ACER
European Union Agency for the Cooperation of Energy Regulators

PUBLIC

DECISION No 11/2022
OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS

of 8 August 2022

on the alternative bidding zone configurations to be considered in the bidding zone review process

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to 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 (ACER)[1], and, in particular, Article 5(7) thereof,

Having regard to Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity [2], and, in particular, Article 14(5) thereof,

Having regard to the outcome of the consultation with consultation with the transmission system operators (TSOs) and regulatory authorities,

Having regard to the outcome of the consultation with ACER's Electricity Working Group (AEWG),

Having regard to the favourable opinion of the Board of Regulators of 5 August 2022, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942,

Whereas

1 Introduction

(1) Regulation (EU) 2019/943 of the European Parliament and the Council of 5 June 2019 on the internal market for electricity (the 'Electricity Regulation') laid down a range of requirements to address congestions and, in particular, to ensure an optimal configuration of bidding zones (BZs). These requirements include the need to carry out a BZ review (BZR).

---

[1] OJ L 158, 14.6.2019, p. 22.
[2] OJ L 158, 14.6.2019, p. 54.

(2) With regard to the BZR, pursuant to Article 14(5) of the Electricity Regulation, all relevant TSOs have to submit a proposal for the methodology and assumptions that are to be used in the BZR process and for the alternative BZ configurations to be considered ('BZR proposal') to the relevant regulatory authorities for approval. Then, the relevant regulatory authorities should take a unanimous decision on the proposal within three months of its submission. Where the regulatory authorities are unable to do so, ACER should, within an additional three months, decide on the methodology and assumptions and on the alternative BZ configurations.

(3) On 5 October 2019, all TSOs submitted a BZR proposal (‘initial BZR proposal’) to all regulatory authorities for approval, pursuant to Article 14(5) of the Electricity Regulation. That proposal, however, lacked alternative BZ configurations for a large part of the EU, namely for the BZR regions (BZRR) of Central Europe (CE), Central-Southern Italy (CSI)[3], Iberian Peninsula, Baltic and Ireland. By 7 April 2020, the TSOs submitted an updated version of the initial BZR proposal (‘updated BZR proposal’) to their respective regulatory authorities, following a request by the regulatory authorities, which all regulatory authorities referred to ACER for decision.

(4) In its Decision No 29/2020 of 24 November 2020[4], ACER:

a. adopted the methodology and assumptions that are to be used in the BZR process in accordance with Article 14(5) of Electricity Regulation, and

b. found that it needed additional information to take a decision on alternative BZ configurations to be considered and requested TSOs to submit additional information [5], mainly results from Locational Marginal Pricing (LMP) simulations, in three stages, the last one ending on 31 October 2021.

(5) The present Decision deals with the adoption of alternative BZ configurations to be considered during the BZR that is carried out by TSOs. In the following, the specific part of the BZR that TSOs have to carry out pursuant to Article 14(6) of the Electricity Regulation is referred to as ‘BZR study’, to differentiate it from the overall ‘BZR process’ that includes further steps such as the launch of the BZR, the adoption of the

[3] See section 6.12 on the specific case of the CSI BZRR.

[4] See https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Individual%20decisions/ACER%20Decision%2029-2020%20on%20the%20Methodology%20and%20assumptions%20that%20are%20to%20be%20used%20in%20the%20bidding%20zone%20review%20process%20and%20for%20the%20alternative%20bidding%20zone%20configurations%20to%20be%20considered.pdf

[5] On 17 December 2019, regulatory authorities had requested TSOs to provide a set of three data items, namely: i) data on historical congestions, ii) data on merged grid models, and iii) results derived from Locational Marginal Pricing (LMP) simulations, with a view to support the approval of the BZR proposal, including in the case of referral to ACER. Pursuant to this request, TSOs provided data items i) and ii), but they did not provide iii). For that reason, ACER reiterated the request on iii) in its Decision No 29/2020.

BZR methodology (constituting Annex I of Decision No 29/2020) and the adoption of alternative BZ configurations to be considered.

2 Procedure

2.1 Engagement with TSOs and other parties concerned before the final submission of the additional information requested by ACER

(6) ACER started to engage in discussions with TSOs on the definition of alternative BZ configurations shortly after the adoption of Decision No 29/2020. This phase lasted until the formal submission of the LMP simulation results by 20 April 2022. The scope of these discussions was twofold. First, ACER described its approach for the definition of alternative BZ configurations, which allowed TSOs to provide early feedback on such approach. Second, TSOs informed ACER on the progress with the LMP simulations, which allowed ACER to provide feedback to the TSOs. During these discussions, ACER received technical advice from experts of the Joint Research Centre (JRC) of the European Commission.

(7) Simultaneously, ACER held regular discussions with the regulatory authorities about the definition of alternative BZ configurations in the context of an expert group reporting to ACER's Capacity Allocation and Congestion Management (CACM) Task Force. Regular updates were also provided at the AEWG.

(8) By letter of 23 December 2020, the three Baltic TSOs[6] requested ACER to postpone their deadline for delivering the results of the LMP analysis required under Decision No 29/2020. The Baltic TSOs explained that the postponement was mainly caused by the difficulties to perform a meaningful LMP simulation without first performing a set of dynamic stability studies related to the synchronisation between the Baltic and the Continental Europe synchronous areas. Moreover, the Baltic TSOs explained that such studies would not be available on time for TSOs to conduct and finalise the LMP simulations by the date requested by Decision No 29/2020.

(9) By letter of 18 March 2021, ACER informed the Baltic TSOs that, in the absence of the LMP data, ACER would not able to take a decision on alternative configurations to be studied for the Baltic BZRR, and required the Baltic TSOs to deliver the results of the LMP analysis as soon as the results of the dynamic studies would become available.

(10) Between April and December 2021, ACER had several exchanges with the Swedish TSO, Svenska Kraftnät, and the Swedish regulatory authority, Swedish Energy Markets Inspectorate, to clarify the difficulties that the Swedish TSO was having in delivering

[6] This includes the Estonian TSO, Elering AS, the Latvian TSO, Augstsprieguma tīkls AS, and the Lithuanian one, Litgrid AB.

the required data to ACER, in particular the geographical coordinates, in light of national security legislation.

(11) As part of JRC's technical advice mentioned in paragraph (6) and following a request from ACER, JRC drafted a note providing recommendations on how TSOs could further align the LMP simulations with Decision No 29/2020. The note was shared with TSOs on 3 June 2021. On 8 July 2021, TSOs provided a reply on whether and how they intended to address the comments included in the note produced by JRC.

(12) Taking into account the input received from regulatory authorities, ACER developed a note setting out ACER's approach ('ACER's high-level approach') for the definition of alternative BZ configurations. ACER shared its high level approach with TSOs on 11 March 2021, held a workshop on it with regulatory authorities, TSOs and the European Network of Transmission System Operators for Electricity (ENTSO-E) on 16 March 2021, discussed it further with the regulatory authorities during the AEWG meeting of 22 and 23 June 2021, where the respective note was widely acknowledged, and presented that note to the Board of Regulators at its meeting of 13 July 2021.

(13) On 24 June 2021, ACER held a public workshop to present ACER's high-level approach.

(14) On 6 July 2021, ACER launched a public consultation to collect views from stakeholders on ACER's high-level approach. The summary and evaluation of the responses received are included in Annex II to this Decision.

(15) By letter of 22 October 2021, TSOs informed ACER that due to the complexity of the simulations and challenges with data formats, they would need additional time to finalise the delivery of the LMP results. Specifically, TSOs estimated the submission of the final LMP simulation results, initially due by 31 October 2021, to take place by 28 February 2022.

(16) On 17 November 2021, in accordance with Article 34 of the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (the 'CACM Regulation')[7] and Article 14(2) of the Electricity Regulation, ENTSO-E submitted a technical report on current BZs covering the years from 2018 to 2020. TSOs asked ACER to consider the information included in this report when deciding on alternative BZ configurations.

(17) On 3 February 2022, TSOs communicated that, in order to be able to submit the data by 28 February 2022, they would need to simplify some aspects of the LMP simulations and that they intended to submit additional data that TSOs deemed relevant for ACER's Decision, namely on the consideration of topological remedial actions, only after 28

[7] OJ L 197, 25.7.2015, p. 24.

February 2022. In view of this, on 4 February 2022, ACER responded that it acknowledged the additional time needed by TSOs, but that ACER would not be able to consider data submitted after 31 March 2022.

(18) In the course of March 2022, TSOs[8] submitted the data requested by Decision No 29/2020. The data for Continental Europe and Ireland was submitted on 7 March 2022. On the same date, the TSOs of Continental Europe informed that they intended to submit additional data by the end of March.

(19) On 21 March 2022, the Nordic TSOs made a provisional submission of the requested data to ACER. Such data was provisional for the following reasons. First, TSOs informed that a simplification was applied when performing the simulations underlying the data submitted; and second, the data was incomplete for Sweden as geographical coordinates of the nodes of the Swedish network were missing. Svenska Kraftnät claimed that the lack of geographical coordinates was due to national security legislation that impeded the delivery of such information to ACER.

(20) On 30 March 2022, the Nordic TSOs submitted an updated dataset to ACER, whereby the simplified assumption that they had introduced in the previous delivery was removed.

(21) On 31 March 2022, the TSOs of Continental Europe and Ireland submitted additional data to ACER, which essentially included LMP simulations for certain sensitivity analyses that the TSOs deemed relevant for ACER's Decision.

(22) On 5 April 2022, the Swedish Energy Markets Inspectorate informed ACER that, to overcome the restrictions related to Swedish national security legislation, Svenska Kraftnät would provide ACER with a graphical representation of the alternative BZ configurations proposed by ACER, based on ACER's input; the latter would be an alternative to providing geographical coordinates to ACER. This was found by both ACER and Svenska Kraftnät as a practical and acceptable solution.

(23) On 8 April 2022, following some data quality issues communicated by ACER, the TSOs of Continental Europe and Ireland submitted an updated version of the network models used for the LMP simulations; on 4 May 2022, the TSOs of Continental Europe informed ACER that they detected some errors in the dataset submitted previously by them, and on 6 May 2022, these TSOs submitted a new dataset that replaced the one submitted previously.

(24) On 20 April 2022, following some data quality issues communicated by ACER, the TSOs of the Nordic area submitted an updated dataset to ACER.

[8] Except the Baltic TSOs as anticipated by them (see paragraph (8)).

2.2 Proceedings following the submission of the requested information to ACER

(25) On 3 May 2022, ACER shared its draft preliminary findings on alternative BZ configurations with regulatory authorities. This was followed by a workshop held on 4 May 2022. ACER invited regulatory authorities to provide comments, allowing ACER to consider the regulatory authorities' views in finalising its preliminary position on the matter.

(26) On 6 May 2022, ACER shared its draft preliminary findings on alternative BZ configurations with TSOs. This was followed by a workshop held on 11 May 2022. ACER invited TSOs to provide comments, allowing ACER to consider TSOs’ views in finalising its preliminary position on the matter.

(27) On 18 May 2022, ACER presented its draft preliminary findings at the AEWG, followed by a discussion with regulatory authorities.

(28) On 24 May 2022, ACER shared its preliminary position on alternative BZ configurations, with the regulatory authorities, and with TSOs, and invited them to provide comments by 3 June 2022.

(29) On 3 June 2022, TSOs sent their feedback on ACER’s preliminary position on alternative BZ configurations.

(30) On 8 June 2022, ACER held an oral hearing to provide the concerned parties an additional opportunity to express their views on ACER’s preliminary position.

(31) On 10 June 2022, ACER held a discussion with the expert group reporting to the ACER’s CACM Task Force, aiming at discussing the amendments that ACER introduced to its preliminary position following the feedback received during hearing phase. ACER also informed the members of the CACM Task Force about such amendments.

(32) On 13 June 2022, ACER submitted its draft Decision for consultation of the AEWG until 23 June 2022.

(33) On 22 June 2022, ACER communicated the closure of the written and oral procedure to the concerned parties.

(34) On 23 June 2022, ACER received advice from the AEWG.

(35) On 20 July 2022, following the Board of Regulators’ meeting of 13 July 2022, ACER submitted its updated draft Decision for consultation of the AEWG until 25 July 2022.

(36) On 25 July 2022, ACER received advice from the AEWG on this updated draft Decision.

3 ACER’s competence to decide on alternative BZ configurations

(37) Pursuant to Article 5(7) of Regulation (EU) 2019/942 of the European Parliament and of the Council establishing a European Union Agency for the Cooperation of Energy Regulators (the 'ACER Regulation'), ACER shall carry out its tasks related to the BZR pursuant to Article 14(5) of the Electricity Regulation.

(38) Pursuant to Article 14(5) of the Electricity Regulation, by 5 October 2019, all relevant TSOs shall submit a proposal for the methodology and assumptions that are to be used in the BZR process and for the alternative BZ configurations to be considered to the relevant regulatory authorities for approval. The relevant regulatory authorities shall take a unanimous decision on the proposal within three months of submission of the proposal and, where they are unable to reach a unanimous decision on the proposal within that time frame, ACER shall, within an additional three months, decide on the methodology and assumptions and the alternative BZ configurations to be considered.

(39) Since the relevant TSOs submitted the updated BZR proposal to the regulatory authorities concerned by 7 April 2020 and the latter were unable to reach a unanimous decision on the proposal by 7 July 2020, referring it to ACER with effect of that date, ACER has become competent to decide on this proposal according to Article 5(7) of the ACER Regulation and Article 14(5) of the Electricity Regulation.

(40) By Decision No 29/2020 of 24 November 2020, ACER approved the updated BZR proposal with regard to the BZR methodology and assumptions subject to the necessary amendments included in the relevant annexes to the Decision. However, due to a lack of relevant information, ACER could not decide on the updated BZR proposal as far as the alternative BZ configurations to be considered were concerned. Thus, to effectively exercise its decision-making competence also with regard to the alternative BZ configurations to be considered, ACER requested TSOs to submit additional information, mainly results from LMP simulations.

(41) Following the complete submission of the requested data, except for the geographical area of the Baltic TSOs, by 20 April 2022, ACER considers to have the necessary information to exercise its decision-making competence, according to Article 5(7) of the ACER Regulation and Article 14(5) of the Electricity Regulation, also with regard to the alternative BZ configurations to be considered, except for the geographical area of the Baltic TSOs.

4 Summary of the submission

(42) As far as the definition of alternative BZ configurations is concerned, TSOs submitted the following elements to ACER:

a. On 7 April 2020, a list of proposed alternative BZ configurations that TSOs included in the updated BZR proposal submitted to regulatory authorities. This list covered the Nordic and the South East Europe (SEE) BZRRs. No alternative configurations were proposed for the other BZRRs. The list was accompanied by a document justifying the proposed alternative BZ configurations.

b. On 17 November 2021, ENTSO-E submitted a technical report on current BZs covering the years from 2018 to 2020, pursuant to Article 34 of the CACM Regulation and Article 14(2) of the Electricity Regulation. Although this technical report is not specifically aimed at defining alternative BZ configurations for the BZR pursuant to Article 14(5) of the Electricity Regulation, TSOs considered that the information included in the report was relevant for the present Decision, and asked ACER to consider it accordingly.

c. By 20 April 2022, all TSOs except the Baltic ones (see paragraph (41)), completed the submission of the data requested by ACER in its Decision No 29/2020. In particular, in line with Article 11 of Annex I of Decision No 29/2020, this data included:

    i. the nodal price for each node and market time unit (MTU), in €/MWh;

    ii. cleared generation, storage and demand volumes for each node and MTU, in MW;

    iii. flows on all considered network elements for each MTU, in MW;

    iv. active network constraints for each MTU if any;

    v. shadow prices associated to the active network constraints, €/MW;

    vi. overall socio-economic welfare resulting from the optimization, in €;

    vii. network model(s) used for the simulations; and

    viii. geographical coordinates of all nodes included in the network model(s).

5 Summary of the observations received by ACER

5.1 Public consultation

(43) The responses to the public consultation (see paragraph (14)) are compiled and evaluated in Annex II to this Decision.

5.2 Consultation with TSOs

(44) The main comments from TSOs on ACER's preliminary position referred to the following aspects:

a. The process followed by ACER to take its Decision;

b. The general methodology followed by ACER to define alternative BZ configurations, in particular on the approach followed by ACER in light of the Electricity Regulation;

c. The detailed methodology followed by ACER, in particular on the process to rank and prioritise alternative BZ configurations;

d. The use of interconnectors as relevant critical network elements, as opposed to using also internal network elements;

e. The size of each BZ in relation to the price dispersion indicator in the ranking for selecting the candidate MSs for a reconfiguration;

f. The loop and internal flows indicator methodology;

g. The consideration of topological remedial actions;

h. The consistency between ACER's proposal on configurations, the price dispersion indicator estimated for France and the observed costs of redispatching in France;

i. The inclusion of a 'greenfield' alternative BZ configuration;

j. The inclusion of a wider set of combination of individual splits as alternative configurations;

k. The number of alternative configurations to be considered for the BZR;

l. The unique assignment of generation and load units to BZs;

m. The appropriateness of following TSOs' borders in Germany;

n. The configurations proposed for the CE BZRR; and

o. The configurations proposed for the Nordic BZRR.

