration with external source of voltage.

**Power System Restoration without External Source of Voltage (“black start“) Article 173**

Complete blackout of Montenegrin EPS considers outage of all generation capacities in Montenegro, absence of voltage in all facilities and stopping the electricity delivery to all customers.

After TSO proclaims complete blackout of EPS, all procedures related to normal operation are suspended and all following actions are executed by instructions issued by TSO in line with the Plan for power system restoration plan without external source of voltage.

Availability of generation unit with “Black start” capability is necessary for power system restoration after complete blackout of EPS. In the scope of the Plan for power system restoration after blackout respective generation units are defined whose location and capability are required for restoration of Montenegrin EPS.

Procedure which relate to black start capability of generation unit must be periodically reviewed and updated under coordination with providers of this service in order to implement potential changes, determine new conditions or to add new generation units.

General strategy for the power system restoration after blackout which must be implemented by all users, is covered in the Plan for power system restoration plan without external source of voltage (“black start“) which comprises following steps:

1. Re-energizing of the part of the load with the help of power plants with fast start-up capability,
2. step by step synchronization and reconnection of parts of the system, and
3. final and complete restoration of normal operation in the whole power system including interconnection lines when conditions for that are fulfilled in line with the current guidelines for mutual operation in the interconnection.

**Plan for Power System Restoration Plan with External Source of Voltage**

**Article 174**

Partial blackout of EPS considers separation of one part of the system from rest of the EPS, with power cut, whereby in that system part the consequences are the same as after complete blackout of EPS.

The Plan for power system restoration with external source of voltage comprises following guidelines:

1. Operation guideline upon absence of voltage due to fault on the bus bars,
2. Guideline for execution of manipulations for every facility in the transmission system, and
3. Guideline for restoration of the EPS with external source of voltage

In preparation of the Plan for power system restoration with external source of voltage, TSO must take account of following priorities:

1. As fast as possible re-energizing of the generation facilities and customers sensitive to long- term interruptions in electricity supply, and
2. Re-energizing of consumption centres according to adopted priority plan.

**Training for Power System Restoration Plan Enforcement**

**Article 175**

TSO has the obligation to perform continuous professional training and education of its personnel to be capable and ready to participate adequately in preparation, enforcement, supervision and adapting of the Plan for power system restoration after blackout.

Producers, DSO and all direct consumers have the obligation to ensure adequate training of their own operational personnel to be capable and ready for active and constructive participation in enforcement of measures and activities related to removal of disturbance in the power system operation.

**Disturbed State Control**

**Article 176**

Control in disturbed state is performed by TSO and considers implementation of defence measures predefined in plans for EPS operation in emergency conditions permitting to sustain system state or to restore it to normal operation as soon as possible.

All local disturbances (faults) in transmission system are cleared by timely and selective operation of the protection system in line with Article 159 of these *Rules* in order to safeguard the equipment against long-lasting damages and minimize the consequences of the faults or disturbances in the power system and to preserve its stable operation.

ThePlan for preventive measures for disturbance elimination plan preventive, which is an integral part of the document “Defence plan of electric power system of Montenegro, comprises all control measures at disposal to TSO’s Dispatch centre for limiting the propagation of the disturbance and enable restoration of normal system operation without implementation of emergency curtailments.

Whenever implemented preventive measures are insufficient or there is still danger for propagation of the disturbance, TSO has the responsibility to temporarily cut-off parts of the system in order to maintain secure system operation and prevent detrimental large scale consequences (total blackout). In disturbed operation regime instruction received from TSO must be executed without delay.

**Activation of operation plans in case of disturbances**

**Article 177**

Whenever there is a case of active power deficiency in the power system, voltage collapse, i.e. lack of reactive power in the system, overloading of transmission network components or any other disturbances threatening to jeopardize the system normal operation, the electricity delivery curtailment may be imposed throughout the system or in parts thereof by applying Plan for electricity delivery curtailment predefined in Article 165 of these *Rules*.

In case of partial or total blackout of the power system, TSO and system user’s competent control centres restore power system operation in line with the Plan for power system restoration after blackout as stipulated by in Article 172 of these *Rules*.

Whenever there is a case of any disturbance interfering with the secure operation of EPS and important for both responsible parties, TSO and the users must exchange information about new situation.

**Determining the cause and reporting on disturbances**

**Article 178**

At TSO’s request, user must carry out specific checkout of its equipment connected to the transmission system under responsibility of TSO with the goal to analyse disturbances in the transmission system.

Responsible parties must provide support to each other and exchange information in order to eliminate and analyse the cause for fault occurrence.

Following every significant disturbance in the transmission system relating to disturbance causing electricity supply cut-offs, load curtailment or suspension of contracted electricity exchanges TSO prepares relating report.

Report on significant disturbance includes following data:

1. date, time of occurrence and disturbance duration,
2. location and cause of disturbance,
3. information about suspension of contracted electricity exchanges or load curtailment, and
4. total suspended exchange/non-delivered electricity.

**Priority utilization of generation units**

**Priority utilization of renewable sources**

**Article 179**

In order to provide priority access to the transmission system and the takeover of electricity produced from renewable sources and high efficiency cogeneration, the TSO in case of congestion in the transmission system, as well as for balancing, which require a reduction in production in some parts of the system, shall carry out reduction in the following order of priority:

1) reduction in production from conventional sources (including the exchange with neighbouring systems)

2) reduction in production from renewable energy sources with the possibility of storage

3) reduction in production of other renewable sources of electricity

**Priority utilization of local conventional sources**

**Article 180**

In the event that the obligation of the TSO prescribed in the energy balance is to hire priority generation facilities that use domestic primary energy sources, TSO will in the case referred in Article 179, paragraph 1 herein, apply priority actions that do not require a reduction of domestic production.

**Requirements for System Operation in Interconnection**

**Article 181**

The electric power system of Montenegro operates as a control area interconnection.

The control area Montenegro may associate with other control areas forming a control block, according to relevant regulations.

Requirements for operation within the interconnection shall be governed by the regulations referred to in Article 1, paragraph 2 of these *Rules*.

**Reporting on the Transmission System Operation**

**Operation Log**

**Article 182**

TSO’s Dispatch centre keeps chronological operation log which comprise all relevant data relating to transmission system control, particularly:

1. issued and received instructions,
2. outages and faults of transmission system components,
3. executed manipulations in the transmission system,
4. relevant events for operation of generation facilities,
5. relevant events for secure transmission system operation,
6. enforcement of suspended electricity delivery,
7. issues with control equipment,
8. protection availability within transmission system,
9. operation documents,
10. received dispatch notes, and
11. other relevant data for power system planning and analysis.

**Periodic reporting**

**Article 183**

Based on operation log, archived data in the metering system, SCADA system and data delivered by the users, TSO prepares periodic reports on transmission system operation which include data on:

1. availability of transmission system within guaranteed transmission parameters on connection points,
2. electricity production,
3. electricity consumption,
4. electricity exchange,
5. transmission system losses,
6. activated ancillary services,
7. events in system operation, and
8. other relevant data for transmission system operation.

Data referred to in paragraph 1 item 1 of this Article are determined as follows:

* + 1. Each registered voltage deviation in connection point from guaranteed parameters shall be registered as inadequate transmission service for an hour in which it is registered.
    2. Average annual availability of the system for each reporting period shall be calculated as the number of hours of interruption in transmission service to the connection point in the last 8760 hours divided by 8760.

TSO shall prepare monthly and annual periodic transmission system operation reports and deliver them to the Agency for review.

**Data publishing**

**Article 184**

TSO is obliged to publish information relevant to the operation of the electricity market.

Users are required to make TSO available for publication all information relevant to the operation of the electricity market.

The data referred to in paragraphs 1 and 2 of this Article, the manner of their submission and publication, shall be prescribed by the Ministry in accordance with the Law on cross-border exchange of electricity and natural gas.

1. **TRANSMISSION SYSTEM ACCESS**

**Access and Use of Transmission System**

**Article 185**

These *Rules* shall regulate access to and use of transmission system, pursuant to Article 114, paragraph 2, item 4 of the Act.

Transmission system access implies third party access (transmission system user) to transmission system for the purpose of electricity transmission for production placement, i.e. meeting the consumption needs in Montenegro or electricity transit across the territory of Montenegro.

Provisions of these *Rules,* related to transmission system access, determine general conditions and activity procedures of TSO and coordination of TSO and Market operator as responsible supervisor for organization and electricity market management with the goal to ensure preconditions for concurrent position of market players as well as their rights for non-discriminatory access to transmission system.

**Transmission System Use Requirements**

**Article 186**

Access to the transmission system is operated by TSO.

The user can acquire the right of access to the transmission system, as:

1) A producer connected to the transmission system, provided that it has concluded contract on use with TSO.

2) Supplier of consumers connected to the transmission system, provided that it has concluded a contract on use of the transmission system with TSO.

3) A customer self-supplier connected to the transmission system, provided that it has concluded a contract on use of the transmission system with TSO.

4) A DSO as equivalent consumer, for the distribution purposes, provided that it has concluded a contract on use of the transmission system with TSO.

5) Electricity trader

6) Power exchange as a "shipping agent"

Access to the transmission system may be, under the terms of paragraph 2 of this Article achieved at all border points of the transmission system, while transmission can be achieved in a way that:

1) place of supply and place of delivery within the control area of TSO,

2) place of supply within the control area of TSO, and a delivery outside its control area,

3) place of supply outside the control area of TSO, and delivery within its control area or

4) place of supply and place of delivery are in different (or the same) control areas, while outside the control area of TSO (electricity transit).

**Transmission System Use Contract**

**Article 187**

On the grounds of transmission system use contract, transmission system user acquires guaranteed transmission system access to carry out electricity transmission in line with agreed program, time frame and transmission 0direction.

Contract on use must be completed before starting use of the system, in terms and manner prescribed in Article 16 and 17 of these *Rules*.

The contract on the use is a standard contract, which provides concurrent treatment for all users of the transmission system, general part of which is prescribed by these *Rules* (Article 190 and Appendix 4).

The elements of the contract that are directly related to the user and which are adapted to each individual user are:

1. User data
2. the place of connection and metering points for the billing of electricity taken in and delivered (period, power, energy, diagram ...)
3. data on the manner of use (period, power, energy, diagram ...)

**Publication of Data Significant for Use of the System**

**Article 188**

TSO publishes data important for use of transmission system, capacities, congestions as well as other data required for electricity market operation in accordance with legislation governing electricity market transparency, the Rulebook on data, adopted by the Government of Montenegro, which determines TSO obligations in terms of procedure of submission and publishing of data relevant for the electricity market.

**Balance Responsibility**

**Article 189**

Before access to the system in accordance with the requirements of Article 186 herein, the user is required to enter into a balance responsibility agreement in accordance with the Market Rules.

The holder of the balance responsibility is the owner of a facility connected to the transmission system unless it has already joined the balance group in accordance with the Law.

**Use of Transmission Capacities within the TSO Control Area**

**Transmission capacity use procedure**

**Article 190**

(The manner of use of transmission capacity within the control area of TSO is determined by means of standard contracts for use of the transmission system referred to in Article 16, paragraph 1, item 2, which contains

1. guaranteed parameters of electricity transmission, guaranteed by these *Rules*
2. the place of connection and the appropriate billing points relevant for measurement of electricity transmitted
3. procedure for registration of electricity transmission, entities and persons authorized for registration
4. contracted connection capacity and maximum power of the intended transmission,
5. the procedure for determining metered data,
6. commercial terms of service of electricity transmission and
7. conditions for temporary or permanent interruption of transmission services.

(Contract on the use of the transmission system within a control area is concluded, as a rule, once a year.

(3The method of using the transmission system for the needs of other TSOs from interconnection shall be governed by a separate multilateral contract in accordance with the law governing the issue of access to the transmission system for cross-border exchanges of electricity.

(4) Electricity trade within the control area of ​​Montenegro is carried out without a signed contract on the connection, whereby the undertakings referred to in Article 186, paragraph 2 are required to report the transmission and participate in the stages of the transmission of electricity in accordance with provisions of these Rules.

**Implementation phases of transmission services**

**Article 191**

Electricity transmission service within TSO’s control area is executed in following phases:

1. Transmission registration (delivery of schedules)
2. verification of technical feasibility and approval,
3. execution of the transaction
4. reporting and billing.

**Transmission Registration (delivery of schedules)**

Transmission system users referred to in Article 4 of these *Rules,* are obliged to register transmission with TSO i.e. deliver schedules in the manner prescribed by Market Rules, in the format prescribed by TSO.

The users referred to in paragraph 1, which conclude use contracts with TSO, may appoint a subject in the contract who will be authorized to submit schedules, wherewith they cannot transfer the responsibility arising from this activity.

Transmission system users who submitted the schedule are allowed to change it according to the procedure established by the Market Rules.

In case of accidental situation in the power system, TSO has the right to suspend some or all reported transactions in order to preserve the stability of the power system.

The format in which schedules are submitted are prescribed by TSO, based on the relevant ENTSO-E recommendations, a special decision.

**Verification of Technical Feasibility Verification of Transmission (schedules)**

**Article 193**

TSO shall verify technical feasibility of the schedule in relation to secure and stable power system operation with the aim of identification of possible technical limitations.

TSO verifies technical feasibility of the schedule referred to in paragraph 1 herein in coordination with other operation in interconnection pursuant to the regulation of the Government, adopted in accordance with the Law on Cross-Border Exchange of Electricity and Natural Gas.

TSO may prohibit transactions which under verification referred to in paragraph 1 are found to threaten safe and stable operation of the system.

TSO prepares realized schedule, in accordance with the Market Rules

**Execution of Transmission**

**Article 194**

Real time monitoring of implementation of the Contract on use of the transmission system is done in the Dispatch Centre TSO.

TSO provides realization of reported transactions, through permanent monitoring system status, corrective actions and engagement of ancillary services.

If by engagement of ancillary services it is not possible to adjust properly voltage, frequency and power exchange, eliminate congestion in the system through re-dispatching or countertrade, TSO may cancel the declared transaction and apply measures provided for operation of the system in extraordinary/emergency circumstances**.**

**Reporting and Billing**

**Article 195**

Reporting on the implementation of reported transactions is carried out by TSO, based on data from the measuring system at points between transmission and users, neighbouring systems and other relevant points.

TSO submits accounting data to the transmission system users, providers of ancillary services and suppliers of electricity intended for covering the losses in the transmission system and implementation of compensation programs for the purpose of billing, as well as to the market operator for the purposes of calculating the deviation in accordance with the Market Rules.

TSO determines losses in transmission system for every hour respectively and deliver determined level of losses to Market operator.

TSO delivers to Market operator verified metering data which are made official. Market operator uses these data to determine cumulative deviation of electricity delivery/withdrawal in relation to exchange program, prepare financial accounting and market operation analysis.

**Allocation and Use of Cross-border Transmission Capacities**

**Capacity Allocation Procedure**

**Article 196**

TSO has the obligation to approve and execute utilization of cross-border transmission capacities.

The allocation and use of transmission capacity must be in compliance with the law governing the issue of cross-border exchanges in electricity and regulations governing the allocation of capacity and congestion management, as well as the long-term allocation of capacity, as determined by the Government of Montenegro.

Allocation process at day-ahead level and longer periods of time, may be delegated by TSO to a special entity who performs coordinated allocation of capacities at the regional level.

Allocation process at day ahead level, and short periods of time, may be delegated by TSO to a special entity who is responsible for connecting markets.

**Calculation of Capacities**

**Article 197**

Transmission system operator calculates available cross-border transmission capacity in cooperation with system operators in the interconnection for every border in yearly, monthly and daily level.

Calculation of cross-border transmission capacity referred to in paragraph 1 of this Article takes account of planned power system operation states in the region for respective time frame, technical criteria set under provisions referred to in Article 196 paragraph 2.

**Use Requirements**

**Article 198**

TSO performs publication of required information and allocation of cross-border transmission capacities in line with Guideline for allocation of cross-border transmission capacities and publishes information related to transmission capacity allocation on its web page.

Following allocation of the rights to market players for utilization of cross-border transmission capacity by TSO, these market players on the grounds of this right prepare and modify exchange schedule and submit cross-border electricity exchanges.

Guidelines referred to in paragraph 1 of this Article shall determine the manner and conditions for curtailment of the already allocated capacity, in cases when it is necessary to preserve the security of the system.

1. **DISPUTE SETTLEMENT**

**Noncompliance of the User**

**Article 199**

Based on the available data, TSO verifies compliance with the provision of the *Rules* and identifies all violations on the part of the user.

TSO is entitled to request from the user all information required to investigate possible non- compliance with these *Rules*.

In case non-compliance with these *Rules* is determined, (Such as: arbitrary alteration of characteristic of the devices connected to the transmission network, failure to comply with the TSO’s operational orders, unauthorized withdrawal or injecting electricity into the grid, arbitrary intervention on the electricity metering devices in the ownership of TSO ...) which may have adverse effects on system operation or quality of electricity transmission service, TSO issues warnings to the user which include:

1. Non-compliance description,
2. Required timeframe for removing the irregularities namely restoration of normal use of the system

In case the user fails to remove the irregularities within the time frame referred to in paragraph 3 above, TSO is entitled to cancel services to the user.

