

DECISION No 29/2020
OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS
of 24 November 2020

on the methodology and assumptions that are to be used in the bidding zone review process and for the alternative bidding zone configurations to be considered

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 Regulators¹, and, in particular, Article 3(2) and 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 electricity² and, in particular, Article 14(5) thereof,

Having regard to the outcome of the consultation with the transmission system operators and ('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 18 November 2020, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942,

Whereas:

1. INTRODUCTION

- (1) Regulation (EU) 2019/943 on the internal market for electricity (the 'Electricity Regulation') laid down a range of requirements to address congestions and, in

¹ OJ L 158, 14.6.2019, p. 22.

² OJ L 158, 14.6.2019, p. 54.

particular, to ensure an optimal configuration of bidding zones (BZs). These requirements include the need to carry out a BZ review (BZR), following the development of a methodology and assumptions that are to be used in such a BZR and for the alternative BZ configurations to be considered in accordance with Article 14(5) of the Electricity Regulation.

- (2) Pursuant to Article 14(5) of the Electricity Regulation, 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 ('BZR proposal') to the relevant regulatory authorities for approval. The relevant regulatory authorities shall take a unanimous decision on the proposal within 3 months of its submission. Where the regulatory authorities are unable to do so, ACER shall, within an additional three months, decide on the methodology and assumptions and the alternative BZ configurations to be considered.
- (3) The present Decision follows from the letter of 13 July 2020 of all regulatory authorities informing ACER that they were unable to reach a unanimous decision on the BZR proposal submitted by TSOs' for approval, and requesting ACER to decide on that proposal.
- (4) The Decision includes the following annexes:
 - (a) Annex I, which sets out the BZR methodology and assumptions, as amended by ACER.
 - (b) Annex Ia, which includes the list of minimum data to be published in accordance with Article 16 of the BZR methodology and assumptions.
 - (c) Annex Ib, which includes a template which may be used by TSOs to consolidate the results of the BZR, for each Bidding Zone Review Region (BZRR) in accordance with Article 13(1)(d) of the BZR methodology.
 - (d) Annex II, which describes the detailed requirements, including submission deadlines, of the data request issued to TSOs as part of the present Decision.
 - (e) Annex III, which includes a summary and evaluation of the responses received in the context of the public consultation launched by ACER on 1 April 2020 with a view to support the approval of the BZR proposal.

2. PROCEDURE

2.1. Proceedings before regulatory authorities

- (5) 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.
- (6) On 17 December 2019, in view of the lack of alternative BZ configurations for the BZRR Central Europe in the initial BZR proposal, all regulatory authorities decided the following:

- (a) Request TSOs to complete the initial BZR proposal within two months.
 - (b) Request TSOs to provide a set of three data items, namely data on historical congestions, on Common Grid Models (CGMs) and results derived from Locational Marginal Pricing (LMP) simulations, with a view to support the approval of the BZR proposal, or to develop additional alternative BZ configurations in case TSOs failed to provide them, including in the case of referral to ACER. The data was requested to be delivered to regulatory authorities and ACER within two months.
- (7) By 7 April 2020, the TSOs submitted an updated version of the initial BZR proposal ('updated BZR proposal') to their respective regulatory authorities.

2.2. Proceedings before ACER

- (8) Prior to the submission of the initial BZR proposal, on 5 October 2019, ACER had been regularly involved in the discussions among TSOs and regulatory authorities on the matter, with a view to support the approval process.
- (9) On 5 November 2019, ACER launched a study to suggest methodologies and indicators to evaluate the potential impact of a BZ reconfiguration on market liquidity and transaction costs. The study was also commissioned with a view to support the regulatory discussions leading to the approval of the BZR proposal. In order to discuss the findings of the study and to receive stakeholder's feedback, ACER organised, in close cooperation with the consultants, a set of teleconferences and meetings. In particular, the following discussions were held:
- (a) on 16 December 2019, a teleconference call with regulatory authorities;
 - (b) on 18 December 2019, a discussion with market stakeholders in the framework of the Market European Stakeholders Committee (MESC) meeting;
 - (c) on 11 March 2020, a discussion with market stakeholders in the framework of the MESC meeting; and
 - (d) on 12 March 2020, a teleconference call with regulatory authorities;
- On 28 April 2020, the study was published³.
- (10) In January 2020, regulatory authorities, anticipating a possible referral of the BZR proposal to ACER, invited ACER to be more intensively involved in the discussions with TSOs, and in the regulatory discussions for the approval of the BZR proposal.

³ The study is available at https://www.acer.europa.eu/en/Electricity/MARKET-CODES/CAPACITY-ALLOCATION-AND-CONGESTION-MANAGEMENT/Documents/200406%20DNV%20GL%20report_final.pdf

- (11) On 1 April 2020, ACER launched, in coordination with regulatory authorities, a public consultation which aimed to collect views from stakeholders to identify improvements to the BZR proposal. The summary and evaluation of the responses received are included in Annex III to this Decision.
- (12) On 23 April 2020, regulatory authorities and ACER discussed a referral of the updated BZR proposal to ACER. With regard to such referral, ACER proposed to split its decision on the BZR proposal into two decisions (hereinafter ‘two steps approach’), in light of the lack of alternative BZ configurations proposed for a large part of the EU:
- (a) a first decision on the pan-European BZR methodology and, potentially, on alternative BZ configurations for those regions that adequately submitted alternative BZ configurations in light of the existent structural congestions; and
 - (b) a second decision on alternative BZ configurations for regions that failed to submit sufficient alternative BZ configurations in light of the existent structural congestions, to be taken at a later stage.

The AEWG supported the proposal of ACER to split the decision into two decisions.

- (13) On 17 June 2020, ACER discussed with stakeholders, in the framework of the MESC, a list of improvements to the BZR methodology, to be potentially introduced in case of referral of the BZR proposal to ACER. Such amendments took into consideration the results of the above-mentioned public consultation.
- (14) By letter of 13 July 2020, the Chair of the Energy Regulators’ Forum (ERF), on behalf of all regulatory authorities, informed ACER that they were unable to reach a unanimous decision on all TSOs’ updated BZR proposal and that the updated BZR proposal was considered as referred to ACER as of 7 July 2020, pursuant to Article 14(5) of the Electricity Regulation.
- (15) The above-mentioned letter included a document titled ‘Non-paper by all regulatory authorities on the methodology and assumptions that are to be used in the BZR process and for the alternative BZ configurations in accordance with article 14(5) of the Electricity Regulation’ where regulatory authorities pointed to the following two main aspects that would need to be addressed during the approval of the updated BZR proposal:
- (a) With regard to the BZR methodology, all regulatory authorities reiterated previous concerns on a number of issues of the BZR proposal, including the definition of the target year, and aspects of the capacity calculation and the market and redispatching simulations. In this context, all regulatory authorities acknowledged the relevance of taking into account previous discussions on the BZR methodology among regulatory authorities, TSOs and ACER.
 - (b) With regard to the alternative BZ configurations, regulatory authorities expressed the need for ACER to perform a legal assessment about the possibility of splitting ACER’s decision into two decisions.