(45) A detailed description and assessment of the above listed comments is included in section 6.8.

(46) Furthermore, the following comments from TSOs were provided on ACER's updated draft Decision following the Board of Regulators' meeting on 13 July 2022:

a. The wording describing how the combinations are to be selected would not be sufficiently clear and could lead to different interpretations.

b. The approach would seriously endanger the completion of the BZR study within the 12 months prescribed in Article 14(6) of the Electricity Regulation.

c. The approach would endanger the TSOs' ability to hold a public consultation within 6 months from the start of the BZR study, as prescribed by Article 17(4) of the BZR methodology.

d. The approach would not be in line with Article 14(5) of the Electricity Regulation, which requires ACER to decide on the alternative BZ configurations, and it would transform the TSOs' right under Article 13.1(a)iii.3 of the BZR methodology to propose additional combinations into an obligation.

(47) A detailed assessment of the above listed comments is included in section 6.10.1.

5.3 Consultation with regulatory authorities and the AEWG

(48) The main comments from regulatory authorities on ACER's preliminary position refer largely to the same aspects as the ones related to the comments received from TSOs. A detailed description of these comments and their assessment is included in section 6.8 together with the comments received from TSOs.

(49) The main comments included in the advice of the AEWG on ACER's draft Decision are included in section 6.9.

(50) The main comments included in the advice of the AEWG on ACER's updated draft Decision following the Board of Regulators' meeting on 13 July 2022 are included in section 6.10.2.

6 Assessment of the updated BZR proposal with regard to alternative configurations

6.1 Legal framework

(51) Article 14(5) of the Electricity Regulation sets out the key requirements of the BZR proposal. In terms of process, it requires all relevant TSOs to submit, by 5 October 2019, a proposal for the methodology and assumptions that are to be used in the BZR process and for the alternative BZ configurations to be considered to the relevant regulatory authorities for approval. In terms of substance, it prescribes that the BZR methodology '*shall be based on structural congestions which are not expected to be overcome within the following three years, taking due account of tangible progress on infrastructure development projects that are expected to be realised within the following three years*'.

(52) More generally, with regard to BZs, Article 14(1) of the Electricity Regulation provides that '*Bidding zone borders shall be based on long-term, structural congestions in the transmission network. Bidding zones shall not contain such structural congestions unless they have no impact on neighbouring bidding zones or, as a temporary exemption, their impact on neighbouring bidding zones is mitigated through the use of remedial actions and those structural congestions do not lead to reductions of cross-zonal trading capacity in accordance with the requirements of Article 16. The configuration of bidding zones in the Union shall be designed in such a way as to maximise economic efficiency and to maximise cross-zonal trading opportunities in accordance with Article 16 [of the Electricity Regulation], while maintaining security of supply*'.

(53) Furthermore, regarding the review of BZs, Article 14(3) of the Electricity Regulation lays down that the BZR '*shall identify all structural congestions and shall include an analysis of different configurations of bidding zones in a coordinated manner with the involvement of affected stakeholders from all relevant Member States, in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18 (5) of Regulation (EC) No 714/2009. Current bidding zones shall be assessed on the basis of their ability to create a reliable market environment, including for flexible generation and load capacity, which is crucial to avoiding grid bottlenecks, balancing electricity demand and supply, securing the long-term security of investments in network infrastructure*'.

(54) In addition, Article 33 of the CACM Regulation includes a list of minimum criteria that a BZR must consider.

(55) With regard to the concept of 'structural congestions', the following definitions apply:

a. Pursuant to Article 2(4) of the Electricity Regulation, 'congestion' represents a situation in which all requests from market participants to trade between network areas cannot be accommodated because they would significantly affect the physical flows on network elements which cannot accommodate these flows.

b. Pursuant to Article 2(6) of the Electricity Regulation, 'structural congestion' means congestion in the transmission system that is capable of being unambiguously defined, is predictable, is geographically stable over time, and frequently reoccurs under normal electricity system conditions.

c. Pursuant to Article 2(18) of the CACM Regulation, a 'physical congestion' corresponds to any network situation where forecasted or realised power flows violate the thermal limits of the elements of the grid and voltage stability or the angle stability limits of the power system.

6.2 Implications of the lack of alternative BZ configurations proposed by TSOs for the EU, except for the Nordic and SEE BZRRs

(56) As mentioned in paragraph (42), the updated BZR proposal submitted by TSOs only included BZ configurations for the Nordic and SEE BZRRs. As a consequence, ACER requested all TSOs to submit additional information, as described in paragraph (4).

(57) As ACER needs to take its Decision on alternative BZ configurations based on all relevant facts, the present Decision is based on the following information:

a. For the Nordic and SEE BZRRs, the Decision is based on both the alternative configurations submitted to ACER on 7 July 2020 and the additional data requested by ACER and submitted by TSOs for these regions.

b. For the CE, Iberian Peninsula and Ireland BZRRs, the Decision is based on the data requested by ACER and submitted by TSOs. Additionally, ACER provided those TSOs that had not initially submitted configurations with (another) opportunity to suggest possible alternative configurations before the submission of the LMP results. Only the Dutch TSO (TenneT TSO B.V.) used this opportunity and submitted alternative configurations to ACER by 31 January 2022. These configurations were also considered by ACER for this Decision.

c. For the CSI BZRR, ACER received the additional data requested by ACER. As explained in section 6.12, ACER decided not to investigate alternative configurations for this specific BZRR.

d. For the Baltic BZRR, in the absence of configurations submitted ty TSOs and of the additional data requested by ACER, ACER was not able to take a decision on alternative configurations. This is further elaborated in section 6.13.

6.3 Approach followed by ACER to identify alternative BZ configurations

6.3.1 High-level approach

(58) First, it is to note that Article 14 of the Electricity Regulation, while requiring a proposal of and a decision on the alternative BZ configurations to be considered for the BZR, does not provide a list of technical criteria for assessing and deciding on the alternative BZ configurations. However, the Electricity Regulation does refer to a set of principles and objectives that should be pursued when designing the configuration of BZs.

(59) Therefore, ACER's approach to identifying alternative BZ configurations is based on and aims to implement the principles and objectives envisaged by the Electricity Regulation for the configuration of BZs in the context of a BZR. In this respect, ACER identifies the following three stages that need to be distinguished for the BZR.

(60) First, structural congestions need to be identified and assessed. This is in line with Article 14(1) of the Electricity Regulation, which prescribes, inter alia, that *'Bidding zone borders shall be based on long-term, structural congestions in the transmission network. Bidding zones shall not contain such structural congestions unless they have no impact on neighbouring bidding zones, or, as a temporary exemption, their impact on neighbouring bidding zones is mitigated through the use of remedial actions and those structural congestions do not lead to reductions of cross-zonal trading capacity in accordance with the requirements of Article 16 [of the Electricity Regulation]'*. As described in paragraphs 63 to 66 of Decision No 29/2020, assessing structural congestions requires to identify the network areas between which there are energy exchanges that significantly contribute to structural physical congestions. In brief, it is not enough to identify the location of the physical congestions, but it is also necessary to identify the network areas between which there are energy exchanges that cause such physical congestions.

(61) Second, alternative BZ configurations need to be identified. Article 14(1) of the Electricity Regulation provides guidance on how the configurations of BZs in the Union are to be designed. In particular, it establishes that *'[t]he configuration of bidding zones*

in the Union shall be designed in such a way as to maximise economic efficiency and to maximise cross-zonal trading opportunities in accordance with Article 16 [of the Electricity Regulation], while maintaining security of supply'.

(62) Third, the alternative BZ configurations need to be analysed and TSOs are required to perform the BZR study. Article 14(3) of the Electricity Regulation describes how the analysis of different configurations of BZs is to be performed and requires such analysis to be in accordance with the CACM Regulation, of which Article 33 is particularly relevant here.

(63) The present Decision deals with the first two stages. The third stage is the BZR study, which is to be performed subsequently by TSOs according to the timeline laid down in Article 14(6) of the Electricity Regulation. Consequently, a distinction should be made between the aspects to be considered for the identification of alternative BZ configurations and the aspects to be considered during the BZR study.

(64) For the BZR study, referred to as 'the second step' in the CACM Regulation, the guidance on how to perform this study is given by Article 32(4)(b) of the CACM Regulation which prescribes that *'In the second step, the TSOs participating in a review of bidding zone configuration shall: assess and compare the current bidding zone configuration and each alternative bidding zone configuration using the criteria specified in Article 33 [of the CACM Regulation]'.*

(65) For the identification of alternative configurations, the guidance is provided by the objectives prescribed in Article 14(1) of the Electricity Regulation (see paragraph (61)), namely the following three: i) maximisation of economic efficiency; ii) maximisation of cross-zonal trading opportunities, and iii) the need to maintain the security of supply. The first two elements can be quantified and, as such, efficiently compared. The third objective (maintaining security of supply) is not, a priori, a distinctive element for the selection of alternative configurations, but rather a prerequisite to be met by any of them. In any case, assessing security of supply entails performing a complete market simulation, which requires additional information that will be only available at a later stage, i.e. during the BZR study. As security of supply is indeed one of the criteria required by the CACM Regulation to be assessed during the BZR study, the process ensures that security of supply is assessed before taking a decision on a potential reconfiguration.

(66) The importance of maximising cross-zonal trading opportunities is further reinforced by the so-called 'minimum 70% target' prescribed by Article 16(8) of the Electricity Regulation, requiring to make at least 70% of the transmission capacity available for cross-zonal trade. This minimum target is also relevant for the identification of

alternative BZ configurations. If it is not satisfied as of 1 January 2026[9], such situation could lead to a BZ change according to Article 15(5) of the Electricity Regulation.

(67) In sum, ACER's approach to identify and prioritise alternative BZ configurations is a step-wise one: first, the areas of the network between which there are energy exchanges that contribute the most to structural congestions are identified; second, alternative BZ configurations are sought within those network areas; and third, those configurations that tend to improve economic efficiency and cross-zonal trading opportunities the most are proposed for the BZR study.

6.3.2 Data and tools available to ACER

(68) As described in paragraph 150 of Decision No 29/2020, results derived from LMP simulations provide a good basis for the identification of structural congestions in line with the principles of the Electricity Regulation set out in section 6.3.1. In particular, LMP simulations deliver theoretically optimal market results for a given scenario, in this case for the target year of the BZR study. Pursuant to Article 14(5) of the Electricity Regulation, this target year corresponds to 2025. The results derived from the LMP simulations enable the performance of the following two analyses:

a. Flow decomposition: Flow decomposition techniques allow establishing a cause-effect relationship between physical congestions and the network areas between which there are energy exchanges that significantly contribute to such congestions. This points to network areas where alternative BZs should be sought with priority. Flow decomposition analyses also provide an indication on whether alternative BZ configurations tend to reduce the flows that do not result from capacity allocation, i.e. loop flows and internal flows. This is important because a decrease in these flows tends to result in an increase in the capacity available for cross-zonal trade; the Electricity Regulation aims at such increase.

b. Clustering of nodes into BZs: Starting from LMP simulation results, clustering techniques aim at grouping nodes of the network in new (alternative) BZs that better meet the objectives of the Electricity Regulation. Specifically, clustering techniques can be designed to identify BZ configurations that tend to increase economic efficiency; the Electricity Regulation aims also at such increase.

(69) For the purpose of this Decision, ACER applied both techniques. To perform flow decomposition analyses, ACER used a commercial software that allows to perform flow decomposition in accordance with the methodology described in Annex I of

[9] The minimum 70% target is binding since 1 January of 2020; however, MSs are allowed to adopt transitory measures (action plans and/or derogations) to reach the target gradually by the end of 2025.

Decision No 30/2020[10]. To cluster nodes into BZs, ACER requested a consultancy firm to provide ACER with clustering algorithms that incorporated, by design, the regulatory objectives described in paragraph (65). Additional information on the specific clustering algorithms used by ACER is provided in section 6.3.4.6.

(70) In terms of data, the following was made available by TSOs to ACER :

a. LMP simulation results for the target year 2025, with the level of detail described in paragraph (42). Those results comprised two different datasets because TSOs decided[11] to carry out a separate LMP analysis for the two following geographical areas: i) Continental Europe and Ireland; and ii) the Nordic BZRR.

b. The LMP analysis for Continental Europe included merged network models for the year 2025. Additionally, historical network models for Continental Europe were also available to ACER[12]. The full set of merged network models for Continental Europe available to ACER is displayed in Table 1 below.

Table 1: Merged network models for Continental Europe available to ACER

Year	Type of merged network models	Number of merged network models available to ACER
2018	Day-2 congestion forecast (D2CF)	2
	Day-1 congestion forecast (DACF)	2
	DACF including recommended remedial actions	2
	Intra-day congestion forecast (IDCF)	2
	Real-time snapshots	2
2019	Day-2 congestion forecast (D2CF)	2
	Day-1 congestion forecast (DACF)	2

[10]Decision No 30/2020 of 30 November 2020 on the Core CCR TSOs' proposal for the methodology for cost sharing of redispatching and countertrading, available at https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Individual%20decisions/ACER%20Decision%2030-2020%20on%20Core%20RDCT%20Cost%20Sharing.pdf

[11] Such a decision was in line with Article 11(1) of Annex I of Decision No 29/2020.

[12] 2018 and 2019 network models were provided by TSOs pursuant to a previous data request made by regulatory authorities (see footnote 5).

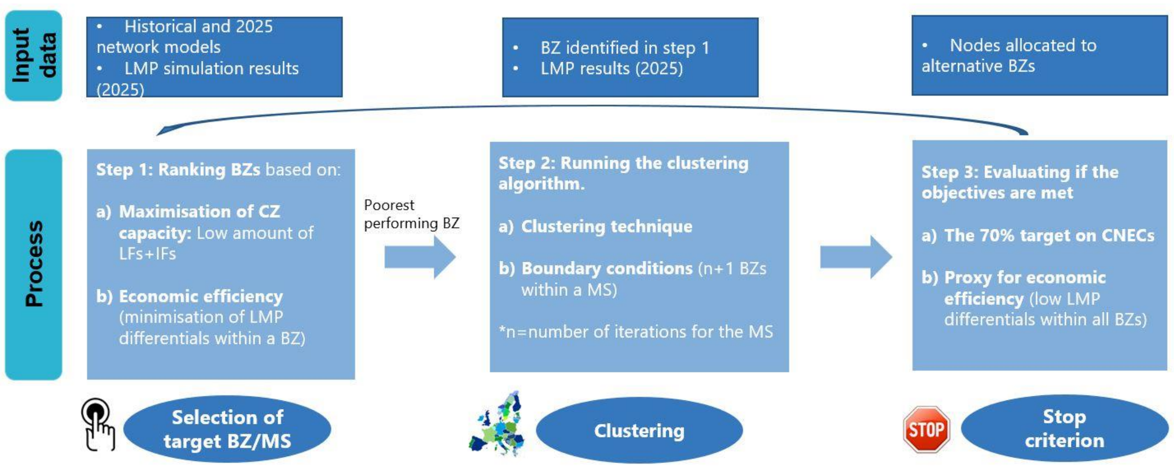
	DACF including recommended remedial actions	2
	Intra-day congestion forecast (IDCF)	2
	Real-time snapshots	2
2025	Network models used for the LMP simulations	16

c. The Nordic TSOs provided ACER with 24 merged network models, which they used for the LMP simulations, for the target year 2025.

6.3.3 <u>Detailed process to identify alternative BZ configurations</u>

(71) In this section, the process for the definition of alternative BZ configurations in accordance with the principles set out in sections 6.3.1 and 6.3.2 is described in detail. As illustrated in Figure 1, the process applies the high-level approach, described in the previous section, in an iterative manner.

Figure 1: Approach for the definition of alternative BZ configurations



(72) Each of the iterations of the process comprises three steps, as displayed in Figure 1: i) the selection of the Member State (MS) where to start searching for alternative BZs; ii) the application of clustering algorithms on the nodes of the MS identified in the previous step; and iii) the stop criterion, i.e. a decision on when to interrupt the process without proceeding with the next iteration.

(73) An additional fourth step, that is not part of the iterations, is required to select or combine, the (‘intermediate’) alternative BZ configurations resulting from each iteration into the ‘final’ ones to be studied. This fourth step is described in section 6.3.4.7.

(74) As the LMP simulations were performed separately for two different geographical areas (see paragraph (70)a) by the TSOs, the iterative process is also conducted

separately for each of those areas. In the following, each of the three steps is presented in detail.

(75) The first step of each iteration is the 'selection of target BZ/MS'. It aims to select the target MS[13] within which the algorithm seeks alternative BZ delineations, for each iteration. Initially, the algorithm selects a BZ at each iteration; however, the whole MS comprising such BZ is considered as the relevant geographical scope for a BZ reconfiguration at a given iteration. This is an important feature of the process as it considers MS borders as a boundary condition to the process. The main consequence of this condition is that the process can lead to splitting BZs, to merging BZs, or to combining parts of them into new BZs, as long as the newly proposed BZs remain within existing MS borders[14]. Further considerations on this assumption are included in section 6.3.4.1.