TSO notifies the Agency of taking measures referred to in paragraph 4, no later than 3 days before starting the measures.

**Noncompliance of TSO**

**Article 200**

Any user suspecting TSO’s non-compliance with these Rules is entitled to inform TSO herein.

TSO has the obligation to conduct internal control with a view to investigating respective non-compliance and within 15 days upon receipt of notification to remove any drawbacks and/or inform the user about the investigation results.

**Material Liability of TSO and the Users**

**Article 201**

Any liability of TSO or the transmission system user in their mutual relation arising from a failure to carry out their responsibilities, ensuing from these *Rules,* is limited to immediate material damage as a direct result of their behaviour.

This excludes any liability of parties for collateral damages or profit loss.

TSO’s liability for damages incurred to users due to non-compliance with the Code is strictly limited to cases of fraud, corruption and/or utter negligence.

1. **TRANSITIONAL PROVISIONS**

**Revision of the Code**

**Initiative for Amendments**

**Article 202**

Initiative for amendments to this Code may be launched by the Agency, TSO, users of the transmission system that have signed contracts, prescribed by these *Rules*.

Propositions for amendments to these *Rules* are se submitted to the TSO that shall decide thereon within 60 days from the submission date.

Amendments to these *Rules* are carried out in line with the relevant adoption procedure.

**Unforeseen Circumstances**

**Article 203**

(In case of circumstances that are not provided in the Code, or the occurrence of which could not be prevented, and the effects thereof may result in altered technical conditions (parameters) in the transmission system and cause effects on the users of the transmission system, the TSO is entitled to take measures in case of unforeseen circumstances.

In the circumstances referred to in paragraph 1 of this Article, TSO shall adopt decisions on measures and actions in urgent consultation to the extent appropriate with all the users concerned.

When adopting the decisions referred to in paragraph 2 of this Article, TSO shall take into account the views of users and take measures with the smallest negative impact on the system and system users.

The user is required to abide by the instructions issued by TSO, provided that the instructions are consistent with existing technical parameters of the system users, registered in accordance with these *Rules*.

TSO shall inform the Agency of all unforeseen circumstances and relevant decisions in accordance with these *Rules*.

TSO is obliged to prepare a report on the implementation of measures in case of unforeseen circumstances, the manner and procedure for the preparation of special reports on the transmission system operation, in which, inter alia, state causes of the occurrence of unforeseen circumstances, the measures taken and the consequences of the effects of unforeseen circumstances.

**Harmonization with the Code Provisions**

**Article 204**

Owners of facilities that on the effective date of these *Rules* are connected to the transmission system are required to respond to TSO’s invitation to contract capacity according to their real needs within 30 days from receipt of invitation.

In case the owners of facility referred to in paragraph 2 of this Article fail to contract capacity within the prescribed period, the values provided in Appendix 7 shall be applied.

**Vested Rights**

**Article 205**

The user who is connected to the transmission system on the effective date of the Rules, is acquitted of charges under Article 51 herein, for an increase in connection load during the calendar year, if the requested increase does not require construction of new elements according to the criteria under Article 30 of these *Rules* and unless a request for an increase is preceded by a request to reduce the connection load.

**Harmonization with Other Regulations**

**Article 206**

Until the adoption of regulations in accordance with the Law on Cross-Border Exchange of Electricity and Natural Gas, Articles from 66 to 97 of the Rules for Electricity Transmission System Operation (“Official Gazette of MNE” no. 5/2012) shall apply.

In the event that the regulations referred to in paragraph 1 of this Article regulate the subject matter of particular provisions of these *Rules*, the relevant provisions of these regulations shall apply.

**Electricity Metering**

**Article 207**

Installed metering equipment (transformers and measuring devices) that do not meet the criteria of these Rules may be used up to the first major reconstruction of the facility, which requires issuance of TSO approvals.

**Harmonization of Contracts with the Provisions of the Rules**

**Article 208**

TSO shall, within 15 days from the date of entry into force of these Rules, deliver to the user connected to the transmission system connection contracts for signing previously harmonized with this Code, as well as notifications of obligation to harmonize connection power in accordance with paragraph 2 Article 204 herein.

**State of the transmission system on the day of entry into force of the Rules**

**Article 209**

Until the conclusion of relevant contracts stipulated by the Law and prescribed by these Rules for the purposes of operation and use of the transmission system, data on the state of the system at the date of entry into force of the Rules provided in Appendix 6 shall be applicable.

The state of the transmission system on the date of entry into force of the Rules shall include:

1) points of connection of users

2) in-take and delivery points

3) points of measurement

4) the total available power at the point of connection

5) connection load (annual contracted power)

6) maximum permissible exceeding of annual contracted power

**Request for Exemption from Compliance with provisions of the Rules**

**Submission of Request**

**Article 210**

Provided the user is not or will not be capable to comply with some of the provisions in the *Rules* or part thereof, the user shall inform TSO herein within 30 days following the day of receipt of notification on this obligation that it receives from the TSO.

In case referred to in paragraph 1 herein the user is entitled to submit to TSO the request for exemption from Code Provisions with detailed explanation within 90 days following the day of entry into force of the *Rules*.

Request referred to in paragraph 2 herein shall include:

* 1. Provision of the *Rules* related to the exemption request,
  2. Identification of facility and/or devices subject to exemption and, if important, description and duration of the exemption,
  3. Detailed explanations for exemption request,
  4. Suggested measures to overcome the issues resulting in requirement for exemption request, and also suggested measures to overcome the consequences relating to exemption during proposed timeframe, and
  5. Exemption timeframe.

**Exemption Decision**

**Article 211**

TSO shall make the decision relating to submitted request within 30 days following its receipt.

Exemption decision referred to in paragraph 1 herein shall include:

1. Provision of the Rules related to the exemption request,
2. The reason for exemption request,
3. Identification of facility and/or devices subject to exemption and, if important, description and duration of the exemption, including also provisions relating to modified compliance requests, and
4. The date until exemption is in effect.

TSO is obliged to allow the user the right to appeal against the decision referred to in paragraph 1 of this Article, in dispute resolution process between energy undertakings and users, conducted by the Agency, in accordance with Article 57 of the Law.

**Register of Exemptions**

**Article 212**

TSO shall keep the register of exemptions with indication of the name of the undertaking at the request of which the exemption has been approved and provision of the Rules relating to the exemption request and timeframe of the exemption period.

The register of exemptions referred to in paragraph 1 herein is public.

1. **FINAL PROVISIONS**

**Appendixes**

**Article 214**

The *Rules* comprises following appendixes:

1. Appendix 1: Application form for Request for opinion on connection to the transmission system
2. Appendix 2: Application form for Request for approval of connection to the transmission system
3. Appendix 3: Application form for Power facilities data (appendix to Connection contract)
4. Appendix 4: Standard contract forms:

* Appendix 4.1: Contract on connection to transmission system
* Appendix 4.2: Contract on use of transmission system
* Appendix 4.3: Contract on purchase of ancillary services and balance energy
* Appendix 4.4: Contract on purchase of electricity for coverage of transmission system losses
* Appendix 4.5: Contract on assigning right to access cross-border transmission capacities

1. Appendix 5: Request for conclusion of contracts on use
2. Appendix 6: Request for conclusion contracts on connection
3. Appendix 7: State of the transmission system on the day of entry into force of the Code.

**Entry into Force**

**Article 214**

These *Rules* shall become effective on the eighth day upon its publication.

As of the date of entry into force of these Rules*,* theRules for Electricity Transmission System Operation (Official Gazette of Montenegro no.5/12) shall cease to be valid.

Chairman of the Board of Directors

APPENDIX 1

REQUEST FOR OPINION ON

TRANSMISSION SYSTEM CONNECTION POSSIBILITIES

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1.** | **User/applicant data** | | | | | | | |
| 1.1. | Name of the user | |  | | | | | |
| 1.2. | Type of the user | | Producer | | | | |  |
| Direct consumer | | | | |  |
| Distribution system operator | | | | |  |
| 1.3. | Name of the facility subject to opinion | |  | | | | | |
| 1.4. | Address of the facility | |  | | | | | |
| 1.5. | No. of cadastral plot of the facility (*enclose positional depiction of the facility*) | |  | | | | | |
| 1.6. | Reason for the request | | Connection of the new facility | | | | |  |
| Increase of installed power of producers or increase of connected power of direct consumer | | | | |  |
| Modification of technical parameters of the connection | | | | |  |
| Connection of the new or increase of installed power for production at the direct consumer facility | | | | |  |
| 1.7. | Planned connected power or power increase (MW) | |  | | | | | |
| 1.8. | Planned voltage level of connection (kV) | |  | | | | | |
| 1.9. | Realization in phases (YES/NO) | |  | | | | | |
| 1.10. | Planned realization date for extension/construction  (indicate per phase) | | Phase | I | II | III | IV | |
| Y/M |  |  |  |  | |
| MW |  |  |  |  | |
| 1.11. | User’s address | |  | | | | | |
| 1.12. | User’s phone | |  | | | | | |
| 1.13. | User’s fax: | |  | | | | | |
| 1.14. | Responsible person | First and Family name |  | | | | | |
| Address |  | | | | | |
| e-mail |  | | | | | |
| Phone |  | | | | | |

**FILLED BY PRODUCER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **2.** | **Production facility data** | | | | | |
| 2.1. | Type of the plant | Run of river hydro power plant | | | |  |
| Reservoir hydro power plant | | | |  |
| Pumped-storage hydro power plant | | | |  |
| Thermal power plant | | | |  |
| Combined heat and power plant | | | |  |
| Wind power plant | | | |  |
| other *(specify)*: | | | | |
| 2.2. | Fuel (for thermal power plants and combined heat and power plant) | coal | | | |  |
| gas | | | |  |
| heavy fuel oil | | | |  |
| other: | | | | |
| 2.3. | Energy data per phase: | I | II | III | IV | |
| 2.3.1. | No. of generation units |  |  |  |  | |
| 2.3.2. | Active power of generator (MW) |  |  |  |  | |
| 2.3.3. | Maximal net power (MW) |  |  |  |  | |
| 2.3.4. | Expected average yearly production (MWh) |  |  |  |  | |
| 2.4. | Possibility for reactive power control (YES/NO) |  | | | | |

**FILLED BY DIRECT CONSUMER AND DSO**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **3.** | **Data about facility subject to connection** | | | | | |
| 3.1. | Type of facility | Industrial facility | | | |  |
| Industrial facility with generation unit | | | |  |
| Traction substation | | | |  |
| Common consumption | | | |  |
| other: | | | | |
| 3.2. | Energy data per phase: | I | II | III | IV | |
| 3.2.1. | Expected maximal load (MW)1 |  |  |  |  | |
| 3.2.2. | Expected maximal load (MVA)1 |  |  |  |  | |
| 3.2.3. | Expected minimal load (MW)1 |  |  |  |  | |
| 3.2.4 | Expected average yearly consumption (MWh)1 |  |  |  |  | |
| 3.2.5 | Maximal power of production units (MW) |  |  |  |  | |
| 3.2.5 | Expected average yearly production (MWh) |  |  |  |  | |

1 Not including generation units

APPENDIX 2

REQUEST FOR TRANSMISSION SYSTEM CONNECTION APPROVAL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1.** | **User/applicant data** | | | |
| 1.1. | Name of the user | |  | |
| 1.2. | Type of the user | | Producer |  |
| Direct consumer |  |
| Distribution system operator |  |
| 1.3. | Name of the facility subject to approval | |  | |
| 1.4. | Address of the facility | |  | |
| 1.5. | No. of cadastral plot of the facility (*enclose positional depiction of the facility*) | |  | |
| 1.6. | Reason for the request | | Connection of the new facility |  |
| Increase of installed power of producers or increase of connected power of direct consumer |  |
| Modification of technical parameters of the connection |  |
| Connection of the new or increase of installed power for production at the direct consumer facility |  |
| 1.7. | Number and date of opinion on connection possibility or connection approval for existing facility | |  | |
| 1.8. | Number and date of decision on setting connection fee | |  | |
| 1.9. | Construction phase (according to issued opinion on connection possibility) | |  | |
| 1.10. | Planned realization date for extension/construction | |  | |
| 1.11. | Planned connected power or power increase (MW) | |  | |
| 1.12. | Planned voltage level of connection (kV) | |  | |
| 1.13. | Amount of connection fee | |  | |
| 1.14. | User’s address | |  | |
| 1.15. | User’s phone | |  | |
| 1.16. | User’s fax: | |  | |
| 1.17. | Responsible person | First and Family name |  | |
| Address |  | |
| e-mail |  | |
| Phone |  | |

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| **2.** | **Production facility data** | | | |
| 2.1. | Type of the plant | Run of river hydro power plant | |  |
| Reservoir hydro power plant | |  |
| Pumped-storage hydro power plant | |  |
| Thermal power plant | |  |
| Combined heat and power plant | |  |
| Wind power plant | |  |
| other *(specify)*: | |  |
| 2.2. | Fuel (for thermal power plants and combined heat and power plant) | coal | |  |
| gas | |  |
| heavy fuel oil | |  |
| other: | | |
| **2.3.** | **Energy data per phases:** | Existing | New | |
| 2.3.1. | No. of boilers |  |  | |
| 2.3.2. | No. of generation units |  |  | |
| 2.3.3. | No. of step-up transformers |  |  | |
| 2.3.4. | Apparent power (MVA) |  |  | |
| 2.3.5. | Active power (MW) |  |  | |
| 2.3.6. | Reactive power (Mvar) |  |  | |
| 2.3.7. | Maximal net power (MW) |  |  | |
| 2.3.8. | Minimal net power (MW) |  |  | |
| 2.3.9. | Available net power (MW) |  |  | |
| 2.3.10. | Expected average yearly production (MWh) |  |  | |
| 2.3.11. | Nominal voltage level of house load (kV) |  |  | |
| 2.3.12. | Maximal active power of house load (MW) |  |  | |
| 2.3.13. | Maximal reactive power of house load (Mvar) |  |  | |
| 2.3.14. | Possibility for reactive power control (YES/NO) |  | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2.4.** | **Generators data (filled for each generator)** | 1 | 2 | 3 | 4 |
| 2.4.1. | Type of generator |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2.4.2. | Apparent power (MVA) | |  |  |  |  |
| 2.4.3. | Active power (MW) | |  |  |  |  |
| 2.4.4. | Power factor | |  |  |  |  |
| 2.4.5. | Nominal voltage (kV) | |  |  |  |  |
| 2.4.6. | Type of excitation system (rotational/static) | |  |  |  |  |
| 2.4.7. | Type of voltage control and system stabiliser | |  |  |  |  |
| 2.4.8. | Short circuit coefficient (ratio) | |  |  |  |  |
| 2.4.9. | Synchronous reactance (%) | |  |  |  |  |
| 2.4.10. | Transient reactance (%) | |  |  |  |  |
| 2.4.11. | Sub-transient reactance (%) | |  |  |  |  |
| 2.4.12. | Time constant of damper winding (s) | |  |  |  |  |
|  | | | | | | |
| 2.5. | **Turbine data (filled for each respectively)** | | 1 | 2 | 3 | 4 |
| 2.5.1. | Turbine type | |  |  |  |  |
| 2.5.2. | Turbine installed power (MW) | |  |  |  |  |
| 2.5.3. | Technical minimum (MW) | |  |  |  |  |
| 2.5.4. | Discharge min/max (m3) | |  |  |  |  |
|  | | | | | | |
| **2.6.** | **Transformers data** | | 1 | 2 | 3 | 4 |
| 2.6.1. | Nominal ratio (kV/kV) | |  |  |  |  |
| 2.6.2. | Nominal power HV/LV1/LV2 (MVA) | |  |  |  |  |
| 2.6.3. | Short circuit voltage (%) | Uk 1-2 |  |  |  |  |
| Uk 1-3 |  |  |  |  |
| Uk 2-3 |  |  |  |  |
| 2.6.4. | Type of control (*under load, no load*) | |  |  |  |  |
| 2.6.5. | Tap ratio range, regulation step (%) | |  |  |  |  |
| 2.6.6. | Connection group | |  |  |  |  |
| 2.6.7. | Reactance in positive sequence (zero regulation step) | |  |  |  |  |
| 2.6.8. | Reactance in zero sequence | |  |  |  |  |
| 2.6.9. | Neutral grounding | |  |  |  |  |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **3.** | **Data about facility subject to connection** | | | |
| 3.1 | Type of facility | Industrial facility | |  |
| Industrial facility with generation unit | |  |
| Traction substation | |  |
| Common consumption | |  |
| other: | | |
| **3.2.** | **Energy data:** | Existing | New | |
| 3.2.1 | Installed power of the facility (MVA) |  |  | |
| 3.2.2. | Power factor (cos) |  |  | |
| 3.2.3. | Expected maximal load (MW) 1 |  |  | |
| 3.2.4. | Expected minimal load (MW) 1 |  |  | |
| 3.2.5. | Expected daily load diagram (daily diagram of active and reactive power in winter and summer regime) given in Appendix (YES/NO) |  | | |
| 3.2.6. | Load sensitivity to voltage and frequency variations in transmission system (*describe*): |  | | |
| 3.2.7. | Maximal flicker level and harmonic content coming from the user’s loads. Specific details of consumption must be specified if the user has industrial furnaces, rolling mills, traction stations and other consumers which can cause variation in supply of other users. |  | | |
| 3.2.8. | Data about cyclic variations of the active and reactive power of the load (>5 MVA/min.) |  | | |
| 3.2.9. | Active and reactive power gradient – increase/decrease (>5 MVA/min.) |  | | |
| 3.2.10. | Net production profile of all production units directly connected to the user’s system (MWh) |  | | |
| 3.2.11. | Maximal power of production units (MW) |  | | |
| 3.2.12. | Expected average yearly production (MWh) |  | | |

