



Assessment of the NEURC Draft Resolution “On Approval of amendments to the Transmission System Code”

by the Energy Community Secretariat

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PURPOSE STATEMENT

Assessment of the NEURC draft Resolution “On Approval of Amendments to the Transmission System Code”, transposing into Ukrainian legislation the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (SO GL) and Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration (ER NC), as adapted and adopted by Ministerial Decision 2021/13/MC-EnC.

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Ukraine Energy Market Observatory

Assessment 4/24

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Introduction

The present assessment relates to the draft Resolution “On Approval of Amendments to the Transmission System Code” submitted by the National Energy and Utilities Regulatory Commission of Ukraine (NEURC) to the Energy Community Secretariat with a request for compliance assessment. NEURC provided an English translation of its draft Resolution “On Approval of Amendments to the Transmission System Code” on 6 December 2023. The draft Resolution was published on the NEURC’s website on 22 November 2023, for comments and suggestions under the regulatory procedure stipulated in Article 15 of the Law of Ukraine “On the National Energy and Utilities Regulatory Commission”¹, and it is expected to be approved at an open NEURC’s meeting after the end of the public consultation.

Background

By Decisions 2021/13/MC-EnC and 2022/03/MC-EnC, the Ministerial Council incorporated a package comprising the latest EU electricity *acquis* in the Energy Community, the so-called Electricity Integration Package. The 2021 Decision adapted and adopted Directive (EU) 2019/944² and Regulation (EU) 2019/941,³ whereas the 2022 Decision, in addition to amending the Directive (EU) 2019/944 and Regulation (EU) 2019/941, adapted and adopted Regulation (EU) 2019/943,⁴ Regulation (EU) 2019/942⁵ as well as the Network Codes and Guidelines on forward capacity allocation (FCA), capacity allocation and congestion management (CACM), electricity balancing (EBGL), system operation (SO GL) and the

¹ Item 8 of the NEURC’s meeting Agenda on 22.11.2023, <https://www.nerc.gov.ua/materials/materiali-do-zasidannya-22112023>

² Directive (EU) 2019/944 of 5 June 2019 on common rules for the internal market for electricity

³ Regulation (EU) 2019/941 of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC

⁴ Regulation (EU) 2019/943 of 5 June 2019 on the internal market for electricity

⁵ Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators

Emergency Restoration Network Code (ER NC).⁶ The Decisions 2021/13/MC-EnC and 2022/03/MC-EnC entered in force on the day of their respective adoption.

As a Contracting Party to the Energy Community Treaty, under Article 2 of the Ministerial Council Decisions 2021/13/MC-EnC and 2022/03/MC-EnC, Ukraine was under an obligation to transpose and implement the Electricity Integration Package by 31 December 2023.

Further to this, the Law of Ukraine “On the Electricity Market” in Article 2 (6) requires the Transmission System Code (hereinafter, TSC) to meet the requirements of regulatory and legal acts of the Energy Community.

The amendments to the TSC aim to transpose the SO GL and the ER NC, as adapted and adopted by the Ministerial Council Decision 2022/03/MC-EnC. In particular, the draft amendments to TSC aim at addressing the following issues:

- determination of criteria and conditions for emergency situations in the power system of Ukraine;
- conditions for applying emergency measures for reduction of electricity consumption;
- the procedure for declaring an emergency situation in the power system of Ukraine;
- clarification of the requirements for the transmission system in emergency operating conditions and recovery operating conditions;
- requirements for the development of the power system defence plan and a restoration plan;
- bringing terminology in line with the Electricity Integration Package;
- specificities of operation of the electricity transmission system, especially with regard to the load and frequency control (LFC) reserves.

Impact on the markets and stakeholders in Ukraine

The draft amendments to the TSC are relevant for the Ukrainian TSO (NPC “Ukrenergo”), other TSOs operating within the same synchronous area (Continental Europe), Ukrainian Distribution System Operators (DSOs), Regional Coordination Centres (RCCs) and Significant Grid Users (SGUs), which are power-generating modules of types B, C and D, transmission-connected demand facilities, transmission-connected distribution systems, providers of dispatching of power generating modules or demand facilities by means of aggregation and providers of active power reserve. The full implementation of the amended TSC should contribute to the increased reliability and resilience of the power system of Ukraine and thus of the Continental European power system. It is also expected that a clear legal framework across the Energy Community, including Ukraine, will make electricity trading easier and ensure high operational security.

⁶ Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management; Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation; Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing; Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration; Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation.