(76) The identification of the target BZ is based on a ranking, built on the following two indicators:

a. Aggregated absolute loop flows and internal flows per BZ on relevant network elements; and

b. The standard deviation of LMPs within a BZ.

(77) The aim of indicator a) is to assess the extent to which a given BZ contributes to the objective of maximising cross-zonal capacity. Indicator b) aims to assess the extent to which a given BZ contributes to the objective of maximising economic efficiency. In both cases, the lower the values of the indicators for a BZ, the better the performance of the said BZ. Further details on how indicators a) and b) are computed can be found in sections 6.3.4.3 and 6.3.4.4, respectively.

(78) Then, based on the performance of each BZ for these two indicators, a ranking of BZs is built. The process to rank BZs based on these two indicators is described in section 6.3.4.5.

(79) Subsequently, the worst performing BZ according to the ranking is selected. The MS where such BZ is located is then the geographical area where alternative BZ configurations are sought in the next step of the iteration.

---

[13] Or the MS to which the BZ belongs when several BZs belong to the same MS, as further elaborated below.
[14] With the only exception of already existing BZs comprising more than one MS, which is the case for Germany and Luxembourg. Therefore, throughout this Decision, the references to the status quo German BZ are to be read as references to the status quo German-Luxembourgish BZ. Similarly, when an alternative BZ configuration included in this Decision foresees the split of the German-Luxembourgish BZ into several BZs, the BZ comprising Luxembourg and referred to as a German BZ is to be read as a German-Luxembourgish BZ.

(80) The second step of the iteration corresponds to the application of clustering algorithms that group nodes into BZs within the MS selected in the first step. The immediate outcome of this step is a split of a MS into BZs. For a given iteration, the number of splits is determined by the number of times the relevant MS was selected for a reconfiguration[15]. Additional information on the clustering algorithms used in this step is provided in section 6.3.4.6.

(81) The outcome of the second step is cumulative in the sense that, after this step, a new 'intermediate' alternative BZ configuration can be built. Such 'intermediate' configuration comprises: i) the BZs of the status quo, except those that were subject to reconfiguration in any of the previous iterations; and ii) the BZs reconfigured by the clustering algorithms in previous iterations[16].

(82) The third step, the 'stop criterion', aims to determine whether the iterations for the identification of additional BZ configurations should continue or not. In light of the objectives envisaged in the Electricity Regulation, the iterations stop when the following two objectives are simultaneously met[17]:

a. For all the considered network elements across all merged network models considered in the analysis, the share of loop flows and internal flows taken together[18] is lower than a threshold[19] that allows to meet the 70% target in all network elements; and

b. For all considered BZs, the standard deviation is equal or below the standard deviation of the best performing BZ in the status quo configuration.

[15] When a MS is selected for the first time in step 1, even if it already comprises multiple BZs, then the algorithm seeks to identity two BZs within the MS. If the MS is selected again in a subsequent iteration, then the algorithm seeks to identify three BZs within the MS, and so on. This approach allows the possibility of considering mergers of BZs within MSs that currently comprise of more than one BZ.

[16] Where a MS was selected previously for a reconfiguration in step 1, the BZs to be considered within that MS are the ones corresponding to the latest iteration when the MS was selected, e.g. the three BZs proposed by the clustering algorithm if the MS was selected twice.

[17] In practice, the algorithm could also be stopped due to computational time constraints (see section 6.4 on the outcome of applying the algorithm).

[18] Contrary to the indicator used in step 1, this indicator is relative to the thermal capacities (Fmax) of the relevant network elements. This is because this indicator aims to assess how a specific alternative BZ configuration facilitates or not the fulfilment of the 70% target, and therefore a given configuration can be deemed as 'sufficient' with regard to the cross-zonal capacity criterion. The indicator used in step 1 assesses the extent to which loop flows and internal flows 'consume' cross-zonal capacity and therefore hinder the objective of maximising cross-zonal capacity.

[19] Assuming a reliability margin of 10%, this threshold should be a priori set at 20% as this would be the maximum share of loop flows and internal flows compatible with the 70% cross-zonal capacity target. However, such target is expected to be slightly lower in some MSs applying an action plan for the target year 2025. To reflect these slightly lower targets, a 30% threshold was used, which is equivalent to assuming no reliability margin or a reliability margin considerably lower than 10% (the latter, in case of an action plan).

(83) If the stop criteria are not met, then a new iteration starts from the first step. This means that a new ranking of BZs is built to select a new target MS where to look for alternative BZ delineations. For each iteration, the 'intermediate' BZ configuration resulting from the previous iteration is then used as an input.

6.3.4 Relevant features of the iterative approach

6.3.4.1 Consideration of MS borders

(84) Ideally, the identification of alternative BZs should not be constrained by existing political (i.e. MS) borders; instead, it should aim to seek BZ borders leading to the most efficient management of congestions. Thus, the possibility for mergers of BZs beyond MS borders should not be, a priori, excluded in a generic BZR process. However, for this specific BZR, ACER considered that the best approach was to focus on reconfigurations (splits) within a MS rather than on possible combinations of BZs (mergers) across MS borders[20], for the reasons described below.

(85) First, such approach allows to tackle the primary goal of a BZR, which is to eliminate or reduce structural congestions within BZs, as envisaged in Article 14(1) of the Electricity Regulation. Second, it leads to propose configurations that face less implementation challenges, in the sense that the implementation challenges remain within a single jurisdiction. And third, it does not exclude the possibility of future mergers across MSs, once the main structural congestions are efficiently managed.

(86) Finally, in response to the public consultation, several stakeholders expressed concerns about the algorithm being constrained by political borders; in their view, this would impede the possibility of merging MSs into one BZ, hindering possible improvements in market liquidity. While ACER considers that the arguments provided in the previous paragraph remain valid, ACER investigated how to accommodate stakeholders' concerns. In particular, ACER explored the possibility to include a 'greenfield'[21] alternative configuration per BZRR (see more details on the process to select the 'final' configurations in section 6.3.4.7).

6.3.4.2 Consideration of the relative size of BZs

(87) During the discussions between ACER, regulatory authorities and TSOs prior to the consultation, the issue of the relative size of BZs was discussed. ACER's initial view was that the size of BZs, e.g. in terms of total generation and consumption, should not be too different across BZs. This would be needed to mitigate the issue related to the so-called 'flow-factor competition', as further elaborated below.

---

[20] See footnote 14.

[21] A 'greenfield' BZ configuration refers to an alternative BZ configuration where MS borders are not considered as a constraint, and therefore a given BZ of such configuration may comprise of parts of multiple MSs.

(88) The competitive position of one BZ with respect to other BZs in the access to cross-zonal capacity is strongly linked to the Power Transfer Distribution Factors (PTDFs)[22]. A flow-factor competition issue arises whenever zone-to-zone PTDFs between two BZs are systematically larger than between any other pair of BZs. In those circumstances, the concerned BZs (with larger PTDFs) have fewer chances to access the available cross-zonal capacity and, under scarcity circumstances, this could in turn lead to security of supply issues. This effect has been recognised by e.g. all Central Western Europe (CWE) regulatory authorities in a 'Position Paper of CWE regulatory authorities on Flow-Based Market Coupling'[23]. The paper acknowledged that, in the absence of interventions in the market coupling algorithm[24], welfare may be 'lost in the smaller areas in favour of the bigger areas in a structural manner'.

(89) In the course of the public consultation, several stakeholders expressed concerns about using the BZ size as a criterion for the identification of BZs. Among other arguments, these stakeholders claimed that the size of BZs is not explicitly mentioned in the legislation and that considering such a criterion would raise questions such as how size would be defined and what size is considered as optimal.

(90) While ACER considers that the issue of similar size of BZs is a relevant criterion, ACER acknowledges that introducing such criterion would require to make an arbitrary choice on an 'adequate' BZ size, which is difficult to agree upon. Furthermore, the issue of similar sizes is partly addressed by the fact that larger BZs often tend to contribute to structural congestions the most and therefore are more likely to be split into smaller BZs; this implicitly contributes to a more homogeneous size of BZs. This could also be a plausible outcome from applying ACER's high-level approach. In sum, alternative BZ configurations with a more homogenous size of BZs could be an expected outcome of the present Decision, without the need to impose a discretional value for the BZ size.

(91) As a result, the condition to have BZs of similar size was finally disregarded as a constraining parameter for the clustering algorithms used by ACER to identify alternative BZ configurations. Notwithstanding this, a technical minimum threshold for the size of the BZs[25] was included in the clustering algorithms.

---

[22] The PTDFs describe the impact of an incremental exchange between BZs in the power flow on a critical network element.

[23] See page 13 of the position paper available at https://www.cre.fr/content/download/13078/file/150326_position_paper_flow_based.pdf.

[24] This does not imply that interventions in the market coupling algorithm address the issue in an efficient manner; in fact, the paper acknowledges that interventions in the market coupling algorithm to address structural differences in BZ sizes, such as the so-called flow-based intuitive (FBI) method, may reduce global welfare.

[25] To avoid that the algorithm could identify an extremely small BZ, e.g. smaller than a city, which would unlikely be implemented, a threshold that refers to the minimum number of nodes comprised in a 'new' BZ was introduced as a constraint. This minimum threshold was made dependent on the number of BZs that are considered for a MS, as follows: 10% of the total of number of nodes in the MS when the MS is split into two BZs, 9% for three BZs,

6.3.4.3 Indicator used to assess how BZs and BZ configurations may contribute to maximise cross-zonal capacity

(92) As explained in section 6.3.3, in order to assess how the BZs delineation contribute to maximise cross-zonal capacity, an indicator on the amount of flows that do not result from capacity allocation, i.e. loop flows and internal flows, is used. The indicator is relevant because a decrease in these flows tends to result in an increase in the capacity available for cross-zonal trade, without the need of applying remedial actions. The lower the amount of loop flows and internal flows on network elements originated in a given BZ, the higher the BZ scores with regard to this indicator.

(93) The indicator is derived from a flow decomposition analysis[26] and, more specifically, it is computed as follows:

"The aggregated absolute value of loop flows and internal flows, originated in each BZ, on the set of network elements used in capacity calculation[27]"

(94) The calculation of this indicator covers historical network models[28] as well as the network models for the target year of the BZR study, i.e. 2025.

8% for four BZs and 7% for five BZs. Such a constraint should not have a relevant impact on the delineation of BZs per se.

[26] See footnote 10.

[27] As a list of network elements used in capacity calculation is not available to ACER, ACER intended to use a proxy for their identification. Such a proxy would consist of a set of network elements comprising the following two sub-sets: i) all interconnectors, and ii) all network elements (without contingencies) having at least one zone-to-zone PTDF larger than or equal to 5%. This selection is driven by computational constraints, while ensuring a sufficiently large and representative set of network elements for the analysis. During the presentation of ACER's preliminary findings on alternative BZ configurations at the workshop of 11 May 2022, ACER was informed by TSOs that this selection of network elements could potentially lead to double counting of loop flows and internal flows for specific BZs of Continental Europe. TSOs informed that this was due to the different level of detail provided by different TSOs when building the network models; for example, some TSOs could have broken down a network element into smaller network elements in series, while other TSOs might have not provided such a breakdown for a similar case. TSOs were unable to inform ACER, without a thorough check that could take considerable time, on the precise scope of this issue. Moreover, while a number of examples of potentially duplicated network elements within a BZ were provided by TSOs, TSOs were unable to identify any duplicated interconnectors despite ACER's reiterated requests. In view of this, for Continental Europe, ACER decided to consider only the network elements characterised as interconnectors. Such an approach prevents double-counting. For the Nordic area, ACER kept its initial intention of combining interconnectors and network elements with a PTDF value larger than or equal to 5%.

[28] Historical network models are relevant because, pursuant to Article 14(2) and Article 14(7) of the Electricity Regulation, the presence of structural congestions is a trigger for a BZR. The latest EU-wide report on structural congestions was the report for the period 2018-2020, submitted by ENTSO-E to ACER on 17 November 2021 (see paragraph (16)). In line with this reporting period, historical network models for the period 2018-2019 (2020 ones were not available to ACER) were used, as they provide information on the structural congestions that are expected to be resolved through a potential BZ reconfiguration. The network models of the target year, i.e. 2025, provide information on the congestions that, with a degree of uncertainty, are expected to remain in the future.

(95) The indicator is used in the process in two different ways:

a. First, it is one of the indicators to rank BZs (see section 6.3.4.5) with a view to select the target MS in step 1 of each iteration as described in ACER's high-level approach.

b. Second, it is one of the two indicators used to rank the BZ changes (one BZ change is the result of each iteration) that lead to the highest improvements. To this end, the aggregation of the absolute value of loop flows and internal flows for all BZs taken together is calculated.

6.3.4.4 Indicator used to assess how BZs and BZ configurations may contribute to maximise economic efficiency

(96) As explained in section 6.3.3, in order to assess how the BZs delineation may contribute to maximise economic efficiency, the following indicator is used:

"The standard deviation of LMPs within a BZ[29]*"*

(97) While economic efficiency will be more accurately modelled in the BZR study itself, this indicator can be considered a proxy for economic efficiency when defining alternative BZ configurations. In particular, a more efficient dispatch is expected to be attained when there are no or very limited LMP differentials within a BZ. This is because the absence of LMP differentials suggests that intra-zonal congestions are not expected to severely constrain the results of the market. This indicator is used in the process in two different ways:

a. First, it is one of the indicators used to rank BZs (see section 6.3.4.5) with a view to select the target MS in step 1 of each iteration as described in ACER's high-level approach. To allow comparability and alignment with the principle of maximising overall welfare at the European Union (EU) level, the indicator needs to be weighted because, all else being equal, the overall economic efficiency gains tend to be proportional to the amount of supply (generation) and demand (load) involved. Consequently, to rank BZs, the indicator on 'standard deviation of LMPs within a BZ' is weighted with the factor *'(generation+load)/2'* for each BZ.

b. Second, it is one of the two indicators used to rank BZ changes (one BZ change is the result of each iteration) according to the improvements expected from a BZ change. As explained in paragraph a, to better capture the improvements at

Both set of network models are therefore relevant for the analysis supporting the delineation of alternative BZ configurations.

[29] To estimate the standard deviation, each node is weighted with the factor '(generation+load)/2', based on the generation and load cleared at each node.

each iteration, the indicator on 'standard deviation of LMPs within a BZ' is weighted with the factor *'(generation+load)/2'* for each BZ.

6.3.4.5 Process to rank BZs in order to select the target MS for each iteration

(98) To rank BZs at each iteration, a multi-criteria decision method is used. Specifically, the so-called Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) is followed. Such a technique allows to take decisions on multi-objective problems, in this case the objectives being the maximisation of economic efficiency and cross-zonal capacity. TOPSIS is a widely used method in scientific applications[30]. The theoretical background and the application of this technique is described in Annex III to this Decision.

6.3.4.6 Clustering algorithms

(99) Three different clustering algorithms to group nodes into new BZs were used. The algorithms aim to identify nodes with similar prices, therefore reducing price dispersion within a BZ in line with the indicator on price dispersion set out in section 6.3.4.4, related to the objectives of the Electricity Regulation set out in section 6.3.1. Moreover, when the price differentials within a BZ reduce, the amount of exchanges within BZs that affect physically congested network elements is expected to decrease, which ultimately contributes to increase cross-zonal capacity. The clustering algorithms are described in Annex IV to this Decision.

6.3.4.7 Fourth step: Process to select the 'final' alternative BZ configurations to be considered for the BZR

(100) The Electricity Regulation does not prescribe the number of alternative BZ configurations to be selected, nor the process to rank and/or combine configurations into the 'final' ones. The process to select the 'final' alternative BZ configurations requires a number of decisions to be taken, including on the number of configurations, how to rank them and how to combine them into the 'final' ones. In this respect, the following feedback was received from stakeholders during the public consultation.

(101) Some stakeholders, including TSOs, mentioned that the number of configurations per BZRR should not be 'too high' to ensure the feasibility of the subsequent BZR study within the timeline set out in the Electricity Regulation. During the preliminary discussions between ACER and TSOs prior to the formal consultation, ten BZ configurations were mentioned as a reasonable maximum.

(102) Some stakeholders mentioned that the analysis should focus on BZ configurations with high potential benefits, while others, including TSOs, mentioned that the

[30] Over 170 Institute of Electrical and Electronics Engineers (IEEE) journal articles written from 2018 to now are available in the IEEE Xplore repository, in over 40 of which the word 'TOPSIS' appears in the article title.

alternative BZs should be practically implementable, e.g. that they would preferably not affect too much the boundaries of the existing control areas of the TSOs.

