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ANNEXES 1 to 8

## **ANNEXES**

**to the**

**Commission Regulation (EU)../.**

**establishing a guideline on electricity transmission system operation**

**ANNEXES**  
**to the**  
**Commission Regulation (EU)..../..**  
**establishing a guideline on electricity transmission system operation**

**ANNEX I**

Provisions not applicable to the TSOs of Lithuania, Latvia and Estonia in accordance with Article 2(4):

- (1) Article 16 subparagraphs (d), (e) and (f) of paragraph 2;
- (2) Article 38(2);
- (3) Article 39(3);
- (4) Article 118;
- (5) Article 119;
- (6) Article 125;
- (7) Article 126;
- (8) Article 127 paragraphs 1(i), 3, 4, 5, and 9;
- (9) Article 128, paragraphs 4 and 7;
- (10) Article 130(1)(b);
- (11) Article 131
- (12) Article 132(2);
- (13) from Article 133 to Article 140;
- (14) Article 141 paragraphs 1, 2, 4(c), 5, 6, 9, 10 and 11;
- (15) Article 142;
- (16) Article 143(3);
- (17) Article 145 paragraphs 1, 2, 3, 4 and 6;
- (18) Article 149(3);
- (19) Article 150;
- (20) Article 151(2);
- (21) from Article 152 to Article 181;
- (22) Article 184(2);
- (23) Article 185;
- (24) Article 186(1);
- (25) Article 187;
- (26) Article 188 paragraphs 1 and 2; and

(27) Article 189(1).

## ANNEX II

Voltage ranges referred to in Article 27:

<b>Synchronous area</b>	<b>Voltage range</b>
Continental Europe	0.90 pu – 1.118 pu
Nordic	0.90 pu – 1.05 pu
Great Britain	0.90 pu – 1.10 pu
Ireland and Northern Ireland	0.90 pu – 1.118 pu
Baltic	0.90 pu – 1.118 pu

Table 1: Voltage ranges at the connection point between 110 kV and 300 kV

<b>Synchronous area</b>	<b>Voltage range</b>
Continental Europe	0.90 pu – 1.05 pu
Nordic	0.90 pu – 1.05 pu
Great Britain	0.90 pu – 1.05 pu
Ireland and Northern Ireland	0.90 pu – 1.05 pu
Baltic	0.90 pu – 1.097 pu

Table 2: Voltage ranges at the connection point between 300 kV and 400 kV

## ANNEX III

Frequency quality defining parameters referred to in Article 127:

	<b>CE</b>	<b>GB</b>	<b>IE/NL</b>	<b>Nordic</b>
<b>standard frequency range</b>	±50 mHz	±200 mHz	±200 mHz	±100 mHz
<b>maximum instantaneous frequency deviation</b>	800 mHz	800 mHz	1000 mHz	1000 mHz
<b>maximum steady-state frequency deviation</b>	200 mHz	500 mHz	500 mHz	500 mHz
<b>time to recover frequency</b>	not used	1 minute	1 minute	not used
<b>frequency recovery range</b>	not used	±500 mHz	±500 mHz	not used
<b>time to restore frequency</b>	15 minutes	15 minutes	15 minutes	15 minutes
<b>frequency restoration range</b>	not used	±200 mHz	±200 mHz	±100 mHz
<b>alert state trigger time</b>	5 minutes	10 minutes	10 minutes	5 minutes

Table 1 Frequency quality defining parameters of the synchronous areas

Frequency quality target parameters referred to in Article 127.

	<b>CE</b>	<b>GB</b>	<b>IE/NL</b>	<b>Nordic</b>
<b>maximum number of minutes outside the standard frequency range</b>	15000	15000	15000	15000

Table 2 Frequency quality target parameters of the synchronous area

ANNEX IV

FRCE target parameters referred to in Article 128:

	<b>GB</b>	<b>IE/NI</b>
Level 1	3 %	3 %
Level 2	1 %	1 %

Table 1 FRCE target parameters for GB and IE/NI

ANNEX V

FCR technical minimum requirements referred to in Article 154:

Minimum accuracy of frequency measurement	CE, IE/NI and Nordic	GB, and 10 mHz or the industrial standard if better
Maximum combined effect of inherent frequency response insensitivity and possible intentional frequency response dead band of the governor of the FCR providing units or FCR providing groups.	CE	10 mHz
	GB	15 mHz
	IE/NI	15 mHz
	Nordic	10 mHz
FCR full activation time	CE	30 s
	GB	10 s
	IE/NI	15 s
	Nordic	30 s if system frequency is outside standard frequency range
FCR full activation frequency deviation.	CE	±200 mHz
	GB	±500 mHz
	IE/NI	Dynamic FCR ±500 mHz
		Static FCR ±1000 mHz
	Nordic	±500 mHz