- (16) On 30 June 2020, ACER sent a letter to the EC requesting its views on the possibility of splitting the decision on the BZ methodology in two separate procedures.
- (17) On 10 July 2020:
- (a) A conference call among regulatory authorities and ACER in the framework of the regulatory authorities and ACER BZR expert group was held.
 - (b) A conference call among regulatory authorities, TSOs and ACER was held.
- (18) By letter of 30 July 2020, the EC replied to ACER's inquiry on the possibility of splitting the BZR decision into two separate procedures. In essence, the EC confirmed ACER's view that splitting the BZR decision into two decisions is legally possible. In particular, such a splitting is justifiable if additional information is needed for ACER to make an informed decision related to alternative configurations, which would be the matter of the second of the decisions.
- (19) On 14 July:
- (a) ACER issued a public notice announcing the commencement of the procedure ref. ACER-ELE-2020-001 to decide on the updated BZR proposal pursuant to Article 14(5) of the Electricity Regulation. Amongst other procedural aspects, ACER announced that in issuing its decision, it will consider stakeholders' feedback to the above-mentioned public consultation held between 1 and 24 April 2020 and other stakeholders' feedback provided at the MESC meetings or via a functional email box.
 - (b) ACER also notified all regulatory authorities and all TSOs on the commencement of the procedure.
- (20) On 14 August 2020, a teleconference call among regulatory authorities, TSOs and ACER was held.
- (21) On 20 August 2020, a discussion among regulatory authorities and ACER in the framework of ACER's capacity allocation and congestion management taskforce (CACM TF) was held.
- (22) On 3 September 2020, TSOs made a request to simplify the two steps approach as envisaged by ACER. In particular, TSOs suggested to follow the two steps approach while ensuring that the BZR would start simultaneously for all regions, rather than at different points in time. They explained that this simplification would lead to increased consistency and coordination and would reduce the risk of not delivering the BZR on time. They also requested to use 2025 (instead of 2023 or 2024) as the target year for the BZR as this would increase consistency and would avoid to analyse configurations that would become obsolete before their implementation.
- (23) On 3 September 2020, a discussion among regulatory authorities and ACER in the framework of the AEWG was held. ACER informed about its intention to accept TSOs' request aiming at ensuring that the BZR are performed simultaneously for the

various regions. No objections were raised by regulatory authorities, although one regulatory authority invited ACER to consider simplifications in the data request to ensure its timely delivery.

- (24) On 9 September 2020, a discussion among regulatory authorities and ACER in the framework of the CACM TF was held. ACER provided a legal justification for the two steps approach to decide on the methodology and configurations.
- (25) On 10 September 2020, a teleconference call among TSOs and ACER was held whereby ACER provided its feedback on the concerns raised by TSOs by email on 3 September.
- (26) On 21 September 2020, a discussion among regulatory authorities and ACER was held. ACER provided an update on the main changes incorporated in the BZR methodology following the written feedback received from regulatory authorities by 21 August and from TSOs on 27 August 2020.
- (27) On 22 September 2020, ACER provided an update on the BZR process and ACER's upcoming decision on the matter at the Electricity Coordination Group (ECG) meeting.
- (28) On 23 September 2020, ACER discussed with stakeholders, in the framework of the MESG, the recent developments on the BZR methodology and the next steps towards issuing the decision. Several concerns and questions were raised by stakeholders, mostly related to the focus on monetised criteria, as envisaged in the BZR methodology, the need to ensure pan-European consistency and the potential challenges of a LMP analysis.
- (29) On 24 September 2020, a discussion among regulatory authorities and ACER in the framework of the AEWG was held. ACER presented the main changes that were incorporated in the BZR methodology following previous feedback from TSOs and regulatory authorities. Overall, regulatory authorities welcomed the amendments made, whereas only one regulatory authority raised concerns few aspects of the updated version.
- (30) On 25 September 2020, a workshop among TSOs, regulatory authorities and ACER was held. The workshop focused on the request for a LMP analysis to enable ACER to decide on alternative BZ configurations, and also as an analysis to be part of the BZR methodology.
- (31) On 28 September 2020, a teleconference call among TSOs and ACER was held. ACER provided an update on the main changes incorporated in the BZR methodology following the written feedback received from TSOs on 27 August.
- (32) On 29 September 2020, a discussion among TSOs and ACER was held. It aimed to discuss a number of general concerns raised by TSOs with regard to the BZR process.

- (33) On 1 October 2020, ACER sent a preliminary draft of the amended BZR methodology to TSOs and regulatory authorities for their feedback.
- (34) On 6 October 2020:
- (a) Upon request, a call between ACER and a number of stakeholders was held. It aimed to clarify and discuss a number of aspects of the BZR methodology and the BZR process in general.
 - (b) A call between ACER and TSOs was held. It aimed to clarify some aspects of the BZR methodology, including the request for a LMP analysis.
- (35) By 9 October 2020:
- (a) ACER received feedback on the preliminary draft of the BZR methodology from two regulatory authorities.
 - (b) ACER received feedback on the preliminary draft of the BZR methodology from TSOs.
- (36) On 23 and 28 October, complementary feedback on the BZR methodology was provided by TSOs.

3. ACER'S COMPETENCE TO DECIDE ON THE BZR PROPOSAL

- (37) Pursuant to Article 5(7) of Regulation (EU) 2019/942, ACER shall carry out its tasks as regards the bidding zone review pursuant to Article 14(5) of Regulation (EU) 2019/943.
- (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 3 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 an 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 Regulation (EU) 2019/942 and Article 14(5) of the Electricity Regulation.

4. SUMMARY OF THE UPDATED BZR PROPOSAL

- (40) The updated BZR proposal consists of the following elements:

- (a) the main document, which describes the BZR methodology and assumptions that are to be used in the BZR process;
 - (b) annexes to the main document 1 to 8 describing the proposed alternative BZ configurations for the different BZR regions (BZRRs);
 - (c) an explanatory document (for information only), which provides additional background information and explains the rationale behind the choices made in the proposal for the BZR methodology and assumptions; and
 - (d) annexes to the explanatory document 1 to 8 (for information only), justifying the proposal for alternative BZ configurations for the different BZRRs.
- (41) The main document of the updated BZR proposal document is structured as follows:
- (a) ‘Whereas’ section and Articles 1 and 2, which include general provisions on the subject matter and scope and definitions and interpretation;
 - (b) Article 3, which provides an overview of the BZR process;
 - (c) Article 4, which lists the BZRRs to be used in the BZR process. The article also refers to the alternative configurations to be used for the BZR process which are described in the above-mentioned annex;
 - (d) Article 5, which describes the process to determine scenarios and assumptions to be used in the BZR process;
 - (e) Article 6, which provides an overview of the modelling chain to be used in the BZR process;
 - (f) Article 7, which describes the requirements for the calculation of cross-zonal capacities within the modelling chain;
 - (g) Article 8, which describes the process to derive the dispatch resulting from the market within the modelling chain;
 - (h) Article 9, which describes the process to perform an operational security analysis (OSA) within the modelling chain;
 - (i) Article 10, which describes the process to simulate the remedial actions to address the congestions resulting from the OSA, within the modelling chain;
 - (j) Article 11, which describes the process to estimate the flows not induced by cross-zonal trade;
 - (k) Article 12, which describes the process to perform a LMP simulation as part of the BZR process;
 - (l) Article 13, which describes the process to evaluate the criteria envisaged for the BZR process, including:
 - i. an overview of the evaluation criteria to be used;
 - ii. the general approach to perform the evaluations;

