ORDER no. 219/ 11.12.2019

Approving the Operational Methodology for the LFC-TEL block

Taking into account article 3 para (2) pt. 136, article 6 para (3) let. e) and article 119 of Commission Regulation (EU) 2017/1485 of 2 August 2017 instituting a network code regarding the operation of the electricity transmission system, article 36 para (7) let. n) of the Electricity and natural gas law 123/2012, with later amendments and additions,

In accordance with the provisions of article 5 para (1) let. c) and d) and of article 9 para (1) let. h) from the Government Emergency Ordinance 33/2007 on the organisation and operation of the National Regulatory Authority in the Energy domain, approved with amendments and additions by Law 160/2012, with later amendments and additions,

The President of the National Regulatory Authority in the Energy domain

issues the following order:

Art. 1. Approving the Operational Methodology for the LFC-TEL block, provided in the annex which is integral part of this order.

Art. 2. The National Power Grid Company Transelectrica SA has the obligation to establish power reserves according to the methodology provided in article 1, beginning with 01.07.2022.

Art. 3. (1) The National Power Grid Company Transelectrica SA has the obligation by 01.07.2022 to monitor the power reserve amounts calculated using the deterministic method, those calculated by the probabilistic method beginning with 01.07.2020, the values taken into account regarding the dimensioning incident, the power reserves that have been activated, the differences between them,as well as the factors considered in calculating the power reserves by the probabilistic method.

(2) Beginning with 01.07.2022 the National Power Grid Company Transelectrica SA has the obligation to monitor the power reserve amounts calculated by the probabilistic method, the values taken into account for the dimensioning incident, the power reserves that have been activated, the differences between them,as well as the factors considered in calculating the power reserves by the probabilistic method.

Art. 4. The National Power Grid Company Transelectrica SA has the obligationto analyse the differences specified in article 3 and to transmit monthly, until the 20th of the month following the one analysed, to the National Regulatory Authority in the Energy domain a report containing the conclusions of the analysis, taking into consideration article 7 paragraph (4) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 instituting a network code regarding the operation of the electricity transmission system.

Art. 5. CNTEE Transelectrica SA publishes the methodology provided in article 1 on its own internet page within three weekdays from its publication in Romania's Official Gazette, Part I.

Art. 6. CNTEE Transelectrica SA publishes on its own internet page, section Transparency, information regarding the reserve amounts necessary for each type.

Art. 7. The National Power Grid Company Transelectrica SA and the economic operators of the electricity sector will carry out the provisions of this order and the organisational entities of the National Regulatory Authority in the Energy domain supervise the observance of the provisions from this order.

Art. 8. This order is published in Romania's Official Gazette, Part I.

The President of the National Regulatory Authority in the Energy domain

Dumitru CHIRITA

ANNEX

OPERATIONAL METHODOLOGY FOR THE LFC-TEL BLOCK

CHAPTER I

General provisions

SECTION 1

Purpose

Art. 1. (1) The present operational methodology for the LFC-TEL block, hereinafter called *Methodology*, it aims to establish:

a) ramping restrictions for active power generation, in accordance with article 137 para (3) & (4) of Commission Regulation (EU) 2017/1485 of 2 August 2017 instituting a network code regarding the operation of the electricity transmission system (hereinafter called *Regulation*);
b) the dimensioning rules for FRR;
c) the dimensioning rules for RR;
d) the coordination measures aimed at reducing FRCE, as they are defined in article 152 para (14) of the *Regulation*;
e) the measures to reduce ARRF by requesting changes in the active power generation or demand of generating units and demand units, in accordance with article 152 para (16) of the *Regulation*.

(2) The present methodology is applied by the transmission system operator TEL in view of achieving the target parameters of the control deviation upon frequency restoration within the frequency-power control block, as defined in the *Regulation* article 128.

(3) The present *Methodology* takes into account the increasing of the transparency level in the operation of the NPS, in the dimensioning and use of active power reserves.

SECTION 2

Scope

Art. 2. The present methodology creates the procedural framework specific for NPS operation.

Art. 3. The present methodology is applied by the TSO and by the suppliers of active power reserves in accordance with the operational requirements of NPS included in the *Regulation*.

SECTION 3

Definitions and abbreviations

Art. 4. (1) The terms used in the present methodology have the meaning specified in the following norms:

a) The electricity and natural gas law 123/2012, with later amendments and additions;

b) Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on the operation of the electricity transmission system.

