RULES OF CROSS-BORDER CAPACITY MANAGEMENT

ARTICLE 1
Authority

This Regulation is drafted implementing Law No.43/2015 article 67, point 1 "On Power Sector" and implementing the Transmission and Grid Codes of ENTSO-E for cross-border exchanges, based on the Regulation (EC) 714/2009 of the European Parliament.

ARTICLE 2
Definitions

"**Energy exchange barriers**"- are caused by the limited capacity of the inter-connectional and internal grid.
"**Congestion in transmission**"- occurs when the System does not work safe in the conditions of a given generation, transmission model and the request.
"**Congestion management procedure**"- means the release of the grid from congestion, i.e measures to prevent the violation of physical rates which ensure the normal work of the grid.
"**Operational working security"**– the Power system, in interconnection with European grid ENTSO-E, it is closely related with the assessment and definition of cross-border transmission capacity,
NTC- Net Transmission Capacity
BCE- Base Case Exchange (Scheduled exchange)
TTC- Total Transmission Capacity
TRM- Transmission Reliability Margin
TRM- Defining the Transmission Reliability Margin
AAC- Already Allocated Capacity
ATC- Available Transfer Capacity

ARTICLE 3
Data for individual network model

1 According to the provisions of Transmission Code, important Network Users provide to TSO the necessary information for determining the transmission capacity. This information includes but is not limited to:

a) Information concerning the technical data;
b) Information concerning the availability of equipment's and network elements;
c) Information concerning the scheduling of the generating units.

2. For each period of the capacity determination, each generating unit or load, provides to TSO the specified data, while the System Operator (planning specialists of the working regimes) prepares with the necessary care the network model of the control area, which is checked for its convergence, before being sent to coordinator TSO in the region, to be able to provide calculations of active power flow, reactive power flow and voltages, in order to make an analysis for static stability.

3. The main input for calculating the NTC, is the document for the preparation of a regional grid model "*SEE regional common grid model for different time horizons* " prepared by Regional Group of South East Europe under the ENTSO-E Market Committee. This document provides two basic elements for the process of NTC calculation:

a) Base case exchange table (BCE);
b) Regional Merged Model for different time horizons.

4. SEE TSOs prepare Base Case Exchange (BCEs) assumptions, which are forecasts of commercial schedules in the network monthly model and then they send them to chosen coordinator TSO. These tables are prepared based on the recent history and TSOs experience. TSO coordinator collects all BCEs of the SEE TSOs region and makes the harmonization. The totals of exchanges stated in these tables are then placed in individual models of each TSO.

5. For each period of the capacity determination, a Merged Regional Grid Model is established at regional level by bringing together the inputs (Individual Grid Models) of all System Operators, through the functioning of coordinator TSO. The function of coordinator TSO is performed by a SEE TSO in a monthly level. In the framework of the working group RG SEE, Transmission Operators have agreed that regional coordination activities should take place on monthly basis rotations. The role of coordinator for the annual reference scenarios, winter and summer, for the synchronous area of Continental Europe is performed by RSCI CORESO security coordination center.

ARTICLE 4
Scenarios for Joint Grid Models

All SEE TSO-s emit a scenario for each period of defining the capacity established in the Joint Grid Model.
If there is necessary to define the additional scenarios for the periods of time neighboring TSO shall agree about the additional characteristic periods considering the (overhauls) maintenance program and the engaging of the generators which may affect in the definition of NTC value.

ARTICLE 5
Methodology of NTC calculation

1. The methodology contains the following sections:

a. The determination of Generation Shift Keys

b. The determination of relevant Operational Security Constraints

c. The determination of Reliability Margins

2. Each System Operator shall apply the methodology described in ENTSO-E Operational Manual "P4-Policy 4: Coordinated Operational Planning", Appendix 4.

a. The value NTC, Net Transfer Capacity is defined as:

$$\mathbf{NTC=TTC-TRM}$$
$$\mathbf{TTC = BCE + \Delta E}$$

Where:
BCE: *Base Case Exchange (scheduled exchange)*
ΔE: Maximum shift of generation (increase/decrease) that can be assigned to control areas involved in the interconnection preventing any violation of the N-1 security principle.

b. The Total Transmission Capacity (TTC) is the maximum exchange programme between two areas (TSO-s) fulfilling the operational security standards obligatory for each System if for the period for which it is made TTC assessment, the grid conditions and generation – consumption model is perfectly known in advance.

c. The Transmission Reliability Margin (TRM) is a security margin that copes with uncertainties on the computed TTC values.

d. The Already Allocated Capacity (AAC) is the total amount of allocated transmission rights, for example in the annual auction or any other form, depending on the allocation method.