1 ... not including generation units

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **3.3.** | **Transformers data** | | 1 | 2 | 3 | 4 |
| 3.3.1. | Nominal ratio (kV/kV) | |  |  |  |  |
| 3.3.2. | Nominal power HV/LV1/LV2 (MVA) | |  |  |  |  |
| 3.3.3. | Short circuit voltage (%) | Uk 1-2 |  |  |  |  |
| Uk 1-3 |  |  |  |  |
| Uk 2-3 |  |  |  |  |
| 3.3.4. | Type of control (*under load, no load*) | |  |  |  |  |
| 3.3.5. | Tap ratio range, regulation step (%) | |  |  |  |  |
| 3.3.6. | Connection group | |  |  |  |  |
| 3.3.7. | Reactance in positive sequence (zero regulation step) | |  |  |  |  |
| 3.3.8. | Reactance in zero sequence | |  |  |  |  |
| 3.3.9. | Neutral grounding | |  |  |  |  |

**FILLED BY ALL USERS**

**Planned electricity consumption (including own production) or net electricity production**

Connection year (20 )

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Month | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| Energy (MWh) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | Total [MWh] | | |  | |

Connection year +1 (20\_ )

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Month | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| Energy (MWh) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | Total [MWh] | | |  | |

Connection year +2 (20\_ )

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Month | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| Energy (MWh) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | Total [MWh] | | |  | |

Connection year +3 (20\_ )

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Month | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| Energy (MWh) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | Total [MWh] | | |  | |

Connection year +4 (20\_ )

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Month | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| Energy (MWh) |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | Total [MWh] | | |  | |

Appendices to the request:

1. Energy permit
2. Capability chart of generation unit (producer)
3. Single line diagram of the facility
4. For direct consumers – general single line diagram of the supply for large consumers, CHP or compensation devices (>5 MVA)
5. Expected daily consumption profile (daily diagram of active and reactive power in winter and summer regime)
6. Payment receipt of connection fee

User’s Responsible Party

**Note:** TSO reserves the right to request additional information from the user for the purpose of connection study preparation.

APPENDIX 3

ENERGY FACILITY DATA (APPENDIX TO CONNECTION AGREEMENT)

**Basic data of the facility:**

|  |  |  |
| --- | --- | --- |
| 1. | Connected power (active power and cos) |  |
| 2. | Connection point |  |
| 3. | Connection voltage level |  |
| 4. | Insulation coordination |  |
| 5. | Existing and planned single line diagram |  |
| 6. | Protection scheme |  |
| 7. | Maximal and minimal short circuit power |  |
| 8. | Terms of automatic synchronization |  |
| 9. | Content of higher harmonics and flickers |  |
| 10. | Disconnection power |  |
| 11. | Neutral grounding |  |
| 12. | Minimal and maximal operation voltage, duration and level of short-term violations of minimal and maximal levels |  |
| 13. | Type and exchange range of reactive power and required reactive power reserves that must be installed in the devices by the user. |  |
| 14. | Voltage control scheme (reference value, accuracy, speed, operation in disturbed state) |  |
| 15. | Inclusion in under-frequency curtailment plan and limitations with energy deficiency on the electricity market |  |
| 16. | Inclusion in provision of ancillary services |  |
| 17. | Data on protection, metering and information equipment and metering devices |  |
| 18. | Way of metering and transfer of metered values of electrical variables predefined by TSO |  |
| 19. | Planned measures in case of large disturbance |  |

**Table 1: Overhead line (for direct consumers with internal HV lines)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **General data** | | | | |
| 1. | Name of the line |  | | |
| 2. | Construction and reconstruction year |  | | |
| 3. | Line ownership, ownership and maintenance delimiting points |  | | |
|  | | | | |
| **Construction parameters** | | **variable** | **unit** |  |
| 4. | Line configuration – scheme | | | |
| 5. | Distance from tower axis to phase conductors and ground wire | a1,2,3, a4 | m |  |
| 6. | Height of phase conductions and ground wire from the ground | h1,2,3, h4 | m |  |
| 7. | Sag | f | m |  |
| 8. | Cross-section and material type of phase conductors and ground wire | A | mm2 |  |
| 9. | No. of current circuits |  |  |  |
| 10. | No. of conductors per phase |  |  |  |
| 11. | No. and location of the towers |  |  |  |
| 12. | Average distance between towers | lsr | m |  |
| 13. | Route length | l | km |  |
| 14. | Conductor length | L | km |  |
| 15. | Fiber-optic cables in ground wire (YES/NO) |  |  |  |
| 16. | Data on insulation (suspension) material |  |  |  |
|  | | | | |
| **Electrical parameters** | | **variable** | **unit** |  |
| 17. | Nominal current | In | A |  |
| 18. | Nominal voltage | Un | kV |  |
| 19. | Apparent power | Sn | MVA |  |
| 20. | Charging power | Qp | Mvar |  |
| 21. | Thermal current (winter, summer) | Ith | A |  |
| 22. | Thermal power (winter, summer) | Sth | MVA |  |
| 23. | Maximal allowed conductor temperature |  | ºC |  |
| 24. | Wave resistance | Zv |  |  |
| 25. | Resistance in positive sequence | R1 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 26. | Reactance in positive sequence | X1 |  |  |
| 27. | Capacitance in positive sequence | C1 | F |  |
| 28. | Susceptance | G | mS |  |
| 29. | Resistance in zero sequence | R0 |  |  |
| 30. | Reactance in zero sequence | X0 |  |  |
| 31. | Capacitance in zero sequence | C0 | F |  |
| 32. | Mutual resistance in positive sequence | R1m |  |  |
| 33. | Mutual reactance in positive sequence | X1m |  |  |
| 34. | Mutual resistance in zero sequence | R0m |  |  |
| 35. | Mutual reactance in zero sequence | X0m |  |  |
| 36. | Short circuit power limit at the beginning of the line | Ssc\_max\_b | MVA |  |
| 37. | Short circuit power limit at the end of the line | Ssc\_max\_e | MVA |  |
| 38. | Reduction factor | r |  |  |
|  | | | | |
| **OHL designated bay** | | | | |
| 39. | Name of OHL bay |  | | |
| 40. | Construction year |  | | |
| 41. | Bay ownership and maintenance |  | | |
| **Technical data of designated bays – nominal current of the element** | | | | |
| 42. | Q0, Q1 (Q2, Q3), Q7, Q8, Q9… (nominal current, construction year) |  | | |
| 43. | Current transformer (primary ratio, maximal current) |  | | |
| 44. | Voltage transformer |  | | |
| 45. | Surge arresters |  | | |
| **Data on bay connected relay protection devices** | | | | |
| 46. | Protection type (enumerate) |  | | |
| 47. | ARS (activated: yes/no) |  | | |
| 48. | Overload protection (current level and time at which the line trips) |  | | |
| 49. | Possibility for error location (yes/no) |  | | |
| 50. | Distant protection transfer (yes/no) |  | | |
| **Data on bay connected remote control devices** | | | | |
| 51. | Type of metering converter |  | | |
| 52. | Type of devices for remote control |  | | |

|  |  |  |
| --- | --- | --- |
| 53. | Direction of remote transfer |  |
| 54. | Possibility and parameter settings for synchronization |  |
| **Data on accounting metering devices in bays** | | |
| 55. | Type of active power metering device |  |
| 56. | Type of reactive power metering device |  |
| 57. | Type of accounting meter |  |
| 58. | Direction of remote transfer |  |

**Table 2: Transformer**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **General data** | | | | |
| 1. | Substation name |  | | |
| 2. | Year of construction/reconstruction |  | | |
| 3. | Transformer ownership and maintenance |  | | |
| 4. | Transformer type |  | | |
|  | | | | |
| **Electrical parameters** | | **variable** | **unit** |  |
| 5. | No. of windings (two, three) |  |  |  |
| 6. | Nominal apparent power of primary, secondary and tertiary winding | Sn\_1,2,3 | MVA |  |
| 7. | Nominal voltage of primary, secondary and tertiary winding | Un\_1,2,3 | kV+/-% |  |
| 8. | Maximal voltage of primary, secondary and tertiary winding | Umax\_1,2,3 | kV |  |
| 9. | Nominal current of primary, secondary and tertiary winding | In\_1,2,3 | A |  |
| 10. | Short circuit power limit at primary, secondary and tertiary side | Ssc\_max\_1,2,3 | MVA |  |
| 11. | Frequency | f | Hz |  |
| 12. | Connection type |  |  |  |
| 13. | Neutral grounding (NO / fixed / through disconnector) |  |  |  |
| 14. | Type and cooling losses | Pn | kW |  |
| **Winding losses (primary, secondary, tertiary)** | | | | |
| 15. | Open-circuit losses (in iron Pfe) | P0 | kW |  |
| 16. | Short circuit losses (in copper Pcu) | Pk | kW |  |
| 17. | Open circuit current | i0 | % |  |
| 18. | Short circuit voltages between the windings (prim- sec, prim-tert, sec-tert) at the lowest, neutral and highest tap position | uk | % |  |
| **Voltage control** | | | | |
| 19. | Regulating winding (primary, secondary, tertiary) |  |  |  |
| 20. | No. of tap positions and step level on regulating side |  | % |  |
| 21. | Lowest, neutral and highest tap position |  |  |  |
| 22. | Voltage at the lowest/highest tap position (eg. - 20% / +20%) | Umin, max | % / kV |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 23. | Resistance and reactance of all windings (positive, negative and zero sequence – short circuit and open circuit) and grounding | R, X |  |  |
|  | | | | |
| **Transformer designated bay** | | | | |
| 24. | Bay name |  | | |
| 25. | Construction year |  | | |
| 26. | Bay ownership and maintenance |  | | |
| **Technical data of transformer designated bays** | | | | |
| 27. | Q0, Q1 (Q2, Q3), Q8… (breaker type, nominal current, construction year) |  | | |
| 28. | Current transformer (primary ratio, maximal current) |  | | |
| 29. | Voltage transformer |  | | |
| 30. | Surge arrester |  | | |
| **Data on bay connected relay protection devices** | | | | |
| 31. | Protection type (enumerate) |  | | |
| 32. | Overload protection (current level and time at which the transformer trips) |  | | |
| **Data on bay connected remote control devices** | | | | |
| 33. | Type of metering converter |  | | |
| 34. | Type of devices for remote control |  | | |
| 35. | Direction of remote transfer |  | | |
| 36. | Possibility and parameter settings for synchronization |  | | |
| **Data on bay connected accounting metering devices** | | | | |
| 37. | Type of active energy metering device |  | | |
| 38. | Type of reactive energy metering device |  | | |
| 39. | Type of accounting meter |  | | |
| 40. | Direction of remote transfer |  | | |

**Table 3: Generation unit (generator + excitation system + turbine)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Basic data** | | | | |
| 1. | Owner |  | | |
| 2. | Location |  | | |
| 3. | Year of construction/reconstruction |  | | |
|  | | | | |
| **Generator and excitation** | | **variable** | **unit** |  |
| 4. | Generator type |  | | |
| 5. | Nominal apparent power of the generator | Sn | MVA |  |
| 6. | Nominal active power | Pn | MW |  |
| 7. | Nominal terminal voltage of the generator | Un | kV |  |
| 8. | Nominal current | In | A |  |
| 9. | Nominal power factor | cos |  |  |
| 10. | Frequency | f | Hz |  |
| 11. | Nominal rotation speed of the rotor | n | o/min |  |
| 12. | Nominal terminal active power of the generator (turbine + generator) | Pst\_max | MW |  |
| 13. | Maximal allowed active power of the generator | Pmax | MW |  |
| 14. | Minimal allowed active power of the generator | Pmin | MW |  |
| 15. | Damper winding (YES/NO) |  |  |  |
| 16. | Participation in secondary control (YES/NO) |  |  |  |
| 17. | Black start possibility (YES/NO) |  |  |  |
| **Excitation system** | | | | |
| 18. | Open circuit excitation current for nominal stator voltage | Im0 | A |  |
| 19. | Excitation current for nominal stator current | Imk | A |  |
| 20. | Excitation current at In, Un, cos= 1 | Imn0 | A |  |
| 21. | synchronous machine short circuit currents | SRC |  |  |
| **Computer model and parameters of the excitation system** | | | | |
| 22. | Model, type |  |  |  |
| 23. | Excitation nominal power | Pnu | kW |  |
| 24. | Excitation nominal voltage | Unu | V |  |
| 25. | Excitation nominal current | Inu | A |  |
| 26. | Excitation maximal voltage | Uu\_max | kV |  |
| 27. | Excitation minimal voltage | Uu\_min | kV |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 28. | Excitation system gain coefficient | KA |  |  |
| 29. | Regulation band |  | % |  |
| 30. | Power System Stabiliser YES/NO |  | | |
|  | | | | |
| **Turbine** | | **variable** | **unit** |  |
| 31. | Type and turbine block diagram |  | | |
| 32. | Nominal power of turbine | Pn | MW |  |
| 33. | Maximal active power on generator shaft | Pmax | MW |  |
| 34. | Minimal active power on generator shaft | Pmin | MW |  |
| 35. | Power increase gradient limit | Gd | MW/s |  |
| 36. | Power decrease gradient limit | Gs | MW/s |  |
| 37. | Type and block diagram of turbine regulator |  | | |
| 38. | Regulation energy | KT | MW/Hz |  |
| 39. | Permanent drop of turbine regulator | s | % |  |
| 40. | Zero Suppression | f | +/- mHz |  |
| 41. | Time constant of turbine regulator | Tc | s |  |
|  | | | | |
| **Other generator data** | | **variable** | **unit** |  |
| 42. | Time constants of rotor and stator winding (synchronous, subtransient, transient) in short circuit and/or open circuit of stator winding, DC time constant |  | S |  |
| 43. | Resistance and reactance of rotor and stator (synchronous, subtransient, transient, saturated and/or non-saturated – in positive, negative and zero sequence) |  | /% |  |
| 44. | Neutral grounding (direct, through R/X, isolated) |  | | |
| 45. | Ohm resistance of neutral grounding | RE |  |  |
| 46. | Ohm reactance of neutral grounding | XE |  |  |
| 47. | Generator losses |  | kW |  |
| **Characteristics / diagrams** | | | | |
| 48. | Capability Chart | GCD |  |  |
| 49. | Open Circuit Characteristic | GOCC |  |  |
| 50. | Short Circuit Characteristic | GSCC |  |  |
| 51. | Metering of turbine control characteristics (frequency and voltage related) |  |  |  |
| **Efficiency** | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 52. | Generator efficiency | gen | % |  |
| 53. | Turbine efficiency | tur | % |  |
| 54. | Generation unit efficiency | agr | % |  |
| **Moment of inertia** | | | | |
| 55. | Generator rotor moment of inertia | mD2gen | tm2 |  |
| 56. | Turbine moment of inertia | mD2tur | tm2 |  |
| 57. | Excitation moment of inertia | mD2exc | tm2 |  |
| 58. | Moment of inertia of rotating parts of generation unit (turbine + generator + excitation) | mD2gu | tm2 |  |
| 59. | Generator/generation unit inertia constant (mechanical or start-up time constant) | H | MWs/MVA |  |
| 60. | Generator protection (excitation loss, underexcitation and overexcitation protection) |  |  |  |
| 61. | Designated water accumulation (table 5) / boiler (table 6) |  |  |  |

**Table 3-A: Hydro turbine**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Hydro turbine** | | **variable** | **unit** |  |
| 1. | Operation diagram |  | | |
| 2. | Water reservoir |  | | |
| 3. | Gross head | Hg | m |  |
| 4. | Net head | Hn | m |  |
| 5. | Temporary Droop | RT |  |  |
| 6. | Permanent Droop | RP |  |  |
| 7. | Reset Time | TR | s |  |
| 8. | Water time constant of hydro unit | TW | s |  |

**Table 3-B: Gas turbine**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Gas turbine** | | **variable** | **unit** |  |
| 1. | Gas turbine time constant | TG | s |  |
| 2. | Multiplication factor of gas turbine | PBr |  |  |
| 3. | Proportional factor of gas turbine | KG |  |  |
| 4. | Cold start-up time | t | h |  |
| 5. | Warm start-up time | t | h |  |