- iii. how to determine the geographical scope for each criterion; and
 - iv. the specific approach to perform the evaluation for each criterion.
- (m) Articles 14 to 16, which address the implementation of the methodology, its publication, the language and other aspects not covered in previous articles.

5. SUMMARY OF THE OBSERVATIONS RECEIVED BY ACER

5.1. Public consultation

- (42) The responses to the public consultation (see paragraphs (11) and (19)) are compiled and evaluated in Annex III.

5.2. Consultation of TSOs

- (43) ACER consulted TSOs on its preliminary position on the BZR methodology and assumptions and on the request to perform a LMP simulations, the latter to enable ACER to decide on alternative BZ configurations. In their feedback, TSOs acknowledged that many of the concerns raised by the TSOs had already been taken into account in the preliminary ACER's draft of the BZR methodology. Moreover, TSOs highlighted a number of remaining concerns that can be summarised as follows:

- (a) The need to consider, in addition to the LMP simulations, a number of qualitative aspects in order to propose alternative configurations to be considered for the BZR process.
- (b) Challenges associated to the LMP simulations, despite TSOs' willingness to perform LMP simulations to the best of their ability.
- (c) Challenges to perform the BZR within the deadlines envisaged in the Regulation if a high number of alternative BZ configurations, including all possible combinations, are required to be studied.
- (d) The fact that several of the modelling requirements remain, in the TSOs' view, overly prescriptive and explicit, leaving limited flexibility to TSOs.
- (e) Challenges to publish all the data required in the methodology, in light of the envisaged publication deadlines and related confidentiality issues that may arise.
- (f) Concerns regarding the process to be followed, and the feasibility of modelling implicit demand response.

5.3. Consultation of regulatory authorities and the AEWG

- (44) ACER consulted regulatory authorities on its preliminary position on the BZR methodology and assumptions. Two regulatory authorities provided feedback. In their feedback, the following observations were made:

- (a) One regulatory authority highlighted the need to mainly consider the following aspects:

- i. the need to clarify the envisaged process and the role for LMP simulations in defining alternative configurations, as this was not easily inferable from the BZR methodology;
 - ii. the need to further clarify some concepts including:
 1. the addressees of the requirements, e.g. when referring to “TSOs”;
 2. the difference between scenarios, single scenario and sensitivities;
 3. the need to keep the number of scenarios limited;
 4. the role of climate years; and
 5. the definition of the target year.
- (b) Another regulatory authority highlighted the need to mainly consider the following aspects:
- i. the need to include further analysis on the impact on CO₂ emissions and renewable energy sources (RES) infeed;
 - ii. the need to further clarify the meaning of ‘availability costs for redispatching purposes’ and the fact that the proposed methodology to estimate them is imperfect;
 - iii. the fact that the BZR methodology overemphasises the importance of some criteria while this is not envisaged in the CACM Regulation;
 - iv. the fact that the robustness of price signals, including price risks, is not sufficiently analysed;
 - v. the need to reflect that a certain amount of loop flows is legally acceptable, in line with the CACM and Electricity Regulations, and the fact that loop flows can lead to negative and positive effects;
 - vi. the need to consider the location of congestions over time; and
 - vii. the need to expand the analysis envisaged to evaluate the integration of RES, e.g. by considering the negative impacts of price volatility on RES integration.
- (45) The AEWG was consulted from 21 October until 30 October. While no comments were submitted during the formal AEWG consultation period, the following AEWG comments were received, in the framework of the 28 October AEWG meeting:
- (a) The request from one regulatory authority to include an additional option to model the costs of network reserves in proportion to the peak need for redispatching energy. ACER agreed to introduce this change, which was not objected by any regulatory authority during the meeting.
 - (b) One regulatory authority expressed concerns related to the risks that RES investors may face due to changes in bidding zone configurations and to the absence of indicators assessing the impacts on the volumes of CO₂ emissions. Regulatory authorities and ACER agreed to include, for transparency, an indicator on CO₂

emissions and a link to the criterion on long-term price signals for efficient low-carbon investments, including RES.

(c) One regulatory authority suggested to introduce an additional indicator on loop flows. No objections were raised in the course of the meeting, although not all regulatory authorities were yet able to express their views during the meeting.

(46) A separate consultation process was set up for Ofgem, to take into account its particular situation following BREXIT and to enable it to provide views.

5.4. Other observations from stakeholders received by ACER

(47) In addition to stakeholder's feedback received through the public consultation, ACER also received feedback directly from one stakeholder. This feedback referred to the following aspects:

(a) the need to consider the effects of a BZ reconfiguration on forward and balancing markets, in addition to the short-term physical markets (day-ahead and intraday);

(b) the need to perform a thorough assessment of market liquidity impacts as part of a broader market efficiency analysis;

(c) the need for harmonising certain aspects of the methodology, such as network congestion and market efficiency, to avoid a fragmented regional approach;

(d) the added value of a LMP simulation to assess alternative BZ configurations;

(e) the need to include an adequate modelling of Demand-Side Response (DSR) and, more broadly, any other upcoming developments with regard to market-based flexibility in the power market;

(f) concerns about limited stakeholder engagement, which is key to ensure a robust and transparent analysis.

6. ASSESSMENT OF THE UPDATED BZR PROPOSAL

6.1. Legal framework

(48) Article 14(5) of the Electricity Regulation sets out the key requirements of the BZR proposal.

(49) 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.

(50) In terms of substantive provisions, 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.