NPC “Ukrenergo” has been working since 2017 on the strategic goal of integrating the power system of Ukraine with Continental Europe and becoming a full member of ENTSO-E⁷. It was expected that disconnection from the Russian and Belarussian power systems and synchronous operation with the Continental European power system would create additional possibilities to develop Ukrainian electricity market and safeguard the electricity supply. Emergency synchronisation with the ENTSO-E on 16 March 2022, following the Russian military aggression and three weeks of isolated mode of operation, provided assistance to the Ukrainian power system to continue operating under previously unseen and difficult circumstances. Permanent synchronous operation of the Ukrainian power system with the Continental European power system, enabled as of 28 November 2023, will increase the reliability and resilience of the Ukrainian power system, expand electricity exchange possibilities between neighbouring countries, increase competition in the domestic market and create opportunities for domestic producers to participate in the European electricity market. Given that the integration of Ukraine's power system and electricity market in the pan-European power system/market is one of its key strategic goals, further alignment of transmission system operational rules with those applied in the Continental Europe will significantly contribute to fulfilling this strategic goal. By implementing the provisions related to the emergency and restoration from the ER NC, especially by defining system defence and restoration plans, the Ukrainian power system will likely be more resilient and prepared to quickly restore its operation in case of anticipated and unanticipated events and faults.

Harmonisation of the requirements for power system operation is expected to lead to a further increase of available cross-border capacity for electricity trade between Ukraine/Moldova control block and Continental Europe (based on system security and stability simulations, it is currently being set at 1700 MW for import/550 MW for export to/from Ukraine/Moldova) which is expected to have a positive impact on the competition in the electricity market in Ukraine and security of supply.

Provisions regarding load-frequency control (LFC) and reserves, especially related to the exchange and sharing of reserves and imbalance netting process, will contribute to an increase of reserves capable of balancing the power system and thus will allow for the higher integration of variable renewable energy sources (vRES).

Transmission-connected demand facilities and distribution-connected facilities that provide demand response directly to the TSO, providers of redispatching of power generating modules or demand facilities by means of aggregation, and other providers of active power reserves will be positively impacted by opening the possibilities for their increasing participation in the system balancing process. Increased competition in the balancing market will potentially lead to the reduction of system balancing costs of the TSO and of the costs of imbalances for market participants.

⁷ Ukrenergo became a member of ENTSO-E as of 01 January 2024

Compliance assessment

By adopting the Decisions 2021/13/MC-EnC and 2022/03/MC-EnC and incorporating the Electricity Integration Package in the Energy Community, Ukraine has committed to transpose and implement the package until 31 December 2023.

The Secretariat has reviewed the proposed draft amendments to the TSC assessing the transposition's completeness and compliance with the SO GL and ER NC. The detailed compliance assessment is presented in the Annexes to this document. This section summarises the main findings of the assessment.

a) SO GL transposition

The main aim of the SO GL is to define a set of minimum requirements for Energy Community-wide transmission system operation and cross-border cooperation between TSOs, taking into account connected DSOs and SGUs. These guidelines are necessary to safeguard operational security, synchronous system frequency and the efficiency of the interconnected system and resources. The guideline on system operation seeks to ensure that Europe's electricity transmission systems meet the goals of security of supply, increased competitiveness, and affordable electricity. The SO GL is a highly technical regulation with five sections covering general and technical aspects. The regulation lays down detailed guidelines on the following:

- requirements and principles concerning operational security;
- rules and responsibilities for the coordination and data exchange between TSOs, between TSOs and DSOs, and between TSOs or DSOs and SGUs, in operational planning and in close to real-time operation;
- rules for training and certification of system operator employees;
- rules on operational security analysis, including regional operational security coordination and appointment of RCCs;
- requirements on outage coordination;
- requirements for scheduling between the control areas for which the TSOs are responsible and
- rules aiming at the establishment of an EU/EnC-wide framework for load-frequency control and reserves.

Based on the conducted compliance assessment, the Secretariat considers that the SO GL is partially transposed by proposed amendments to the TGC. In particular, the amendments to the TSC directly meet specific technical requirements from the SO GL including technical details of the transmission system operation, in a compliant manner. For example, the SO GL requires that the TSO shall specify the operational security limits for each network element regarding the voltage limits, short-circuit currents, current limits in terms of thermal rating, and the draft amendments to the TSC define concrete these elements.

However, the draft amendments to the TSC fail to transpose general (non-technical) provisions of the SO GL, especially related to the pan-European, regional and national terms and conditions or methodologies (TCMs) which have to be directly applied (pan-European TCMs) or prepared by TSOs and adopted by national regulatory authorities from the respective regions (regional TCMs) or the Ukrainian regulatory authority (national TCMs).

Several provisions from TSC and its amendments make reference to the ENTSO-E standards/practices and rules, or ENTSO-E requirements and not to the SO GL. The Secretariat considers that those provisions need to be amended to reflect relevant TCMs as defined by SO GL.

The detailed compliance analysis is in Annex I.

b) ER NC

The main rationale of the ER NC is to set up an electricity network code with the aim of safeguarding the security of the electricity/power system and preventing incidents from spreading/worsening and avoiding widespread disturbances and blackout situations, as well as allowing for the efficient and fast restoration of the electricity system from the emergency or blackout states, as defined in the SO GL. The regulation establishes an electricity network code setting out requirements on:

- the management by the TSOs of the emergency, blackout and restoration states;
- the coordination of system operation across the Energy Community in emergency, blackout and restoration states;
- the tests, tools and facilities to guarantee a reliable, efficient and fast restoration.