(2) To the purpose of the present methodology, the terms and expressions used have the following meanings:

Historical values for the imbalances of the LFC-TEL block	Represent the active power imbalances occurring during system operation and those that were covered by reserve activation
Positive dimensioning incident for FRR	The highest imbalance which might result from an instantaneous variation of the active power generated, at the tripping of the largest generating unit, of a bus bar where several generating units are connected, **of a single HVDC interconnection line or of a AC line of the LFC-TEL block**.
Negative dimensioning incident for FRR	The highest imbalance which might result from an instantaneous variation of the active power demand, at the tripping of the largest demand facility, **of the single HVDC interconnection line or of a AC line of the LFC-TEL block.**
Imbalance netting within the IGCC	Means a process agreed between TSOs of two or more LFC areas within one or more synchronous areas, which enables avoiding the simultaneous aFRR activation in opposite directions taking into consideration the control deviations upon frequency restoration in the respective area and the activated aFRR.

Art. 5. Abbreviations used in the present Methodology have the following meanings:

A.C.	Alternative Current
ACE	Area Control Error (ARZ equivalent)
ACEol (ACE open loop)	ACE left without the contribution of mFRR and RR
ARZ	Control deviation of the control area
CCPP	Combined Cycle Power Plant
FCR	Frequency Containment Reserves
FRCE	Frequency Restoration Control Error
FRP	Frequency Restoration Process
FRR	Frequency Restoration Reserves
$FRR_{probabilistic}$	Frequency Restoration Reserves determined by means of probabilistic dimensioning rules
aFRR	Frequency Restoration Reserve with automatic activation
mFRR	Frequency Restoration Reserve with manual activation
HVDC	High Voltage Direct Current
IGCC	International Grid Control Cooperation
LFC	Load-Frequency Control
LFC block	Load-Frequency Control block
LFC-TEL block	Load-Frequency Control block – Transelectrica
NPS	National Power System
NRA	National Regulatory Authority in the energy domain
PVPP	Photovoltaic Power Plant
RR	Replacement Reserves
SAFA	System Area Framework Agreement
TEL	National Power Grid Company „Transelectrica" S.A.
TPP	Thermoelectric Power Plant
TSO	Transmission and System Operator
TSO grid	TSO electricity transmission grid
WPP	Wind Power Plant

CHAPTER II

Operational methodology for the LFC-TEL block

SECTION 1

Ramping restrictions for active power generation

Art. 6. (1) The **LFC–**TEL block is not interconnected with neighbouring blocks by means of direct current interconnections.

(2) In case the LFC-TEL block is connected with direct current lines the TSO is entitled to establish common limitations of the interchange schedule of the respective HVDC interconnection line in order to limit its influence over the achievement of the target parameter for FRCE of the connected LFC blocks. TEL agrees with the responsible TSOs of the connected LFC block responsible for the ramping periods and / or for the maximum rate of change of the load for this HVDC interconnection line.

(3) The common limitations provided in para (2) are not applied to imbalance netting, to frequency coupling nor to the cross-border FRR and RR activation through HVDC interconnection lines.

Art. 7. TSO establishes measures to achieve the FRCE target parameter of the LFC-TEL block and to reduce deterministic frequency deviations taking into account the technological limitations of generating and consuming units as follows:

a) monitoring the FREC maintaining time in the variation domain defined by the limits established by SAFA[1] for TEL: the number of time intervals per year outside the level 1 FRCE domain within a time interval equal to the frequency[2] restoration period should be below 30% of the time intervals of the year and the number of time intervals per year outside the FRCE level 2 within a time interval equal to the frequency restoration period should be below 5% of the yearly time intervals.
b) during operation under normal operational status or alert status, monitoring monthly the following:

[1] On the approval date of this document the ARRF level 1 value is 81.29 MW and the ARRF level 2 value is 153.732 MW. ARRF levels 1 & 2 are recalculated annually according to SAFA.
[2] The frequency restoration period is 15 minutes according to art. 127 para 3 from *Regulation*.
[3]In ACE calculation the transition from cross-border exchange programme to another it is realized on a period beginning with 5 minutes before the moment of the exchange power modification and finalizes to 5 minutes after the moment of change of the exchange power modification. The ramp it is realized linearly, for a duration of 10 minutes.

1. for a set of data containing the average values of FRCE of the LFC block for time intervals equal to the frequency restoration period:
   (i) average value;
   (ii) standard deviation;
   (iii) standard deviation of 1%, 5%, 10%, 90%, 95% and 99% within the measured time intervals;
   (iv) the number of time intervals when the average value of FRCE was outside the FRCE level 1, distinguishing between the negative and positive FRCE's and
   (v) the number of time intervals when the average value of FRCE was outside the FRCE level 2, distinguishing between the negative and positive FRCE's;
2. for a set of data containing the average values of FRCE of the LFC block for time intervals lasting one minute: number of events per month when FRCE exceeded 60% of the reserve capacity of FRR and was not restored to 15% of the reserve capacity of FRR during frequency restoration period, distinguishing between negative and positive FRCE's;