- (51) In that context, Article 14(1) and Article 14(3) of the Electricity Regulation describe how the configurations of BZs in the Union are to be designed and how the analysis of different configurations of BZs is to be performed, including the need to perform such an analysis in accordance with Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management⁴ ('the CACM Regulation'). In this regard, Article 33 of the CACM Regulation includes a list of minimum criteria that shall be considered for a BZR.
- (52) With regard to the process to propose alternative BZ configurations, the following provisions are relevant in order to determine the jurisdictions and BZs for which alternative BZ configurations shall be proposed:
- (a) First, Article 14(1) of the Electricity Regulation prescribes that '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.
 - (b) Second, Article 14(3) of the Electricity Regulation prescribes that the BZR 'shall identify all structural congestions...', which implies the need for performing a BZR involving all BZs containing structural congestions, even if those structural congestions have no impact on neighbouring BZs.
 - (c) Third, Recital 31 of the Electricity Regulation states that 'For Member States which adopt an action plan to address congestion, a phase-in period in the form of a linear trajectory for the opening of interconnectors should apply. At the end of the implementation of such an action plan, Member States should have a possibility to choose whether to opt for a reconfiguration of the BZ(s) or whether to opt for addressing remaining congestion through remedial actions for which they bear the costs. In the latter case their BZ should not be reconfigured against the will of that Member State, provided that the minimum capacity is reached'.

6.2. Submission of the updated BZR proposal

- (53) The updated BZR proposal included a methodology and assumptions for the BZR and alternative BZ configurations for the Nordic Region and Greece. Contrary to the regulatory authorities' request, it did not include alternative configurations for the other BZs in the Union, nor did it include relevant information with regard to the alternative BZ configurations.
- (54) In that regard it is first to note that ACER needs to take its decision on the updated BZR proposal based on relevant facts. The inquiry of those facts may require

⁴ OJ L 197, 25.7.2015, p. 24.

cooperation by and information from other parties. In particular, in case of insufficient technical information, it can be justified to ask for additional data so that ACER can take an informed decision, and to defer the decision until the required information is available.

- (55) While for the methodology and assumptions the relevant facts are clear and the relevant information has been provided, this is not yet the case for the alternative configurations: Alternative configurations were provided for some regions only, and the information requested by the regulatory authorities to justify the proposed alternative configurations, or for ACER to assess and decide on alternative configurations, was not provided or only partly.
- (56) Moreover, in general, a decision covering two areas may be split also into two decisions that are issued not simultaneously but one after the other, provided that the two areas are not intrinsically linked and the relevant part is actually ready to be decided. Article 14(5) of the Electricity Regulation does not require to decide by a single act on the proposed methodology and assumptions as well as on the proposed alternative configuration; nor does it prohibit taking a decision on the proposed methodology and assumptions and a separate decision on the proposed alternative configuration.
- (57) Indeed, the methodology and assumptions, on the one hand, and the alternative configurations, on the other hand, can be considered as not intrinsically linked in the sense that the methodology and assumptions can be assessed and decided regardless of the configurations.
- (58) Therefore, ACER considers it justified to take a bipartite approach for the updated BZR proposal and decide on the separable elements of this proposal if and once they allow for a decision, resulting in the following two decisions:
- (a) a first decision (i.e. the present Decision) on the BZR methodology and assumptions, in the context of which TSOs are requested to provide additional information on LMP simulations to enable ACER to assess and decide upon the proposed alternative BZ configurations; and
 - (b) a second decision on alternative BZ configurations.
- (59) Section 6.3 details the information missing for ACER to take a decision on the alternative BZ configurations and explains its relevance, and Annex II sets out detailed requirements, including submission deadlines, of the request concerning the missing information.

6.3. Compliance of the updated BZR proposal with the requirements of the Electricity Regulation and the CACM Regulation

- (60) With regard to the submitted methodology and assumptions for the BZR process, ACER observes the following:

- (a) The updated BZR proposal defines a regional governance of the BZR process. Such a definition is not in line with the governance of the BZR process set out in Article 14(3) to Article 14(5) of the Electricity Regulation, which envisages Pan-European governance involving TSOs, regulatory authorities and Member States (MSs) at Union level. Therefore, the methodology needs to be adapted to reflect that:
- i. TSOs are jointly responsible for carrying out the BZR, while some tasks, which do not affect the governance of the BZR process itself, may be conducted at the regional level; and
 - ii. adequate coordination among the different regions, defined for the purpose of the BZR, is needed. The necessary amendments in that respect are discussed in sub-section 6.4.4 and 6.4.20 of this Decision.
- (b) The updated BZR proposal partly meets the requirements of Article 14(5) of the Electricity Regulation. While the BZR methodology refers to this article, it fails to clarify whether the methodology is based on structural congestions which are not expected to be overcome within the following three years. In particular, it fails to clarify whether and how the data set used as a basis for the BZR accounts for tangible progress on infrastructure development projects that are expected to be realised within the following three years. The necessary amendments in that respect are discussed in sub-section 6.4.6 of this Decision.
- (c) The updated BZR proposal formally meets the requirement of considering the list of minimum criteria to be considered for a BZR, as set forth in Article 33 of the CACM Regulation. However, the description on how these criteria are to be assessed is often very general, which either does not allow to sufficiently understand the actual analysis to be done or jeopardises its robustness. This shortcoming affects both the overall modelling chain and the specific analyses for the list of minimum criteria, described in the BZR methodology. The necessary amendments in that respect are discussed in sub-sections 6.4.7 to 6.4.15 of this Decision.
- (d) The BZR proposal partly meets the requirements of Article 14(3) of the Electricity Regulation that require the BZR to be performed in a coordinated manner with the involvement of affected stakeholders in accordance with the CACM Regulation. The latter further specifies, in its Articles 12 and 32(4)(b)(ii), the need to consult stakeholders, including the relevant authorities. While elements of interaction with stakeholders and regulatory authorities are mentioned in the updated BZR proposal, this is limited to the collection of input via an expert workshop, which do not fully reflect the requirements specified in the above-mentioned legal provisions. The necessary amendments in that respect are discussed in sub-sections 6.4.15 and 6.4.19 of this Decision.
- (e) The BZR proposal only partially meets the general regulatory principle of acting with transparency. In particular, Article 16.2 of the updated BZR proposal, that considers that all information handled during the BZR is, by default, market sensitive and therefore needs to be treated as confidential is in conflict with the objective set out in Recital 30 of the Electricity Regulation, which envisages ‘a

coherent, objective and reliable determination of BZs via a transparent process'.
The necessary amendments in that respect are discussed in sub-section 6.4.19.

- (61) With regard to the alternative BZ configurations that are to be studied in the BZR process, ACER observes the following:
- (a) As set out in Section 6.2 (paragraph (53)), the updated BZR proposal failed to include alternative BZ configurations for the EU, except for the Nordic Region and Greece.
 - (b) Anticipating this outcome, regulatory authorities had previously requested TSOs to provide information on historical congestions, common grid models and the results of LMP simulations to assess and decide on the updated BZR proposal, or to enable ACER to do so in case of referral.
 - (c) To date, the above mentioned information was neither completely delivered to regulatory authorities, nor to ACER, in particular LMP simulations are missing.
- (62) In fact LMP simulations are necessary for ACER to take an informed decision on alternative BZ configurations, for the following reasons:
- (63) First, in line with Article 14(1) of the Electricity Regulation, structural congestions shall be identified in order to make a meaningful proposal of alternative BZ configurations to be studied.
- (64) Second, in this context, the relevant following definitions of congestions 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 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.