ER NC defines that each TSO must design a system defence plan and a restoration plan, in consultation with relevant DSOs, SGUs, national regulatory authority and other stakeholders. It also sets conditions when TSO may temporarily suspend market activities.

Based on the conducted compliance assessment, the Secretariat considers that ER NC is also partially transposed by the draft amendments to the TSC. Namely, the draft amendments include provisions related to the defence and restoration plans and other technical details of these plans, which are the core provisions of the ER NC.

Draft amendments to TSC define in detail the system defence plan concerning the protection and automatised systems used, actions regarding large frequency deviations in both directions, and actions and measures to prevent voltage collapse and asynchronous operation of the system. Those draft provisions are compliant with, and are properly implementing the ER NC, taking into account Ukrainian practices and equipment/systems used. The provisions related to the system restoration in the amended TSC more directly transpose relevant provisions from the ER NC.

At the same time the draft amendments to the TSC do not transpose provisions from the general part of the ER NC, the provisions related to compliance testing of TSO, DSO and SGU capabilities considered in the system defence and the restoration plan, periodic reviews of the system defence plan and the restoration plan, as well as the final provisions (as presented in Annex II). The market interaction provisions, like procedures for suspension and restoration of market activities, rules for suspension and restoration of market activities, communication procedure and rules for settlement in case of suspension of market activities are also not transposed or addressed by the draft amendments.

In some cases, the Ukrainian TSC and its draft amendments go beyond the ER NC, such as in the chapter related to the protection of power system in a case of loss of synchronism

(asynchronous operation) of separate parts of IPS of Ukraine and/or power plants. The detailed compliance analysis is in Annex II.

Conclusions and recommendations

The TSC in force and the draft amendments subject to the present assessment transpose most of the SO GL and the ER NC provisions. This relates mainly to the technical details of these two acts and the practical operationalisation/implementation of their provisions, while the more general provisions, especially with respect to regulatory aspects and international obligations are transposed to a much lower extent. In some cases the amendments to the TGC go beyond the original regulation on emergency and restoration, defining in detail defence and restoration procedures applied in Ukraine.

It is expected that proposed amended version of the TSC will positively affect the performance of *Ukrenergo* in ensuring secure, reliable and efficient electricity power system, as well as other energy market stakeholders from Ukraine and the EU Member States and the Contracting Parties contributing to the security of electricity supply in general, as explained above.

At the same time, the different TCMs were not transposed, and although some of them might be applied directly through the synchronous area framework agreement (SAFA) and the LFC block operational agreement, those were not submitted for review by the Secretariat.

Proposed draft TSC completely fails to transpose market interaction provisions, like procedures for suspension and restoration of market activities, rules for suspension and restoration of market activities, communication procedure and rules for settlement in case of suspension of market activities. It shall be noted that currently provisions on market suspension are still set by the NEURC Resolution No.332 governing the functioning of the electricity market during martial law, which was assessed by the Secretariat⁸ as not in line with Article 4(2) of the ER NC.

In order to completely transpose and to fully comply with the SO GL and the ER NC, the Energy Community Secretariat recommends to *Ukrenergo* and NEURC to fully transpose all missing provisions in line with the assessment presented in the Annexes below.

⁸ Assessment Note 1/2023, https://www.energy-community.org/dam/jcr:e2e8e47c-c3e2-4cff-a861-affc94b75282/ECS_Ukraine-Energy-Market-Observatory_Note01.pdf

ANNEX I

Detail compliance analysis of TSC and its amendments with SO GL

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
PART I GENERAL PROVISIONS	
Article 1 - Subject matter	<i>Not transposed.</i> TSC does not define a summary of the provisions in the same way as SO GL.
Article 2 - Scope	<i>Partially transposed in the TSC.</i> TSC defines TSO, DSO, and all users as subjects of the TSC. SO GL defines TSO, DSOs, closed DSOs, producers, demand and users providing response to the system including aggregators as a subject of the Regulation.
Article 3 - Definitions	<i>Partially transposed by amendments to the TSC.</i> Several definitions are not in line with the original regulation (significant grid user, common grid model, situation N-1, rate of change of active power).
Article 4 - Objectives and regulatory aspects	<i>Not transposed.</i> TSC does not define the objectives and the regulatory aspects in a same way as SO GL.
Article 5 - Terms and conditions or methodologies of TSOs	<i>Not transposed.</i> TSC and the amendments do not transpose general principles of the terms and conditions or methodologies (TCM) as defined in the SO GL regarding the procedures, voting rights, cooperation and obligations toward the Energy Community Regulatory Board (ECRB), Energy Community Secretariat (ECS) and ACER.
Article 6 - Approval of terms and conditions or methodologies of TSOs	<i>Partially but not properly transposed.</i> This article defines TCM at the pan-European level which must be applied by Ukraine, regional TCM which must be developed by TSOs in the same regions and national TCMs which are prepared by national TSO and approved by the national regulatory Authority (RA). Ukrainian TSC and the amendments define several methodologies at the pan-European level but use the reference to the ENTSO-E and its standards and practices, not to the Regulation.
Article 7 - Amendments to the terms and conditions or methodologies of TSOs	<i>Not transposed.</i> TSC and the amendments do not contain procedures to amend TCM nor the role of ECRB or ACER in this process.