**Table 3-C: Steam turbine**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Steam turbine** | | **variable** | **unit** |  |
| 1. | Steam Chest Time Constant | TCH | s |  |
| 2. | Reheat Time Constant | Trh | s |  |
| 3. | Crossover Time Constant | TCO | s |  |
| 4. | Low Pressure Turbine Power Fraction | FLP |  |  |
| 5. | Intermediate Pressure Turbine Power Fraction | FIP |  |  |
| 6. | High Pressure Turbine Power Fraction | FHP |  |  |
| 7. | Cold start-up time | t | h |  |
| 8. | Warm start-up time | t | h |  |

**Table 3-D: Wind turbine**

|  |  |  |
| --- | --- | --- |
| **Wind turbine** | | |
| 1. | Diagram of wind turbine and its parameters |  |

**Table 4: Reservoir**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Basic data** | | **variable** | **unit** |  |
| 1. | Name |  | | |
| 2. | Owner |  | | |
| 3. | River |  | | |
| 4. | Reservoir type (daily, weekly, yearly) |  | | |
| 5. | Reservoir capacity – gross energy | Wgross | MWh |  |
| 6. | Total reservoir capacity | Vtotal | hm3 |  |
| 7. | Usable capacity | Vusable | hm3 |  |
| 8. | Upper water level | Hu | m |  |
| 9. | Lower water level | Hl | m |  |
| 10. | Reservoir discharge time |  | h |  |
| 11. | Maximal permissible water level gradient |  | m/h |  |
| 12. | Spillway capacity |  | m3/s |  |
| 13. | Operation permit validity |  | | |

**Table 5: Boiler**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Basic data** | | **variable** | **unit** |  |
| 1. | Boiler type and scheme |  | | |
| 2. | Type of boiler control and scheme |  | | |
| 3. | Fuel |  | | |
| 4. | Cold start-up time | Tb\_cold | h |  |
| 5. | Warm start-up time | Tb\_warm | h |  |

**Table 6: Systems for compensation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Basic data** | | | | |
| 1. | Substation name |  | | |
| 2. | Year of construction/reconstruction |  | | |
| 3. | Ownership and maintenance |  | | |
| 4. | Type (reactance, capacitor, static var compensator) |  | | |
|  | | | | |
| **Electrical parameters** | | **variable** | **unit** |  |
| 5. | Nominal apparent power | Sn | Mvar |  |
| 6. | Nominal voltage | Un | kV |  |
| 7. | Connection voltage | Un | kV |  |
| 8. | Busbar or tertiary winding connection |  |  |  |
| 9. | Iron losses | PFe | kW |  |
| 10. | Winding losses | PCu | kW |  |
| 11. | Total losses | Ploss | kW |  |
| 12. | No. of elements |  |  |  |
| 13. | No. of blocks |  |  |  |
| 14. | Block power |  | Mvar |  |
| 15. | For static var compensator: characteristic of connecting transformer, I/O characteristic, control scheme with relating parameters |  | | |

**APPENDIX 4: STANDARD CONTRACTS**

**Appendix 4.1: Contract on Connection to the Transmission System**

**Contract on Connection *[INSERT: NAME OF THE FACILITY]***  **to the Transmission System**

(hereinafter referred to as: Contract)

*between*

**Crnogorski elektroprenosni sistem AD, Podgorica**

Bulevar Svetog Petra Cetinjskog 18

81000 Podgorica

TIN: 02751372

represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter referred to as: **CGES**),

and

***[Insert: Name of the user]***

[*Insert*: User address]

*[Insert: ZIP code and city]*

TIN: *[Insert: TIN]*

represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter referred to as**: User**),

or as a rule, hereinafter individually referred to as: Party or collectively referred to as: Parties

**General provisions and scope of the Contract**

**Article 1**

1. The Parties shall determine the following:
2. The User is connected to the transmission network on voltage level *[Insert voltage level]* kV.
3. Total connected power of the User is *[Insert connected power]* MW and consists of sum of connected powers by connection points from Article 3 paragraph 1 herein.
4. In case of change of connected power from item 2), the User shall submit a notice on the change not later than 15 days before the commencement of the month to which the change refers.
5. This Agreement shall regulate mutual rights and obligations of the Parties arising from:
6. connecting facilities to transmission system, operation, maintenance and access to the parts of the transmission system at location *[Insert: connection location]* (hereinafter referred to as: connection location),
7. technical parameters of other devices of the User at connection location and *[Insert: user or facility]*prescribed by CGES in compliance with provisions of the Rules for electricity transmission system operation. (hereinafter: the Rules)
8. Any mutual relations not explicitly regulated by this Contract shall be deemed regulated in accordance with the Rules.
9. Terms and expressions used in this Contract have the same meaning as are given to them in the Energy Act, Law on Cross-Border Exchange of Electricity and Natural Gas, the Rules and other secondary acts arising from them.

**Technical and operating characteristics of the facility**

**Article 2**

1. Technical and operating characteristics of energy facilities of the User and connection location are shown in Appendix 1: Single-line diagram and Appendix 5: Technical and operating characteristics.
2. Plants and devices of the User must meet minimal technical standards to provide connection to the transmission network according to the following priority schedule:
3. Appropriate international technical standards like: IEC, ISO, EN,
4. Secondary acts regulating the issue of connection to the transmission system,
5. Appropriate national standards, and
6. The Rules.
7. The Parties are obliged to ensure that their facilities and equipment at the connection location meet technical and operational exploitation criteria prescribed by the Rules.
8. Plants and devices of the User connected to the transmission system shall not affect, beyond the limits prescribed by this Contract expressly or generally by the Rules, the security of the transmission system, including the limitations of high level harmonics, power factor, voltage changes, phase asymmetry and insulation coordination.
9. CGES are obliged to promptly inform the User of any changes to its facilities and equipment, which can significantly affect the facilities and equipment of the User connected to the transmission system.
10. The User shall promptly inform CGES of any planned changes in its facilities and equipment, which may affect transmission system functioning. The User must obtain a prior written consent of CGES for every change in devices affecting transmission network operation.
11. In the event of significant changes in technical parameters of the plants and devices of the User, specified herein, the User must obtain CGES's consent for connection to the transmission network, by which CGES allows changes in technical parameters of the devices and determines the technical and operating conditions for them to be changed.
12. At User request, CGES will provide information detailing the technical criteria for plant and equipment of CGES and the User, relating to connection points as defined in Article 3 herein and are not defined in the Rules.
13. The User must enable CGES qualified personnel or its authorized persons to access plants and devices of the transmission system and auxiliary equipment owned by the User and to the test results and technical and operating characteristics of the plant and equipment of the User, in order to inspect compliance of the operation and characteristics of the User's plants and equipment with this Contract.
14. CGES must enable User’s personnel access to plants and devices in its ownership, under the same conditions as laid down in paragraphs 8 and 9 herein.

**Connection points and ownership of plant elements**

**Article 3**

1. Connection points of the User to the transmission system are the following:
2. *[Insert: Connection point, belonging connected power in MW, connection voltage level in kV]*.
3. CGES is the owner at the connection location of the entire plant and equipment except the part stated in paragraph herein.
4. The User is the owner at the connection location of the following:
5. *[Insert: Equipment owned by the User].*
6. The User is allowed a short-term system load with power higher than the connected power determined in paragraph 1 herein, and maximum up to the amount of total available power on the connection point, determined by CGES once a year for all connection points to the transmission system, in accordance with the Rules.

**Supply interruptions**

**Article 4**

1. CGES is entitled, without being responsible for it, to interrupt power supply of User’s facilities from the transmission network:
2. in cases envisaged by the Law and Code;
3. by order or instruction of a competent authority;
4. in the event of any unauthorized change of technical parameters in relation to those required in order to perform the connection;
5. in the event of termination or expiry of this Contract.
6. CGES is entitled, without being responsible for it, to temporarily interrupt power supply of the User’s facilities from the transmission network:
7. in the event of revocation of license to the User;
8. in the event of any unauthorized changes of technical parameters in relation required in order to perform the connection, in case that these changes endanger the security and quality of supply to consumers;
9. if the User fails to perform its obligations relating to the protective relay system set out in the Article 5 herein;
10. if the User violates the terms of this Contract, which could have a negative impact on the reliability and/or safety of transmission system functioning;
11. if the User does not grant access to CGES in order to perform reading and control of the commercial metering devices.
12. CGES is entitled, without being responsible for it, to temporarily disconnect facilities and/or equipment of the User at any time, without prior written notification, in the following circumstances:
13. prevention of imminent danger to the health and safety of people and equipment;
14. technical failures in the transmission network or technical failures of the User’s facilities that threaten reliable operation of the transmission system;
15. failure to obey CGES orders by the User’s operating staff;
16. other circumstances beyond CGES control, which are not the result of any deliberate action or violation of this contract, not subject to planning and
17. force majeure.
18. In cases from paragraphs 1, 2 and 3 herein, the User is not entitled to an indemnification from CGES based on costs or eventual damage, related to or arisen from the disconnection.
19. CGES shall notify the User of the disconnections referred to in paragraphs 1 and 2 herein within a reasonable deadline, and the latest immediately prior the disconnection, and of disconnection under paragraph 3 herein immediately after disconnection, or before the disconnection if possible.
20. After eliminating reasons that caused disconnection of the User, CGES shall enable reconnection of User’s facility within the shortest time possible.
21. The User is entitled to disconnect a part of the facility or facility of the User from the network in order to prevent imminent danger to health and safety of people and devices with the obligation to inform CGES thereof within reasonable deadline.

**Relay protection system**

**Article 5**

1. The User is obliged to accept the proposal of type and size of protection system devices submitted by CGES.
2. Parties shall agree on coordinating and calibrating protection protections to ensure a reliable and selective disconnection of a part of the transmission network or of the User's plant.
3. The User is obliged to notify CGES of all potentially necessary changes in the protection system, and the same can be made ​​only with the approval of CGES and with the presence of CGES representative, which finally approves the overall coordination of calibrating protections of CGES and the User.
4. On the current and voltage protection circuits on a transmission network connection point, the User is not allowed to perform works or replacements without the presence and/or consent of CGES representative.

**Electricity metering**

**Article 6**

1. Electricity deliver/withdrawal points are/is at the delimitation line of fixed assets of CGES and the User.
2. Metering points of delivered electricity of CGES and the User are the following:
3. *[Insert: billing metering points for each connection point]*.
4. Metering point components are instrument transformers, meters for measuring active and reactive energy, telecommunication equipment and devices for storing data.

On the billing metering point, instrument transformers are in the ownership of *[Choose: the User or CGES]*. Meters, communication equipment and devices for storing data are in the ownership of CGES.

1. Testing protocols for voltage transformers (VT), current transformers (CT) and meters, at any time and in all cases must be available to the Parties.
2. During the period of Contract implementation, CGES shall maintain, modernize, or change metering system components. Replacement of metering components belonging to CGES might cause necessary replacements of metering components belonging to the User. In such case, the User carries out replacement in accordance with technical characteristics set by CGES.
3. CGES shall notify the User of the planned date of replacement and commissioning of new components of the metering system. Upon receipt of notification, the Parties shall prepare the schedule of works on the installation of new devices. The Parties shall use the existing metering devices up to real commissioning date of new devices.
4. The Parties have the right to access, at any time necessary, to the places of the installed component of the metering system of the other Party, provided that it has previously delivered to the other Party a written notice thereof, with a receipt confirmation. The request shall clearly state reasons for the access, time needed for the completion of works, as well as the list of personnel to be carrying out those works.
5. The Parties shall take all necessary measures in order that persons authorized by the User, during the next 24 hours, upon receipt of notice, could access to metering devices and effectively use operating permit.
6. The owner shall carry out control of the meters complying with the appropriate standards. The other Party may request for a special testing of the meters. Control includes compatibility of meter accuracy class as defined in metering device classification. Special control is carried out upon providing detailed justification for the request of the other Party. Costs of control will be borne by the other Party providing that meters comply with proper accuracy class; otherwise, they shall be borne by the owner.
7. If the metering systems are unavailable or faulty, the billing shall be performed in manner determined by the Rules.

**Communication systems**

**Article 7**

1. The Parties are required to have a reliable communication system to ensure continuous exchange of data and information, i.e. monitoring and control over the electric power system.
2. CGES shall propose and approve communication systems. The User is not allowed to change technical characteristics of the communication system without prior approval of CGES.
3. The Parties are obliged to notify each other of the intention to change characteristics of their communication equipment, and of any noticed change in equipment

**Schedule of responsibilities on the connection location**

**Article 8**

1. The Parties shall bear responsibility for the construction, commissioning, control, management and maintenance of facilities, each for its part of fixed assets.
2. The User shall submit to CGES at its request all information necessary for the preparation of Schedule of responsibilities on the connection location. (Appendix 3)
3. CGES shall draft the Schedule referred to in paragraph 2 herein that following its harmonization with the User constitutes an integral part of this Contract.
4. If t there has been a change in data from the Schedule of responsibilities, the User shall timely notify CGES thereof, so it can update the Schedule accordingly.
5. CGES will constantly keep updated the Schedule of responsibilities on connection locations (Appendix 3) and apply it in coordination with the User.

**Rights and obligations relating to the quality of electricity**

**Article 9**

1. CGES and the User must comply with the technical characteristics and working conditions provided in the Rules. Deviations from the limits specified in the Rules are allowed exclusively if listed in the following paragraph herein.
2. All the facilities and devices of the User connected to the transmission system, as well as the transmission system, must have the technical capacity to withstand the voltage impulse form (flicker) and distortion in terms of harmonic content and phase disorders within the limits defined in the Rules.
3. Short-circuit current at the connection points, as defined in Article 3 herein, has a value lower than *[Insert: allowed short-circuit current]* kA.
4. Nominal power system frequency under normal conditions is 50.00 Hz, and the tolerance is ± 0.2 Hz. Exceptionally, in the case of disturbances in the power system, the frequency of the electric power system can have values outside the indicated range in normal conditions.
5. In normal power conditions, CGES is obligated to ensure that the voltage deviation at all connection points to the transmission network does not exceed:
6. *[Insert: for each voltage level, allowed deviation in percentage and thresholds in kV]*.
7. Exceptionally, in case of disturbances in the power system, i.e. major failures of the generation and transmission facilities caused by force majeure, short-term wider voltage deviations are allowed from deviations specified in the preceding paragraph:
8. *[Insert: for each voltage level, allowed deviation in percentage and thresholds in kV]*.

1. Content of higher harmonics in the connection point must not exceed
   1. *[Insert: for each voltage level, percentage of total harmonic distortions and maximum percentage of individual distortion by harmonic]*.
2. The User’s exchange of reactive power with the transmission system must be technically adjusted to meet set-points by CGES, when they are in compliance with technical and exploitation characteristics of the facility from Appendix 5 herein.

**Facility Operation**

**Article 10**

1. All manipulations on connection locations shall be performed by the operating staff of *[Select: the User or CGES]* *[Select: exception]*
2. Manipulations shall be performed upon CGES orders, in accordance with the Rules and Agreement on Facility Control (Appendix 2) that constitutes an integral part of this Contract.
3. The Facility Management Agreement defines rules on operation on the connection location, with the aim of providing reliable and safe operation of transmission system and ensuring maximum use of apparatuses and devices belonging to transmission system and the User’s system.
4. Notwithstanding provisions of the Facility Management Agreement on the connection location, CGES has the right to, at any time depending on the operational conditions of transmission network, give order for changes of the announced operation regime and connection status of the elements of the User.

**Maintenance and implementation of workplace safety measures**

**Article 11**

1. Each Party, for the apparatuses and devices that are under their ownership, shall perform maintenance of the apparatuses and devices in line with standards and instructions of the manufacturer, except for that part regulated by the separate Maintenance Agreement (if any).
2. The User shall allow the technical staff of CGES to access the apparatuses and devices owned by CGES, namely:
3. for regular maintenance works 24 hours after receipt of notice from CGES,
4. for intervention works no later than 2 hours after receipt of notice from CGES.
5. CGES shall allow the User’s staff to access apparatuses and devices which are under their ownership, under the same conditions as laid down in paragraph 2 herein.
6. When the User enters and performs works on its part of the facility, which is on the location under the ownership of CGES, the User shall work and act in accordance with the Workplace Safety Rules set forth by CGES
7. When CGES enters and performs works on its part of the facility, which is on the location under the ownership of the User, CGES shall work and act in accordance with the Workplace Safety Rules set forth by the User,
8. The Parties shall define all details relating to the compliance with the workplace safety measures on the connection point in the Schedule of responsibilities on the connection location (Appendix 3).
9. CGES is entitled to control at any time the status, testing results and report on the maintenance of facility and devices of the User on the connection location, in order to check if maintenance is performed in the prescribed way.
10. The User is entitled to control at any time the testing results and report on the maintenance of the facilities and devices owned by CGES and which are on the connection location, in order to check if maintenance is performed in the prescribed way.

