

Methodology for coordinating operational security analysis

in accordance with Article 75 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation

General additional Recommendations to be included in CSA Methodology Whereas:

- (1) In accordance with Article 35(2) of Regulation 2019/943 of the European Parliament and of the Council on the internal market for electricity (hereafter referred to as “Electricity Regulation”), the regional coordination centres (‘RCCs’) shall replace the RSCs established pursuant to the SO Regulation and shall enter into operation by 1 July 2022.

Proposal for an additional definition to be added in paragraph 1 from Article 2 Definitions and Interpretations

(26) ‘Setpoint’ means a state or target value of an individual network element or set of network elements to impact active power flows and/or control voltage and/or manage reactive power, such as but not limited to a Phase-Shifting Transformer (PST), a HVDC system or a Flexible Alternating Current Transmission System (FACTS)

Article 21

Remedial actions inclusion in individual grid models

1. When preparing individual grid models pursuant to Article 70 of the SO Regulation, each TSO shall include all remedial actions already agreed as a result of previous coordinated operational security analyses in accordance with Article 17(1) and Article 18(4) or previous coordinated regional operational security assessments in accordance with Article 78 of the SO Regulation.
2. When preparing individual grid models pursuant to Article 70 of the SO Regulation, each TSO shall have the right to perform a local preliminary assessment.
3. When performing a local preliminary assessment, and provided this is consistent with the common provisions developed as required by Article 76(1) of the SO Regulation, each TSO may choose whether or not to relieve operational security limit violations on:
 - (a) network elements identified in accordance with Article 20(1) if the TSO expects it to be relieved during the subsequent coordinated regional operational security assessment;
 - (b) any other network elements provided those operational security limit violations are likely to be solved by non-cross-border relevant remedial actions;
 - (c) any other network elements provided those operational security limit violations are likely to be relieved by subsequent coordinated regional operational security assessment.
4. When preparing individual grid models pursuant to Article 70 of the SO Regulation, in addition to the remedial actions referred to in paragraph 1 and taking into account where applicable the results of the local preliminary assessment referred to in paragraph 2, each TSO may include any cross-border

relevant remedial action in accordance with paragraph 6 or any non-cross-border relevant remedial actions in accordance with Article 21(1)(a) of the SO Regulation.

5. Remedial actions included pursuant to paragraphs 1 and 4 shall be clearly distinguishable from the injections and withdrawals established in accordance with Article 40(4) of the SO Regulation and the network topology without remedial actions applied. Injections and withdrawals shall by default reflect the latest market schedules and load/RES forecasts available. Any deviation from these default assumptions shall be considered as a Remedial Action.

6. In Day-Ahead when preparing the Individual Grid Models referred to in Article 33(1)(a), for the topology or setpoint of any network element, injections and withdrawals, each TSO shall include the best-forecast operational situation, in accordance with Articles 67(1) and 70(1) of the SO Regulation establishing a guideline on electricity transmission system operation, consistent with the common provisions developed as required by Article 76(1) of the SO Regulation and in accordance with the paragraphs 1 until 5.

All the IGMs updated later on, in Day-Ahead or Intra-Day timeframe, shall not include new or modified XRAs, compared to the previous IGM version, on topology, setpoints, injections or withdrawals, unless it is agreed in the latest coordinated operational security assessment or coordinated process defined in methodologies developed as required by Article 76 of the SO Regulation, or they are not technically available anymore.

7. In addition to paragraph 5, for topology and setpoint of any network element, no distinction is made between remedial actions and forecasts within the Day-Ahead Individual Grid Models referred to in Article 33(1)(a).

8. If required by at least one TSO, XRA affected TSOs of a concerned CCR shall agree at CCR level on detailed rules on how to meet the best-forecast approach for a specific network element. The concerned CCR is the CCR to which the remedial action is appointed in accordance with Article 27(9).

9. Monitoring of topology and setpoints included in the IGMs shall be performed by RSCs as a solution for the improvement of forecasts and to prevent unfair behaviour of TSOs that could impact the operational security and economic efficiency.

Article 27

Overlapping zones, XNEs and XRAs

1. Where a network element has been defined as XNE in a Bidding Zone and where the physical flows on this XNE are significantly impacted by activation of XRAs in two or more CCRs as referred in paragraph 4, this XNE shall be defined as overlapping XNE. Such XNEs shall be grouped into overlapping zones and the concerned CCRs shall be considered as impacting CCRs for these overlapping zones.