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 8 - Publication of terms and conditions or methodologies on internet	<i>Not transposed.</i> TSC and the amendments do not transpose TSO's obligation to publish TCM on the internet except when they are confidential.
Article 9 - Recovery of costs	<i>Not transposed.</i>
Article 10 - Stakeholder involvement	<i>Not applicable.</i> This article imposes obligations to ECRB, ECS and ACER.
Article 11 - Public consultation	<i>Not transposed.</i> TSC and the amendments do not define an obligation to conduct public consultations on TCMs.
Article 12 - Confidentiality obligations	<i>Partially transposed.</i> TSC and its amendments contain provisions about confidentiality but more specifically defined comparing with the Regulation.
Article 13 - Agreements with TSOs not bound by this Regulation	<i>Not applicable.</i> Relationship with third countries for Ukraine is not realistic (Russia, Belarus).
Article 14 - Monitoring	<i>Not relevant.</i> The article prescribes duties of ENTSO-E, ACER and DSOs in the monitoring process. TSO's obligation to deliver data to ENTSO-E is addressed in TSC.
Article 15 - Annual report on operational security indicators	<i>Not relevant.</i> The article prescribes duties of ENTSO-E in the reporting process. TSO's obligation to deliver data to ENTSO-E is addressed in TSC.
Article 16 - Annual report on load-frequency control	<i>Not relevant.</i> The same as previous.
Article 17 - Annual report on regional coordination assessment	<i>Not relevant.</i> The same as previous, related to duties of ENTSO-E and RCCs.
PART II OPERATIONAL SECURITY	
Article 18 - Classification of system states	<i>Transposed.</i> Amendments to the TSC address provisions from this article.
Article 19 - Monitoring and determination of system states by TSOs	<i>Transposed.</i> TSC contains provisions from this article.
Article 20 - Remedial actions in system operation	<i>Transposed.</i> TSC and the amendments contain provisions from this article.
Article 21 - Principles and criteria applicable to remedial actions	<i>Transposed.</i> TSC and the amendments contain provisions from this article.

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 22 - Categories of remedial actions	<i>Transposed.</i> TSC and the amendments contain provisions from this article.
Article 23 - Preparation, activation and coordination of remedial actions	<i>Transposed.</i> TSC and the amendments contain provisions from this article.
Article 24 - Availability of TSO's means, tools and facilities	<i>Transposed.</i> Amendments to the TSC contain provisions from this article.
Article 25 - Operational security limits	<i>Transposed.</i> TSC and the amendments contain provisions from this article.
Article 26 - Security plan for critical infrastructure protection	<i>Transposed.</i> TSC contains provisions from this article.
Article 27 - Obligations of all TSOs regarding voltage limits	<i>Transposed.</i> TSC fulfils provisions from this article.
Article 28 - Obligations of SGUs concerning voltage control and reactive power management in system operation	<i>Not transposed.</i> TSC defines voltage limits but doesn't impose an obligation to SGUs to declare their voltage capabilities within 3 months following the transposition of the regulation.
Article 29 - Obligations of all TSOs concerning voltage control and reactive power management in system operation	<i>Partially transposed.</i> TSC and the amendments contain provisions related to voltage control but not directly imposing provisions from related SO GL article.
Article 30 - Short-circuit current	<i>Partially transposed.</i> TSC and the amendments contain provisions related to short-circuit but do not contain obligation of the TSO to calculate their minimum values used for correct operation of protection equipment.
Article 31 - Short-circuit current calculation and related measures	<i>Partially transposed.</i> TSC and the amendments contain provisions related to short-circuit calculations and related measures but not directly imposing provisions from related SO GL article.
Article 32 - Power flow limits	<i>Transposed.</i> TSC contains provisions related to permitted power flows in the N and N-1 situations.
Article 33 - Contingency lists	<i>Transposed.</i>
Article 34 - Contingency analysis	
Article 35 - Contingency handling	
Article 36 - General requirements on protection	<i>Transposed.</i> TSC contains provisions related to system protection.
Article 37 - Special protection schemes	<i>Not transposed.</i>