- (65) Third, in view of the above mentioned definitions, and in line with previous work of ACER in this matter⁵, the border between two network areas (including areas between and within existing BZs) has to be considered structurally congested when the commercial exchanges between these two areas significantly affect structurally (and physically) congested network elements.
- (66) Fourth, the practical consequence of this conclusion is that, when seeking alternative BZ configurations, two dimensions need to be considered:
- (a) the physical dimension, i.e. the existence and location of structural physical congestions in network elements (in the following referred to as ‘structural physical congestion’); and
 - (b) the commercial dimension, i.e. the commercial exchanges between network areas (across or within BZs) that significantly affect structural physical congestions (in the following referred to as a ‘structural commercial congestion’).
- (67) Fifth, in order to consider the two dimensions mentioned in paragraph (66), the following information is thus required:
- (a) frequency and location of structurally physically congested network elements; and
 - (b) structurally commercially congested network areas i.e. those areas whose exchanges significantly contribute to structural physical congestions.
- (68) Sixth, whereas the information collected under the regulatory authorities’ data request provides sufficient evidence on point (67)(a), information to identify commercially congested network areas pursuant to point (67)(b) is missing. In this respect, a LMP analysis is an adequate tool to identify commercially congested areas. The LMP analysis deliver prices at each node that reflect both the cost of the energy and the cost of delivering it, including congestion costs, thus identifying the areas of the network contributing the most to network congestions.
- (69) As a consequence, in the absence of LMP simulations, ACER is unable to take an informed decision on alternative BZ configurations, because ACER cannot:
- i. evaluate the relevance of the proposed alternative BZ configurations, for regions where those configurations were submitted; and
 - ii. evaluate the need to propose alternative BZ configurations where such BZ configurations were not submitted.

⁵ For example, ACER concluded in its opinion 09/2015 and Decision 06/2016 that ‘an interconnection linking national transmission networks has to be considered as “structurally congested” when the exchanges between these two areas significantly affect structurally physically congested network elements’. As the definition of ‘congestion’ was updated in the Electricity Regulation to refer to ‘network areas’ and not only to ‘interconnections’, the conclusions of previous ACER’s work was upgraded as described in paragraph (65).

- (70) Therefore, ACER needs to request TSOs to provide data resulting from a LMP analysis as specified in section 7 below.

6.4. Amendments to the BZR methodology

- (71) Further to assessing the compliance of the BZR methodology with the legal framework as detailed above and making the necessary amendments to ensure such compliance, ACER also assessed the BZR proposal for consistency, robustness and completeness, taking into consideration stakeholders' views. All this resulted in substantive amendments which are described in paragraphs (73) to (145) .

- (72) Any reference to articles and paragraphs of the BZR methodology in the following sub-sections relate to the amended version of the BZR methodology, as approved by ACER, provided in Annex I to this Decision.

6.4.1. Amendments to the 'Whereas' section

- (73) ACER found it necessary to add Recital (2) of the 'Whereas' section to clarify that the BZR methodology document does not deal with alternative BZ configurations. In fact, the alternative BZ configurations will be dealt with in a separate decision, at a later stage, as described in section 6.2.
- (74) ACER found it necessary to amend Recital (3) to better reflect the requirement of the Electricity Regulation that the methodology shall be based on structural congestions which are not expected to be overcome within the following three years, while other considerations (including the necessary efforts to collect input data) should not affect such a requirement.
- (75) ACER found it necessary to enlarge the scope of Recital (5) to fully reflect the multiple objectives that an efficient BZ configuration is expected to meet, as envisaged in the Electricity Regulation.
- (76) ACER found it necessary to add Recital (6) to reflect the objective for BZs to avoid reductions of cross-zonal capacity due to internal congestions, in relation with the objective of finding a common solution to best address congestions, as envisaged in Recital 30 and Recital 31 of the Electricity Regulation.
- (77) ACER found it necessary to add Recital (8) to reflect the need for stakeholders' and regulatory authorities' involvement and consultation, as envisaged in Article 14(3) of the Electricity Regulation, and Article 12 and Article 32(4)(b) of the CACM Regulation.
- (78) ACER found it necessary to add Recital (9) to reflect the need to ensure transparency during the BZR process, including the need to provide sufficient information for MS to make an informed decision on any change resulting from the BZR, pursuant to Article 14(10) of the Electricity Regulation.

(79) ACER found it necessary to add Recital (10) to recognise the need to protect confidential information in accordance with Article 13 of the CACM Regulation.

(80) ACER did not find it appropriate to keep a recital on the need of ‘taking due consideration of regional specificities’. While various articles of the BZR methodology allow for considering regional specificities to a certain degree, ACER considers that the need to ensure pan-European consistency throughout the BZR methodology should prevail, in line with the BZR process described in Article 14 of the Electricity Regulation, which does not envisage a regional approach.

6.4.2. Amendments to Article 1 Subject matter and scope

(81) ACER found it necessary to amend Article 1 to clarify that the scope of the document is limited to the BZR methodology and assumptions used in the BZR process.

6.4.3. Amendments to Article 2 Definitions and interpretation

(82) ACER found it necessary, for the sake of completeness, to amend Article 2(1) to refer to Regulations, other than the ones included in the updated BZR proposal, which contain definitions that are relevant for the BZR methodology.

(83) ACER found it necessary to clarify that, in case of inconsistency between a definition included in the BZR methodology and a definition provided in Regulations listed in Article 2(1), the latter should prevail.

(84) ACER found it necessary, for the sake of clarity to refine a number of definitions in Article 2(2).

(85) ACER found it necessary, for reasons of completeness and consistency with other amendments made by ACER to the BZR methodology, to introduce, Article 2(2), a number of additional definitions.

6.4.4. Amendments to Article 3 Overview of the BZR process

(86) ACER considers that prescribing a regional governance for the BZR, including responsibilities at regional level, is not in line with the requirements laid down in Article 14(3) to Article 14(5) of the Electricity Regulation. ACER thus found it necessary to clarify that TSOs are jointly responsible for carrying out the BZR, while some tasks, which do not affect the governance of the BZR process itself, may be conducted at the regional level. ACER also found it necessary to clarify the specific tasks that may be conducted at the regional level.

6.4.5. Removal of the Article 4 of the updated BZR proposal

(87) ACER found it necessary to remove Article 4 describing the alternative BZ configurations, as the alternative BZ configurations for the BZR process will be established in a separate decision, to be issued at a later stage, as described in section 6.2. The provisions describing the BZRRs, included in this article, were merged with Article 3.