c) monitoring the cross-border exchanges and unintentional power deviations;
d) monitoring the preliminary qualification process of the providers of balancing reserves;
e) activating only the balancing reserves from the qualified beforehand providers;
f) respects the period of ramping rate of load from the cross-border exchange programmes as defined in SAFA[3] ;
g) respects the ramping rate of load of generating units during the notification process and activation in the balancing market. The maximum ramping rates of the load of generating units are declared by the generating unit's owner and verified during the preliminary qualification process for the provision of balancing reserves namely when checking the compliance with the technical requirements of applicable technical norms;
h) activates the generating units on the balancing market with respect to the loading time resulting from the maximum ramping rate value of the load of the generating unit for the notified power step, namely disposed of on the balancing market. Thus the maximum variation step of the notified power cannot exceed the maximum ramping rate value of the load value expressed in MW/min multiplied with the corresponding time interval.

Art. 8. TEL examines the generation structure in order to verify/validate the ramping rate of the load necessary to compensate the possible imbalances of the LFC – TEL block.

SECTION 2

Probabilistic dimensioning rules for FRR and RR in accordance with article 157, namely with article 160 of the *Regulation*

Art. 9. (1) TEL is responsible for the dimensioning of the FRR and RR within NPS and applies the provisions of article 157 and of article 160 from the *Regulation* for the LFC-TEL block.

(2) The total amount of FRR reserve capacity for the LFC-TEL block is determined both for positive and for negative imbalances.

(3) The FRR reserve in positive and negative direction represents the maximum value among the dimensioning incident and $FRR_{probabilistic}$.

(4) $FRR_{probabilistic}$ is determined by probabilistic analysis as follows:

(a) in accordance with article 157 para (2) let. a) of the *Regulation*, dimensioning is based on the historical values corresponding to the imbalances of the LFC-TEL block, for a complete period of at least one year, which should end no sooner than six months before the examined dimensioning period. TEL takes into account a complete period of two years.

(b) the sampling of values covers at least the frequency restoration period of 15 minutes.

(c) the historical values corresponding to the imbalances of the LFC-TEL block are profiled for the time period for which dimensioning is made. At least the following factors are taken into consideration for profiling:

(i) seasonal characteristics of the dimensioning period: summer/winter day, peak/off-peak hour, weekday/weekend day, legal holiday, mini-vacations occasioned by legal holidays, other a-typical days (religious holidays);

(ii) variation of the generation of the power plants using renewable energy as primary sources, results from forecast;

(iii) instantaneous variation of the electricity demand produced by passing from one demand level to another (demand passing from off-load to peak load and vice versa), namely the demand variation produced by demand units with variable load (e.g. steel works etc.);

(iv) recorded values of generation and demand; for WPP and PVPP it will take into account the realized and notify values;

(v) accidental outages of equipments from the power system for various causes (major technical defects, extreme meteorological phenomenas, failures etc.);

(d) application of probabilistic dimensioning rules may takes into consideration and the following forecast factors:

(i) forecast of the available capacities by types of power generating units, and also the forecast of the total available capacity for the studied dimensioning period;

(ii) forecast of the demand request for the studied dimensioning period;

(iii) forecast of the generation of WPP/PVPP for the studied dimensioning period;

(iv) seasonal meteorological forecast;

(v) forecast of the energy exchanged with neighbouring power systems (import/export) for the studied dimensioning period;

(vi) indexes of unplanned outages of power generating units;

(vii) ramping rate of load corresponding to the power generation from renewable sources (WPP/PVPP), statistically determined for the historical registration period, by 15 minutes' sampling periods.

(5) The positive FRR reserve amount of the LFC – TEL block or a combination of FRR & RR reserve capacity should be sufficient to cover positive imbalances of the LFC-TEL block, at least 99% of the time based on the historical data mentioned in para (4).

(6) The negative FRR reserve amount of the LFC – TEL block or a combination of FRR & RR reserve capacity should be sufficient to cover negative imbalances of the LFC-TEL block, at least 99% of the time based on the historical data mentioned in para (4).

(7) The FRR reserve amount (aFRR and mFRR) for the LFC-TEL block should be sufficient to provide achievement of target-parameters for FRCE in accordance with article 128 para (3) of the *Regulation*, for thestudied dimensioning period. When using this probabilistic method TSO takes into consideration the restrictions defined in the reserve sharing or exchange

agreements owed to possible violations of operational security or of the requirements for FRR availability.

(8) The way to determine the value of the positive and negative dimensioning incident for FRR is provided in the annex which is part of the present methodology.

(9) The dimensioning of aFRR and mFRR respects the following:

(a) the aFRR and mFRR ratio is variable, with priority given to aFRR dimensioning;

(b) aRRF dimensioning is performed according to the provisions of article 10;

(c) mRRF value is obtained from the difference between FRR and aFRR

(10) TEL establishes the FRR reserve capacity and the possible geographical limitations of its distribution within the LFC – TEL block in accordance with the provisions of article 157 para (2) let. g) of the *Regulation.* Geographical limitations are given either by the possible congestions, outages, meteorological or force majeure events, which might endanger the activation of reserves resulting from dimensioning.