(103) ACER's interpretation of these views is that there are two opposing objectives, one is the objective of maximising benefits and the other is the practical need of finding alternative configurations with a limited number of BZ changes as opposed to many changes. In view of this, ACER finds it relevant to prioritise configurations that deliver high benefits with a limited number of BZ changes, e.g. that each alternative configuration only affects one or few MSs.

(104) Finally, during the workshop held on 11 May 2022, some TSOs mentioned that there should be a balance between configurations including individual changes and configurations including a combination of individual ones. Moreover, following this workshop, TSOs expressed that combinations of configurations involving substantial changes should be avoided, based on the understanding that the EU-wide benefits that can be achieved by an additional increase in number of BZs are significantly reduced. Concerning the selection of configurations combining individual changes, in the framework of the AEWG held on 18 May 2022, regulatory authorities expressed that it would be difficult to select, ex-ante, the combinations that are worth studying, without previously carrying out a welfare analysis. These regulatory authorities expressed that it would be preferable to select few or even only one combination (with the highest potential improvements) as opposed to many.

(105) To be able to identify configurations that deliver high potential benefits with a limited number of changes, ACER built a list of potential alternative configurations comprising only individual BZ changes. Such a list was built as follows:

a. An individual BZ change refers to an alternative BZ configuration where only one MS is affected, e.g. a split of a given MS into more than one BZ.

b. The list included, initially, as many individual configurations as iterations were performed pursuant to the steps 1 to 3, described in section 6.3.3.

c. ACER enriched the initial list by using three different clustering algorithms. For example, for a given split of a MS into two BZs, three different splits into two BZs were identified. This enlarged the list of potential configurations by a factor three.

d. For each individual configuration, ACER estimated the improvement for each of the two indicators defined in 6.3.4.3 and 6.3.4.4, compared to the status quo.

e. Based on the improvements for each indicator, the individual configurations were ranked. For the ranking, the TOPSIS decision method was applied (see section 6.3.4.5 and Annex III).

(106) Based on the list of individual configurations, ranked based on their potential benefits, and considering the arguments described in paragraphs (103) and (104) and

section 6.3.4.1[31], ACER decided to take the following approach when selecting the alternative BZ configurations to be considered for each BZRR:

a. Select a maximum of ten alternative BZ configurations per BZRR. By way of comparison, this number is in line with the number of configurations analysed in recent BZRs in Europe[32].

b. Prioritise alternative configurations that potentially deliver high benefits with a limited number of BZ changes. This corresponds e.g. to the individual configurations that rank the highest in the list of potential configurations built as above described.

c. Include at least one configuration that combine individual configurations.

d. For those BZRRs where alternative configurations for more than one MS are proposed, ACER identified a possible 'greenfield' configuration (see section 6.3.4.1)[33].

6.3.5 Caveats related to the iterative process to define alternative BZ configurations

(107) When applying the methodology described above, the following caveats and considerations related to the flow decomposition analysis, performed in step 1 of each iteration, apply.

(108) First, the flow decomposition analysis assumes that the market outcome[34] remains unchanged after each iteration; however, in reality, the market outcome may evolve after a change in BZ configurations. This assumption is necessary because revaluating the market outcome would require to perform a full market simulation after each iteration; the time necessary for such a market simulation would not be compatible with the timeline of the present Decision. Moreover, the assumption of unchanged market

[31] Regarding stakeholders' feedback on the consideration of MS borders (see section 6.3.4.1).

[32] For example, the first BZR affecting several MSs pursuant to the CACM Regulation, which was completed in 2018, considered four alternative BZ configurations. The Italian BZR, undergone in 2018, considered five alternative BZ configurations. Given that the geographical scope of these two BZRs is considerably smaller than the current one, considering a maximum of ten alternative configurations per BZRR for the current review can be considered to be in line with these two recent BZRs; in particular, such a maximum appears to be relevant for the CE BZRR, being the largest region defined by TSOs for this BZR.

[33] Following the presentation of ACER's preliminary findings on alternative configurations at the workshop of 11 May 2022, TSOs informed that it would be difficult for them to assess a 'greenfield' configuration within the timeline of the BZR. In view of this, ACER did not include any 'greenfield' configuration in its preliminary position shared with TSOs and regulatory authorities on 24 May 2022.

[34] For the current Decision, this market outcome is either a historical market dispatch for the years 2018-2020 or a dispatch resulting from the LMP results for the year 2025.

outcome was acknowledged to be reasonable during a workshop among the regulatory authorities, TSOs and ACER held on 8 January 2020[35].

(109) Second, the flow decomposition analysis relies, among other parameters, on the so-called Generation Load Shift Keys (GLSKs). They define how a change in the net (importing or exporting) position of a BZ is mapped to the output of generating units. The load-flow software used by ACER considers GLSKs that are proportional to the generation or load in the merged network model. This may not be fully aligned with the GLSKs used during capacity calculation by TSOs. However, in the absence of more detailed information on the actual GLSKs, using proportional GLSKs is a regular practice for simulations[36].

(110) Third, the methodology implemented in the commercial software used by ACER to perform the flow decomposition analysis is based on the methodology described in Annex I of Decision No 30/2020 (see paragraph (69)), except for the following two elements: i) a Direct Current (DC) load flow is performed instead of an Alternating Current (AC) one; and ii) proportional Generation Shift Keys (GSKs) are used for net exporting areas and proportional Load Shift Keys (LSKs) are used for net importing areas, instead of applying proportional GSKs to all areas.

(111) Fourth, the merged network models considered for the flow decomposition analysis are updated to switch on all interconnectors, in order to avoid that a maintenance affecting a specific MTU is assumed to be a recurrent feature of the simulated year. This is also a regular practice for simulations when only a limited sample of network models is available[37].

(112) Fifth, in order to ensure that the computational time allows ACER to take a decision by the given legal deadline, the flow decomposition analysis is based on a subset of the network models available to ACER, namely:

a. For Continental Europe, ACER used two network models for each of the historical years 2018 and 2019, and four network models for the target year 2025. For the historical years 2018 and 2019, ACER considered the two D2CF (see Table 1) network models provided by TSOs for each of these two years. For 2025, to ensure that the network models were representative, ACER performed a correlation analysis aiming at using the network model(s) with the

[35] In particular, TenneT TSO B.V. presented a case study that used flow decomposition for different alternative configurations. In light of the time constraints, the case study assumed an unchanged market outcome for the different configurations.

[36] See e.g. ACER's Methodological paper on estimating the margin available for cross-zonal trade pursuant to ACER Recommendation 01/2019 in light of Article 16(8) of Regulation (EU) 2019/943, available at https://documents.acer.europa.eu/en/Electricity/Market%20monitoring/Documents/20201209%20Methodological%20paper%20MACZT_final.pdf.

[37] See footnote 36.

highest correlation between a set of results derived from individual network models and a set of results that would be derived from using all of them[38].

b. For the Nordic area, ACER used two network models selected[39] among those provided by the Nordic TSOs (see Table 1).

6.4 Preliminary configurations as an outcome of ACER's iterative approach

(113) As a result of applying the iterative approach described in section 6.3.3, four MSs (Germany, France, the Netherlands and Italy (Italy North)[40]) were selected within Continental Europe as the target geographical areas within which the algorithm seeks alternative BZ delineations, before the stop criteria were met[41]. Table 2 below shows the sequence of the iterations for Continental Europe. Additionally, Figure 2 below illustrates how the algorithm selects a given MS (Germany in the example) for a given iteration (iteration 1 in the example) based on the indicators defined in sections 6.3.4.3 and 6.3.4.4, and how the indicators evolve after a change in the BZ delineation (iteration 2).

Table 2: MSs selected as geographical areas within which to seek alternative BZ configurations in Continental Europe as an outcome of ACER's iterative approach

Iteration	MS	Number of BZs
1	DE	2
2	FR	2
3	DE	3
4	FR	3
5	FR	4
6	DE	4
7	FR	5
8	DE	5
9	FR	6

[38] Specifically, for the year 2025, a flow decomposition analysis, considering the status quo BZ configuration, was performed for each of the network models provided by TSOs (see Table 1), which resulted in an amount of loop flows and internal flows per BZ and network model. The results were then aggregated per BZ for all network models taken together. The network models with the highest correlation between the loop flows and internal flows per BZ and network model, and the aggregated loop flows and internal flows per BZ for all network models, were chosen. The following four 2025 network models with a correlation higher than 0.99 were selected: 'y1989_m3_d8_h22'; 'y1995_m1_d8_h8'; 'y1995_m12_d3_h14' and 'y2009_m1_d24_h14'.

[39] The selection was made based on the information provided by the Nordic TSOs, which indicated which two network models could be considered as representative in case that computational time constraints did not allow to use all the provided network models. These network models were 'y1989_w10' and 'y2009_w31'.

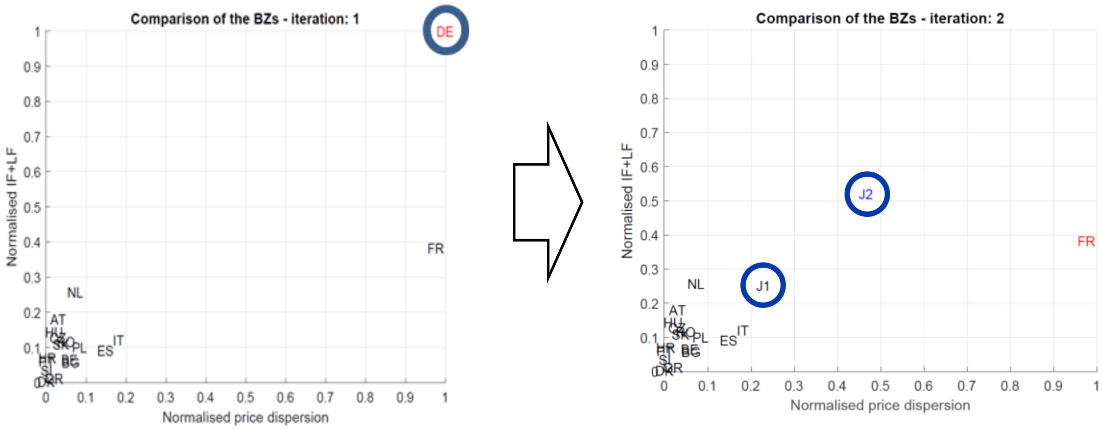
[40] For the purpose of the iterative approach, only Italy North was considered (see the underlying justification in section 6.12).

[41] The first stop criterion to be met was the computational time limit; this limit was set to four days, as this was the maximum amount of time compatible with the required timeline for this Decision, considering that the iterative process had to be repeated several times, e.g. following several corrections of the input data made by TSOs.

10	FR	7
11	FR	8
12	DE	6
13	DE	7
14	DE	8
15	IT North	2
16	NL	2

Figure 2: Example of the evolution of the indicators used to select the target MS in Continental Europe for two consecutive iterations

Iteration 1 ***Iteration 2***



Note: For simplicity and illustration purposes, only iterations 1 and 2 are shown. J1 and J2 refer to the newly identified BZs following a split of Germany into two BZs as a result of iteration 1. The example illustrates how a BZ change potentially improves the performance in terms of economic efficiency (decreasing price dispersion within BZs) and cross-zonal capacity (decreasing the amount of loop flows and internal flows on network elements that are relevant for capacity calculation).

(114) Similarly, as a result of the iterative approach described in section 6.3.3, only Sweden was selected within the Nordic area as the target geographical area within which the algorithm seeks alternative BZ delineations, before the stop criteria were met[42]. Table 3 below shows, for the Nordic area, the sequence of the iterations.

Table 3: MSs selected as geographical areas within which to seek alternative BZ configurations in the Nordic area as an outcome of ACER's iterative approach

Iteration	MS	Number of BZs

[42] In practice, the algorithm was manually stopped after the fifth iteration because beyond this iteration the algorithm was repetitively seeking splits of the area of Stockholm into very small BZs that would unlikely be implemented.

0 (status quo)	SE	4
1	SE	2
2	SE	3
3	SE	4
4	SE	5
5	SE	6

(115) Following the identification of the target MSs, ACER built two lists of potential alternative configurations comprising only individual BZ changes, as described in section 6.3.4.7. One list was built for Continental Europe and another one for the Nordic area, as displayed below in Table 4 and Table 5. The column Delta Price Dispersion (PD) shows the improvement, with respect to the status quo, of the indicator on the 'standard deviation of LMPs within a BZ', whereas column Delta Loop and Internal Flows (LIFs) shows the improvement, with respect to the status quo, of the indicator on 'the aggregated absolute value of loop flows and internal flows, originated in each BZ, on the set of network elements used in capacity calculation'. For example, the first configuration in the table would reduce by 21% the average price dispersion across all BZs in Continental Europe and the overall amount of loop and internal flows by 15% in Continental Europe. The ranking of configurations displayed in the table is based on the TOPSIS method (explained in section 6.3.4.5), rather than on a simple aggregation of the indicators.

Table 4: Overall ranking of individual configurations identified by ACER for Continental Europe, according to their performance with respect to the status quo

Ranking	**MS**	**Algorithm**	**Number of BZs**	**Delta PD**	**Delta LIFs**
1	DE	k-means	5	-21%	-15%
2	DE	k-means	4	-19%	-16%
3	DE	Spectral P1	4	-17%	-16%
4	DE	Spectral P1	5	-19%	-13%
5	DE	k-means	3	-17%	-14%
6	DE	k-means	2	-14%	-16%
7	DE	Spectral P1	3	-15%	-14%
8	DE	Spectral DIRC	3	-15%	-13%
9	DE	Spectral DIRC	4	-13%	-12%
10	DE	Spectral P1	2	-11%	-14%
11	DE	Spectral DIRC	2	-11%	-14%
12	DE	Spectral DIRC	5	-13%	-6%
13	NL	Spectral DIRC	2	-1%	-1%
14	NL	Spectral P1	2	-1%	-1%
15	NL	k-means	2	-1%	-1%
16	FR	Spectral P1	5	-12%	2%

17	IT	k-means	2	-2%	0%
18	FR	Spectral DIRC	5	-16%	4%
19	FR	Spectral P1	4	-16%	6%
20	FR	Spectral P1	3	-6%	2%
21	FR	Spectral DIRC	4	-10%	4%
22	FR	k-means	5	-10%	6%
23	FR	Spectral DIRC	2	-3%	2%
24	FR	k-means	4	-9%	7%
25	FR	Spectral P1	2	-3%	2%
26	FR	Spectral DIRC	3	-9%	8%
27	FR	k-means	3	-6%	8%
28	IT	Spectral P1	2	-1%	1%
29	IT	Spectral DIRC	2	-1%	1%
30	FR	k-means	2	-4%	8%

Note: As described in section 6.3.4.7, the table includes, for each of the three clustering algorithms used by ACER, as many individual configurations as iterations were performed pursuant to the steps 1 to 3. However, splits of MSs beyond five BZs were not considered, in line with the feedback received from TSOs (see paragraph (104)). PD means price dispersion, LIFs means loop and internal flows.

Table 5: Overall ranking of individual configurations identified by ACER for the Nordic area, according to their performance with respect to the status quo

Ranking	**MS**	**Algorithm**	**Number of BZs**	**Delta PD**	**Delta LIFs**
1	SE	Spectral DIRC	4	-18%	-10%
2	SE	Spectral P1	4	-17%	-11%
3	SE	Spectral P1	3	-5%	-5%
4	SE	Spectral DIRC	5	-11%	-2%
5	SE	Spectral P1	5	-16%	-2%
6	SE	Spectral DIRC	3	4%	15%
7	SE	k-means	5	36%	38%
8	SE	k-means	4	38%	37%
9	SE	k-means	3	38%	38%
10	SE	k-means	2	39%	38%
11	SE	Spectral DIRC	2	41%	37%
12	SE	Spectral P1	2	41%	37%

Note: See notes below Table 4.

(116) Based on the above shown Table 4 and Table 5 and the considerations included in section 6.3.4.7 with regard to the combination of individual configurations, ACER proposed the following alternative configurations to be considered during the BZR study as part of ACER's preliminary position shared with TSOs and regulatory authorities on 24 May 2022.