e. The Available Transfer Capacity (ATC) that is the part of NTC that remains available, after each allocation phase, for further commercial activity.

f. ATC is given by the following equation:

$$\mathbf{ATC = NTC – AAC}$$

Where:
AAC – *is the already allocated capacity.*

ARTICLE 6
Definition of generation shift key methods

a. Generators that take part in the NTC determination must be characterized by their minimal and maximal power limits. The generation shift method is in conformity with the method of global exchange shift is shared between different generation units.

b. The chosen generators are used to define NTC the following way:

- in the area of one TSO (generators i=1,n) the generators' active power is increased and in the area of the other TSO (generators j=1,m) the generators' active power is decreased by the same value simultaneously.

c. All chosen injections are modified proportionally to the remaining available generation capacity.

d. This shift can be accomplished as follows:
Where:
i P - Actual active power generation (MW),
inc neë P- New increased injection, in next iteration it will be P

dec neë P- New decreased injection, in next iteration it will be P

ΔE- Shift generation, negative for increasing and positive for decreasing

Max*i P-Maximum permissible generation (MW),* Min*i P-,Minimum permissible generation (MW)*

Additional conditions:
$|\Delta E| \leq |\Sigma(Pmax - Pi)|$, and $|\Delta E| \leq |\Sigma(Pmin - Pi)|$
The last value of ΔEmax is determined when all generators or any network element reaches its operation limits.

ARTICLE 7
Operational Security Constrains

1. In defining capacities process, each TSO shall respect the following Operational Security Constraints under different contingencies defined by the Operational Security Code.

a. Thermal limits of the critical network elements;
b. Voltage Limits, imposing admissible substation voltage ranges;
c. Generation Limits ensuring adequate availability of generation reserves to meet the requirements defined by Operational Security Code.

1. Critical grid elements shall be both Regional Grid Elements and/or Internal Grid Elements and are defined from regional merge model as elements with sensitivity coefficient above 10%, which means that the outage of a critical element causes at least in one other network element interior or exterior, a load change of 10% or more.

2. The list of critical elements is updated continuously in accordance with the changes of the work conditions for every System and it is made available to the working group of congestion management RG SEE.

ARTICLE 8
Definition of the reliability margin (TRM)

1. Reliability Margin is based on a statistical approach, taking into account historic evidence and future expectations.
2. The Reliability Margin comprises the following uncertainties:

a. Unintended deviations of physical flows during operation due to the physical functioning of load-frequency regulation
b. Emergency exchanges between TSOs to cope with unexpected unbalanced situations in real time;
c. Inaccuracies, e.g. in data collection and measurements
d. Uncertainties in the base case used for calculation, as well as the foreseen for generation, consumption, exchange and grid topology, etc.

2.The size of TRM margin shall be the one defined in Bilateral Agreements.

ARTICLE 9
Harmonizing of the Results of Capacity Calculation NTC

1. NTC annual value for each border and direction flow is calculated considering the minimum monthly value that is used, exploited, in the past three years and is coordinated with the respective neighboring TSO within the month of November of each year.
2. NTC monthly values are calculated and harmonized with neighboring TSO for each border separately, within the 7th of each month, for the next month. For this is followed the procedure below:

a) 10 days before the expiration of harmonization, the data are exchanged, the national model with all nodes of 220/400 kV level, between TSOs, in format approved UCT, including the active power reserve for increasing/decreasing the generation and data on the maintenance program (elements out of operating) for the period under consideration,
b) 5 days prior to the expiration of harmonization, are performed calculations (simulations) for TTC/NTC values, performed through the grid analyzer (software TNA) that all regional TSOs own.
c) 2 days prior to the expiration of harmonization, are exchanged TTC values, determined for each border, and then begins the process of harmonization. In case of inconsistency of the calculated values, and if the parties fail to convince each other, then the smallest TTC value enters automatically into force.

3. In case of significant changes of the situation of the System compared to the foreseen situation, cross-border capacities are calculated, neighboring TSOs, after the exchange of the relevant data of the new situation, make re-calculation of cross-border capacity, and define jointly new values of NTC's and ATC respectively.

4. Cross-border Capacity Allocation for market participants in our region is performed by the Coordinated Auction Office SEE CAO in Podgorica.
5. The use of these transmission capacity is part of the energy market, and if the market participants are motivated to use both directions of the cross-border flow, then it

would facilitate cross-border flows contributing to increasing the level of security of Power system operation.

6. Normally, the amount of capacity exchanges for all borders, is multiplied by 0.75 to determine the total import/export in a control area, which is taken into consideration in the process of generation scheduling for the day ahead.

ARTICLE 10
Entry into force

These Rules enter into force after ERE Board approval.