Art. 10 (1) aFRR dimensioning is performed by probabilistic methods using historical data, which represent the ACEol value with 2 seconds sampling. Historical data are profiled taking into consideration the ramping rate of NPS demand, inclusive the ramping rate of load from power plants using renewable energy as primary sources.

(2) The aFRR reserve capacity in positive direction represents 99% of the aFRR probabilistic distribution calculated in para (1). Such value should not be smaller than the aFRR value recommended in SAFA part B, annex 1 article B-6-2-2-1-5, namely: the aFRR amount in positive direction is 1% higher from the difference of one minute average ACEol and the 15 minutes average ACEol of the LFC-TEL block, registered in the historical database (the aFRR quantity in positive direction will be considered equal to 1% of the specified difference in order to establish the calculation conditions).

(3) The aFRR reserve capacity in negative direction represents 99% of the aFRR probabilistic distribution calculated in para (1). Such value should not be smaller than the aFRR value recommended in SAFA part B, annex 1 article B-6-2-2-1-5, namely: the aFRR amount in negative direction is 99% higher from the difference of one minute average ACEol and the 15 minutes average ACEol of the LFC-TEL block, registered in the historical database (the aFRR quantity in negative direction will be considered equal to 99% of the specified difference in order to establish the calculation conditions).

(4) The full aFRR and mFRR activation time should provide achievement of target-parameters for FRCE and be smaller or at the most equal to frequency restoration period.

Art. 11 (1) The replacement reserve should be dimensioned in such a way as, at any time, can restore the total activated FRR amount both in positive and in negative direction.
(2) The replacement reserve amount of the LFC – TEL block should be sufficient when it is taken into consideration to the dimensioning of the FRR reserve capacity in order to respect the FRCE target-parameters and to comply with the operational security of the LFC-TEL block.

(3) The RR reserve amount of the LFC – TEL block in positive direction should be sufficient to cover the FRR imbalances activated in positive direction in the LFC-TEL block at least 99% of the time based on historical data.

(4) The RR reserve amount of the LFC – TEL block in negative direction should be sufficient to cover the FRR imbalances activated in negative direction in the LFC-TEL block at least 99% of the time based on historical data.

Art. 12 FRR and RR dimensioning in case of a reserves sharing or exchange agreement concluded by TEL with other LFC blocks is performed in accordance with the provisions of article 157 para (2) let. j) pt. i) and let. k) pt. i), article 160 para (4) and para (5), articles 165 ÷ 167 and article 169 of the *Regulation*.

SECTION 3

Measures to reduce FRCE

Art. 13. Since TEL is the only TSO of the LFC block, it does not coordinate the FRCE reduction measures with any other TSO.

SECTION 4

Measures to reduce FRCE by requesting changes in the active power generation or demand of power generating and demand units

Art. 14. Upon any violation of limits provided in article 152 para (12) and (13) of the *Regulation*, TSO applies the following types of measures in order to reduce FRCE:

a) power activation on the balancing market;
b) participating to imbalance netting within IGCC;

c) real time monitoring of the response of power generating units and providing reserve units, participating units in frequency restoration process in order to identify the errors and to improve their response.

ANNEX

to the methodology

A. Positive dimensioning incident for FRR

A1) In case of the LFC-TEL block the positive dimensioning incident for FRR may have the following maximum values:

- 700 MW to cover the tripping of one unit of NPP Cernavoda, U1 or U2, with an installed active power of 706,5 MW;
- 800 MW to cover the tripping of TG1, TG2 and TA assembly of CCPP Brazi Petrom, with an installed active power of 885 MW;
- 900 MW to cover the tripping of an assembly consisting of 3 units with an installed active powerof 300 MW, operating all on a single bus bar - possible situation to meet in TPP Rovinari and TPP Turceni;
- 1400 MW to cover the tripping of the U1 + U2 assembly of NPP Cernavoda when a bus bar of the 400 kV substation Cernavoda is under outage or unavailable;

A2) The maximum value is selected from the above-mentioned cases depending on the structure of operational generating units and on the operational diagrams within TSO grid . Other generating unit configurations operating on a single bus bar are also taken into consideration, which cumulate evacuated powers comparable with the ones provided above.

B. Negative dimensioning incident for FRR

In case of the LFC-TEL block the negative dimensioning incident may have the following maximum values:

- 350 MW to cover the tripping of a 110 kV demand area;
- 250 MW to cover the up variations of the generation from WPP and PVPP determined using statistical data in accordance with the provisions of article 9 para (4) let. a), c) and d) from order.