Table 6: Alternative BZ configurations for the CE BZRR included in ACER's preliminary position

MS	Alternative configuration	Justification for the selection of each MS	Justification for the selection of the specific configuration
DE	2 BZs (k-means)	The configurations including splits of Germany lead to the highest reductions in loop and internal flows. Price dispersion also improves significantly (see Table 4). To ensure a balance between potential improvements (that increase with the number of BZ splits) based on the analysed indicators and the number of BZ changes (that should not be too high based on TSOs' feedback), one configuration for each of the considered number of BZs (i.e. two, three, four and five BZs) is included.	It corresponds to the best performing configuration among the configurations including 2 BZs for Germany.
	3 BZs (Spectral P1)		It corresponds to the second best performing configuration for three BZs. However, the best performing configuration with three BZs showed an irregular geographical shape, potentially leading to splitting distribution areas in different BZs, which was mentioned by TSOs as something to be avoided.
	4 BZs (Spectral P1)		Same reasoning as the one above for the split into three BZs.
	5 BZs (k-means)		It corresponds to the best performing configuration among the configurations including five BZs for Germany.
FR	3 BZs (Spectral P1)	France ranks the second poorest MS in the status quo (see Table 2 and Figure 2). However, when analysing alternative BZ configurations for France, only the indicators on price dispersion improve, while the indicator on loop flows and internal flows does	The configuration was chosen as it represents a balance between improvements in the performance, based on the two analysed indicators, and the number of BZ changes.

		not[43]. For this reason, only one individual configuration is selected for France.	
NL	2 BZs (Spectral DIRC)	The Netherlands is selected among the target MSs before the stop criteria are met (see Table 2).	It corresponds to the best performing configuration among the configurations including 2 BZs for the Netherlands.
IT North	2 BZs (k-means)	Italy North is selected in the main scenario before the stop criteria are met and the relevance of the selection is further confirmed by the high prices scenario (see paragraph (118)f).	It corresponds to the best performing configuration among the configurations including 2 BZs for Italy North.
Combination of MSs	DE 2 BZs (k-means) + NL 2 BZs (Spectral DIRC)	Only one combination was preliminarily chosen in light of the initial feedback provided by TSOs and regulatory authorities.	This configuration was chosen as it includes the two simplest splits of the two MSs ranking first in terms of improvements (see Table 4). Additionally, they belong to the same capacity calculation region, which increases the relevance of analysing the two configurations taken together.

Note: The column 'Alternative configuration' describes the number of BZs for a given MS and the clustering algorithm used to derive the configuration, e.g. '2 BZs (k-means)' for Germany means a split of Germany into two BZs based on the outcome of applying the 'k-means' clustering algorithm.

Table 7: Alternative BZ configurations for the Nordic BZRR included in ACER's preliminary position

[43] The fact that the indicator on loop flows and internal flows does not improve is compatible with the proposal of alternative BZ configurations for France. This is due to two main reasons. First, because for France the price dispersion indicator improves in relative terms more than the worsening of the loop flows and internal flows indicator. This means that considering both indicators together, an overall improvement is expected, which is per se a sufficient reason to study alternative BZ configurations in France. Second, a more accurate analysis of the behaviour of an alternative configuration with respect to loop and internal flows requires to reassess the market outcome, something that can only be done during the BZR study itself (see paragraph (108)). This is all the more relevant given that the indicators for the status quo BZ configuration show that France is the MS which is second largest contributor to loop flows and internal flows across the EU and at a significant distance from the third largest contributing MS. This suggests that alternative BZs for France have the potential of improving the performance of this MS with regard to this indicator.

MS	Alternative configuration	Justification for the selection of each MS	Justification for the selection of the specific configuration
Sweden	3 BZs (Spectral P1)	Sweden is the MS that is identified with priority as the area where to study alternative BZ configurations in the Nordics (see Table 3). Only BZ configurations that improve the performance with respect to the status quo are considered.	It corresponds to the second best performing configuration among the configurations including three BZs for Sweden. The best performing one with three BZs for Sweden was excluded because it would lead to splitting the Stockholm area into several BZs, which would unlikely be implemented.
	4 BZs (Spectral P1)		It corresponds to the best performing configuration among the configurations including four BZs for Sweden.

Note: The column 'Alternative configuration' describes the number of BZs for a given MS and the clustering algorithm used to derive the configuration, e.g. '3 BZs (Spectral P1)' for Sweden means a split of Sweden into three BZs based on the outcome of applying the 'Spectral P1' clustering algorithm. Additionally, in its preliminary position, ACER included the Swedish configurations submitted by the Nordic TSOs in their updated BZR proposal.

6.5 Consideration of the sensitivity analyses

(117) As described in paragraph (21), as part of their data submission on 31 March 2022, the TSOs of Continental Europe and Ireland submitted certain sensitivity analyses complementing the main LMP results.

(118) The sensitivity analysis included the following:

a. A simulation considering topological remedial actions as opposed to not considering them.

b. A simulation whereby the technical constraints of thermal generation units were considered instead of disregarding them.

c. A simulation whereby the market outcome is optimised sequentially as opposed to considering parallel market time units.

d. A simulation with hourly as opposed to two-hourly granularity for the market time units.

e. A simulation considering a scenario with the CO_2 price increased up to 90 €/ton.

f. A simulation considering a scenario with the fuel and CO_2 prices increased (90 €/ton for CO_2, 95€/MWht for gas, 90 €/boe for brent and 160 €/ton for coal)

g. A scenario where the consideration of nuclear as must-run units was deactivated.

(119) Given its potential relevance for the present Decision, ACER analysed the data related to the scenarios (118)a and (118)f. The former because TSOs expressed that considering topological remedial actions could relevantly affect the LMP results. The latter because a scenario of high CO_2 and fuel prices is likely to be a realistic assumption, given the current high-energy-prices context.

(120) ACER found that the conclusions that could be derived from these two scenarios did not yield relevantly different conclusions than the one derived from the analysis of the main scenario used by TSOs; rather, the sensitivity analyses allowed ACER to confirm that the focus of the alternative BZ configurations on the MSs selected by ACER and the precise delineations in the present Decision would be relevant also for other scenarios that differ from the main one.

6.6 Comparison of the BZ configurations submitted by TSOs with the BZ configurations derived from ACER's approach

(121) As described in section 6.2, alternative BZ configurations were only included for the Nordic and SEE BZRRs in the updated BZR proposal submitted by TSOs. Additionally, the Nordic TSOs and TenneT TSO B.V. suggested additional configurations at a later stage. Moreover, in the course of the hearing phase, the TSOs of BZRRs CE and Nordic provided additional information that amended, replaced or complemented the information that they had previously provided.

(122) In view of this, ACER decided to consider both the alternative configurations formally submitted by TSOs and the most updated information on alternative configurations provided by them when finalising its Decision on alternative BZ configurations. A description on how this information was considered is included in section 6.8 together with other feedback received by ACER following its preliminary position.

6.7 Consideration of the technical report submitted by ENTSO-E

(123) As explained in paragraph (16), TSOs asked ACER to consider the information included in their latest technical report when deciding on alternative BZ configurations.

(124) Among other elements, the report includes a list of the most relevant physical congestions, including their location and frequency, in the period 2018-2020. However, the report does not provide an assessment of those areas between which there are energy exchanges that significantly contribute to structural physical congestions.

(125) Therefore, while the report can be used as a basis to identify the presence of historical physical congestions and where they occur, it cannot be directly taken as a reference to identify the areas of the network where alternative configurations should be studied with priority. In ACER's view, to identify such areas of the network, the technical report would have to be complemented with a flow decomposition analysis.

In the absence of such an analysis, ACER concluded that it could not meaningfully use the technical report as a conclusive basis for this Decision.

6.8 Assessment of the feedback provided by TSOs and regulatory authorities on the preliminary alternative BZ configurations derived from ACER's approach, as included in ACER's preliminary position

(126) By 3 June 2022, ACER received comments from TSOs and regulatory authorities on the BZ configurations included by ACER in its preliminary position. TSOs provided comments in two different ways; first, jointly, as 'all TSOs'; second, individually or at MS level (two TSOs provided individual comments, and the four German TSOs provided comments jointly). In addition, three regulatory authorities provided comments. Clarifications on some of the comments were provided during the oral hearing held on 8 June 2022. A summary of this feedback and its assessment by ACER is included below.

6.8.1 On the process followed by ACER to take its Decision

(127) In general, all TSOs welcomed the cooperation with ACER throughout the decision-making process. Some TSOs considered that there was limited time to analyse the details of the methodology used by ACER to define alternative BZ configurations.

(128) ACER also considers that there was a good level of cooperation with TSOs. With regard to the timing, ACER notes that it shared the methodology that it would follow, and did actually follow, to define alternative BZ configurations well in advance, thereby allowing the TSOs sufficient time to analyse it. In particular, the 'high level approach' followed by ACER (see paragraph (12)) was shared with TSOs more than one year before actually applying it in the present process for identifying alternative BZ configurations; such an approach also included several details of the methodology (e.g. on the indicator on cross-zonal capacity). ACER acknowledges that some details of the methodology (e.g. the precise indicator on price dispersion or the list of network elements used for the flow decomposition analysis) were shared only once the procedure was formally open. However, some of these details, e.g. the scope of the network elements used for the flow decomposition analysis, could not be shared earlier as they were dependent on the data provided by TSOs. In any case, ACER shared all details of the methodology, as soon as such details were robustly defined by ACER, and always being mindful of the limited time (three months) within which its Decision needs to be taken. ACER also made efforts to consider comments and corrections of the data provided by TSOs, beyond the initially set deadlines. By way of example, following the detection of TSOs' data quality issues, identified by either ACER or TSOs, ACER accommodated corrections of the data provided by TSOs in at least three occasions (see paragraphs (18) to (24)).

6.8.2 On the general methodology used by ACER

(129) The German TSOs considered that it was not clear why ACER based its Decision solely on two indicators (loop and internal flows, and price dispersion); in particular,

they questioned how this related to the presence of structural congestions, which in their view should be the basis to define alternative BZ configurations, pursuant to the Electricity Regulation.

(130) ACER considers that during the process (including when sharing with TSOs its 'high level approach' more than one year before this Decision was taken, see paragraph (12)) it provided numerous explanations on why both indicators are aligned with the principles and objectives envisaged in the Electricity Regulation to define alternative BZ configurations. In particular, arguments explaining the relevance of the indicators used by ACER and their link with the presence of structural congestions are included in section 6.3.1 of this Decision; such arguments were also part of ACER's preliminary position shared with TSOs on 24 May 2022.

(131) The German regulatory authority, BNetzA, commented that ACER's methodology to define BZ configurations penalises larger BZs because it does not consider the potential benefits that larger BZs may render, e.g. in terms of market liquidity and competition.

(132) ACER considers that ACER's methodology does not focus on the size of BZs. Rather, ACER's methodology aims to ensure that structural congestions are not situated within BZs, but rather on BZ borders as envisaged in the Electricity Regulation. With regard to the size of BZs, ACER considers that the outcome of this Decision illustrates that the BZ size is not per se a distinctive criterion; this is illustrated by the fact that relative large BZs such as Spain or Poland were not subject to the definition of alternative BZ configurations in this Decision and, by contrast, relative small BZs such as the Netherlands or Italy North were subject to the delineation of alternative BZ configurations as an outcome of this Decision.

(133) The French regulatory authority, CRE, commented that the indicator on cross-zonal capacity should be given more relevance than the one on economic efficiency as the former has a pan-European dimension while the latter does not have it so much. Moreover, this regulatory authority mentioned that, in the case of France, 'the costs of splitting the French BZ outpaces the potential gains, leading to a net value destruction'.

(134) ACER considers that the Electricity Regulation does not provide different weights to the objectives of maximising economic efficiency and maximising cross-zonal capacity when defining alternative BZ configurations, rather they are presented on equal footing. As regards potential gains specifically for France, ACER considers that the trade-off between benefits and costs is the subject of the BZR study by TSOs, subsequent to this Decision, rather than a conclusion that should be reached within the context of this Decision.

6.8.3 On the detailed methodology used for selecting the target BZs or MSs to be selected for reconfiguration

(135) TSOs expressed concerns on the coherence of the stop criteria applied in the three first steps of ACER's methodology (section 6.3.3), where the list of BZ splits to be

potentially studied are identified, with the fourth step, where the final priority list is defined. In particular, TSOs commented that the priority order assigned in the fourth step is not confirming the iteration order produced in the three first steps. Moreover, TSOs mentioned that the methodological approach on how to get to the final configurations based on individual splits was not sufficiently clear.

(136) ACER provided further explanations on the interaction between the three first steps and the fourth step (as defined in section 6.3.3 and section 6.3.4.7, respectively) during the oral hearing. In particular, ACER explained that the first three steps aim to identify BZs and MSs where the potential for improvement, based on the indicators used by ACER, is the highest at each iteration. The fourth step is the basis to select configurations because it does provide the actual improvement of each individual configuration with respect to the status quo. ACER further explained that the inconsistency perceived by TSOs might arise from the fact that the first iteration points to some BZs and MSs (e.g. France) numerous times, while during the fourth step, the said MS does not rank among the alternative configurations to be selected first. ACER clarified that this was due to the fact that, in this specific case, the improvements for the said MS at each iteration were not as high as for other MSs; consequently, the algorithm kept on aiming at selecting this MS to pursue further improvements. Therefore, ACER considered that the differences in the ranking observed between the first three steps and the fourth were not an inconsistency, but rather a logical outcome of the iterative process. Finally, in reply to a question from TSOs, ACER acknowledged that if the computational time available for this Decision was unlimited, it could not be excluded that the algorithm could find another configuration with higher potential benefits than the ones finally selected in this Decision. However, ACER considers that the objective of the process was not to endlessly identify configurations, but rather to identify sufficient alternative configurations in an orderly manner, and rank them consistently, being mindful of the limited time within which ACER has to take its Decision.

(137) CRE claimed that the inclusion of alternative configurations for France was not consistent with the results of the indicators used by ACER. In particular, it commented that France does not rank ‘too high’ in the list of alternative configurations (see Table 4) and that France appears to improve only one indicator (price dispersion) while it does not improve or even deteriorates for the other indicator (loop and internal flows).

(138) In response to these comments, ACER refers to its considerations in footnote 43. Moreover, ACER considers that the number of individual configurations proposed for the different MSs is in line with the results of the analysis based on the indicators used by ACER. In particular, considering that i) four MSs are identified as target geographical areas where to study alternative configurations (see Table 3) and ii) that the highest improvements from alternative configurations are found for Germany, followed by the other three MSs at some distance, ACER finds it consistent that four individual configurations are proposed for Germany, while solely one is proposed for each of the other MSs, i.e. France, the Netherlands and Italy.

(139) The French TSO, RTE, commented that the price dispersion indicator may present some biases for the French scenario, linked to seasonal variations of prices and demand patterns; moreover, this TSO commented that the price dispersion within France is not as relevant as the average price deviations on the French borders.

(140) With regard to the comment on the biased prices for France, ACER considers that the situation described by the French TSO with regard to seasonal variations is not different from situations that can be found in all other MSs, therefore the price dispersion indicator is not biased against the performance of France. With regard to the existence of higher price differentials on the borders, ACER does not find it in contradiction with the need to study configurations within MSs. In particular, the amount of energy exchanged within a given MS can be considerably higher than the energy exchanged on a given border; therefore, the benefits of delineating BZ borders where congestions are located within a given MS may be potentially higher than just having BZ borders that follow the delineation of the MS' ones.

6.8.4 On the use of interconnectors for Continental Europe as relevant critical network elements, as opposed to using also internal network elements

(141) TSOs commented that ACER's proposal to focus on absolute flows on interconnectors only, as opposed to also use internal network elements, was acknowledged as an approach to overcome the previously identified duplication of network elements (see footnote 27). However, TSOs claimed that this approach is not in line with the current operational practice where both cross-zonal and internal network elements are considered in the capacity calculation processes. TSOs recommended ACER to include the set of critical network elements that is coherent with the capacity calculation methodologies that are expected to be in place in 2025 and with the set of network elements monitored for the 70% target. TSOs also recommended ACER to use indicators that relate the flows to the thermal capacity of network elements, instead of using absolute values.

(142) As explained during the oral hearing, ACER considered that the approach followed by ACER was the only solution available, given the identified data quality issues, considering that TSOs explained that amending the network models to address the duplication of network elements would take a considerable and uncertain amount of time. ACER provided two main reasons for its choice as opposed to the proposal made by TSOs. First, ACER considers that, conceptually, using the absolute amount of loop and internal flows as an indicator of cross-zonal capacity, as opposed to relative values, is more in line with the objective of maximising cross-zonal capacity, considering that meeting the minimum 70% target does not per se ensure that cross-zonal capacity is maximised. Second, using relative values as proposed by TSOs would not address per se the issue of duplicated network elements, and it would not affect the outcome of the analysis; in particular, if a given BZ A induces twice as many loop and internal flows

as BZ B in absolute terms, it would also induce twice the amount of flows expressed as a fraction of the thermal capacities[44].

6.8.5 On the size of each BZ in relation to the price dispersion indicator in the ranking for selecting the candidate MSs for a reconfiguration

(143) Some TSOs and regulatory authorities questioned or opposed to the use of the size of a BZ (understood as the amount of generation and consumption in the said BZ) to weigh the price dispersion indicator.

(144) ACER considers that the size of the BZ is not per se a criterion that drives the current Decision on configurations, as illustrated by the examples mentioned in paragraph (132). However, as the price dispersion indicator within a BZ is used as a proxy for the scope of improving economic efficiency, ACER considers that it is necessary to include a proportionality factor (as the one described by ACER in paragraph (97)) that links the volumes of energy involved in a given BZ with the overall efficiency gains.

6.8.6 On the loop and internal flows indicator methodology

(145) TSOs, in particular the German ones, commented that ACER did not sufficiently specify the flow decomposition methodology used to estimate the loop and internal flows indicator and in particular that ACER did not specify the GLSKs used for the computation of such flows. The German TSOs commented that the choice of GLSKs could have a relevant impact on the results, possibly negatively impacting MSs with high renewables penetration.