6.4.6. Amendments to Article 4 Scenarios, sensitivities and assumptions

(88) ACER found it necessary to update significantly this Article to improve the robustness and reliability of the assumptions underlying the BZR process. ACER made the following main changes:

- (a) A single year ('target year') is used for the main scenario to avoid confusion induced by the use of 'base year' on top of target year. The definition of the target year has been improved to fully align with Article 14(5) of the Electricity Regulation.
- (b) The network description was amended to:
 - i. Ensure consistency and thus comparability between the studies run by the various BZRRs, by requesting the use of the same network model across BZRRs. In order to ensure feasibility of the study, a simplified grid model may be introduced for neighbouring BZRRs, provided that this simplification preserves the key properties of the neighbouring network as seen from the considered BZRRs.
 - ii. Request that, by default, only network elements (and related operational security limits and contingencies) with nominal voltage greater than or equal to 380 kV must be included, because network elements with voltage below 380 kV are usually less sensitive to cross-zonal trade (and thus to a change in BZ configuration). The amendment allows introducing additional elements related to lower nominal voltages, if properly justified.
 - iii. Clarify how to handle non-costly remedial actions to ensure a robust and realistic modelling of these remedial actions while ensuring feasibility of the BZR. Non-costly remedial actions may be reflected either:
 1. by updating the contingencies and operational security limits considered within the BZR; or
 2. by fully modelling them within the capacity calculation and consideration of remedial action steps
 - iv. Detail how to reflect new network investments in the grid model, to ensure a realistic assessment of their impact on alternative BZ configurations.
 - v. Clarify that the network topology must reflect the best forecast of expected operational practices for the target year, to ensure a realistic network topology.
 - vi. Specify which minimum information must be included in the model, to ensure feasibility of the capacity calculation and consideration of remedial action steps.
 - vii. Ensure that deviations from the grid model used in the ten year network development plan (TYNDP) are properly justified, e.g. regarding how the grid model was adapted to reflect a target year different from the one used for the TYNDP.

- viii. Prescribe a modelling of reserve requirements in line with the applicable regulatory framework, to ensure a robust modelling of this aspect.
- (c) The description of climate years was amended to ensure minimum comparability among the BZRRs. Additional climate years may also be considered within specific BZRRs if properly justified. Finally, the description highlights how to ensure that all climate years are considered on an equal footing.
- (d) The description of load data was amended to:
- i. Describe how to build a load curve ensuring a realistic representation of implicit demand response, at least for the day-ahead timeframe. To that end, the methodology defines preferred calculation approaches, but allows alternative approaches if properly justified. Furthermore, the methodology defines a fall-back value for implicit demand response based on recent credible studies⁶, but leaves freedom to follow alternative approaches if refined data is available.
 - ii. Explicitly request that implicit demand response be modelled, because it may significantly impact the welfare change under alternative BZ configurations⁷.
 - iii. Describe how to value load-shedding in a realistic manner, as load-shedding may significantly impact the welfare change under alternative BZ configurations.
- (e) The description of generation was amended to describe a minimum set of technical constraints required to ensure robust modelling of generation units. This description also explains how the modelling of technical constraints may be simplified, to ensure a feasible BZR.
- (f) A description of storage was added to ensure realistic modelling of this technology in line with expected operational practices for the target year.
- (g) The description of disaggregation of data to nodal level was clarified to explain that alternative disaggregation methodologies may be used, as long as they lead to a level of detail at least as good as the standard (TYNDP) disaggregation approach.
- (h) The description of sensitivities was updated, to introduce a mandatory sensitivity to enable the assessment of the ‘robustness of BZs over time’ criterion. The description also specifies that all sensitivities must reflect appropriate and foreseeable variations and clarifies how to present the results from sensitivities to clearly differentiate them from the results of the ‘main study’.

⁶ See https://ec.europa.eu/energy/sites/ener/files/documents/demand_response_ia_study_final_report_12-08-2016.pdf, p.27 and 63.

⁷ Implicit demand response may participate in the market and contribute to resolve congestions, but is unlikely to participate in the remedial action mechanisms, which reduces efficiency, as described in previous work of ACER, e.g. see https://www.acer.europa.eu/official_documents/acts_of_the_agency/publication/acer%20market%20report%20on%20bidding%20zones%202014.pdf, p.10.

6.4.7. Amendments to Article 5 Modelling chain

- (89) ACER found it necessary to update this Article to clarify the main steps of the BZR process. ACER made the following main changes:
- (a) The description of cross-zonal exchanges was refined to ensure that electricity flows with third countries are properly modelled, thereby ensuring a realistic assessment while enabling a feasible BZR.
 - (b) The market time unit was set to one hour to strike a balance between accuracy and feasibility of the BZR.
 - (c) A request to make results available for each modelling step was included to ensure proper validation of the results and understanding of the final results.

6.4.8. Amendments to Article 6 Capacity calculation

- (90) ACER found it necessary to update this Article to increase robustness and consistency. The updates strike a balance between ensuring a robust approach (mainly based on expected capacity calculation practices for the target year), a transparent calculation, and a feasible BZR process. ACER made the following main changes:
- (a) The scope of coordination and governance among TSOs was aligned with the operational coordination scope of capacity calculation, i.e. the methodology requests to reflect coordination and governance within Capacity Calculation Regions (CCRs).
 - (b) To ensure consistency and comparability of results, it was specified that the same cross-zonal capacities should, as much as possible, apply across all BZRRs for a given BZ border. Moreover, to ensure feasibility of studies between different synchronous areas, an option to simplify cross-zonal capacities outside the considered synchronous area was introduced, consistently with the use of a simplified grid model.
 - (c) The potential simplifications to be applied have been described in more detail to ensure consistent simplification approaches among BZRRs.
 - (d) The requirement pursuant to Article 16(8) of the Electricity Regulation has been described in more details to improve consistency among BZRRs. The scope of derogations pursuant to Article 16(9) has also been included to ensure a realistic modelling of such derogations (if any).
 - (e) A requirement to use at least two sets of cross-zonal capacities was introduced, because cross-zonal capacities often significantly differ between winter and summer. It was also specified that TSOs need to refine cross-zonal capacities when these are expected to vary significantly within a season, to ensure a realistic modelling.

(f) To ensure a robust and feasible approach, further details on the capacity calculation approach were included, taking ACER Recommendation no 01/2019 of 8 August 2019⁸ into account. Those details include the following:

- i. To ensure feasibility of the BZR, a simplified approach to Flow Reliability Margin (FRM) calculation has been introduced to complement the detailed FRM calculation, in case the latter is not technically possible. This simplified approach requires the FRM to be set to 10% of Fmax for all CNECs (except High Voltage Direct Current (HVDC) lines), or any other fixed value if agreed by all TSOs of the relevant CCR (in line with currently adopted operational practices) to ensure a feasible yet realistic approach. A similar approach is allowed when no CNECs are defined in capacity calculation. To ensure comparability among alternative BZ configurations it is required that the simplified FRM consistently applies across all alternative BZ configurations.

In practice, BZ configurations that are based on structural network congestion may reduce FRMs; however, based on the discussions between ACER and TSOs, accurately calculating FRMs in a BZR context seems technically difficult. ACER thus considered the simplified approach, above described, as an acceptable ‘second best’.