**Communication and information exchange**

**Article 12**

1. The Parties agree to consider information mentioned in this Contract confidential and not to reveal it to any third party except for their legal and financial counsellors, auditors, correspondent bank, state or supervisory body which is responsible for the Party or if it may be requested according to law or some other regulations.
2. Each Party shall before revealing confidential information send a written request for consent to other Party.
3. The Parties agree to make all notices referring to this Agreement in a written form, via registered letter with a confirmation of the receipt, personal delivery with a delivery confirmation (signature on the receipt), fax or electronic mail with a confirmation of the receipt.
4. Information referred to in paragraph 3 herein is effective:
5. on a day written on the confirmation of the personal delivery, or on the first working day after delivery date, if this date is a non-working day;
6. on a day of receipt of the registered letter with the receipt confirmation;
7. on a day of the confirmation of sending if it is through fax, if this fax is sent before 15 hours of a working day, otherwise, on the first working day following the sending day;
8. on a day of receipt of electronic mail, if it is sent before 15 hours of a working day, otherwise, on the first working day following the receipt day.
9. The Parties shall define exchange of all necessary information in the course of the validity of this Contract, related to a specific connection, in the Protocol for Exchange of Information, Data and Reports (Appendix 4), which is an integral part of this Contract.
10. Any information affecting the operation, readiness to operate, special circumstances and remedial maintenance of devices mentioned under Article 11 herein shall be exchanged between responsible representatives of the Parties in writing at the address, internet site or telefax, in accordance with paragraph 9 herein.
11. In case of issuance of instructions for work and notices, confirmation of receipt thereof and notices on actual operational conditions, a mutual communication can be done also by phone, where all instructions and notices must be stated in a dispatch book and recording of all telephone conversations ensured.
12. Responsible representatives of the Parties or their authorized persons shall all the time be available at the addresses or telephone numbers specified under Article 12 item 9 of this Contract.
13. The authorized persons in charge of managing devices and switch manipulation are given in Appendix 3: Schedule of responsibilities on the connection locations.

**Connection charge or increase of connected power**

**Article 13**

* + - 1. In case the User submits a request for connection of a new energy facility or increase of connected power, the amount of charge for connection or increase of connected power shall be determined in accordance with the regulation determining the amount of charge for connection to the transmission network.
      2. The User is entitled to require reduction of connected power, and the Operator is obliged to propose annexes to the Contract by which this issue is regulated in accordance with the User’s request within 7 days of the day of submission of request.

**Force majeure**

**Article 14**

1. The Parties shall be relieved of responsibility to fulfil obligations under this Contract during the force majeure.
2. In terms of this Contract, under force majeure are implied natural events having characteristics of natural disasters (floods, earthquakes, fires, atmospheric discharges, winds, salt deposits, ice and snow that exceed projected values of parameters determined by technical standards for a certain facility or equipment of the competent operator etc.), which could not be predicted, prevented, avoided or eliminated by taking measures applied in order to maintain a safe and reliable operation of the electric power system, and which are determined based on report of a competent state authority, as well as in the event of state of emergency or war activities and measures introduced based on decision of competent state authorities.
3. A Party referring to the effects of force majeure shall send a written notice to the other Party within three working days, stating character and commencement of the effect of force majeure. A notice of termination of the effect of force majeure shall be performed in the same manner.
4. A Party shall not be responsible for omissions in fulfilment of any of its contractual obligations, if the nonfulfillment is caused by the force majeure effect, during the course of event and one reasonable period after the end of effect necessary for the Party to continue with the fulfilment of contractual obligations.
5. A Party that fails to notify the other Party within the period under item 14.3 herein shall not have the right to refer to force majeure as the reason for nonfulfillment of its contractual obligations.

**Insurance and indemnification**

**Article 15**

1. The Parties shall apply their own insurance policies during implementation of this Contract.
2. At the request of one Party, the other Party is obliged to submit it insurance policies from paragraph 1 herein.
3. Manner of indemnification based on inadequate electricity transmission service is regulated in the Rules and it is subject of the contract on transmission system use.

**Dispute resolution**

**Article 16**

1. The Parties shall endeavour to solve amicably any disputes arising out of interpretation or implementation of this Contract.
2. To this end, the Party that initiates negotiations shall submit registered letter with a confirmation of receipt to the other Party, stating the following:
3. identification references to the contract (name and date of signature);
4. subject matter of dispute and brief description of actual status;
5. date and place of meeting for the purpose of reaching an amicable agreement.
6. If it is impossible to reach an agreement within 30 days, or within any other time agreed between the Parties, the Parties shall accept the jurisdiction of the Commercial Court of Montenegro.

**Termination of the Contract**

**Article 17**

1. Each Party may terminate this Contract in caste the other Party fails to comply with contractual obligations.

CGES may unilaterally terminate the Contract in case of endangering the system operation security and security of supply of other users, due to operation of the User contrary to this Code and this Contract.

The Party that initiates a procedure is obliged to forward a notice of intention to terminate to the other Party through a registered letter with the receipt confirmation.

1. Termination shall become effective on the first following working day upon the expiry of 60 days from the day of receipt of the notice of intention to terminate, if the Party unfulfilling its contractual obligations fails to respond or start to fulfil its obligations or prove that impossibility of such nonfulfillment resulted from the effects of force majeure.
2. The deadline referred to under item 17.2 herein may be shortened, especially if the safety of people and/or assets and/or power supply security is endangered due to the non-fulfilment of contractual obligations. In this case, the deadline for contract termination shall be specified in the notice, which shall be sent by fax and confirmed with the registered letter with the receipt confirmation.
3. In the event of Contract termination due to the blame of one Party, the other Party is entitled to damage compensation, which shall be determined by the Parties by mutual consent.
4. In the event of Contract termination, the User shall be disconnected from the transmission network starting from the day of entry into force of Contract termination.

**Amendments to the Contract**

**Article 18**

1. If in the course of the validity of this Contract any changes appear in legal or other regulations based on which this Contract is made or which may affect its implementation, the Parties agree that amendments to this Contract, in order to comply with new regulations, shall be performed with an Appendix to the Contract.
2. If any provision of this Contract becomes invalid, it shall not apply, but with obligation of amending those provisions which are affected by that provision. In the case referred to in paragraph 2 herein, the Parties shall, in the form of an Annex to the Contract, regulate the matters that were subject of these provisions in accordance with the Law.
3. Any amendment to the Contract shall be implemented through an Annex to the Contract, which is made in six identical and original copies out of which each Party shall retain three copies.

**Appendixes**

**Article 19**

1. An Integral part of this Contract are the following appendixes:

* Appendix 1 Single-line diagram of the facility
* Appendix 2 Agreement on Energy Facility Control
* Appendix 3 Schedule of responsibilities on the connection location
* Appendix 4 Protocol on Exchange of Information, Data and Reports
* Appendix 5 Technical and operating characteristics of the facility

**Transitional and final provisions**

**Article 20**

1. Neither Party shall transfer any of its rights or obligations from this Contract to a third party without previous written consent by other Party.
2. The Contract is made in six identical and original copies out of which each Party shall retain three copies.
3. This Contract shall enter into force on the day of signing.

In Podgorica, *[Insert: date]* (year),

|  |  |  |
| --- | --- | --- |
| **CGES**  Executive Director  *[Insert: name and surname]* |  | **User**  Executive Director  *[Insert: name and surname]* |

***Appendix 1: SINGLE-LINE DIAGRAM OF THE FACILITY***

***Appendix 2: AGREEMENT OF ENERGY FACILITY CONTROL***

***Appendix 3: SCHEDULE OF RESPONSIBILITIES ON THE CONNECTION LOCATION***

***Appendix 4: PROTOCOL ON EXCHANGE OF INFORMATION, DATA AND REPORTS***

***Appendix 5: TECHNICAL AND OPERATING CHARACTERISTICS OF THE FACILITY***

**Appendix 4.2: Contract on use of transmission system**

**CONTRACT ON USE OF TRANSMISSION SYSTEM FOR NEEDS OF [CHOOSE: WITHDRAWAL OR GENERATION][[1]](#footnote-1) OF ELECTRICITY**

**for the period from [insert: commencement date] to [insert: completion date]**

(hereinafter referred to as: the Contract)

*between*

**Crnogorski elektroprenosni sistem AD, Podgorica**

Bulevar Svetog Petra Cetinjskog 18

81000 Podgorica

TIN: 02751372

In capacity of Transmission System Operator

Represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter to as: **Service Provider**),

and

***[Insert: Name of the user]***

[*Insert*: User address]

*[Insert: ZIP code and city]*

TIN: *[Insert: TIN]*

represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter referred to as **Service User**),

or as a rule, hereinafter individually referred to as: Party or collectively referred to as: Parties

**General provisions**

**Article 1**

* 1. Contract on use of transmission system for needs of withdrawal of electricity (hereinafter referred to as: the Contract) stipulates the manner and conditions of transmission system use for transmission of electricity for supply of consumers in Montenegro.
  2. Access to cross-border transmission capacities is stipulated by a separate contract.

**Article 2**

* 1. Under this Contract, the Service Provider of transmission system use and Service User shall stipulate issues of electricity transmission *for needs of supply[[2]](#footnote-2)* of [Insert: for whose needs], and particularly:
* manner of providing transmission system use,
* duration of service, maximum power and energy,
* *billing metering points[[3]](#footnote-3)****,***
* price, calculation and invoicing procedure for the service of transmission system use,
* financial guarantees to be provided by the Service User,
* indemnification of the Service User in the event of failing to perform the service,
* cases of service provision termination,
* cases in which service use may be cancelled, and
* period of application and entry into force of the Contract.

**Manner of providing service of transmission system use**

**Article 3**

* 1. The Service Provider shall ensure transmission system use for needs of the User, in accordance with conditions laid down in the Grid Code – Rules of Electricity Transmission System Operation (hereinafter referred to as: the Rules).

**Article 4**

* 1. The Service Provider undertakes, in order to create conditions from Article 3 herein, to provide to the Service User the following:

1. capacity of exchange on withdrawal/delivery points in accordance with the agreed power from Article 5 paragraph 1 herein;
2. availability and quality parameters of the transmitted electricity in accordance with the Rules for contracted electricity volumes from Article 5 paragraph 2 herein;
3. coverage of transmission system losses incurred due to electricity transmission for needs of the Service User;
4. balancing of deviation of real consumption power of the Service User compared to the reported consumption power.
   1. Compensation of balancing costs from paragraph 1 item 4 herein is stipulated by the Contract on balance responsibility.

**Duration and type of service**

**Article 5**

* 1. The Service User may use the transmission system for electricity transmission in the period from [Insert: commencement date] to [Insert: completion date].
  2. The contracted consumption power[[4]](#footnote-4) of the Service User on delivery/withdrawal point (Pug mop) is equal to the connected power determined by the contracts on connection and amounts to:

|  |  |
| --- | --- |
| Delivery/withdrawal point | Connected power (MW) |
| *Insert connection point* | *Insert connected power* |
|  |  |
|  |  |
|  |  |

* 1. The minimum contracted power of basic calculation use amounts to 80% of connected powers from paragraph 2 herein.
  2. The maximum contracted power of basic calculation use amounts to 110% of connected powers from paragraph 2 herein.
  3. Short-terms excesses of power from paragraph 2 herein are allowed up to the amount of total available power at the connection point, given in Appendix 3[[5]](#footnote-5).
  4. Total approved transmitted electricity for needs of the Service User in the period from paragraph 1 herein amounts to [Insert: approved energy] MWh.
  5. In case of change of connected power from paragraph 2, the User shall submit a notice on the change not later than 15 days before the commencement of the month to which the change refers.

**Billing metering points[[6]](#footnote-6)**

**Article 6**

* 1. Billing metering points with identification marks of meters are provided in Appendix 1 herein.
  2. Data read on billing metering points from paragraph 1 herein shall be used as elements for calculation of charge for the service of transmission system use.
  3. In case of unavailability or inaccuracy of metering system on the billing metering point from paragraph 1 herein, calculation of charge shall be performed in manner laid down by the Rules[[7]](#footnote-7).

**The fee for use of the transmission system**

**Article 7**

* + - 1. The Service Provider shall calculate the fee for use of the transmission system to the Service User on the basis of:

1. prices for use of transmission system;
2. prices for the losses in the transmission system;
3. prices for overly withdrawn energy.[[8]](#footnote-8)
   * + 1. Prices from paragraph 1 herein shall be set in accordance with relevant acts of the Energy Regulatory Agency by which are set prices and fees for use of electricity transmission system and prices of ancillary services and balancing services.

**Billing, invoicing and payment**

**Article 8**

* + - 1. The fee N for service of using the transmission system shall be calculated by applying the following formula:

Where:

Ck - Price for using the transmission system referred to in Article 7 paragraph 3 of this Contract,

PUTP - Connection power at a connection point "tp" under Article 5, paragraph 2 of this Contract,

PoTP - positive deviation of the maximum fifteen- minute load recorded at the connection point in the accounting period from minimum contracted power of basic calculation use in accordance with Article 5, paragraph 3 of this Contract PoTP = 0 for negative deviation),

n - number of connection points,

PPtp - positive deviation of the maximum fifteen-minute load recorded at the connection point in the accounting period of the maximum contracted power of basic calculation use in accordance with Article 5, paragraph 4 of this Contract (PPTP = 0 for negative deviation),

CKG – Price of losses under Article 7 paragraph 4 of this Contract,

Tce - Active energy measurement in the accounting period at the connection point "tp",

CR - Price for overly withdrawn reactive energy under Article 7 paragraph 45 of this Contract,

QTP - Overly withdrawn reactive energy measured in the accounting period at the connection point "tp" (power factor of less than 0.95)[[9]](#footnote-9).

* 1. Billing period begins on the first day in a month at 0000, and it ends on the last day in a month at 2400 hours.

**Article 9**

* 1. The Service Provider shall submit to the Service User a report on the implementation delivery of electricity ad energy (active and reactive), based on data from Article 6 paragraph 2 herein.
  2. The Service User is entitled to appoint a representative that shall attend the taking over of metering data and drafting of report from paragraph 1 herein.[[10]](#footnote-10)
  3. The Parties shall harmonize the report under the paragraph (1) of this Article by the third working day in a month for the previous month.
     + 1. In case they do not harmonize the report, for needs of implementation of this Contract, the Parties shall use the monthly report prepared by the Service Provider.

**Article 10**

* + - 1. The Service Provider shall calculate to the Service User the fee for the service of use of transmission system in manner determined by the Methodology for setting regulatory allowed revenue and prices for use of electricity transmission system.
      2. In the event of interruption of supply to the Service User, the period of recovery of consumption for the period of 4 hours is excluded from the calculation of peak load.[[11]](#footnote-11)

**Article 11**

* 1. The Service Provider shall calculate to the Service User a charge for overly withdrawn reactive energy in the manner determined by the Methodology for setting prices, deadlines and conditions for providing ancillary and balancing service of electricity transmission system[[12]](#footnote-12).

**Article 12**

* 1. The Service Provider shall invoice to the Service User the charge from Article 10 and 11[[13]](#footnote-13) herein in the billing period after expiration of the monthly billing period, up to the 10th day of the month for the previous month.
  2. The Service User shall pay to the Service Provider the invoiced amount from paragraph 1 within eight days from the day of submission of invoice, according to the instructions from the invoice.
  3. In the event of delay in payment of charges from paragraph 1 herein, the Service User shall pay to the Service Provider a default interest pursuant to the Law.

**Financial guarantees**

**Article 13**

* 1. According to the Law on Obligations and with the aim of securing financial obligations arising from this Contract, the Service user shall be required to constitute and submit in favour of the Service Provider an acceptable security instrument.
  2. Acceptable payment security instruments are: bank guarantee or a specific purpose (guarantee) deposit.

**Bank guarantee**

**Article 14**

* 1. The Service User shall submit a bank guarantee in favour of the Service Provider, payable on first demand and without a right to objection issued by a bank having a solvency ratio in the latest available audit report in accordance with the regulations set forth by the Central Bank of Montenegro.
  2. The Service Provider should determine the content of the bank guarantee and the same has been submitted in Appendix 3.

1. The value of the first bank guarantee, with validity period of six months from the Contract effective date shall be determined in the amount equal to two-month fee for use of the transmission system, as estimated by the Service Provider, which the Service User would be required to pay in the event of using the system in accordance with the provisions of this Contract, amounting \_[insert: the value of the guarantee]\_.
   1. The Parties hereby agree, upon expiry of the fifth month of warranty period to revise the submitted guarantee and to establish the value of the new guarantee in the amount of double average monthly invoices issued in accordance with this Contract in the past five months.
   2. The Service User is obliged to renew the bank guarantee, whereby the same shall come into force until the date of expiration of the previous bank guarantee and must have validity period of at least six months.
   3. The Service User shall cover with bank guarantees a period of two months after the contract expiration date, until \_[insert: the date]\_.
   4. If due to the outstanding financial obligations of the Service User, the Service Provider activates bank guarantee, the Service User shall submit within five days a new bank guarantee in favour of the Service Provider with the same conditions as the previous one and which shall be effective immediately.
   5. If the Service User fails to submit a bank guarantee pursuant to this Article, the Service Provider reserves the right to terminate this Contract, with no forewarning and without liability for any damage that may occur to the Service User.