(146) ACER provided the relevant information in its preliminary position, both with regard to the flow decomposition methodology used and the GLSKs. It corresponds to the information included in sections 6.3.4.3 and 6.3.5. Moreover, to provide additional clarity on this aspect, ACER shared with TSOs further details on this methodology and detailed data on the calculations performed by ACER, following the oral hearing.

(147) With regard to the comment made by the German TSOs about GLSKs, ACER reiterates what is described in section 6.3.5 about the use of proportional GLSKs, which, in the absence of information on GLSKs used in operational processes, is a regular practice[45]. Moreover, ACER considers that given the vast difference between the amount of loop and internal flows estimated for Germany and any other MSs (e.g. more than 2.5 times higher than France and almost four times higher than the Netherlands, which are the MSs ranking the second and the third, respectively, in terms

[44] Assuming all considered network elements have the same thermal capacity.
[45] See footnotes 36 and 37.

of loop and internal flows), using more accurate GLSKs, if they were available, would not relevantly change the results of the analysis.

6.8.7 On the consideration of topological remedial actions

(148) RTE and CRE commented that the LMP simulations data provided by TSOs to ACER did not sufficiently capture the potential for topological actions to manage congestions in the French TSO’s control area, and therefore led to overestimate the price dispersion indicator used by ACER for France.

(149) ACER considers that TSOs were sufficiently well informed in advance that ACER would ground its Decision on the LMP simulations results jointly submitted by TSOs. Moreover, upon their request, TSOs were given additional time to simulate the effects of topological remedial actions (see paragraph (17)). Additionally, TSOs resubmitted the LMP simulation results in few occasions, following the identification of data quality issues by either TSOs or ACER. Therefore, ACER considers that the latest LMP simulation results jointly submitted by TSOs constitute the most robust set of data that ACER should use as a basis for its Decision. Moreover, the subsequent BZR study to be performed by TSOs provides an additional opportunity to consider topological remedial actions in a more thorough manner.

6.8.8 On the consistency between ACER’s proposal on configurations, the price dispersion indicator estimated for France and the observed costs of redispatching in France

(150) RTE and CRE commented that the price dispersion indicator and ACER’s proposal on configurations was not consistent with the costs of redispatching recorded in France, which are among the lowest in Europe.

(151) ACER considers that relatively low costs of redispatching to address congestions in internal network elements in France is not in conflict with the possibility of studying alternative BZ configurations for France. This is mainly due to three reasons. First, the current Decision on alternative configurations is based on the objectives envisaged in the Electricity Regulation for the definition of alternative configurations and associated indicators; redispatching costs are not among those indicators. Second, even if redispatching costs were considered, such redispatching costs should include not only the costs incurred by RTE to address congestions within the French network but also the redispatching costs related to physical congestions in neighbouring MSs induced by exchanges of energy within France[46]. Third, the price dispersion indicator suggesting

[46] This is in line with ACER’s Decision on cost sharing of redispatching and countertrading for the Core CCR (see footnote 10), which implements the polluter-pays principle and could lead to a higher share of redispatching costs for France and other MSs.

the presence of congestions for France is estimated for a future 2025 scenario, as opposed to historical congestions referred to by RTE in its comment.

6.8.9 On the inclusion of a 'greenfield' alternative BZ configuration

(152) BNetzA commented that considering a 'greenfield' configuration is of high importance in order to serve as benchmark and plausibility check.

(153) TSOs commented that they strongly prefer not to study a 'greenfield' configuration in the context of this BZR as it would be 'nearly impossible' to complete the analysis within the timeline of the review, to the detriment of studying other configurations in more detail, jeopardising the successful finalisation of the entire BZR.

(154) ACER acknowledges that considering a 'greenfield' configuration could be relevant, provided that doing so improves the robustness of the BZR study while not hindering its feasibility. However, given the recurrent delays of this BZR study, which should have started in 2019 pursuant to the Electricity Regulation, the difficulties experienced so far by TSOs with the LMP simulations that anticipate the additional difficulties that the TSOs will face during the BZR study, as acknowledged by TSOs, and the lack of experience in dealing with this type of alternative configurations in the EU, ACER finds it inappropriate to risk the completion of a robust, focused and timely BZR by including a 'greenfield' configuration. As a result, ACER did not include any 'greenfield' alternative BZ configuration in this Decision.

6.8.10 On the inclusion of a wider set of combination of individual splits as alternative configurations

(155) TSOs commented that the process for the selection of combinations of individual configurations by ACER was not sufficiently clear.

(156) The German NRA, BNetzA, commented that the study should not focus on one MS but instead combining several MSs in order to come as close as possible to the overall optimum. It suggested to add an additional combination of three BZs splits and a 'greenfield' approach with as little restrictions as possible.

(157) The German TSOs commented that ACER should limit the number of individual splits to a few per existing MS and instead focus on combinations of the individual split scenarios across different MSs when making its Decision.

(158) TenneT TSO B.V. commented on the benefits of adding combinations of individual splits to the alternative configurations proposed by ACER, including the possibility of increased welfare benefits from these combinations, better comparisons of incremental benefits leading to better decisions, and a simpler and more robust decision-making process on a possible change of a BZ configuration. This TSO pointed to the possibility of combining configurations related to individual splits within the same capacity calculation region, namely combining configurations for Germany, France and the Netherlands. The Dutch TSO also commented that it would be worth studying more

combinations, even if it would lead to a slight increase of the total amount of configurations to be studied in the BZR (e.g. from eight to ten).

(159) RTE commented, during the oral hearing, that it did not see the need of adding combinations involving France, given that the benefits from such a potential configuration would be smaller than studying other options.

(160) ACER finds it relevant to recall the feedback provided by TSOs following the workshop held on 11 May (see paragraph (104)). In particular, TSOs expressed that they would favour to include two combinations of individual configurations, namely a combination of Germany with France, and a combination of Germany with France and The Netherlands.

(161) In light of the arguments included above, ACER agrees that it could be beneficial to include some more combinations for the BZR study; in this respect, ACER considers that the decision on whether combinations should be added, and if so, which combinations should be considered with priority, needs to be based on the same methodology and indicators which ACER followed when prioritising individual configurations. Yet, ACER considers it also important for the purpose of this BZR to keep the number of combinations and BZ changes manageable. Therefore, ACER evaluated the performance of the simplest combinations (i.e. all pairs of individual configurations and a combination of three individual configurations of the same capacity calculation region, i.e. for Germany, France and the Netherlands). To build these combinations, ACER used for Germany the split into four BZs proposed by TSOs, as this was the one performing the best among the German individual configurations included by ACER (after withdrawing the configuration with five BZs). Based on the updated ranking of alternative configurations, ACER concluded that the following three combinations could be the most adequate to be incorporated: first, the above mentioned combination of three individual configurations; second, the combination of splitting Germany into four BZs with splitting France into three BZs; and third, the combination of splitting Germany into four BZs with splitting the Netherlands into two BZs. Following this analysis, ACER included the above mentioned three combinations in the draft Decision submitted to the AEWG for consultation.

6.8.11 <u>On the number of alternative configurations to be considered for the BZR</u>

(162) TSOs welcomed that ACER intended to limit the number of alternative configurations to make the BZR study more thorough and focused while meeting the set deadlines.

(163) ACER acknowledges the need to limit the number of alternative configurations, in particular avoiding the inclusion of combinations that are technically difficult while unlikely to be implemented, e.g. a ‘greenfield’ configuration, as expressed by TSOs (see section 6.8.9). However, in light of other feedback received by TSOs (see in particular section 6.8.10), ACER found it relevant to enrich the variety of alternative configurations with some combinations of individual splits, as long as these combinations can be expected to deliver higher benefits than the individual ones. While

the BZR methodology allows TSOs to include combinations during the BZR study itself, TSOs commented that they would prefer ACER to include the relevant ones in this Decision. With all alternative configurations being set in this Decision, TSOs can run all simulations in parallel, which could save time during the BZR.

(164) As a result of the above considerations, the number of alternative configurations included in the draft Decision increased slightly compared to the number of configurations proposed in ACER's preliminary position. In particular, ten configurations were included for the CE BZRR and four configurations for the Nordic BZRR (see section 6.14), in line with the process envisaged by ACER for the selection of the 'final' configurations described in section 6.3.4.7.

6.8.12 <u>On the unique assignment of generation and load units to BZs</u>

(165) By 8 June 2022, i.e. within the deadline for TSOs to send comments on ACER's preliminary position, TSOs mentioned that they were in the phase of verifying the criterion on the unique assignment of generation and load units to BZs as envisaged in the BZR methodology ('unique assignment').

(166) This verification was completed by the relevant TSOs after the set deadline for written comments as follows.

(167) On 10 June 2022, Svenska Kraftnät and TenneT TSO B.V. confirmed that the alternative configurations that were expected to be part of ACER's Decision were compliant with the criterion of 'unique assignment'.

(168) On 10 June 2022, the Italian TSO, Terna, and the French TSO, RTE, proposed to reallocate a few nodes in the configurations proposed by ACER, in order to fulfil the criterion of 'unique assignment'.

(169) Based on the indicators used throughout the analyses underlying this Decision, ACER analysed the proposal for changes made by Terna and RTE. ACER concluded that such changes only minimally affect the performance of the alternative configurations proposed by ACER; in view of this, ACER introduced the changes proposed by TSOs in the delineation of the alternative configurations for France and Italy.

(170) On 21 June 2022, the German TSOs submitted the following information:

a. A proposal to reallocate few nodes for the alternative BZ configurations with identifier 1, 3 and 4 (see Table 10) proposed by ACER.

b. A statement indicating that, to conclude on whether the fulfilment of the unique and unambiguous assignment of generation and load units to BZs is possible for the alternative BZ configurations proposed by ACER, the TSOs would need to consult the affected distribution system operators (DSOs).

(171) Concerning the reallocation of nodes proposed by the German TSOs, ACER concluded that such changes only minimally affect the performance of the alternative configurations proposed by ACER; in view of this, ACER introduced the changes proposed by the German TSOs in the delineation of the alternative configurations for Germany.

(172) Concerning the statement in (170)b, ACER assesses the following:

a. ACER received a network model including network elements and nodes to which TSOs assigned generation and load units. The configurations proposed by ACER ensure that each node (therefore also each load and generation unit assigned to each node) is assigned only to one BZ, in line with Article 33(1)(c)(iii) of the CACM Regulation. On the basis of this information, given the level of detail of the network model, ACER could not assess if all existing generation and load units were indeed assigned to a node, neither whether the TSOs' assignment of generation and load units was done with a homogenous and robust approach.

b. Only in the final stages of these proceedings, TSOs informed ACER that new data, not part of the network model provided by TSOs to ACER, could be relevant for the unique assignment of generation and load units to a BZ for the alternative configurations in Germany, especially regarding generation and load units connected at lower voltage levels which could have been assigned to nodes in a heterogonous way. According to the TSOs, a relevant part of this new data is possessed by DSOs and collecting and assessing it could take considerable time.

c. Article 15(18) of the BZR methodology provides that the criterion of the unique assignment is addressed during the definition of alternative BZ configurations; otherwise, TSOs may reject alternative BZ configurations for which this criterion is not fulfilled, during the first step of the BZR. In ACER's view, this provision of the BZR methodology aims at assessing the criterion of unique assignment based on the network model provided by TSOs. This is in line with the fact that the BZR methodology consistently refers to such specific network model as the basis for the various analyses foreseen during the BZR. Consequently, TSOs should consider that such criterion is formally fulfilled for the purpose of "Step 1" of the upcoming BZR insofar it follows from the information included in the network model.

d. ACER understands that the collection of new data by TSOs might lead to situations where the unique assignment of generation and load units to a BZ is not as clear as the network model suggested. In particular, ACER was informed that the unique assignment of generation and load units to a BZ may be more challenging in meshed networks such as the German one and more specifically in Amprion's network. In this respect, a TSO informed ACER that, even in meshed networks, there are different options available to ensure the unique assignment of generation and load units during the BZR. According to this TSO, it should be possible for all TSOs to ensure the unique assignment of generation and load units to BZs for all the configurations proposed by ACER.

e. In view of the above, ACER considers that the German TSOs should collect sufficient information during the BZR study with a view to further assess and fulfil the unique assignment of load and generation units to BZs. In case this is not possible, ACER foresaw fallback alternative configurations to be considered during the BZR study (see section 6.14).

6.8.13 On the appropriateness of following TSOs' borders in Germany

(173) The German TSOs recommended to consider the borders of the existing control areas in Germany when proposing alternative BZ configurations. In their view, this could ease the BZR study and a potential implementation of a BZ change, and the unique assignment of generation and load units to BZs should also be generally easier. In this regard, the German TSOs submitted to ACER a proposal to reallocate some nodes for the configurations into two and four BZs derived from the Spectral P1 clustering algorithm.

(174) ACER first observes that the German TSOs submitted this proposal at a very late stage, while they had been invited to do so by 31 January 2022, and they declined this offer (see paragraph (57)). Despite this fact, ACER made an effort to analyse these two configurations, by evaluating their performance with respect to the indicators used by ACER in this Decision. ACER concluded that the modified version of 'Spectral P1' with four BZs proposed by TSOs performs very similarly to the one originally proposed by ACER (see the split into four BZs, Spectral P1, in Table 8). With regard to the configuration into two BZs, ACER concluded that the modified version of 'Spectral P1' proposed by TSOs is inferior to the one proposed by ACER (split into two BZs, k-means, in Table 8). Consequently, ACER decided to replace the configuration in four BZs proposed by ACER with the one proposed by the German TSOs and to incorporate the configuration of two BZs proposed by the German TSOs as a second alternative in addition to the one proposed by ACER. To compensate this addition, as the number of configurations should remain limited, ACER decided to withdraw its configuration into five BZs.

6.8.14 On the configurations proposed for the CE BZRR

(175) The main comments related to the CE BZRR were already described in the previous sections 6.8.7 to 6.8.10. Table 8 displays the overall ranking of configurations, including the additional alternative configurations submitted by TSOs. The configurations to be considered for the BZR are highlighted in bold in Table 8 and listed in section 6.14.

Table 8: Overall ranking of individual alternative configurations proposed by ACER and by TSOs, according to their performance with respect to the status quo for the CE BZRR

Ranking	Number of BZs per MS	Source (ACER's algorithm / TSOs)	Delta PD	Delta LIFs
1	**DE4**	**Modified version of Spectral P1 following remarks provided by the German TSOs**	**-18%**	**-15%**
2	DE4	Spectral P1	-17%	-16%
3	**DE2**	**k-means**	**-14%**	**-16%**
4	**DE3**	**Spectral P1**	**-15%**	**-14%**
5	**DE2**	**Modified version of Spectral P1 following remarks provided by the German TSOs**	**-13%**	**-11%**
6	**NL2**	**Spectral DIRC**	**-1%**	**-1%**
7	**IT2**	**k-means**	**-2%**	**0%**
8	**FR3**	**Spectral P1**	**-6%**	**2%**

Note: The configurations to be considered for the BZR are highlighted in bold. The combinations of individual configurations included in the draft Decision submitted to the AEWG (see section 6.8.10) are not included in this table.

6.8.15 <u>On the configurations proposed for the Nordic BZRR</u>

(176) The Nordic TSOs welcomed the configurations proposed by ACER subject to the following considerations.

(177) First, the Nordic TSOs welcomed the 'Spectral P1' split of Sweden into three BZs, as proposed by ACER, while including a modification to enable that the Forsmark power plants and the Fennoskan interconnector are included in the 'Stockholm BZ'. Svenska Kraftnät informed that this modification would allow Svenska Kraftnät to manage the network in a more coherent manner, considering the fact that the area around Stockholm is operated by a DSO with different operational principles.

(178) Second, the Nordic TSOs welcomed the 'Spectral P1' split of Sweden into four BZs, as proposed by ACER, while including two modifications:

a. That the Forsmark power plants and Fennoskan interconnector are included in the 'Stockholm BZ', as described above.

b. That the border between the current BZs of SE1 and SE2 remains untouched, to limit the number of BZ changes.

(179) In addition, the Finnish TSO, Fingrid, proposed to study the 'Spectral P1' split of Sweden into three BZs as proposed by ACER, without modifications. In this configuration, the Forsmark power plants and Fennoskan interconnector are connected

to the current SE3 BZ. Fingrid explained that including the Fennoskan interconnector in the 'Stockholm BZ' may have a relevant negative impact on the Finnish BZ with respect to cross-border flows and adequacy issues.

(180) ACER analysed the performance of the alternative BZ configurations proposed by the Nordic TSOs with respect to the indicators used by ACER in this Decision (see Table 9). The analysis indicates the following: first, for the splits of Sweden into four BZs, ACER's configuration 'Spectral P1' performs better than the modified version of this alternative configuration proposed by Svenska Kraftnät; second, for the splits of Sweden into three BZs, the modified version of the configuration 'Spectral P1' proposed by Svenska Kraftnät performs better than the original version proposed by ACER.