Table 1 FCR properties in the different synchronous areas



ANNEX VI

Limits and requirements for the exchange of FCR referred to in Article 163:

Synchronous area	Exchange of FCR allowed between:	Limits for the exchange of FCR
CE synchronous area	TSOs of adjacent LFC blocks	<ul style="list-style-type: none"> <li>- the TSOs of an LFC block shall ensure that at least 30 % of their total combined initial FCR obligations, is physically provided inside their LFC block; and</li> <li>- the amount of reserve capacity on FCR, physically located in an LFC block as a result of the exchange of FCR with other LFC blocks, shall be limited to the maximum of:                             <ul style="list-style-type: none"> <li>o 30 % of the total combined initial FCR obligations of the TSOs of the LFC block to which the reserve capacity on FCR is physically connected; and</li> <li>o 100 MW of reserve capacity on FCR.</li> </ul> </li> </ul>
	TSOs of the LFC areas of the same LFC block	<ul style="list-style-type: none"> <li>- the TSOs of the LFC areas constituting a LFC block shall have the right to specify in the LFC block operational agreement internal limits for the exchange of FCR between the LFC areas of the same LFC block in order to:                             <ul style="list-style-type: none"> <li>o avoid internal congestions in case of the activation of FCR;</li> <li>o ensure an even distribution of reserve capacity on FCR for the case of network splitting; and</li> <li>o avoid that the stability of the FCP or the operational security is affected.</li> </ul> </li> </ul>
Other synchronous areas	TSOs of the synchronous area	<ul style="list-style-type: none"> <li>- The TSOs of the synchronous area shall have the right to specify in the synchronous area operational agreement limits for the exchange of FCR in order to:                             <ul style="list-style-type: none"> <li>o avoid internal congestions in case of the activation of FCR;</li> <li>o ensure an even distribution of FCR in case of network splitting; and</li> <li>o avoid that the stability of the FCP or the operational security is affected.</li> </ul> </li> </ul>

Table 1 Limits and requirements for the exchange of FCR

## ANNEX VII

Requirements and limits for the exchange of FRR within the synchronous area referred to in Article 167:

<b>Synchronous area</b>	<b>Exchange of FRR allowed between</b>	<b>Limits for the exchange of FRR</b>
All synchronous areas consisting of more than one LFC block	TSOs of different LFC blocks	<ul style="list-style-type: none"> <li>- The TSOs of a LFC block shall ensure that at least 50 % of their total combined reserve capacity on FRR resulting from the FRR dimensioning rules in Article 153(1) and before any reduction due to the sharing of FRR in accordance with Article 153(2) remains located within their LFC block.</li> </ul>
	TSOs of the LFC areas of the same LFC block	<ul style="list-style-type: none"> <li>- The TSOs of the LFC areas constituting a LFC block shall have the right, if needed, to specify internal limits, for the exchange of FRR between the LFC areas of the LFC block in the LFC block operational agreement to:               <ul style="list-style-type: none"> <li>o avoid internal congestions due to the activation of the reserve capacity on FRR subject to the exchange of FRR;</li> <li>o ensure an even distribution of FRR throughout the synchronous areas and LFC blocks in case of network splitting;</li> <li>o avoid that the stability of the FRP or the operational security is affected.</li> </ul> </li> </ul>

Table 1 Requirements and limits for the exchange of FRR within a synchronous area

## ANNEX VIII

Requirements and limits for the exchange of RR within the synchronous area referred to in Article 169:

<b>Synchronous area</b>	<b>Exchange of RR allowed between</b>	<b>Limits for the exchange of RR</b>
All synchronous areas consisting of more than one LFC block	TSOs of different LFC blocks	<ul style="list-style-type: none"> <li>- The TSOs of the LFC areas constituting a LFC block shall ensure that at least 50 % of their total combined reserve capacity on RR resulting from the RR dimensioning rules according to Article 156(3) and before any reduction of reserve capacity on RR as a result of the sharing of RR according to Article 156(4) and Article 156(5) remains located within their LFC block.</li> </ul>
	TSOs of the LFC areas of the same LFC block	<ul style="list-style-type: none"> <li>- The TSOs of the LFC areas constituting a LFC block shall have the right, if required, to define internal limits for the exchange of RR between LFC areas of the LFC block in the LFC block operational agreement as to:               <ul style="list-style-type: none"> <li>o avoid internal congestions due to the activation of reserve capacity on RR subject to the exchange of RR;</li> <li>o ensure an even distribution of RR throughout the synchronous area in case of network splitting; and</li> <li>o avoid that the stability of the RRP or the operational security is affected.</li> </ul> </li> </ul>

Table 1 Requirements and limits for the exchange of RR within the synchronous area