2. In case the Overlapping XNE is an XNE located in a Bidding Zone of a TSO belonging to more than one CCR, the operational security violations on an overlapping XNE, as defined in paragraph (4), shall be addressed at a regional level first, in a single-CCR, together with other XNEs of this CCR. This single CCR shall be appointed by the overlapping XNE connecting TSO(s), ensuring consistency with the choices made during the capacity calculation process in case such overlapping XNE is also a CNE. In case of an objection from any TSO of the concerned CCRs, the XNE connecting TSO(s) shall demonstrate that the operational security violations on the concerned XNE can most efficiently be addressed in the appointed CCR. In case an XNE is not a CNE from the CCR it is appointed to, on request of any TSO the XNE connecting TSO shall demonstrate that the operational security violations on the concerned XNE can efficiently be addressed within the appointed CCR, if not such an XNE should not be declared as XNE in such a CCR. In case an Overlapping XNE is a cross-zonal line, this overlapping XNE shall be appointed to the CCR the bidding zone border belongs to. Subsequently, in

Day-Ahead timeframe the residual operational security violations, resulting after each coordinated regional operational security assessment is finalised, shall be addressed with a common cross-regional coordination process involving TSOs and RSCs of all impacting CCRs.

3. For intraday timeframe, the default approach is to run a cross-regional coordination process to address residual operational violations, in accordance with Article 30, after any intraday coordinated regional operational security assessment. The TSOs from a CCR shall communicate to relevant RSCs, at least on a yearly basis, if coordinated regional operational security assessment is not followed by a cross-regional coordination process due to time constraints or according to an agreement between concerned CCRs. In this case, a conservative approach shall be implemented for intraday coordinated regional operational security assessment. This conservative approach for the intraday coordinated regional operational security assessment shall ensure that the loading of each overlapping XNE appointed to a different CCR is not increased more than a maximum percentage of the remaining available margin obtained in the CGM to reach its current limit (defined and further described in Annex II).

4. Overlapping XNEs shall be assessed through a quantitative approach by TSOs with support from RSCs, according to the following process:

- a) Individual remedial action influence factor shall be computed for each XRA appointed to a given CCR A against all the XNEs with contingencies which are appointed to a different CCR B according to paragraph 2;
- b) XRAs consisting of a combination of multiple devices operated simultaneously in a common way (e.g. parallel PSTs operated with same tap position) shall be considered as an individual XRA and are therefore associated to an individual remedial action influence factor, in accordance with Article 14. Such XRAs consisting of a combination of multiple devices shall be defined by TSOs;
- c) All XRAs that have an individual remedial action influence factor (at maximum range) below 1% shall be discarded. The remaining XRAs shall be grouped per CCR in accordance to Article 27 paragraph (9);
- d) The maximum potential XRAs' impact of a given CCR A on XNEs with contingencies which are appointed to a different CCR B according to paragraph (c) is computed as the sum of the absolute values of the remedial action influence factors of the group of XRAs of CCR A;
- e) If the maximum potential XRAs impact of a given CCR A on at least one XNE with contingencies appointed to a different CCR B is higher than or equal to 5%, this XNE is labelled as Overlapping XNE and CCR B is labelled as impacted by CCR A.
- f) The XRAs used in point e) to identify Overlapping XNEs are defined as Overlapping XRAs

5. Overlapping XNEs are assessed on a yearly basis using the CGMs built for the year ahead scenarios established according to article 65 of SO Regulation and on TSO request in case of significant changes occurred in the grid (e.g. commissioning/decommissioning of relevant network elements, forced outages, etc.), using updated year-ahead common grid models in accordance with Article 68 of the SO Regulation. Requesting TSO shall provide a sound justification for such a reassessment. If an XNE is identified as overlapping XNE during the assessment of at least one of the models, this XNE becomes an overlapping XNE as long as there is no new yearly assessment and it participates in further steps of the cross-regional coordination process.

6. When residual violations are identified during the common cross-regional coordination process:

- a) If the violations are located on Overlapping XNEs as referred to in paragraph (4)(e), the effective XRAs (i.e. Overlapping XRAs) of the impacting CCRs should be used to solve such violations;
- b) If the violations are on XNEs which are not Overlapping XNEs as referred to in paragraph (4)(e), the effective XRAs made available in the CCR to which the XNE is assigned according to paragraph 2 should be used.
- c) If the violations are located on both Overlapping XNEs and not-Overlapping XNEs, all the XRAs that were made available in concerned CCRs should be used to solve such violations.
- d) RSCs might propose additional Remedial Actions in accordance with Article 31.