- ii. To ensure efficient congestion management principles, and given that:
 1. it is difficult to predict how the definition of CNECs may evolve when BZs change; and
 2. BZ configurations should be designed to maximise economic efficiency and cross-zonal trading opportunities pursuant to Article 14(1) of the Electricity Regulation,

A requirement to perform a generic economic efficiency test for the selection of CNECs test was introduced. In this respect, the possibility to simplify the definition of internal CNECs based on a fixed Power Transfer Distribution Factor (PTDF) threshold was introduced. In this case, a default PTDF threshold was set to 10%, in order to approximate current operational practices as well as likely future developments (e.g. resulting from Article 16(8) of the Electricity Regulation) in capacity calculation. To reflect local specificities while ensuring efficiency at EU level, the possibility of using other fixed thresholds was envisaged, if appropriately justified.

⁸ ACER Recommendation No 01/2019 of 8 August 2019 on the implementation of the minimum margin available for cross-zonal trade pursuant to Article 16(8) of Regulation (EU) 2019/943, available at: https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf

- iii. To ensure realistic cross-zonal capacities, the maximum flow on a critical network element (F_{max}) has to reflect expected operational practices for the target year.
 - iv. To enable robust comparison of welfare between alternative BZ configurations, only the coordinated Net Transfer Capacity (cNTC) approaches which allow to reflect the impact of alternative BZ configurations on cNTC values are allowed on BZ borders which are impacted by a change in BZ configuration.
 - v. To ensure a transparent and reliable modelling of how cross-zonal capacity is impacted by alternative BZ configurations (and consistent modelling with the consideration of remedial actions), some requirements related to the calculation of allocation constraints were introduced.
- (g) In line with point (89)(c), ACER found it necessary to list the outputs that TSOs should provide following the capacity calculation simulation described in Article 6.

6.4.9. Amendments to Article 7 Day-ahead market dispatch

- (91) ACER found it necessary to update this Article to increase robustness and consistency. ACER made the following main changes:
- (a) The objective function was clarified to properly reflect the impact of demand response, in line with point (88)(d). Therefore, the day-ahead market dispatch maximises welfare, rather than minimising cost.
 - (b) To ensure realistic results when many units have similar marginal costs, in particular to reflect the different impact on the network of units with similar marginal cost, a small random mark-up has been introduced to differentiate units with similar marginal costs.
 - (c) To ensure realistic results, modelling a minimum set of technical constraints was required, e.g. regarding start-up and shutdown of power plants. Furthermore, additional requirements to ensure a realistic modelling of technical constraints and optimisation objectives underlying hydro power plants, were introduced. Similarly, to properly reflect intertemporal constraints, the market dispatch was required to jointly optimise market time units within a week.
 - (d) The modelling of reserves was clarified to properly reflect their impact on the market dispatch.
 - (e) To ensure meaningful comparisons between alternative BZ configurations, a requirement to deliver market dispatch results for the EU, was added.
 - (f) In line with point (89)(c), ACER found it necessary to list the outputs that TSOs should provide following the day-ahead market dispatch simulation described in Article 7.

6.4.10. Amendments to Article 8 Operational security analysis

- (92) ACER found it necessary to update this Article to increase robustness and relevance. ACER made the following main changes:
- (a) To ensure realistic results, detailed load-flow approaches (such as AC load-flow or DC load-flow accounting for losses) were specified as the preferred approach. As a fall-back, a simple DC load-flow was allowed to ensure feasibility of the BZR. To ensure consistency, a harmonised approach was required within a BZRR.
 - (b) To ensure consistency with capacity calculation and allocation, consistency between the contingencies considered in capacity calculation and in operational security analysis was requested. Similarly, a consistency requirement related to contingencies among alternative BZ configurations and climate years was introduced, to ensure comparability of the welfare results among alternative BZ configurations.
 - (c) Because many uncertainties which could happen between day-ahead capacity calculation and real time operations (such as unplanned outages, changes in weather conditions, etc.) are not explicitly modelled within the BZR, and to ensure that they are reflected in an approximate manner, a requirement to correct thermal ratings was introduced, to take into account that the FRM is intended to cope with these uncertainties. To avoid ambiguity, a list of operational security limits to monitor was introduced.
 - (d) In line with point (89)(c), ACER found it necessary to list the outputs that TSOs should provide following the operational security analysis described in Article 8.

6.4.11. Amendments to Article 9 Consideration of remedial actions

- (93) ACER found it necessary to update this Article to increase robustness and relevance. ACER made the following main changes:
- (a) As the amount of activated remedial actions may significantly differ among alternative BZ configurations, the cost to ensure availability of the units providing remedial actions also changes⁹. Therefore, ACER found it necessary to include a requirement to estimate this cost. As a simplification, the requirement assumes that, by default, the costs of ensuring availability are proportional to the volume of activated remedial actions. In addition, TSOs and one regulatory authority suggested that the cost of ensuring the availability of the units providing remedial actions should be proportional to the peak needs for remedial actions within a given MS. Additionally, TSOs considered that the peak needs for remedial actions

⁹ See e.g. a relevant example of the effects of a BZ change in the costs to ensure availability for remedial actions, in recital 69 of the state aid case No. SA.42955 (2016/N-2), available at https://ec.europa.eu/competition/state_aid/cases/265043/265043_1872192_91_2.pdf.

in a given MS should be equal to the sum of the individual peak needs for each BZ within the MS. In this respect, ACER found it adequate:

- i. To incorporate, as an alternative method, the possibility of considering the cost of ensuring availability to be proportional to the peak needs for remedial actions within a given MS. In ACER's view, the peak needs for remedial actions may differ among alternative BZ configurations and the costs to ensure the availability of the units providing remedial actions may indeed be related to the peak needs for remedial actions.
 - ii. Not to consider that the peak need for remedial actions in a MS is equal to the sum of the individual peak needs for each BZ within the MS. In ACER's view, for a given fixed amount of congestions that need to be addressed through remedial actions, the peak need for remedial actions in a given MS does not depend on the number of bidding zones in that MS.
- (b) The cost of remedial actions may be higher than the cost of the same unit for the day-ahead dispatch, due to, inter alia, additional readiness costs and opportunity costs reflecting lost opportunity on other markets. This effect relates to the additional costs induced in other processes (e.g. in intraday and/or balancing markets) which are not explicitly modelled within the BZR; they thus do not lead to a transfer between parties, but rather to an increase in overall system costs. The Article now describes how to estimate the additional cost in a realistic and feasible manner, based on:
- i. empirical information about costs from market-based redispatching; and/or
 - ii. additional costs considered on top of short-run marginal cost in non-market-based redispatching.

To ensure feasibility of the BZR, TSOs which lack relevant data may rely on data from neighbouring BZs (or from the EU as a whole).