(181) Additionally, during the oral hearing of 8 June 2022, the Nordic TSOs informed ACER that the configurations submitted by them in 2020 were based on outdated information and therefore those configurations were not as relevant as the ones that the Svenska Kraftnät suggested in the course of the hearing phase. Notwithstanding this, ACER analysed the configurations submitted in 2020 by the Nordic TSOs (see Table 9) and concluded that their performance was inferior to the configurations proposed by ACER or more recently by Svenska Kraftnät.

(182) In view of this, ACER decided to include four configurations to be considered in the Nordic BZRR (highlighted in Table 9 and listed in section 6.14) for the following reasons.

(183) With regard to the split into four BZs, ACER' 'Spectral P1' performs better than the modified version proposed by Svenska Kraftnät. However, the latter is also relevant as it performs close to ACER's one and it is supported by all Nordic TSOs.

(184) With regard to the split into three BZs, the configuration proposed by Svenska Kraftnät performs better than ACER's one, but ACER's one might address some of the concerns mentioned by Fingrid; in the absence of more information on how ACER's configuration may effectively address such concerns, ACER considers that it is recommendable to study both configurations, the one proposed by Svenska Kraftnät and the one proposed by ACER, during the BZR.

Table 9: Overall ranking of alternative configurations, including configurations proposed by ACER and by TSOs, according to their performance with respect to the status quo for the Nordic BZRR

Ranking	Number of BZs per MS	Source (ACER's algorithm / TSOs)	Delta PD	Delta LIFs
1	**SE4**	**Spectral P1**	**-17%**	**-11%**
2	**SE4**	**Modified version of Spectral P1 following remarks provided by Svenska Kraftnät**	**-15%**	**-4%**

Ranking	Number of BZs per MS	Source (ACER's algorithm / TSOs)	Delta PD	Delta LIFs
3	**SE3**	**Modified version of Spectral P1 following remarks provided by Svenska Kraftnät**	**-13%**	**-5%**
4	**SE3**	**Spectral P1**	**-5%**	**-5%**
5	SE4	'Configuration 3 - Merge of current SE3-SE4, and new SE5' proposed by Svenska Kraftnät on 18 February 2020	-10%	18%
6	SE3	'Configuration 4 - Merge of current SE3-SE4, merge of current SE1-SE2, and new SE5' proposed by Svenska Kraftnät on 18 February 2020	-8%	17%

Note: The configurations to be considered for the BZR are highlighted in bold.

6.9 Assessment of the advice provided by AEWG on the draft Decision on alternative BZ configurations to be considered during the BZR

(185) On 23 June 2022, ACER received advice from the AEWG on its draft Decision on alternative BZ configurations. The AEWG broadly endorsed ACER's draft Decision and invited ACER to consider the comments received from specific regulatory authorities. A description of these comments and the corresponding ACER's assessment is included below. Additionally, a typo identified by the Luxembourgish regulatory authority, ILR, was corrected by ACER.

6.9.1 <u>Specific comments from BNetzA</u>

(186) BNetzA commented that it did not agree with ACER's approach to focus on absolute flows on interconnectors only for the assessment of internal and loop flows.

(187) ACER reiterates the observations made on this aspect in section 6.8.4.

(188) BNetzA commented that ACER's approach ignores the fact that meshed, larger BZs provide important liquidity and price signals for the entire internal energy market.

(189) ACER reiterates the observations made on this aspect in paragraphs (131) and (132).

(190) BNetzA questioned why a split of Germany into five BZs was introduced by ACER as a fallback for a split of Germany into two BZs, and it proposed to consider as a

fallback the split into two BZs (Configuration 1) included as annex to the TSOs' BZR proposal submitted in 2019 and 2020[47].

(191) ACER observes that the inclusion of a split of Germany into five BZs is consistent with ACER's preliminary position where a configuration with five BZs for Germany was included. Following the feedback of German TSOs, ACER had replaced this configuration with a split of Germany into two BZs, specifically proposed by the German TSOs (see section 6.8.13) with a view to assess two alternative splits of Germany into two BZs during the BZR study. One of these alternatives corresponds to the split of Germany into two BZs proposed by ACER, while the other corresponds to the one proposed by the German TSOs. Therefore, ACER finds it adequate that the fallback of ACER's alternative is in line ACER's preliminary position where a split into five BZs was foreseen; this split into five BZs was however adapted to ease the unique assignment of units to BZs.

(192) BNetzA considered it more adequate that the combinations for Germany refer to splits of Germany into two BZs as opposed to four or five BZs proposed by ACER.

(193) ACER considers that, given that the number of combinations need to be remain limited, it would not be justifiable to combine a split of Germany into two BZs when there are other German individual configurations included in ACER's Decision with better performance. Moreover, it wouldn't be consistent either to combine a split of Germany into two BZs with a split of other MSs into three BZs (e.g. for France where a split into three BZs is the only configuration included in ACER's Decision).

(194) BNetzA reiterated that it would prefer not to exclude the 'greenfield' approach as an alternative configuration, and that additional work should be done in order to allow such an assessment in the future.

(195) ACER reiterates its observations on this point included in section 6.8.9 and it agrees that such a 'greenfield' approach might be more relevant in future BZRs.

6.9.2 Specific comments from CRE

(196) CRE commented that ACER combined two indicators, namely standard deviation of prices and variations of loop and internal flows, which are of completely different nature.

(197) ACER observes that these indicators are in line with the Electricity Regulation as explained in sections 6.3.4.3 and 6.3.4.4. Moreover, to ensure a robust combination of

---

[47] See https://eepublicdownloads.entsoe.eu/clean-documents/cep/implementation/BZ/A1_BZR_ED_Considerations%20on%20BZRR%20CE%20configurations.pdf.

the two indicators into a single ranking, ACER followed a scientific approach (see section 6.3.4.5).

(198) CRE commented that, in light of the Electricity Regulation, only configurations with positive performance for the two indicators used by ACER in this Decision should be selected. Therefore, the split of France into three BZs that does not show a positive performance for the loop and internal flows indicator should be excluded.

(199) ACER reiterates the arguments included in footnote 43. In particular, the fact that this indicator suggests a negative performance of the configuration proposed for France does not imply that such configuration cannot contribute to increase cross-zonal capacity. In fact, a more accurate analysis of the behaviour of an alternative configuration with respect to loop and internal flows requires to reassess the market outcome, something that can only be done during the BZR study itself (see paragraph (108)). This is all the more relevant given that the indicators for the status quo BZ configuration show that France is the MS which is second largest contributor to loop flows and internal flows across the EU and at a significant distance from the third largest contributing MS (see Figure 2). This suggests that alternative BZs for France have a considerable potential of improving the performance of this MS with regard to this indicator. Finally, the relevance of proposing an alternative configuration for France through ACER's model-based approach is consistent with the previous edition of the BZR[48]; the selection of alternative BZ configurations for such edition of the BZR relied on the opinion of experts and it foresaw four alternative BZ configurations, out of which two configurations envisaged BZ splits for France.

(200) CRE commented that the loop and internal flows indicator should have been divided by a proportionality factor capturing the capacity of interconnectors connecting a MS with the rest of the EU.

(201) ACER considers that it would be incorrect to divide this indicator by a proportionality factor. On the contrary, any indicator assessing the performance of a MS should focus on the cumulative impact of the loop and internal flows originated in such MS, at the EU level. Dividing this impact by the interconnector capacity of the said MS or any other similar factor would lead to irrational results. For example, it could lead to conclude that a MS 'consuming' 20% of cross-zonal capacity on only one interconnector would have more potential for improvement in terms of amount of cross-zonal capacity compared to a MS 'consuming' 15% of cross-zonal capacity on twenty interconnectors. Finally, while CRE's observation seems to assume that ACER's approach focuses on the impact of each MS on its own interconnectors, ACER clarifies that the indicator used in this Decision measures the impact across the entire EU network.

[48] See section 4.1 at https://eepublicdownloads.entsoe.eu/clean-documents/nc-tasks/EBGL/CACM_A32_2018-03_First_Edition_of_the_Bidding_Zone_Review%20(1).pdf.

(202) CRE commented that the fact that the sensitivity analysis for the scenario with topological remedial actions does not show different results than the main scenario confirms that the impact of topological remedial actions was not properly considered. Moreover, CRE considers that ACER acknowledges in its Decision that topological remedial actions were not sufficiently taken into account. Finally, CRE considers that ACER relies on an imperfect modelling of topological remedial actions as opposed to considering the daily application of such actions by the French TSO.

(203) ACER reiterates that TSOs were given specific additional time, upon their request, to consider topological remedial actions (see paragraph (149)) for the LMP simulations. Moreover, ACER considers that the fact that TSOs should model topological remedial actions even more robustly during the BZR does not preclude that they were incorrectly considered for the LMP simulations. This is all the more true, considering that during the public workshop held on 21 April 2022, where TSOs presented the results of the LMP analysis[49], TSOs highlighted the relevance of the results derived from the sensitivity analysis considering topological remedial actions. Finally, concerning the imperfection of the modelling, ACER clarifies that TSOs were allowed to consider, ex-post, topological remedial actions in the LMP simulations by factoring in the expertise of each TSO in the daily operation of the grid.

(204) CRE expressed concerns on the fact that ACER did not consider ENTSO-E's technical report on congestions as basis for its Decision, in particular given that it contains historical information.

(205) ACER reiterates that the technical report cannot be directly used as a basis for ACER's Decision because it lacks the link between the location of physical congestions and the areas of the network between which there are energy exchanges that contribute the most to structural congestions. Precisely for this reason, ACER incorporated a flow decomposition analysis which allows to make such a link. Finally, ACER did not disregard historical data; in fact, the flow decomposition analysis encompassed both historical and network models (see paragraph (112)).

(206) CRE commented that ACER disregarded the historical remedial action costs to address congestions, which are low in France, other historical data and other modelling experiences as useful insights.

(207) ACER reiterates the arguments included in section 6.8.8. In addition. ACER reiterates that the opinion of experts confirms the relevance of proposing configurations for France (see paragraph (199)).

(208) Following its comments included in the AEWG's advice, CRE provided ACER with further details on its views. During this bilateral discussion, CRE commented that

[49] See https://eepublicdownloads.azureedge.net/clean-documents/mc-documents/220421_Bidding%20Zone%20Review%20Stakeholders%E2%80%98%20Workshop.pdf.

it did not find it adequate to include combinations of individual alternative configurations in this Decision. CRE argued that combinations of alternative configurations carry a higher probability of being recommended for a BZ change, as an outcome of the BZR study, than the individual configurations. Therefore, such combinations should be selected with a more in-depth assessment compared to the one performed by ACER in this Decision; in view of CRE, such in-depth assessment can only be performed by TSOs during the BZR study. For all the reasons above, CRE advocated to withdraw all combinations from this Decision and to require TSOs to select the combinations to be assessed only during the BZR study itself.

(209) In light of CRE's feedback on the combinations of alternative configurations, ACER decided to discuss two possible options at the Board of Regulators meeting held on 13 July 2022:

a. Under the first option, the three combinations of individual alternative configurations described in section 6.8.10 are included in this Decision.

   The main advantage of this option is that TSOs could assess all alternative BZ configurations in parallel, which could save time during the BZR study.

   The main disadvantage of this option is that the selection of combinations is made on the assessment and indicators used by ACER for this Decision, which could be less accurate than any subsequent assessment performed by TSOs during the BZR study.

b. Under the second option, no combinations of individual alternative configurations are included in this Decision. Instead, for BZRR CE, TSOs would be required to assess at least two combinations of individual configurations. Such combinations would not be set ex-ante in the present Decision; rather, the combinations would be set during the BZR study of TSOs based on the intermediate results of such study. More specifically, TSOs would be required to consider at least two combinations as follows. First, the combinations should meet the condition of including individual alternative configurations for at least two MSs. Second, TSOs should first build a list of combinations meeting the above condition and then rank the combinations according to the sum of the individual monetised benefits estimated by TSOs in the so-called "Step 1" of the BZR study (see Article 13(1) of the BZR methodology). The two first combinations of this ranking should then be selected.

   The main advantage of this option is that it would ensure a more targeted and robust selection of combinations.

   The main disadvantage is that TSOs might need additional time to assess the combinations of individual configurations as they would have to perform this assessment only after assessing the performance of individual configurations.

(210) During the discussions at the Board of Regulators' meeting on 13 July 2022, most regulatory authorities acknowledged the advantages of the second option and that the disadvantages of this option would be acceptable. As a result, ACER took this option as a basis for its Decision, as reflected in section 6.14.

6.10 Assessment of the feedback provided by TSOs and the AEWG on the updated draft Decision following the Board of Regulators' meeting on 13 July 2022

(211) Following the outcome of the Board of Regulators' meeting held on 13 July 2022, ACER updated its draft Decision by incorporating the approach described in paragraph (209)b for the selection of combinations of individual configurations. A consultation with TSOs on this update took place between 13 July 2022 and 20 July 2022. Following the assessment of this feedback, ACER consulted the AEWG on the updated version of the draft Decision on 20 July 2022 and received AEWG's advice on 25 July 2022. A description of the comments received and the corresponding ACER's assessment is included below.

6.10.1 <u>Assessment of the feedback provided by TSOs</u>

(212) In essence, TSOs raised four issues on the updated approach to select combinations:

a. The wording describing how the combinations are to be selected would not be sufficiently clear and could lead to different interpretations.

b. The approach would seriously endanger the completion of the BZR study within the 12 months prescribed in Article 14(6) of the Electricity Regulation.

c. The approach would endanger the TSOs' ability to hold a public consultation within 6 months from the start of the BZR study, as prescribed by Article 17(4) of the BZR methodology.

d. The approach would not be in line with Article 14(5) of the Electricity Regulation, which requires ACER to decide on the alternative BZ configurations, and it would transform the TSOs' right under Article 13.1(a)iii.3 of the BZR methodology to propose additional combinations into an obligation.

(213) In light of this feedback, ACER updated its draft Decision as follows.

(214) First, ACER further clarified how TSOs should select the combinations of individual configurations. In particular, ACER clarified that TSOs are required to consider two combinations on the basis of the individual configurations highlighted in bold in Table 8. To that end, TSOs should build a list of candidate combinations that comprise only two MSs, and then TSOs should rank the candidate combinations according to the sum of the individual monetised benefits estimated by TSOs in the so-called "Step 1" of the BZR study (see Article 13(1) of the BZR methodology). The two first combinations of this ranking should be selected.

(215) The above selection of combinations does not prevent TSOs from considering additional combinations in accordance with Article 13.1(a)iii.3 of the BZR methodology.

(216) Second, with regard to the risk of missing the 12-month deadline for the BZR study, ACER sees that the updated approach to select combinations may involve a risk of delay for the BZR study, as acknowledged by regulatory authorities at the Board of Regulators' meeting on 13 July 2022.

(217) Third, with regard to the fulfilment of Article 17(4) of the BZR methodology, ACER observes that the public consultation can be held before TSOs complete the modelling process and the computation of the indicators envisaged in the different steps of the BZR methodology for the selected combinations; therefore, ACER considers that the approach envisaged by ACER to select combinations does not impede TSOs to meet the 6-month deadline for the public consultation according to Article 17(4) of the BZR methodology.

(218) Fourth, with regard to the obligation of ACER to decide on alternative BZ combinations according to Article 14(5) of the Electricity Regulation and the right of TSOs to add configurations during the BZR study according to Article 13.1(a)iii.3 of the BZR methodology, ACER notes that the updated approach does decide on the alternative BZ configuration and does not affect the TSOs' right to propose additional alternative BZ configurations. In particular, the updated approach defines a minimum set of alternative BZ configurations to be considered during the BZR study, including the range of combinations from which the finally relevant combinations are determined, as prescribed in paragraph (214), and the information that will become available during the BZR study. This definition of alternative BZ configurations, especially of the specific combinations that are to be considered, does not preclude TSOs from considering also other combinations, in addition to those defined by the present Decision, in line with Article 13.1(a)iii.3 of the BZR methodology.

(219) In addition, the Dutch TSO, TenneT TSO B.V., questioned the number of combinations included in the updated draft Decision and the fact that these combinations comprise only two MSs as a minimum, requiring an agreement among TSOs for the inclusion of combinations with three or more MSs.

(220) ACER observes that requiring a minimum of two combinations, each of them consisting of alternative configurations for two MSs, was found to be an appropriate solution during the discussions among regulatory authorities. Moreover, in the course of these proceedings, other TSOs expressed different views on this matter (see e.g. paragraph (104) and paragraph (159)). In light of the above, ACER finds the proposed approach to be an adequate solution. However, this does not exclude the possibility of TSOs to consider more than two combinations and/or combinations comprising more than two MSs in accordance with Article 13.1(a)iii.3 of the BZR methodology.

6.10.2 Assessment of the advice provided by the AEWG

(221) On 25 July 2022, ACER received advice from the AEWG on its updated draft Decision on alternative BZ configurations. The AEWG broadly endorsed ACER's draft Decision and invited ACER to consider the comments received from specific regulatory authorities. A description of these comments and the ACER's corresponding assessment is included below.