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
	TSC or the amendments don't include provisions related to a special protection scheme (except its definition).
Article 38 - Dynamic stability monitoring and assessment	<i>Partially transposed.</i> TSC and the amendments contain provisions related to dynamic stability but not directly imposing provisions from related SO GL article.
Article 39 - Dynamic stability management	<i>Transposed.</i> TSC and the amendments contain provisions related to the critical clearing times and minimum inertia.
Article 40 - Organisation, roles, responsibilities and quality of data exchange	<p><i>Mostly Transposed.</i> TSC and the amendments define data and information exchange between TSO and other TSOs, DSOs and SGUs but not in details defined in the respective articles of the SO GL.</p> <p>(continues on the next page)</p>
Article 41 - Structural and forecast data exchange	
Article 42 - Real-time data exchange	
Article 43 - Structural data exchange	
Article 44 - Real-time data exchange	
Article 45 - Structural data exchange	
Article 46 - Scheduled data exchange	
Article 47 - Real-time data exchange	
Article 48 - Structural data exchange	
Article 49 - Scheduled data exchange	
Article 50 - Real-time data exchange	
Article 51 - Data exchange between TSOs and DSOs concerning significant power generating modules	
Article 52 - Data exchange between TSOs and transmission-connected demand facilities	
Article 53 - Data exchange between TSOs and distribution-connected demand facilities or third parties participating in demand response	
Article 54 - Responsibility of the SGUs	<i>Not transposed.</i> There are no provisions defining roles and responsibilities of the significant grid users regarding modification of their facilities, compliance testing and simulations and other obligations defined in the Article 54 of the SO GL.
Article 55 - Tasks of TSOs regarding system operation	<i>Partially transposed</i> but not directly as defined in the relevant article of the SO GL.
Article 56 - Purpose and responsibilities	<i>Partially transposed.</i>

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 57 - Performing operational tests and analysis	Only testing procedure for ancillary services providers is included in the amendments.
Article 58 - Training program	Partially transposed. There are detail provisions regarding the training program in the TSC but not strictly following the Articles 58-61 of the SO GL.
Article 59 - Training conditions	
Article 60 - Training coordinators and trainers	
Article 61 - Certification of system operator employees in charge of real-time operation	
Article 62 - Common language for communication between the system operator employees in charge of real time operation	
Article 63 - Cooperation between TSOs on training	<i>Transposed</i> in the amendments.
PART III OPERATIONAL PLANNING	
Article 64 - General provisions regarding individual and common grid models	<i>Transposed</i> in the amendments.
Article 65 - Year-ahead scenarios	<i>Partially transposed.</i> TSC defined year-ahead scenarios but misses to define exact hours as in SO GL.
Article 66 - Year-ahead individual grid models	<i>Transposed.</i> TSC defines details related to IGMs, their modification and exchange with the ENTSO-E.
Article 67 - Year-ahead common grid models	
Article 68 - Updates of year-ahead individual and common grid models	
Article 69 - Week-ahead individual and common grid models	<i>Transposed</i> in the amendments.
Article 70 - Methodology for building day-ahead and intraday common grid models	
Article 71 - Quality control for grid models	
Article 72 - Operational security analysis in operational planning	
Article 73 - Year-ahead up to and including week-ahead operational security analysis	<i>Transposed</i> to a large extent.
Article 74 - Day-ahead, intraday and close to real-time operational security analysis	
Article 75 - Methodology for coordinating operational security analysis	
Article 76 - Proposal for regional operational security coordination	<i>Partially transposed.</i> Amendments on the TSC contain provisions related to regional cooperation including relations with the RCCs but not directly transposing relevant articles of the SO GL.
Article 77 - Organisation for regional operational security coordination	
Article 78 - Regional operational security coordination	
Article 79 - Common grid model building	<i>Transposed</i> by the amendments.
Article 80 - Regional outage coordination	

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation		
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments	
Article 81 - Regional adequacy assessment		
Article 82 - Outage coordination objective		
Article 83 - Regional coordination		
Article 84 - Methodology for assessing the relevance of assets for outage coordination		
Article 85 - Lists of relevant power generating modules and relevant demand facilities		
Article 86 - Update of the lists of relevant power generating modules and relevant demand facilities		
Article 87 - Lists of relevant grid elements		
Article 88 - Update of the list of relevant grid elements		
Article 89 - Appointment of outage planning agents		
Article 90 - Treatment of relevant assets located in a distribution system or in a closed distribution system		
Article 91 - Variations to deadlines for the year-ahead outage coordination		
Article 92 - General provisions on availability plans		<i>Transposed by the amendments.</i>
Article 93 - Long-term indicative availability plans		
Article 94 - Provision of year-ahead availability plan proposals		
Article 95 - Year-ahead coordination of the availability status of relevant assets for which the outage planning agent is not a TSO taking part in an outage coordination region, nor a DSO or a CDSO		
Article 96 - Year-ahead coordination of the availability status of relevant assets for which the outage planning agent is a TSO taking part in an outage coordination region, a DSO or a CDSO		
Article 97 - Provision of preliminary year-ahead availability plans		
Article 98 - Validation of year-ahead availability plans within outage coordination regions		
Article 99 - Final year-ahead availability plans		
Article 100 - Updates to the final year-ahead availability plans		
Article 101 - Management of the 'testing' status of relevant assets		
Article 102 - Procedure for handling forced outages		