**Deposit**

**Article 15**

* 1. The Service User shall deposit in favour of the Service Provider dedicated (guarantee) funds on a special purpose account with a bank that has a solvency ratio in the latest available audit report in accordance with the regulations set forth by the Central Bank of Montenegro.
  2. The first dedicated (guarantee) deposit, with validity period of six months from the Contract effective date shall be determined in the amount equal to no less than three-month fee for use of the transmission system, as estimated by the Service Provider, which the Service User would be required to pay in the event of using the system in accordance with the provisions of this Contract, amounting \_[insert: the value of the deposit]\_.
  3. The Service User, the Service Provider and the bank shall execute a tripartite agreement for administering a special purposes account referred to in paragraph 1 of Article herein.
  4. The Service Provider and the Service User agree that any proceeds (i.e. interests) and/or costs arising from the ownership of the special purpose account, referred to in paragraph 1 of Article herein, shall be in favour of and/or borne by the Service User.
  5. In case of outstanding liabilities by the Service User, the Service Provider has the right on first written demand made to the bank, to collect the amounts claimed from the User from the special purpose account.
  6. In case of the collection referred to in paragraph 5 herein, the Service User shall deposit within five days funds on the special purpose account in the manner defined herein.
  7. Dedicated (guarantee) deposit shall be deposited for not less than six-month period and must be determined in the amount of triple average monthly invoices issued in the past five months in accordance with this Contract.
  8. The Service User shall ensure that the funds are deposited into a special purpose account also for a two-month period following the Contract expiration date, until \_[insert: the date]\_.
  9. The Service User shall restore the funds deposited into a special purpose account in the amount calculated in accordance with paragraph 7 herein prior to the expiration of the guarantee period of a dedicated (guarantee) deposit.
  10. If the Service User fails to deposit funds to the dedicated (guarantee) account pursuant to this Article, the Service Provider reserves the right to terminate this Contract without prior notice and with no liability for any damage that may occur to the Service User.

**Indemnification of the Service User**

**Article 16**

* 1. Setting and payment of eventual financial compensations based on nonfulfillment of minimum quality of electricity supply by network operators shall be performed pursuant to the Law and sublegal acts, based on determined responsibility of CGES, with providing evidence that payment of damage towards the distribution system user was performed.

**Cases of interruption of service provision**

**Article 17**

1. The Service Provider is entitled to terminate provision of service of transmission network use without being responsible for it in the following events:

- in the events envisaged by the Energy Law,

- when the Service User does not fulfil its obligations determined herein.

**Force majeure**

**Article 18**

* 1. The Parties shall be relieved of the responsibility to fulfil obligations based on this Contract during the force majeure.
  2. Force majeure, as defined by this Contract, means any unforeseen natural events that have a character of natural disasters (floods, earthquakes, fire, atmosphere discharges, strong winds, excessive ice, salt deposits etc.) as well as failures of devices and installations that did not happen as a result of the fault of the Parties.
  3. A Party that refers to the effects of force majeure shall immediately submit, and no later than three days, a written notification to the other Party, indicating the character and commencement of the effects of force majeure.
  4. The same notification procedure shall apply in case of termination of the effects of force majeure.
  5. A Party that refers to the effect of force majeure shall prove the same upon request of the other Party, but the procedure of proving cannot in any case disturb further implementation of this Contract.

**Releasing a User of liability**

**Article 19**

* 1. A Party shall not be liable for any omission in the fulfilment of any of its contractual obligations if a failure to fulfil obligations was caused by the effects of force majeure, during the force majeure and within reasonable period after termination of such effects that is needed for the Party to continue fulfilling its contractual obligations, i.e. to remove consequences to the effect of force majeure.

**Delayed notification of the occurrence of force majeure**

**Article 20**

* 1. A Party that fails to notify the other Contracting Party within the deadline referred to under Article 17 paragraph 3 herein, shall not be entitled to refer to the effects of force majeure as a reason for failure to carry out its contractual obligations

**Amendments to the Contract**

**Article 21**

* 1. If in the course of the validity of this Contract any changes appear in legal or other regulations based on which this Contract is made, the Parties agree to adjust this Contract with changed legal, i.e. secondary and other regulations via annex.
  2. If any provision of this Contract or its amendment is or becomes invalid, they shall be deemed as special provisions and shall not affect the validity of other provisions.
  3. In the case referred to under paragraph 2 herein, the Parties shall determine by mutual consent one or several provisions having the same or similar effect as a replacement for the invalid provisions, taking into consideration the purposes of this Contract

Any amendments to the Contract shall be implemented through an Annex to the Contract, which is made in the same number of identical and original copies as basic contract.

**Dispute resolution**

**Article 22**

* 1. The Parties shall solve amicably any eventual dispute based on this Contract.
  2. If it is impossible to solve amicably the occurred dispute, the Parties shall accept the jurisdiction of the Commercial Court of Montenegro.

**Final provisions**

**Article 23**

* + - 1. Integral part of this Contract are the following appendixes:

Appendix 1: Billing metering points[[14]](#footnote-14)

Appendix 2: Amounts of available powers at connection points

Appendix 3: text of banking guarantee

**Article 24**

* 1. This Contract is signed for a definite period of time, and it shall be applied from \_[Insert: commencement]\_ to \_[Insert: end]\_ of the year.

**Article 25**

* 1. The Contract is made in 4 (four) identical copies of which the Service User shall keep 2 (two) copies, and the Service Provider 2 (two copies).

In Podgorica, on *[Insert: date]*

|  |  |  |
| --- | --- | --- |
| **Service Provider**  Executive Director  *[Insert: Name and surname]* |  | **Service User**  Executive Director  *[Insert: Name and surname]* |

***Appendix 1: Billing metering points***

***Appendix 2: Amounts of available powers at connection points***

***Appendix 3: Text of banking guarantee***

**BANK GUARANTEE**

Crnogorski elektroprenosni sistem AD

Bul. Sv. Petra Cetinjskog, no. 18

20000 Podgorica

Montenegro

…, dated …

Guarantee (reference. no. …)

**PROVIDED THAT**

* The Company …............................ with registered office in ..................…….., tax code/VAT identification number ....................…, paid-in capital EUR .......................…, registered within ...................….…, (hereinafter referred to as: the Service User) stipulates with Crnogorski elektroprenosni sistem AD (hereinafter referred to as: the Service Provider) the Contract on use of transmission system pursuant to Article.............................;
* The Service User shall provide in favour of the Service Provide an appropriate bank guarantee pursuant to Article 14 of the Contract on use of transmission system;
* The Service User submitted a formal request for the abovementioned guarantee, in the maximum amount of EUR ………...........,
* The Bank …............…….. is in possession, directly or through a subsidiary, of a solvency ratio in line with the rules established by the Central Bank of Montenegro.

**IN VIEW OF THE ABOVE**

The Bank ….........………., with registered office in … tax code ……….., VAT identification number ……………, represented by its legal representatives……… (hereinafter referred to as: the Bank), shall provide this guarantee in favour of the Service Provider according to terms and conditions indicated below and anyhow in accordance with provisions contained in the Contract on use of transmission system.

1. The guarantee is valid and effective from …………… to ……….. The requests for execution can be submitted within two months as of the indicated validity period, and after the expiry of such period, the guarantee will be considered devoid of any effectiveness, although not returned.
2. The Bank, irrevocably and unconditionally, shall guarantee the fulfilment of obligations assumes by the Company………… towards the Service Provider in the implementation of the Contract on use of transmission system, during the validity and effectiveness period of this guarantee.
3. As a result of what is envisaged in item 2 herein, the Bank commits to pay, irrevocably and without delay, any amount without proceeding to any examination of reasons presented in favour of the related payment request, and regardless of any exception, challenge or objection which the Company ……………. raised in this regard against a simple request written by the Service Provided, up to the maximum amount of EUR ………………,00 (………………../00).
4. Following the request from item 3 herein to be sent via registered mail with acknowledgment of receipt, anticipated by sending an email to the following address ………………., the Bank will pay, within ten days of the date of receipt of the request, with value date on the same day, through a bank transfer the amount indicated in EUR in the payment request. If the payment date is a non-working day, the due date shall be extended to the first following working day.
5. It will be possible to enforce this guarantee also partially, remaining in any case valid and effective for the residual amount.
6. The Bank shall explicitly waive any protection, exception, right to compensation, complaint or request towards the Service Provider in relation to obligations assumed by this guarantee including, but not limited to, any protection, compensation, complaint or request that the Company ………….……. could file on whatever basis against the Service Provider.
7. Any communication related to this guarantee will have to be carried out through registered mail with acknowledgment of receipt, anticipated by sending an email to the following email address:

for the Service Provider: [office@cges.me](mailto:office@cges.me)

for the bank: ….. (to insert email address).

1. (\*) will be competent for any dispute arising from this act.

**Appendix 4.3: Contract on purchase of ancillary services and balancing energy**

**CONTRACT ON PURCHASE OF ANCILLARY SERVICES AND BALANCING ENERGY**

(hereinafter referred to as: the Contract)

*between*

**Crnogorskog elektroprenosnog sistema AD, Podgorica**

Bulevar Svetog Petra Cetinjskog 18

81000 Podgorica

TIN: 02751372

In capacity of Transmission System Operator

Represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter referred to as: **CGES**),

and

***[Insert: Name of the Service Provider ]***

[*Insert*: Address]

*[Insert: ZIP code and city]*

TIN: *[Insert: TIN]*

In capacity of *[Insert type of service ]*

represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter referred to as **Service Provider**),

or as a rule, hereinafter individually referred to as: Party or collectively referred to as: Parties

**I GENERAL PROVISIONS**

Article 1

1. The Contract shall regulate the issues related to the provision of:

* reserve of active power for primary control purposes;
* reserve of active power for secondary control purposes;
* reserve of active power for generating units tertiary control purposes;
* reserve of active power for tertiary control through managing power consumption
* Electricity sale and purchase based on compensation programs
* Generation capacities and reactive power absorption in generating units for voltage control purposes;
* Generation capacities and reactive power absorption in devices owned by the user for voltage control purposes
* Operational readiness of generating units for the restoration of electric power system following a black-out (black start), or island (isolated) operation of one part of the system.

*(From the listed services select those a Contract is related to)*

1. With respect to the provision of ancillary services from the Article 1 hereof, the Parties shall determine:

* The scope of ancillary services including active power, reactive power, active and reactive energy, operational readiness and other energy-related and technical characteristics depending on the type of ancillary service;
* information on the facility from which ancillary service is provided including authorized personnel for cooperation in relation to the provision of ancillary services;
* Fees, accounting method, payments and terms and conditions of payments for ancillary services.

**PRIMARY CONTROL**

Article 2

1. An ancillary service of primary control shall be provided by the following generating units owned by the Service Provider:
2. Energy-related and technical characteristics of generating units as referred in paragraph 1 hereof and the value of frequency corresponding to referent disturbance under paragraph 2 hereof are provided in Annex 2 which is an integral part of the Contract.

Article 3

1. Through the planning of ancillary services, the Service Provider shall ensure continuous provision of ancillary service of primary control, within the framework of operational schedules of its generating capacities, so that the amount of primary reserve capacity for the change of active power in all generators planned to be in operation, shall amount to at least ± ……. MW.
2. The Service Provider shall submit to CGES the list of engagements by 16:00 h day-ahead for the corresponding day. The list of engagements shall include following information:

• Day to which the list of engagements applies;

• List of capacities with the following information:

* Identification code of the capacity;
* Planned output of the generator by hour;
* Capacity available for primary control

Article 4

* + - 1. If the Service Provider is unable to provide a reserve of secondary control referred to in Article 3 of this Contract with a daily schedule, it shall notify, in writing CGES before 12:00 on the day of registration of the daily schedule, stating reasons for it.
      2. If the Service Provider due to unforeseen circumstances (failure to generating units), occurred after the registration of daily schedule, concludes that it is unable to provide secondary reserve under Article 3 of this Contract, it shall promptly notify CGES thereof in writing.

Article 5

Ancillary service of primary control is provided free of charge.

Article 6

* + - 1. The Service Provider shall provide primary control of quality as prescribed in the Rules.
      2. In case it is identified that the amount of available primary reserve does not meet the contracted amount under Article 3 hereof, CGES shall immediately inform the Service Provider thereof, in order to take steps to reach the contracted amount of primary reserve.
      3. CGES reserves the right to install the appropriate equipment in the in facility of the Service Provider, or its own facility, if that allows monitoring the quality of control, in order to verify the adequacy of the response of primary control.

Article 7

CGES shall prepare monthly report on primary control service pursuant to this Contract and submit it to the Service Provider by 7th working day of the current month for the previous month.

**SECONDARY CONTROL**

Article 8

1. The ancillary service of secondary control is provided by the following generating units owned by the Service Provider:

•

•

•

1. Energy-related and technical characteristics of generating units that provide the service of secondary control are provided in Annex 3 hereof, which is an integral part hereof.

Article 9

Through the planning of ancillary services, the Service Provider shall, within the framework of operational schedules of its generating capacities, ensure the possibility to engage the secondary control and the control band as follows:

* For upward control
* From D/M/Y to D/M/Y in the period from hh:mm to hh:mm \_\_ MW
* For downward control
* From D/M/Y to D/M/Y in the period from hh:mm to hh:mm \_\_ MW

Article 10

1. The Service Provider shall submit to CGES the resource engagement list for participation in the secondary control.
2. CGES shall engage resources in real-time for the purposes of secondary control according to the list of engagements submitted by the Service Provider.

Article 11

1. CGES shall establish the form, content and manner for the submission of the resource engagement list as referred in Article 10, paragraph 1 which should contain at least the following information:

* Day to which the list of engagements applies;
* List of capacities with the following information:
* Identification code of the capacity;
* Planned output of the generator by hour;
* Capacity available for primary control
* The resource engagement price (€/MWh).

1. The Service Provider shall submit to CGES the list of engagements by 16:00 h day-ahead for the corresponding day.
2. The Service Provider in case of changes in engagements of power plants within the daily schedule, shall submit the new list of engagements of secondary reserve for that day, as well as the time starting from which the new list of engagements gets operational, at least 15 minutes before it becomes effective.

Article 12

1. If the Service Provider is unable to provide a reserve of secondary control referred to in Article 9 of this Contract with a daily schedule, it shall notify, in writing CGES before 12:00 on the day of registration of the daily schedule, stating reasons for it.
2. If the Service Provider due to unforeseen circumstances (failure of generating units), occurred after the registration of daily schedule, concludes that it is unable to provide secondary reserve under Article 9 of this Contract, it shall promptly notify CGES thereof in writing.

Article 13

1. The Service Provider shall ensure measurement of production power (in real time) of generators involved in secondary control, continuous availability of local equipment for secondary control while CGES will ensure the functioning of telecommunications equipment, as well as transmission lines for transmitting measurements and signals for the secondary control from NDC to generating units performing secondary control.
2. The Service Provider will allow CGES remote control over the operation of generating unit controller involved in the secondary control or group controller, if exists in the plant.

Article 14

1. Delivered electricity in secondary regulation at a specific hour is determined as a difference of registered and planned (base) production of generator in regulation established by the list of engagements separately for both upward and downward control.
2. Registered production of a generator in the secondary control shall be determined based on the registered values of production of generators involved in the control, on SCADA system in the National Dispatch Centre.

Article 15

1. CGES and the Service Provider shall agree, no later than 3 working days after the date of delivery, on a daily amount of electricity delivered and determine the adequacy of supply within the meaning of Article 17 of this Contract.
2. CGES shall prepare a monthly report on the availability and engagement of service of secondary control pursuant to this Contract and submit it to the Service Provider at latest by 7th working day in the current month for the previous month.

Article 16

1. Price for the secondary reserve engagement under Article 11 paragraph 2 hereof is established on the basis of the Methodology for setting prices and conditions for the provision of ancillary and system services and electricity transmission system balancing services (hereinafter referred to as: Methodology), and for upward regulation shall not exceed € --------MW/h .
2. Price for the lease of capacity reserve of secondary control shall be determined on the basis of a valid Decision on setting prices for the provision of ancillary services and balancing services to Crnogorski elektroprenosni system AD Podgorica (hereinafter referred to as: Decision), and amounts to € ------MW/h.

Article 17

1. Secondary control is considered adequate in terms of this Contract for a specific hour, if satisfies quality criteria laid down in Rules for electricity transmission system operation (hereinafter referred to as: Rules) and the Methodology.
2. Secondary control quality factor shall be determined by CGES in accordance with the Methodology.
3. If the value of the quality factor referred to in paragraph 2 of this Article in a month is less than 0.90, CGES is not obliged to pay compensation for the availability of secondary control for the relevant month.

**GENERATING UNIT TERTIARY CONTROL**

Article 18

1. The ancillary service of tertiary control shall be provided by the following generating units owned by the Service Provider.

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•

1. Energy-related and technical characteristics of generating units from the paragraph 1 hereof are provided in Annex 4, which is an integral part hereof.