(222) CRE requested to ensure that the updated approach was in line with the position reached at the Board of Regulators' meeting of 13 July 2022.

(223) ACER verified that the updated approach reflects the Board of Regulators' position.

(224) BNetzA commented that the updated approach for selecting combinations risks the timely completion of the BZR study. Moreover, BNetzA commented that the updated approach would unlikely lead to select more than two combinations and/or combinations with more than two MSs.

(225) ACER observes that the aspects mentioned by BNetzA are an inherent element of the common position reached at the Board of Regulators' meeting of 13 July 2022. However, ACER reiterates that TSOs can still consider more than two combinations and/or combinations comprising more than two MSs in accordance with Article 13.1(a)iii.3 of the BZR methodology.

6.11 Specific case of the SEE BZRR

(226) In the updated BZR proposal, TSOs submitted, for the SEE BZRR, a configuration for Greece consisting of the split of the Greek BZ into two BZs (mainland and Crete).

(227) ACER did not include this configuration in its Decision on alternative BZ configurations for the following reasons. First, based on the analysed indicators, Greece was not identified among the areas of the network where alternative configurations should be studied with priority (see Table 2 and Figure 2). Second, both the relevant TSO and the relevant regulatory authority did not oppose to such an exclusion in the preliminary position shared by ACER on 24 May 2022. Finally, such an alternative BZ configuration could still be studied, e.g. in a national BZR, provided that the conditions for such a national BZR prescribed by the Electricity Regulation and the CACM Regulation are met.

6.12 Specific case of the Central-Southern Italy BZRR

(228) In the updated BZR proposal, Terna explained that the CSI BZRR had recently undergone a BZR process[50], considering both the time horizons 2020 and 2025, the latter overlapping with the time horizon covered by the present Decision.

(229) By the time when the updated BZR proposal was submitted by TSOs, the BZ changes stemming from the above mentioned BZR process in Italy were not yet applied, although these changes entered into force in the course of 2021.

(230) Moreover, during the consultation phase of this Decision, ACER did not receive any consideration from other TSOs or regulatory authorities beyond Italy, expressing concerns about possible impacts of the BZ changes resulting from the Italian BZR on the network areas of their own jurisdictions.

(231) In view of all the elements above, ACER concluded that it was not necessary to seek alternative BZ configurations for this BZRR as part of the ongoing BZR.

6.13 Specific case of the Baltic BZRR

(232) As mentioned in paragraph (41), the Baltic TSOs were unable to perform the LMP simulations that were requested by ACER in its Decision No 29/2020, by the set deadline. In particular, the Baltic TSOs would need first additional time to finalise dynamic studies related to the synchronisation with Continental Europe that were presented by the Baltic TSOs as a necessary element to carry out the LMP analysis. This would entail twelve additional months that are needed to undergo the LMP analysis after the completion of such studies, which are not yet completed to the best of ACER's knowledge.

(233) Without results from a LMP analysis from the Baltic TSOs, ACER considers not to be in a position to take a decision on alternative BZ configurations for the Baltic BZRR.

(234) Consequently, in order to take a decision on alternative BZ configurations for the entire EU, including the Baltic BZRR, ACER would have to suspend the entire decision-making process, resulting in a further significant delay in the definition of alternative BZ configurations. In ACER's view, such suspension would not be appropriate for the following two reasons: i) given the delay already incurred in this BZR process, it is not reasonable to delay the entire process where a decision on alternative BZ configurations concerning the other MSs of the EU can be taken; and ii)

---

[50] Based on the information provided by Terna, Terna had submitted a BZR study to ARERA on 15 May 2018. Following this, ARERA decided the following:

- To approve the study and to implement a first change to the previous BZ configuration starting from 1 January 2019, by eliminating three out of the four national virtual BZs, namely 'Brindisi', 'Foggia' and 'Priolo' (ARERA Decision 386/2018/R/EEL, 12 July 2018);
- To approve Terna's proposal for a new BZ configuration ('Alternativa Base') and to ask for implementing it in 2021 (ARERA Decision 103/2019/R/EEL, 19 March 2019).

such Decision can indeed be taken without taking into account the Baltic BZRR, because the regional approach that TSOs have set out for this BZR implies that the progress with the BZR in a given BZRR (or the rest of Europe in this case) is not essentially affected by the progress in a specific BZRR (the Baltic one). The latter is irrespective of the need for modelling the exchanges between the Baltic BZRR and the neighbouring BZRRs undergoing the BZR.

(235) Therefore, ACER considered it necessary to decide, at this point in time, on the alternative BZ configurations for all EU MSs, except for those of the Baltic BZRR.

(236) It is still critical that following this Decision, the Baltic TSOs submit this data as soon as feasible, i.e. once the necessary studies, described by the Baltic TSOs as a precondition to start the LMP analysis, are performed. Once this data is delivered, ACER will be in position to decide on alternative BZ configurations also with respect to the Baltic BZRR.

6.14 ACER conclusions on alternative BZ configurations to be considered

(237) In light of the assessments made in sections 6.1 to 6.13, and the consultation with TSOs and regulatory authorities, ACER concluded that the alternative BZ configurations indicated in Table 10 below are to be considered by TSOs during the BZR study.

Table 10: Alternative configurations to be considered for the BZR

Identifier	BZRR	Number of BZs per MS	Source (ACER's algorithm / TSOs)
1	CE	DE2	k-means
2	CE	DE2	Modified version of Spectral P1 following remarks provided by the German TSOs
3	CE	DE3	Spectral P1
4	CE	DE4	Modified version of Spectral P1 following remarks provided by the German TSOs
5	CE	FR3	Spectral P1
6	CE	IT2	k-means
7	CE	NL2	Spectral DIRC
8	Nordic	SE3	Spectral P1
9	Nordic	SE3	Modified version of Spectral P1 following remarks

Identifier	**BZRR**	**Number of BZs per MS**	**Source (ACER's algorithm / TSOs)**
			provided by Svenska Kraftnät
10	**Nordic**	**SE4**	**Spectral P1**
11	**Nordic**	**SE4**	**Modified version of Spectral P1 following remarks provided by Svenska Kraftnät**
15 onwards	**CE**	**Combinations as derived during the bidding zone review study**[51]	

(238) The geographical delineation of these configurations is included in Annex I to this Decision.

(239) Additionally, ACER invites the German TSOs to collect sufficient information during the BZR study with a view to further assess the unique assignment of load and generation units to BZs (see section 6.8.12). Such an assessment should be done for all the configurations involving Germany. In case the new information indicates that the current assignment of certain generation and load units to BZs is ambiguous, ACER recommends TSOs to assign, unambiguously, these units to BZs[52]. In order to do so, TSOs should consider at least the following two criteria: i) the usual switching state of a distribution grid; and ii) the lowest impedance between generation or load units and the various nodes to which such units could be potentially assigned. ACER recommends TSOs to include sufficiently clear information on the unique assignment of generation and load units to BZs in the outcome of the BZR study.

(240) Finally, if, after exhausting all the options available to ensure the unique assignment of generation and load units to BZs, TSOs conclude that such a unique assignment cannot be achieved for the alternative BZ configurations with identifier 1, 3 or 4[53], then TSOs should replace the concerned configuration(s) with the

[51] See paragraph (214).
[52] ACER understands that the reassignment of certain generation and load units to BZs would not fundamentally change the relevance of the configurations proposed by ACER, as the performance of these configurations should change only marginally.
[53] ACER did not include a fallback configuration for the configuration with identifier 2 as this configuration was provided by the German TSOs (see section 6.8.13) with the specific purpose of facilitating the unique assignment of generation and load units to BZs.

corresponding fallback BZ configuration(s) included in Annex 1[54, 55]. Moreover, if TSOs replace any of the above listed configurations, TSOs also need to update the ranking of combinations and the selection of two of them during the BZR study (see paragraph (214)); these combinations should then be assessed by TSOs.

7 ACER's recommendations on how to align the approach and assumptions used by TSOs for the BZR study with the approved BZR methodology

(241) As described in paragraph (11), following a request from ACER, JRC provided a set of recommendations on how TSOs could further align the LMP simulations with Decision No 29/2020. The recommendations were shared with TSOs on 3 June 2021. On 8 July 2021, TSOs provided a reply on whether and how they intended to address the recommendations made by JRC.

(242) In their reply, TSOs explained that they did not deem it necessary for the LMP simulations, or that they were not able to implement in short time, the main suggestions made by JRC. Among the recommendations made by JRC, ACER considers that the following two can have significant impacts on the outcome of the BZR, in particular if TSOs do not take actions to tackle these issues for the BZR study:

a. JRC recommended to review the network model of the target year to ensure that only the network projects with a strong indication that they would go-live by the target year of the BZR study (end of June 2025) were considered for the LMP simulations. JRC explained that including projects that will unlikely be available for the target deadline can substantially affect the results of the analysis. TSOs, however, explained that they did not intend to change their initial consideration of network projects, mainly because this would entail substantial work.

b. JRC recommended to review the approach used by TSOs to consider demand response in the simulations. Among other aspects, JRC recommended to reflect the possibility of demand to react with notice periods longer than day-ahead and, in any case, given the uncertainty about demand elasticity, to envisage a sensitivity analysis for different demand elasticity values.

(243) Additionally, for the LMP simulations, TSOs informed that, due to time constraints, they were not able to fully implement the following elements that are however prescribed by Decision No 29/2020:

[54] The performance of these alternative BZ configurations, in light of ACER's indicators, is likely to be slightly inferior to the configurations being replaced; however, they are still expected to be relevant in so far they are likely to perform better than other configurations (e.g. configurations 5, 6 and 7) included in this Decision.

[55] It should be noted that for the fallback configurations the precise allocation of nodes to BZs is not included in Annex VI as ACER is not in possession of the necessary information to do so. However, such information is already in possession of TSOs because it refers to the allocation of nodes to control areas and/or to BZs previously proposed by the German TSOs.

a. The need to consider technical generation constraints. Instead, TSOs used a linear approach, which disregarded all or most of these constraints. To shed light on the impact of this simplification, TSOs provided a sensitivity analysis by considering technical constraints for a subset of the simulated period (one week).

b. The need to perform simulations on an hourly basis. Instead, TSOs performed the simulations with a granularity of two hours. As above, to shed light on the impact of this simplification, TSOs provided a sensitivity analysis by considering hourly granularity for a subset of the simulated period (one week).

c. The need to optimise the simulated dispatch on at least a weekly basis. Instead, TSOs used a daily optimisation horizon. As above, to shed light on the impact of this simplification, TSOs provided a sensitivity analysis by considering a weekly optimisation for a subset of the simulated period (one week).

d. The need to align the non-costly remedial actions used for the LMP simulations as much as possible with the non-costly remedial actions envisaged for the BZR study. For the BZR study, TSOs are expected to consider the non-costly remedial actions that best reflect the expected operational practices for the target year (2025). For the LMP simulations, TSOs only partly considered non-costly remedial actions.[56]

(244) Decision No 29/2020 sets out the methodologies that TSOs need to follow both for the LMP simulations and the upcoming BZR study. In general, both methodologies are broadly aligned to ensure consistent analysis and decisions throughout the BZR process. However, in case of computational-related or other type of constraints, ACER considers that simplifications for the LMP simulations could be more acceptable than for the BZR study. This is because the LMP simulations are only one of the two analyses (the other being flow decomposition) to support a decision on alternative BZ configurations to be studied, while the BZR study may lead to effectively decide on a change in the BZs configuration. Moreover, ACER believes that the simplifications made by TSOs for the LMP results do not impede ACER from taking an informed and robust decision on alternative BZ configurations. Consequently, as described in paragraph (41) , ACER considered the LMP results provided by TSOs by 20 April 2022 as completely delivered and took them into account as a relevant input for the current Decision.

(245) Overall, ACER considers that the simplifications introduced by TSOs for the LMP simulations should be avoided for the BZR study. Keeping such simplifications could alter the outcome of the BZR study. More specifically, ACER considers that, in line

[56] Namely, TSOs informed that out of the 24 simulated weeks, non-costly remedial actions were considered only for France (for three weeks), for Czech Republic (for two weeks) and for Spain and Portugal (for one week).

with its Decision No 29/2020, TSOs should tackle the following issues for the upcoming BZR study:

a. Ensure that only those projects for which there is sufficient certainty about their realisation by June 2025 are included in the network models used in the BZR study;

b. Ensure that the modelling of demand response considers notice periods longer than day-ahead;

c. Incorporate the technical generation constraints in the simulations of the day-ahead market dispatch and remedial action optimization;

d. Perform the simulations with an hourly granularity and using (at least) a weekly simulation horizon;

e. Duly take account of non-costly remedial actions; and

f. In case that they are not able to overcome the issues related to points a and b above, perform two separate sensitivity analyses to inform on how: i) excluding network projects that are unlikely to be realised by June 2025, and ii) considering longer notice periods for demand response, would affect the outcome of the BZR study.

8 Conclusion

(246) For all the above reasons, ACER considers that the alternative BZ configurations proposed by the TSOs with their updated BZR proposal need to be revised in order to meet the requirements of alternative BZ configurations according to Article 14(5) of the Electricity Regulation. The revisions necessary to that end have been incorporated in Annex I to this Decision. Subject to these necessary revisions, ACER has approved the alternative BZ configurations set out in Annex I for all EU MSs, except for those of the Baltic BZRR.

(247) ACER considers that TSOs should ensure the full alignment of the BZR study with the BZR methodology described in Decision No 29/2020 and that, in order to do so, TSOs should tackle the issues identified during the LMP simulations. A list of issues to be tackled with priority are listed in paragraph (245) of this Decision.

HAS ADOPTED THIS DECISION:

Article 1

The alternative bidding zone configurations for all EU Member States, except for those of the Baltic bidding zone review region, namely Estonia, Latvia and Lithuania, to be considered in the bidding zone review process according to Article 14(5) of Regulation (EU) 2019/943 are adopted as set out in Annex I to this Decision.

This Decision is addressed to:

50Hertz - 50Hertz Transmission GmbH
Amprion - Amprion GmbH
APG - Austrian Power Grid AG
Augstsprieguma tïkls - AS Augstsprieguma tïkls
BritNed - BritNed Development Limited
ČEPS - ČEPS a.s.
Creos Luxembourg S.A.
EirGrid - EirGrid plc
Eirgrid Interconnector - Eirgrid Interconnector DAC
ElecLink - ElecLink Ltd
Elering - Elering AS
ELES - ELES, d.o.o. Sistemski operater prenosnega elektroenergetskega omrežja
Elia - Elia Transmission Belgium SA/NV
Energinet – Energinet
ESO - Electroenergien Sistemen Operator EAD
Fingrid - Fingrid Oyj
HOPS - Croatian Transmission System Operator Ltd
Independent Power Transmission Operator S.A. ("IPTO" or “ADMIE”)
Kraftnät Åland - Kraftnät Åland Ab
LITGRID - Litgrid AB
MAVIR Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkörűen Működő Részvénytársaság
Moyle Interconnector - Moyle Interconnector Ltd
National Grid ESO - National Grid ESO
National Grid Interconnectors - National Grid Interconnectors Ltd
PSE - Polskie Sieci Elektroenergetyczne S.A.
REE - Red Eléctrica de España S.A.
REN - Rede Eléctrica Nacional, S.A.
RTE - Réseau de Transport d'Electricité, S.A
SEPS - Slovenská elektrizačná prenosovú sústava, a.s.
SONI - System Operator for Northern Ireland Ltd
Svenska Kraftnät - Affärsverket svenska kraftnät
TenneT GER - TenneT TSO GmbH
TenneT TSO - TenneT TSO B.V.
Terna - Terna Rete Eletrica Nazionale S.p.A.
Transelectrica - National Power Grid Company Transelectrica S.A.
Transmission System Operator – Cyprus
TransnetBW -TransnetBW GmbH
VUEN - Vorarlberger Übertragungsnetz GmbH

Done at Ljubljana, on 08 August 2022.

- SIGNED -

For the Agency
The Director

C. ZINGLERSEN

<u>Annexes:</u>

Annex I – List of alternative bidding zone configurations to be considered for the bidding zone review
Annex II – Evaluation of Responses to the public consultation – (For information only)
Annex III – Description of the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), used to prioritise alternative bidding zone configurations
Annex IV – Description of the clustering algorithms
Annex V – Values of the indicators underlying the ranking of alternative bidding zone configurations
Annex VI – Allocation of nodes to bidding zones for the alternative bidding zone configurations included in Annex I

In accordance with Article 28 of Regulation (EU) 2019/942, the addressees may appeal against this Decision by filing an appeal, together with the statement of grounds, in writing at the Board of Appeal of the Agency within two months of the day of notification of this Decision.

In accordance with Article 29 of Regulation (EU) 2019/942, the addressees may bring an action for the annulment before the Court of Justice only after the exhaustion of the appeal procedure referred to in Article 28 of that Regulation.