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 103 - Real-time execution of the availability plans	
Article 104 - Forecast for control area adequacy analysis	<i>Partially transposed.</i> TSC and the amendments include a lot of provisions on the adequacy assessments but not structured as in the SO GL. No provisions related to intraday adequacy.
Article 105 - Control area adequacy analysis	
Article 106 - Control area adequacy up to and including week-ahead	
Article 107 - Control area adequacy in day-ahead and intraday	
Article 108 - Ancillary services	<i>Partially transposed.</i> TSC and the amendments include a lot of provisions on the ancillary services but not structured as in the SO GL.
Article 109 - Reactive power ancillary services	
Article 110 - Establishment of scheduling processes	<i>Transposed by the amendments.</i>
Article 111 - Notification of schedules within scheduling areas	
Article 112 - Coherence of schedules	
Article 113 - Provision of information to other TSOs	
Article 114 - General provisions for ENTSO for Electricity operational planning data environment	<i>Not relevant</i> for Ukrainian TSC, defines the obligation of ENTSO-E. Provisions related to individual grid models imposing obligations on Ukrainian TSO included into TSC.
Article 115 - Individual grid models, common grid models and operational security analysis	
Article 116 - Outage coordination	
Article 117 - System adequacy	
PART IV LOAD-FREQUENCY CONTROL AND RESERVES	
Article 118 - Synchronous area operational agreements	<i>Transposed to a large extent.</i> TSC and the amendments define the obligation and provisions of SAFA. Provisions relate to the ENTSO-E standards and rules and not to the SO GL. There is no obligation of the regulatory authority to confirm such agreement.
Article 119 - LFC block operational agreements	<i>Transposed to a large extent.</i> TSC and the amendments define the obligation and provisions of LFC block agreement. Provisions relate to the ENTSO-E standards and rules and not to the SO GL. There is no obligation of the regulatory authority to confirm such agreement.
Article 120 - LFC area operational agreement	<i>Not applicable.</i> There is only one TSO in Ukrainian control area.
Article 121 - Monitoring area operational agreement	
Article 122 - Imbalance netting agreement	<i>Transposed by the amendments.</i>
Article 123 - Cross-border FRR activation agreement	
Article 124 - Cross-border RR activation agreement	

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 125 - Sharing agreement	
Article 126 - Exchange agreement	
Article 127 - Frequency quality defining and target parameters	<i>Partially transposed</i> but not in the same structure as in the SO GL.
Article 128 - FRCE target parameters	<i>Partially transposed</i> but not in the same structure as in the SO GL.
Article 129 - Criteria application process	<i>Transposed</i> in the definitions part of the TSC.
Article 130 - Frequency quality evaluation data	<i>Partially transposed</i> in the definitions part of the TSC.
Article 131 - Frequency quality evaluation criteria	<i>Transposed.</i>
Article 132 - Data collection and delivery process	<i>Partially transposed</i> in the definitions part of the TSC.
Article 133 - Synchronous area monitor	<i>Partially transposed</i> but not in the same structure as in the SO GL.
Article 134 - LFC block monitor	<i>Partially transposed</i> but not in the same structure as in the SO GL.
Article 135 - Information on load and generation behaviour	<i>Partially transposed.</i>
Article 136 - Ramping period within the synchronous area	<i>Transposed.</i>
Article 137 - Ramping restrictions for active power output	<i>Partially transposed</i> but not in the same structure as in the SO GL.
Article 138 - Mitigation	<i>Not transposed.</i>
Article 139 - Basic structure	<i>Partially transposed</i> in the definitions part of the TSC.
Article 140 - Process activation structure	
Article 141 - Process responsibility structure	<i>Partially transposed</i> but not in the same structure as in the SO GL.
Article 142 - Frequency containment process	<i>Partially transposed</i> , no provision about monotonic decrease of the FCR activation as a function of the frequency deviation.
Article 143 - Frequency restoration process	<i>Not transposed</i> as in the SO GL.
Article 144 - Reserve replacement process	<i>Partially transposed</i> in the definitions.
Article 145 - Automatic and manual frequency restoration process	<i>Partially transposed</i> but not in the same structure as in the SO GL.
Article 146 - Imbalance netting process	
Article 147 - Cross-border FRR activation process	<i>Transposed</i> in the amendments.
Article 148 - Cross-border RR activation process	
Article 149 - General requirements for cross-border control processes	<i>Not transposed</i> directly as in the SO GL.
Article 150 - TSO notification	<i>Not transposed.</i>
Article 151 - Infrastructure	<i>Partially transposed.</i>
Article 152 - System states related to system frequency	
Article 153 - FCR dimensioning	<i>Partially transposed</i> but not directly by using provisions from the SO GL.
Article 154 - FCR technical minimum requirements	
Article 155 - FCR prequalification process	<i>Not transposed.</i>