Article 19

Through the planning of ancillary services, the Service Provider shall, within the framework of operational schedules of its generating units, ensure the possibility to engage tertiary control and the control band as follows:

* + 1. For upward control
* From D/M/Y to D/M/Y in the period from hh:mm to hh:mm \_\_ MW
  + 1. For downward control
* From D/M/Y to D/M/Y in the period from hh:mm to hh:mm \_\_ MW

Article 20

1. The Service Provider shall submit separate lists of engagements for the upward tertiary control (engagements of positive tertiary reserve) and downward control (engagements of negative tertiary reserve).
2. CGES shall establish the form, content and manner for the submission of the list of resource engagements which shall include the following information:

* Direction of tertiary control to which the engagement list applies;
* Day to which the engagement list applies;
* List of capacities with the following information:
* Identification code of the capacity;
* Capacity available for engagement;
* Price for using capacity separately for upward control and downward control (€/MWh)

1. The Service Provider shall submit to CGES the engagement list by 16:00 h day-ahead for the corresponding day.
2. In case of changes in engagements of power plants within the daily schedule, the Service Provider shall submit the new list of engagements of reserve for that day, as well as the time starting from which the new list engagements gets operational, at least 15 minutes before it becomes effective.

Article 21

1. If the Service Provider is unable to ensure tertiary reserve by daily schedule under Article 21 of this Contract, it shall notify CGES thereof in writing before 12:00 on the day of registration of the daily schedule stating reasons for it.
2. If the Service Provider, due to unforeseen circumstances (failure to generating unit), occurred after the registration of daily schedule, concludes that it is unable to provide tertiary reserve under Article 21 of this Contract, it shall promptly notify CGES thereof in writing.

Article 22

CGES shall engage real- time resources for tertiary control purposes by issuing an order to the person in charge of service provision, in form of dispatch, specifying the required diagram of delivery and exact time of the start and end of delivery.

Article 23

The Service Provider shall ensure measurement of production power of generators involved in real time tertiary control while CGES will ensure the functioning of telecommunications equipment, as well as transmission links for transmitting measurements to the NDC from generating units performing secondary control.

Article 24

1. CGES and the Service Provider shall, not later than three working days after the delivery date, agree on daily quantities of mutually delivered electric energy and assess the adequacy of delivery.
2. CGES prepares a monthly report on the provision of services of tertiary control and submits it to the Service Provider, at latest by 7th working day of the current month for the previous month.
3. Monthly report determines the adequacy and availability of delivery for the entire month and the total volumes of mutually delivered energy on the basis of tertiary control.

Article 25

1. Price for availability of tertiary reserve referred to in Article 19, paragraph 1, has been established on the basis of Methodology and Decision and is amounts to € ----------MW per month.
2. Price for availability of tertiary reserve referred to in Article 19, paragraph 2 has been established on the basis of the Methodology and Decision and is amounts to € ----------MW per month.
3. Price for engagement of tertiary control reserve shall be determined on the basis of Methodology and for upward control may not exceed € ----------MWh.

Article 26

1. The adequacy of delivery and availability of service provision of reserving capacity shall be determined in accordance with the Methodology.
2. In case of inadequate and unavailable services, the Service Provider is obliged to pay penalties to CGES in the amount set by the Methodology.

**TERTIARY CONTROL THROUGH MANAGING POWER CONSUMPTION**

Article 27

1. The ancillary service of tertiary control shall be provided by the following consumption units owned by the Service Provider:

•

•

1. Energy-related and technical characteristics of consumption units from the paragraph 1 hereof are provided in Annex 5, which is an integral part hereof.

Article 28

1. Through the planning of ancillary services, the Service Provider shall, within the framework of operational schedules of its consumption units, ensure the possibility to engage tertiary control and the control band for upward control:

From D/M/Y to D/M/Y in the period from hh:mm to hh:mm \_\_ MW

Article 29

1. The Service Provider shall submit to CGES the consumption plan by 16:00 h day-ahead for the corresponding day which includes tertiary reserve availability plan, in hourly resolution.
2. If the Service Provider, due to unforeseen circumstances (failure to consumption unit), concludes that it is unable to provide tertiary reserve under Article 29 of this Contract, it shall promptly notify CGES thereof in writing.

Article 30

1. CGES shall engage real-time resources for tertiary control purposes by issuing an order to the person in charge of service provision, in form of dispatch, specifying the required reduction of power consumption and exact time of the start and end of reduction of power consumption.
2. CGES and balance responsible entity to which balancing group the Service Provider belongs to shall exchange appropriate documents to ensure that transaction arranged by order under paragraph 4 above, is formally registered.
3. The Service Provider will reduce power consumption in the required amount, at the latest within 15 minutes of receiving the order.

Article 31

The Service Provider shall ensure measurement of power consumption of generators involved in real time tertiary control while CGES will ensure the functioning of telecommunications equipment, as well as transmission links for transmitting measurements to the NDC from consumption units performing secondary control.

Article 32

1. CGES and the Service Provider shall, not later than three working days after the delivery date, agree on daily quantities of mutually delivered electric energy and assess the adequacy of delivery.
2. CGES prepares a monthly report on the provision of services of tertiary control and submits it to the Service Provider, at latest by 7th working day of the current month for the previous month.
3. Monthly report determines the adequacy and availability of delivery for the entire month and the total volumes of mutually delivered energy on the basis of tertiary control.

Article 33

1. Price for availability of tertiary reserve referred to in Article 29 has been set on the basis of the Methodology and Decision and is amounts to € ----------MW per month.
2. Price for engagement of tertiary control reserve shall be set on the basis of Methodology and may not exceed € ----------MWh.

Article 34

1. The adequacy of delivery and availability of service provision of reserving capacity shall be determined in accordance with the Methodology.
2. In case of inadequate and unavailable services, the Service Provider is obliged to pay penalties to CGES in the amount set by the Methodology.

**DELIVERY OR TAKE OVER OF ELECTRICITY ON THE BASIS OF COMPENSATION PROGRAMS**

Article 35

The Service Provider shall offer to CGES delivery or take-over of electricity on the basis of implementation of the respective control area compensation programs.

Article 36

1. CGES shall inform the Service Provider in writing on the delivery diagram required (power in hourly resolution, duration of delivery, course of delivery - purchase or sale), at latest by 9:00h, 2 working days before the start of realization.
2. The Service Provider shall inform CGES about the price of energy and the delivery specified in paragraph 1 of this Article, in writing, at latest by 12:00 h 1 day before delivery.
3. The price of energy referred to in paragraph 2 of this Article shall be determined on the basis of the Methodology may not exceed € ----------MWh.

Article 37

CGES shall prepare monthly report on the provision of service of delivery or take-over of electricity based on compensation program and submit it to the Service Provider at latest by the 7th day of the current month for the previous month.

**VOLTAGE CONTROL**

Article 38

1. The ancillary service of voltage control is provided by the following generating units and devices owned by the Service Provider:

•

•

1. Energy-related technical characteristics of generating units and devices from the paragraph 1 hereof are provided in Annex 5, which is an integral part hereof.

Article 39

1. The Service Provider shall ensure in continuous manner the capacities for generation and absorption of reactive energy in all generating units and devices referred to in Article 38, paragraph 1, that are in operation, in accordance with the technical characteristics given in the Annex 6, which is an integral part hereof.
2. CGES shall register the period during which a generating unit and a device were unable to control the voltage within the limits of technical characteristics from Annex 6 and inform the Service Provider in writing within three working days thereof.

Article 40

* + - 1. CGES shall engage real- time resources for tertiary control purposes by issuing an order to the person in charge of service provision, in form of dispatch, specifying the required voltage values or the required generation output or reactive energy absorption.
      2. The Service Provider will allow the inclusion of all of its generating units or devices into the system for automatic voltage control, which is managed by the appropriate module SCADA EMS in the National Dispatching Centre.
      3. The Service Provider will provide local equipment for automatic control, while CGES will ensure the functioning of telecommunications equipment, as well as transmission links for transmitting signals from the NDC from generating units performing automatic voltage control.

Article 41

Voltage control is an ancillary service that service providers provide free of charge.

**PARTICIPATION IN RESTORATION OF ELECTRIC POWER SYSTEM**

Article 42

1. Ancillary service of black-start shall be provided by the following generating units owned by the Service Provider:

•

•

1. Energy-related and technical characteristics of generating units from the paragraph 1 hereof are provided in Annex 6, which is an integral part hereof.

Article 43

The Service Provider shall make sure that at least one of available generating units referred to in Article 42 hereof is ready for black start when needed.

Article 44

1. CGES shall issue the black start order in form of dispatch.
2. The black start is carried out in accordance with the “Procedures for Black-start” provided in Annex 9.

Article 45

1. In case of activation of the service referred to in Article 43 hereof, CGES shall register:

* The time when the black start was activated and the duration of island operation until

the moment of restoration of synchronization with the electric power system;

* Code of generating unit for which black start was carried out;
* Reasons for which the black start was carried out in the generating unit;
* Time when the generating unit was unable to black start within the defined technical characteristics given in the Annex 7 hereof.

1. CGES shall inform the Service Provider about registered data from the paragraph 1 hereof in writing within three working days from the day of data registration.

Article 46

1. At the request of CGES, the Service Provider shall perform a self-launch test for power units.
2. Self-launch test under paragraph 1 hereof consists of:

* Starting the generator with no presence of an external voltage
* Connecting the generator to the busbar system or section with no voltage present
* Energization of one of 110kV transmission lines
* Synchronization of the transmission line with the rest of the network

(3) CGES will not require more than one test during the contract period.

Article 47

Participation in EPS restoration is an ancillary service that service providers provide free of charge.

**PERSONNEL AUTHORIZED FOR COOPERATION**

Article 48

1. The list of responsible persons for implementation of this Contract is provided in Annex 8.
2. The Parties shall timely inform each other about the change of data about responsible persons.

**PAYMENT OF SERVICES**

Article 49

Accounting period for accounting and payment of ancillary services is established as a continuous period from each 1st day of the month at 00:00 h until the 1st day of the following month at 00:00 h (monthly accounting period).

Article 50

* + - 1. The Parties shall invoice the fees for services and other outstanding amounts under the present Contract after the expiry of the monthly accounting period, by the 15th day of the current month for the previous month.
      2. The Parties shall pay the invoiced sums by the 20th day of the current month following the accounting month.
      3. Any payment under the present Contract shall be executed according to the instructions given in the invoice.
      4. If a Party fails to fulfil its obligation within the deadline specified in the paragraph above, after the expiry of such period shall pay interest on arrears pursuant to the provisions of respective legal and sub-legal regulations of Montenegro.

**SETTLEMENT OF DISPUTES**

Article 51

1. Any dispute arising out from or in connection with the present Contract shall be resolved by the Parties in amicable way, in the spirit of good business cooperation.
2. In case such dispute cannot be resolved in amicable way, the court of competent jurisdiction shall be the Commercial Court of Montenegro.

**FINAL PROVISIONS**

Article 52

1. The Parties agree that in accordance with the subject matter of the Contract the following articles will apply: [select articles that apply ], while articles: [select articles that do not apply] will not apply because they are not related to the subject of the Contract.

Article 53

1. The present Contract shall apply from ----------until-----------.

Article 54

If during the validity of this Contract any respective legal or sub-legal regulation is amended, the Parties shall, within the shortest time possible and by means of an annex to this Contract, harmonize corresponding provisions hereof with such amendments of laws or sublegal regulations.

Article 55

1. If any Article hereof becomes invalid or unenforceable, the validity of other Articles hereof shall not be affected and other provisions shall remain in force.
2. The Parties undertake to replace such invalid or unenforceable Article with another corresponding Article within the shortest time possible.

Article 56

Amendments hereof shall be made by annexes, in writing.

Article 57

The Contract shall become effective on the day of its signature by the authorized representatives of the Parties.

**ANNEXES**

Article 58

The following annexes shall constitute an integral part hereof.

* **Annex no. 1**: Protocol for exchange of information and data relevant for the implementation of this Contract
* **Annex no. 2**: The list and energy-related technical characteristics of generating units included in the provision of primary control
* **Annex no. 3**: The list and energy-related technical characteristics of generating units included in the provision of secondary control
* **Annex no. 4**: The list and energy-related technical characteristics of generating units included in the provision of tertiary control
* **Annex no. 5**: The list and energy-related technical characteristics of consumption units included in the provision of tertiary control
* **Annex no. 6**: The list and energy-related technical characteristics of generating units included in the provision of voltage control
* **Annex no. 7**: The list and energy-related technical characteristics of generating units included in the provision of black-start
* **Annex no. 8**: The list of persons responsible for implementation of the Contract on the provision of ancillary services
* **Annex no**. **9**: The procedure of black-start

Article 59

1. Amendments to data contained in the annexes shall be executed when needed, at the proposal of one of the Parties.
2. Amended data from the Annexes from 1 to 8 hereof shall be stated in the minutes signed by the authorized representatives of the Parties.
3. The minutes from the paragraph 2 hereof shall be made in the same number of copies in which the Contract was made.

Article 60

The present Contract is made in six identical copies, of which each Party retains three copies.

In Podgorica, \_*[Insert date]* \_ year.

**CGES User**

Executive Director Executive Director

*[Insert name and surname] [Insert name and surname]*

**Appendix 4.4: Contract on purchase of electricity for coverage of transmission system losses**

**CONTRACT ON PURCHASE OF ELECTRICITY FOR COVERAGE OF TRANSMISSION SYSTEM LOSSES**

( hereinafter referred to as: the Contract)

*Between*

**Crnogorski elektroprenosni sistem AD, Podgorica**

Bulevar Svetog Petra Cetinjskog 18

81000 Podgorica

TIN: 02751372

In capacity of Transmission System Operator

Represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter to as: **CGES**),

and

***[Insert: Name of the User ]***

[*Insert*: Address]

*[Insert: ZIP code and city]*

TIN: *[Insert: TIN]*

In capacity of *[Select: type of User]*

represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter referred to as **Supplier**),

or as a rule, hereinafter individually referred to as: Party or collectively referred to as: Parties

**I SUBJECT OF CONTRACT**

**Article 1**

Contract on delivery of electricity for coverage of losses in the transmission system (hereinafter: Contract) stipulates conditions according to which the Supplier delivers energy to CGES for coverage of losses in the transmission system.

**Article2**

Under this Contract, Contracting parties shall specify the conditions for delivery of energy for coverage of losses in the transmission system, and in that respect also:

* Planned quantities of losses in the transmission system
* Price, calculation and invoicing procedure for delivered electricity,
* Procedure for submission of delivery schedules and a list of responsible persons
* Cases when delivery may be terminated,
* Conditions under which a receipt of electricity may be cancelled,
* Duration of the Contract.

**II CONDITIONS OF ELECTRICITY DELIVERY**

**Article 3**

1. The Supplier undertakes to supply electricity to CGES according to the following dynamics:

|  |  |  |
| --- | --- | --- |
|  | **Item 1** | **Item n** |
| **Period of delivery** |  |  |
| **Diagram of power**  **(MW)** |  |  |

1. Delivery from paragraph 1 herein is performed based on daily delivery schedules submitted by CGES to the Supplier no later than 9:00 for the following day.
2. Daily schedule of delivery of electricity for coverage of losses can be adjusted +/- 20% for each hour with respect to the diagram from paragraph 1 herein.
3. In case of mutual consent, Contracting Parties can amend the delivery diagram outside limits defined in paragraph 3 herein.
4. The energy delivery place from paragraph 1 herein is the border of the electric power system of Montenegro, within Montenegro.

**III PRICE, CALCULATION AND INVOICING PROCEDURE**

**Article 4**

1. The contracted price of energy for coverage of transmission system losses amounts to:

|  |  |  |
| --- | --- | --- |
|  | **Item 1** | **Item n** |
| **Period of delivery** |  |  |
| **Price**  **(€/MWh)** |  |  |

**Article 5**

1. Calculation of electricity for coverage of transmission system losses is performed based on monthly total of daily delivery schedules that are compliant with Crnogorski operator tržišta električne energije **–** COTEE (Montenegrin Electricity Market Operator).
2. The Supplier shall calculate and invoice the energy delivered for coverage of transmission system losses no later than three working days following the confirmation of quantities total from paragraph 1 herein.

**Article 6**

1. CGES undertakes to pay the invoiced amount within fifteen days from the day of receipt of invoice.
2. In case of delay in payment of fees from paragraph 1 herein, CGES is obliged to pay a default interest to the Supplier in accordance with the law.

**IV AUTHORIZED PERSONS**

**Article 7**

1. The list of responsible persons for implementation of this Contract is given in Appendix.
2. The Contracting Parties undertake to inform timely in writing each other on change of information about authorized persons.

**V CASES OF FORCE MAJEURE AND TERMINATION OF DELIVERY**

**Article 8**

* 1. The Contracting parties are relieved of a responsibility to fulfil obligations under this Contract during the event of force majeure.
  2. Force Majeure, as defined under this Contract, shall be understood as an unplanned natural event having a character of natural disasters (floods, earthquakes, fires, atmosphere discharges, strong winds, excessive ice, sea salt deposits etc.), as well as failures on devices and installations that did not happen as a result of fault of the Contracting parties.
  3. Contracting Party that refers to the effects of Force Majeure is obliged to notify without delay within three working days the other Contracting party thereof in writing, indicating the character and beginning of the effect of Force Majeure. The same notification procedure shall be applicable in case of notification about termination of effects of Force Majeure.
  4. Contracting Party that refers to the effects of Force Majeure proves the same upon request of the other party, but the procedure of proving shall not anyhow disturb further implementation of the contract.