7. To ensure a consistent interaction between coordinated regional operational security assessment and coordinated cross-regional operational security assessments, residual violations shall be identified by RSCs with application of the contingency list from each CCR and the inclusion of all XRAs agreed within each coordinated regional operational security assessment. All the XRAs agreed during each coordinated regional operational security assessment can be re-evaluated during the coordinated cross-regional operational security assessment.

8. RSCs of the concerned CCRs shall identify and propose solutions to manage residual violations with at least the available input data and RSC's supporting tools, and with respect to the time constraints of Day-Ahead and intraday processes. The identification of economically efficient remedial actions to address residual operational security violations at cross-regional level shall be done with the aim to minimize changes of agreed XRAs within each coordinated regional operational security assessment while:

- a) Solving the residual overloads
- b) Not generating new overloads on any XNE
- c) Minimizing the costs of remedial actions
- d) Respecting the technical, operational, procedural and legal constraints defined by each TSO within the coordinated regional operational security assessment.

The XRA affected TSOs shall evaluate the resulting recommended XRAs in accordance with Article 17(6) and 17(7).

9. When considering an individual XRA, the XRA connecting TSO(s) shall decide on a single impacting CCR to which it shall provide this individual XRA. This decision shall take account of the assumptions on remedial actions considered in capacity calculation methodologies established pursuant to Articles 20 and 21 of the CACM Regulation.

10. In the implementation of Articles 78, 80 and 81 of the SO Regulation, RSCs and TSOs shall take into account the agreements reached in accordance with paragraphs 1 to 8.

11. The costs resulting from solving residual violations on overlapping XNEs during the coordinated cross-regional operational security assessment will be subject to a cost-sharing process among CCRs. The cost sharing will be proportional to the burdening flows created by the CCRs on the overlapping XNEs during their coordinated regional operational security assessment. The burdening flows induced by one CCR on overlapping XNEs are computed as the maximum between zero and the difference between the absolute value of the flow (in Amperes) calculated in the CGM after coordinated regional operational security assessment in this CCR and the absolute value of the flow (in Amperes) calculated in the initial CGM before any coordinated regional operational security assessment has taken place. For the CCR where the operational security violations on the overlapping XNEs are addressed at a regional level first, the burdening flow is increased by the remaining overload after the coordinated regional operational security assessment, if any.

12. The cost-sharing process among CCRs described in paragraph 11 does not apply for a given overlapping XNE:

- a) in case not all the XRAs agreed at regional level were consistently included in the CGM used for the cross-regional process for the concerned CCRs
- b) in case the agreed XRAs from one neighbouring CCR have an impact lower than 5% over the concerned overlapping XNE

In this case, the cost resulting from solving the residual operational security violations on the overlapping XNE are allocated to the CCR where the overlapping XNE is managed at a regional level.

13. Any XRA agreed outside the coordinated cross-regional operational security assessment or any XRA agreed to solve a constraint on an XNE which is not an Overlapping XNE cannot trigger any cost sharing between CCRs.

14. No later than twelve months after the adoption of this methodology, all TSOs shall jointly develop a proposal for amendment of this methodology in accordance with Article 7(4) of the SO Regulation. The proposal shall complement this methodology with rules for the sharing of costs of the overlapping XRAs activated to address the residual operational security violations by assigning the shares of costs to individual overlapping XNEs (i.e. mapping process).

15. The process described under paragraph 11-14 will result in costs allocated at CCR level to solve operational security violations on overlapping XNEs during the cross-regional operational security assessment. Regional cost-sharing methodology will then apply for splitting these costs within the TSOs of the CCR. Regional Cost-Sharing Methodologies shall make sure that XNEs labelled as overlapping XNEs are properly considered. The regional Cost-sharing methodologies might use different principles for costs originating from cross-regional operational security assessment compared to the ones applied for costs originating from coordinated regional operational security assessment.

Annex II

In accordance with Article 27, the remaining available margin of an Overlapping XNE is the absolute value of the difference, when the Overlapping XNE is not overloaded, between PATL (in Amperes and assumed positive) and the absolute value of the active current flow (in Amperes) on this Overlapping XNE in the last intraday CGM before the next intraday coordinated regional operational security assessment is run. The remaining available margin is set to zero in case the overlapping XNE is already overloaded.

The maximum percentage of this remaining available margin is 10 % for the conservative approach within Intraday timeframe. The maximum percentage of this remaining available margin can be reassessed during the Implementation phase or also at a later stage upon agreement of all TSOs. ENTSO-E shall publish the final value on its website.