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
	Provisions regarding prequalification process of FCR providers have been not transposed in the TSC nor in the amendments.
Article 156 - FCR provision	<i>Partially transposed</i> but not directly by using provisions from the SO GL.
Article 157 - FRR dimensioning	<i>Partially transposed.</i>
Article 158 - FRR minimum technical requirements	TSC and its amendments contain a lot of details on how to dimension FRR, including both products aFRR and mFRR, but not by using provisions from the SO GL because ENTSO-E technical details have been applied. However, these details may be incorporated in the LFC block operational agreement.
Article 159 - FRR prequalification process	<i>Not transposed.</i> Provisions regarding prequalification process of FRR providers have been not transposed in the TSC nor in the amendments.
Article 160 - RR dimensioning	<i>Partially transposed.</i>
Article 161 - RR minimum technical requirements	TSC and its amendments contain a lot of details on how to dimension RR but not by using provisions from the SO GL because ENTSO-E technical details have been applied. However, these details may be incorporated in the LFC block operational agreement.
Article 162 - RR prequalification process	<i>Not transposed.</i> Provisions regarding prequalification process of RR providers have been not transposed in the TSC nor in the amendments.
Article 163 - Exchange of FCR within a synchronous area	<i>Transposed</i> in the amendments.
Article 164 - Sharing of FCR within a synchronous area	
Article 165 - General requirements for the exchange of FRR and RR within a synchronous area	
Article 166 - General requirements for sharing FRR and RR within a synchronous area	
Article 167 - Exchange of FRR within a synchronous area	
Article 168 - Sharing of FRR within a synchronous area	
Article 169 - Exchange of RR within a synchronous area	
Article 170 - Sharing of RR within a synchronous area	
Article 171 - General requirements	<i>Not transposed and practically not applicable in Ukrainian case.</i>
Article 172 - Frequency coupling between synchronous areas	These articles are related to the exchange and sharing of reserves between synchronous areas, which for Ukraine means with Russia and Belarus, which is not applicable to be included in TSC at this moment.
Article 173 - Exchange of FCR between synchronous areas	
Article 174 - Sharing of FCR between synchronous areas	

COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 175 - General requirements for sharing of FRR and RR between synchronous areas	
Article 176 - Exchange of FRR between synchronous areas	
Article 177 - Sharing of FRR between synchronous areas	
Article 178 - Exchange of RR between synchronous areas	
Article 179 - Sharing of RR between synchronous areas	
Article 180 - Cross-border activation process for FRR/RR	<i>Transposed</i> in the amendments.
Article 181 - Time control process	<i>Transposed</i> by using technical details agreed between all TSOs.
Article 182 - Reserve providing groups or units connected to the DSO grid	<i>Mostly not transposed.</i>
Article 183 - General transparency requirements	<i>Partially transposed.</i>
Article 184 - Information on operational agreements	<i>Not transposed.</i> There are no provisions regarding sharing of the contents of synchronous area operational agreement and LFC block operational agreement with the regulatory authority.
Article 185 - Information on frequency quality	<i>Partially transposed.</i> TSC and the amendments define a lot of data and information which shall be shared with ENTSO-E but not the one related to frequency quality in line with the deadlines defined in these articles.
Article 186 - Information on the load-frequency control structure	
Article 187 - Information on FCR	
Article 188 - Information on FRR	
Article 189 - Information on RR	
Article 190 - Information on sharing and exchange	
Article 191 - Amendments to contracts and general terms and conditions	<i>Not transposed.</i>
Article 192 - Entry into force	<i>Not applicable.</i>

ANNEX II

Detail compliance analysis of TSC and its amendments with ER NC

COMMISSION REGULATION (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
CHAPTER I GENERAL PROVISIONS	
Article 1 - Subject matter	<i>Not transposed.</i>
Article 2 - Scope	<i>Not transposed.</i> TSC and its amendments do not clearly define subjects affected by this regulation.
Article 3 - Definitions	<i>Partially transposed.</i> Some definitions from the ER NC are missing although used in the TSC and the amendments (frequency leader, bottom-up re-energisation strategy..., etc.)
Article 4 - Regulatory aspects	<i>Not transposed.</i> Basic requests when applying the ER NC are missing, regulatory aspects are not included, terms and conditions to act as defence service providers are not included, no deadlines regarding system defence plan.
Article 5 - Consultation and coordination	<i>Partially transposed.</i> There are no general provisions related to consultation and coordination or regional coordination, but some aspects are incorporated in the individual articles (consultations with DSO, other TSOs...).
Article 6 - Regional coordination	
Article 7 - Public consultation	<i>Not transposed.</i> No provisions regarding public consultations and the inclusion of stakeholders regarding emergency and restoration.
Article 8 - Recovery of costs	Not transposed but grid code is not the right legal document to define that costs related to emergency and restoration shall be included into transmission tariff.
Article 9 - Confidentiality obligations	<i>Partially transposed</i> in the individual articles but not in a general way defined by article 9 of the ER NC.
Article 10 - Agreement with TSOs not bound by this Regulation	<i>Not applicable.</i> Due to obvious reasons Ukraine can't cooperate with Russia and Belarus in the E&R issues.
CHAPTER II SYSTEM DEFENCE PLAN	
Article 11 - Design of the system defence plan	