**Article 9**

1. In case the Supplier fails to deliver all or part of the energy that it should supply according to this Contract, and in case there were no interruptions caused by Force Majeure, the Supplier shall compensate to CGES the cost incurred as a consequence of supply of corresponding energy volumes from the balance mechanism.
2. In case CGES fails or refuses to take over the delivery (at the timely agreed place of delivery) of the total or part of energy delivered according to this contract, and in case there were no interruptions caused by Force Majeure, CGES shall compensate to the Supplier the difference between the contracted price and price of imbalance determined by the balance mechanism, if it’s positive.

**V TAXES AND EXPENSES**

**Article 10**

1. The Supplier is obliged to cover all taxes, liabilities and all other expenses related to production of import of energy in Montenegro.

**VII FINAL PROVISIONS**

**Article 11**

1. The Contracting Parties shall amicably resolve any dispute arising out of or related to this Contract.
2. In case it is not possible for the Contracting Parties to resolve the dispute amicably, it will be resolved by the Commercial Court in Montenegro.

**Article 13**

1. This Contract shall enter into force on a day of its signing by the Contracting parties, and shall be implemented from \_\_\_\_\_\_\_\_\_ to\_\_\_\_\_\_\_\_\_\_.

**Article 14**

1. This Contract is made in 4 (four) identical copies, whereof 2 (two) copies are given to \_\_\_\_\_\_ and 2 (two) to CGES.

In Podgorica, \_*[Insert date]* \_ year.

**CGES User**

Executive Director Executive Director

*[Insert name and surname] [Insert name and surname]*

|  |
| --- |
|  |
|  |
|

**Appendix 4.5: Contract on assigning right to access cross-border transmission capacities**

**CONTRACT ON ASSIGNING RIGHT TO ACCESS CROSS-BORDER TRANSMISSION CAPACITIES**

(hereinafter referred to as: the Contract)

*Between*

**Crnogorski elektroprenosni sistem AD, Podgorica**

Bulevar Svetog Petra Cetinjskog 18

81000 Podgorica

TIN: 02751372

In capacity of Transmission System Operator

Represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter to as: **CGES**),

and

***[Insert: Name of the User ]***

[*Insert*: User address]

*[Insert: ZIP code and city]*

TIN: *[Insert: TIN]*

In capacity of *[Select: type of User]*

represented by: Executive Director, *[Insert: Name and surname]*

(hereinafter referred to as **User**),

**Article 1**

With the Contract herein CGES and User regulate the User’s right to access to the transmission network with the aim of using cross-border capacity, obtained in the allocating procedure (auction) organized by CGES.

**Article 2**

CGES approves to the User the access to the transmission network with the aim of using cross-bored capacity in the following manner:

TABLE

Border:

Direction:

Period of validity:

Diagram:

Price of allocated transmission capacity:

Allocating capacity code(CBCcID):

**Article 3**

CGES reserves the right, in case of unforeseen perturbations in the electric power system decreases or terminates the right of cross-border transmission from the previous Article. In this case, the User shall be refunded the funds from the transmission capacity allocation that arises from introduced limitations.

CGES does not take responsibility for damage occurred due to decrease or termination of the approved electricity transmission carried out due to unforeseen circumstances.

**Article 4**

CGES shall perform calculation of for rendered service pursuant to the “Rules for allocation of available transmission capacities and submit a relevant invoice to the User.

Payment by the User will be made to the CGES's bank account indicated in the invoice.

**Article 5**

The User is obliged to pay the invoiced amount no later than 5 days from the delivery of the invoice from the previous Article, at the gyro account stated in the invoice.

If the User does not settle its payment obligation pursuant to the previous paragraph, CGES shall calculate a default interest.

The rate of default interest is 6% per annum, calculated at a compound (interest) method.

If the User does not settle its payment herein, CGES keeps the right to terminate User’s rights to the allocated capacity, as also the ban on participation of the User to future auctions.

**Article 6**

The user is obliged to deliver for all payments a specification of obligations it settles according to the maturity of the invoice, and if the User does not deliver it, it agrees that CGES shall make such specification according to deadlines of the maturity of obligations.

**Article 7**

The contracting parties are obliged to respect fully the “Rules for allocation of available transmission capacities on interconnection links of the control area Montenegro with the neighbouring control areas”.

**Article 8**

Any dispute arising out of the Contract Contracting Parties shall settled by mutual consent.

If the occurred dispute cannot be solved by mutual consent, that dispute shall be referred to the Commercial Court in Podgorica

In Podgorica, \_*[Insert date]* \_ year.

**CGES User**

Executive Director Executive Director

*[Insert name and surname] [Insert name and surname]*

**APPENDIX 5: REQUEST FOR SIGNING THE CONTRACT ON USE**

REQUEST FOR SIGNING THE CONTRACT ON USE

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 1 | Type of use of transmission system | Choose option (mark with 🗹):   * For the purposes of electricity generation * For the purpose of supplying direct customers * For the purposes of the distribution of electricity * For the purpose of self- supply with electricity |
| 2 | Date and time of commencement of service | \_\_.\_\_.\_\_\_\_ at \_\_:\_\_ |
| 3 | Date and time of end of service | \_\_.\_\_.\_\_\_\_ at \_\_:\_\_ |
| 4 | User's name/ Name and surname |  |
| 5 | User's address |  |
| 6 | Zip code and city |  |
| 8 | TIN |  |
| 9 | Authorized person |  |
| 10 | Connection points on which withdrawal/delivery is performed |  |
| 11 | Total transmitted energy |  |
| 12 | Connection contract |  |
| 12 | Balance Responsibility Contract |  |

Date and place Applicant**APPENDIX 6: REQUEST FOR SIGNING THE CONTRACT ON CONNECTION**

REQUEST FOR SIGNING THE CONTRACT ON CONNECTION

|  |  |
| --- | --- |
|  |  |
| Name of the facility to be connected |  |
| Number of operating permits |  |
| Location of the facility |  |
| Owner's name / Name and Surname |  |
| Owner's address |  |
| Zip code and city |  |
| TIN |  |
| Authorized person |  |
| Connection voltage level |  |
| Connection power |  |
| Connection location |  |
| Connection points, connection power and voltage levels |  |
| Ownership details at the connection location |  |
| Billing metering points and ownership of measuring equipment |  |
| Responsibility for manipulation |  |

Date and place Applicant

**APPENDIX 7:** **STATUS OF TRANSMISSION SYSTEM AS OF THE DAY OF ENTRY INTO FORCE OF THE RULES**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Facility:** | | **HPP Perućica** |
|  |  |  | ***User*** | **Elektroprivreda Crne Gore a.d. Nikšić** |
|  |  |  | ***Connection point*** | 110 kV busbars in the facility 220/110 kV HPP Perućica |
|  |  |  | ***Withdrawal/delivery point*** | Connection point |
|  |  |  | ***Metering point*** | Electricity meters in generation bays at voltage level 10 kV |
|  |  |  | ***Connected power*** | 330 MVA, (305 MW) |
|  |  |  | ***GTC*** | 330 MVA, (305 MW) |
|  |  | **Facility:** | | **HPP Piva** |
|  |  |  | ***User*** | **Elektroprivreda Crne Gore a.d. Nikšić** |
|  |  |  | ***Connection point*** | 220 kV busbars in 220 kV switchyard of HPP Piva |
|  |  |  | ***Withdrawal/delivery point*** | Connection point |
|  |  |  | ***Metering point*** | Electricity meters in generation bays at voltage level 15,75 kV |
|  |  |  | ***Connected power*** | * 1. A, (342 MW) |
|  |  |  | ***GTC*** | 360 MVA, (342 MW) |
|  |  | **Facility:** | | **TPP Pljevlja** |
|  |  |  | ***User:*** | **Elektroprivreda Crne Gore a.d. Nikšić** |
|  |  |  | ***Connection point*** | * + 1. Insulator strings on 220 kV on gantries in bay B12 (generator bay) 400/220/110 kV Pljevlja 2     2. Insulator strings 220 kV on gantries in bay B11 (auxiliary consumption bay- transformer 220/6 kV, 32 MVA, T3 according to the User's nomenclature) 400/220/110 kV Pljevlja 2     3. Bushings of Tertiary 6 kV transformer 220/110/6 kV, 125 MVA (T3 according to the CGES nomenclature or T4 according to the User's nomenclature)     4. Connection point of 6 kV cable in 6 kV User's auxiliary consumption plant (connection of auxiliary consumption plant of CGES, over transformer 6 / 0,4 kV designation 8T5 according to the User's nomenclature, and the User's auxiliary consumption through which the CGES receives electricity from 6kV feeder bay - cells BM23 cells according to the User's nomenclature) |
|  |  |  | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | ***Metering point*** | CGES meters at the connection points. |
|  |  |  | ***Connected power*** | 210 MVA, (200 MW) |
|  |  |  | ***GTC*** | 480 MVA |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Direct consumers** | | | | |
|  |  | **Facility:** | | | **Steel Works Nikšić** |
|  |  |  | | ***User*** | **Toščelik a.d.** |
|  |  |  | | ***Connection point*** | Conductive insulators of transformer 110/35kV T3, T4 and coupling 35 kV |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | CGES meters at connection points in bays T3, T4 and |
|  |  |  | | ***Connected power*** | 15 MW |
|  |  |  | | ***GTC*** | 76 MVA |
|  |  | **Facility:** | | | **Aluminium Plant Podgorica** |
|  |  |  | | ***User*** | **Uniprom d.o.o.** |
|  |  |  | | ***Connection point*** | Insulator sets connecting overhead lines 110kV Podgorica 2-KAP, lines I, II and III to the outgoing gantry of facility 110kV in KAP, and insulator sets are under the ownership of CGES |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | CGES meters in OHL bays KAP I, II and III in SS Podgorica 2 and bay Podgorica 2 in SS Podgorica 5 |
|  |  |  | | ***Connected power*** | 65 MW |
|  |  |  | | ***GTC*** | 230 MVA |
|  |  | **Facility:** | | | **SS 220/110/35kV Podgorica 1** |
|  |  |  | | ***User*** | **Railway Infrastructure of Montenegro** |
|  |  |  | | ***Connection point*** | Busbars 110kV – bays 21 and 22 in SS Podgorica 1 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection point |
|  |  |  | | ***Metering point*** | CGES meters on 110 kV side of transformers in the plant of the Railway Infrastructure of Montenegro |
|  |  |  | | ***GTC*** | 24MVA |
|  |  | **Facility:** | | | **SS 110/35kV Bar** |
|  |  |  | | ***User*** | **Railway infrastructure of Montenegro** |
|  |  |  | | ***Connection point*** | Section disconnector between the facilities of CGES and Railway Infrastructure of Montenegro |
|  |  |  | | ***Withdrawal/delivery point*** | Connection point |
|  |  |  | | ***Metering point*** | CGES meters on 110kV side of transformer in the plant of the Railway infrastructure of Montenegro |
|  |  |  | | ***GTC*** | 24MVA |
|  |  | **Facility:** | | | **Electric traction substation Trebješica** |
|  |  |  | | ***User*** | **Railway Infrastructure of Montenegro** |
|  |  |  | | ***Connection point*** | Outgoing gantry 110kV facility |
|  |  |  | | ***Withdrawal/delivery point*** | Connection point |
|  |  |  | | ***Metering point*** | CGES meters on 110kV side of transformer in the plant of the Railway Infrastructure of Montenegro |
|  |  |  | | ***GTC*** | 24MVA |
|  |  | **Facility:** | | | **SS 220/110/35kV Mojkovac** |
|  |  |  | | ***User*** | **Railway Infrastructure of Montenegro** |
|  |  |  | | ***Connection point*** | Busbars 110kV – bays 7 and 8 in SS Podgorica 1 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection point |
|  |  |  | | ***Metering point*** | CGES meters on 110kV side of transformer in the plant of the Railway Infrastructure of Montenegro |
|  |  |  | | ***GTC*** | 24MVA |
|  |  |  | | ***Total connection power*** | 9MW |
|  | **Distribution system operators** | | | | |
|  |  | **Facility:** | | | **SS 400/110/35 kV Ribarevine** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 15 MW |
|  |  |  | | ***GTC*** | 24 MVA |
|  |  | **Facility:** | | | **SS 220/110/35 kV Podgorica 1** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 45 MW |
|  |  |  | | ***GTC*** | 48 MVA |
|  |  | **Facility:** | | | **SS 220/110/35 kV Mojkovac** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 7 MW |
|  |  |  | | ***GTC*** | 24 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Pljevlja 1** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 24 MW |
|  |  |  | | ***GTC*** | 24 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Berane** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 15 MW |
|  |  |  | | ***GTC*** | 24 MVA |
|  |  | **Facility:** | | | **TS 110/35 kV Danilovgrad** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformer 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 11 MW |
|  |  |  | | ***GTC*** | 11 MVA |
|  |  | ***Facility:*** | | | **SS 110/35 kV Kličevo** |
|  |  |  | ***User*** | | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | ***Connection point*** | | Conductive insulators on low voltage of power transformers 110/10 |
|  |  |  | ***Withdrawal/delivery point*** | | Connection points |
|  |  |  | ***Metering point*** | | Meters on 10kV side of transformer |
|  |  |  | ***Connected power*** | | 15 MW |
|  |  |  | ***GTC*** | | 36 MW |
|  |  | **Facility:** | | | **SS 110/35 kV Nikšić** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer and in 35kV bay coupling |
|  |  |  | | ***Connected power*** | 38 MW |
|  |  |  | | ***GTC*** | 75 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Cetinje** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 19 MW |
|  |  |  | | ***GTC*** | 24 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Virpazar** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 10 MW |
|  |  |  | | ***GTC*** | 24 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Ulcinj** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 15 MW |
|  |  |  | | ***GTC*** | 24 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Bar** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 35 MW |
|  |  |  | | ***GTC*** | 48 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Budva** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 45 MW |
|  |  |  | | ***GTC*** | 48 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Tivat** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 38 MW |
|  |  |  | | ***GTC*** | 48 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Herceg Novi** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 34 MW |
|  |  |  | | ***GTC*** | 48 MVA |
|  |  | **Facility:** | | | **TS 110/35 kV Andrijevica** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 6 MW |
|  |  |  | | ***GTC*** | 12 MVA |
|  |  | **Facility:** | | | **SS 110/35 kV Vilusi** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/35 |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 35kV side of transformer |
|  |  |  | | ***Connected power*** | 1 MW |
|  |  |  | | ***GTC*** | 6 MVA |
|  |  | **Facility:** | | | **SS 110/10 kV Podgorica 3** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/10kV |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 10kV side of transformer |
|  |  |  | | ***Connected power*** | 34 MW |
|  |  |  | | ***GTC*** | 38 MVA |
|  |  | **Facility:** | | | **SS 110/10 kV Podgorica 4** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/10kV |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 10kV side of transformer |
|  |  |  | | ***Connected power*** | 42 MW |
|  |  |  | | ***GTC*** | 48 MVA |
|  |  | **Facility:** | | | **SS 110/10 kV Podgorica 5** |
|  |  |  | | ***User*** | **Crnogorski elektrodistributivni sistem d.o.o.** |
|  |  |  | | ***Connection point*** | Conductive insulators on low voltage of power transformers 110/10kV |
|  |  |  | | ***Withdrawal/delivery point*** | Connection points |
|  |  |  | | ***Metering point*** | Meters on 10kV side of transformer |
|  |  |  | | ***Connected power*** | 24 MW |
|  |  |  | | ***GTC*** | 38 MVA |

1. depending on the selected options the hereinafter is the text of the contract for the purpose of withdrawal (basic) or generation ("Alternative G") [↑](#footnote-ref-1)
2. Alternatively G: "for the purpose of generation in the facilities' [↑](#footnote-ref-2)
3. Alternatively G: "the maximum power at the threshold of power plants" [↑](#footnote-ref-3)
4. Alternatively G: "generation'' [↑](#footnote-ref-4)
5. Alternatively G “ “ [↑](#footnote-ref-5)
6. Alternatively G: “billing elements” [↑](#footnote-ref-6)
7. Alternatively G: “Elements for the calculation of the transmission network use service are contracted power under Article 5, paragraph 2 of this Contract and the price for use of the transmission system of electricity that are paid by producers” [↑](#footnote-ref-7)
8. Alternatively G: “ “ [↑](#footnote-ref-8)
9. Alternatively G: “N=Ck \* 

   Ck – Price for using the transmission system referred to in Article 7 paragraph 3 of the Contract,

   PUTP - connection power at the connection point "tp" under Article 5, paragraph 2 of the Contract” [↑](#footnote-ref-9)
10. Alternatively G:¨ ...¨ [↑](#footnote-ref-10)
11. Alternatively G:¨ ...¨ [↑](#footnote-ref-11)
12. Alternatively G: “The Service Provider shall deliver to the User a calculation of fee for overly withdrawn reactive energy in the manner deter,omed by the Methodology for setting prices, deadlines and conditions for the provision of ancillary services and electricity transmission system balancing services, based on which the amount of fee will be set that on this basis the Service Provider is entitled to.” [↑](#footnote-ref-12)
13. Alternatively G: “Reduced by the amount of fees under Article 11” [↑](#footnote-ref-13)
14. An alternative G: “Metering points for the purpose of reporting” [↑](#footnote-ref-14)