COMMISSION REGULATION (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 12 - Implementation of the system defence plan	<i>Partially transposed.</i> There are no general provisions regarding the design, implementation and activation of the system defence plan but some provisions from the original regulation are implemented into individual articles of the TSC and its amendments.
Article 13 - Activation of the system defence plan	
Article 14 - Inter-TSO assistance and coordination in emergency state	<i>Transposed</i> in the amendments.
Article 15 - Automatic under-frequency control scheme	<i>Transposed but not directly as in the ER NC.</i> TSC and its amendments do not directly transpose provisions from these articles but define technical details of applied protection systems in Ukrainian transmission network (relays and automation devices, referred as EA systems) and frequency thresholds related to the activation of individual actions to recover frequency.
Article 16 - Automatic over-frequency control scheme	
Article 17 - Automatic scheme against voltage collapse	<i>Transposed.</i>
Article 18 - Frequency deviation management procedure	<i>Transposed but not directly as in the ER NC.</i>
Article 19 - Voltage deviation management procedure	
Article 20 - Power flow management procedure	<i>Partially transposed.</i> The majority of technical provisions from these articles are defined in the TSC and its amendments, although not directly transposed from the original regulation.
Article 21 - Assistance for active power procedure	
Article 22 - Manual demand disconnection procedure	
CHAPTER III RESTORATION PLAN	
Article 23 - Design of the restoration plan	<i>Partially transposed.</i> There are no general provisions regarding the design, implementation and activation of the system restoration plan but some provisions from the original regulation are implemented into individual articles of the TSC and its amendments.
Article 24 - Implementation of the restoration plan	
Article 25 - Activation of the restoration plan	<i>Transposed</i> in the amendments (directly as in the ER NC).
Article 26 - Re-energisation procedure	
Article 27 - Activation of the re-energisation procedure	
Article 28 - Frequency management procedure	
Article 29 - Appointment of a frequency leader	
Article 30 - Frequency management after frequency deviation	
Article 31 - Frequency management after synchronous area split	
Article 32 - Resynchronisation procedure	<i>Transposed</i> in the amendments (directly as in the ER NC).
Article 33 - Appointment of a resynchronisation leader	
Article 34 - Resynchronisation strategy	
CHAPTER IV MARKET INTERACTIONS	
Article 35 - Procedure for suspension of market activities	<i>Not transposed.</i>
Article 36 - Rules for suspension and restoration of market activities	

COMMISSION REGULATION (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 37 - Procedure for restoration of market activities	TSC and its amendments do not contain any provision from the ER NC related to possible suspension of market activities.
Article 38 - Communication procedure	
Article 39 - Rules for settlement in case of suspension of market activities	
CHAPTER V INFORMATION EXCHANGE AND COMMUNICATION, TOOLS AND FACILITIES	
Article 40 - Information exchange	<i>Partially transposed</i> by the amendments. They contain the provisions related to data exchange between TSO and other TSOs, DSOs, system users, generators of type B, C and D, but not directly transposing relevant article from the ER NC.
Article 41 - Communication systems	<i>Partially transposed</i> by the amendments but only defining that restoration plan shall contain requirements for means of telecommunications, including the compatibility of voice communication systems, and their backup power supply.
Article 42 - Tools and facilities	<i>Not transposed.</i>
CHAPTER VI COMPLIANCE AND REVIEW	
Article 43 - General principles	<i>Not transposed.</i>
Article 44 - Compliance testing of power generating module capabilities	
Article 45 - Compliance testing of demand facilities providing demand side response	
Article 46 - Compliance testing of HVDC capabilities	
Article 47 - Compliance testing of low frequency demand disconnection relays	
Article 48 - Testing of communication systems	
Article 49 - Testing of tools and facilities	
Article 50 - Compliance testing and periodic review of the system defence plan	<i>Transposed.</i>
Article 51 - Compliance testing and periodic review of the restoration plan	
CHAPTER VII IMPLEMENTATION	
Article 52 - Monitoring	<i>Not relevant</i> since it defines obligations of ENTSO-E and Energy Community Secretariat.
Article 53 - Stakeholder involvement	<i>Not relevant</i> since it defines obligations of ECRB and ENTSO-E.
CHAPTER VIII FINAL PROVISIONS	
Article 54 - Amendments to contracts and general terms and conditions	<i>Not transposed.</i>

COMMISSION REGULATION (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration	
Specific comments (e.g. transposed, not transposed, partially transposed)	Most relevant comments
Article 55 - Entry into force	<i>Not relevant.</i>