- (c) To ensure feasibility of the optimisation of remedial actions, the optimisation time window is set to one day (i.e. less than for the day-ahead market dispatch). Similarly, the optimisation of remedial actions may only be fully simulated for a representative reduced sample of days.
- (d) To ensure consistency with the day-ahead market dispatch, the same technical constraints should be considered. However, given the additional complexity introduced by the detailed network modelling, constraints related to start-up and shutdown may be modelled in a simplified manner.
- (e) The level of coordination of the optimisation of remedial actions must reflect the expected coordination of remedial actions for the target year, to ensure that the impact of imperfect coordination on the available and costs of remedial actions is properly reflected (if applicable).
- (f) To ensure realistic cost estimates, non-costly remedial actions which are fully modelled must reflect expected operational practices for the target year (other non-costly remedial actions are modelled in line with point (88)(b)iii.1).

- (g) To ensure realistic results, TSOs may calibrate the model to ensure that it leads to realistic costs of remedial actions.
- (h) In line with point (89)(c), ACER found it necessary to list the outputs that TSOs should provide following the simulation of remedial actions described in Article 9.

6.4.12. Amendments to Article 10 Estimate of flows not induced by cross-zonal trade

- (94) ACER found it necessary to specify an additional possibility to calculate the flows not induced by cross-zonal trade. TSOs may thus either apply the flow decomposition methodology applicable for cost-sharing of redispatching and countertrading costs in line with Article 74 of the CACM Regulation, if adopted, or alternatively the flow calculation methodology set forth in ACER Recommendation no 01/2019.
- (95) ACER found it necessary to clarify for which CNECs and based on which CGMs the calculation has to be performed, for reasons of consistency with capacity calculation and operational security analysis processes.
- (96) ACER found it necessary to calculate only the contribution of flows not induced by cross-zonal trade that are loading the CNEC, in line with the principle that only those flows effectively limit the capacity available for cross-zonal trade at the capacity calculation stage and bring a detrimental contribution to the violation of Operational Security Limits (OSLs) at the operational security analysis stage. In particular, this change enables a better assessment of the ‘effects of internal transactions on other BZs’ criterion.

6.4.13. Amendments to Article 11 LMP analysis

- (97) ACER found it necessary to make the LMP analysis mandatory to identify commercially congested network areas, in line with paragraph (68), to support the delineation of bidding zones, and to enable the assessment of certain criteria.
- (98) ACER considers that the objective function of the LMP analysis should be the maximization of socio-economic welfare rather than the minimization of total system costs for reasons of consistency with the day-ahead market dispatch.
- (99) ACER found it adequate, compared to the day-ahead market dispatch, to allow TSOs to reduce the optimization period of the LMP analysis to one day so as to strive for feasible computational efforts, while ensuring realistic and robust results.
- (100) ACER found it necessary to include DSR, storage, reserves and balancing requirements for reasons of consistency with the day-ahead market dispatch.
- (101) ACER found it necessary to allow the modelling of technical constraints of generating units in a simplified manner, with some conditions, in order to strike a balance between computational complexity and accuracy of the results.

- (102) ACER found it necessary to include at least Phase Shifting Transformers (PSTs) taps and HVDCs active power flows as optimization variables in the LMP analysis as, based on already-implemented operational practices, these optimization variables can be linearized, thus not causing any additional significant computational burden to the LMP analysis.
- (103) ACER found it necessary to require the LMP analysis to be performed for all Market Time Units (MTUs) of the target year or, in case of technical limitations, for a minimum of eight weeks, ensuring that this limited time horizon is representative of the entire target year. This change strikes a balance between computational complexity and accuracy of the results.
- (104) ACER found it necessary to include a list of the expected results of the LMP analysis, which would be subject to publication pursuant to Article 16 of the BZR methodology. This list ensures transparency and understanding of the LMP results by all interested stakeholders.

6.4.14. Amendments to Article 12 List of evaluation criteria

- (105) ACER found the enumeration of the criteria included in this article in line with the minimum list of criteria set out in Article 33 of the CACM Regulation. However, ACER found it necessary, for the sake of legal certainty, to specify that the set of criteria to be used for the BZR are those listed in Article 12 of the BZR methodology so that it is ensured that additional criteria may only be used after their regulatory approval.
- (106) ACER found it necessary, for the sake of robustness, to split a number of criteria into sub-criteria, to enable differentiated conclusions for each of the identified aspects within the scope of the said criteria. This includes the following criteria:
- (a) The market concentration and market power criterion: ACER found it necessary to split this criterion into sub-criteria related to the various market timeframes, from long-term to day-ahead markets, on the one hand; and related to the TSOs' mechanism to resolve physical congestions on the other hand. More details on the split of this criterion into sub-criteria is provided in sub-section 6.4.17.
 - (b) The effective competition criterion: ACER found it necessary to split this criterion into three sub-criteria related to: i) short-term competition, ii) long-term competition and iii) competition in the access to cross-zonal capacity. More details on the split of this criterion into sub-criteria is provided in sub-section 6.4.17.
 - (c) The impact on the operation and efficiency of the balancing mechanisms and imbalance settlement processes criterion: ACER found it necessary to split this criterion into two criteria, as follows: i) the operation and efficiency of the balancing mechanisms and ii) the imbalance settlement process.

- (d) The criteria related to energy transition. In line with the greenhouse gas emission reduction targets for the period from 2021 to 2030¹⁰ and the feedback received from regulatory authorities and the AEWG, ACER found it necessary to split the analysis of the impacts on energy transition into three criteria related to i) short-term effects on CO₂ emissions; ii) short-term effects on RES integration; and iii) long-term effects on low-carbon investments.
- (107) ACER found it necessary, for the sake of consistency, to combine the analysis of liquidity and transaction costs into one criterion, as these two aspects are intrinsically related, while in the updated BZR proposal the analysis of transaction costs was combined with transition costs, which are only relevant when estimating the cost of amending existing contractual obligations incurred by market participants.
- 6.4.15. Amendments to Article 13 Evaluation: General approach and outcome of the BZR
- (108) The article includes a set of general guidelines to be followed, together with the description of the steps to be taken when evaluating of alternative BZ configurations.
- (109) With regard to the general guidelines:
- (a) ACER found that the option envisaged in the updated BZR proposal for TSOs to deviate, ‘in case of technical limitations’, from the assessment envisaged for each of the individual criterion does not contribute to the robustness of the methodology. ACER thus found it necessary to remove this provision. However, to address TSOs’ concerns about the complexity of some requirements, ACER introduced the option for TSOs to assume, exceptionally and only until the relevant modelling tools are developed, that the alternative BZ configurations perform the same as the status quo BZ configuration. This exception applies exclusively to the analysis of the ‘security of supply’ and the ‘efficiency of the balancing mechanisms sub-criterion’, as both require the use of complex modelling tools that are not currently available.
- (b) ACER found that the possibility, included in the updated BZR proposal, to perform sensitivity analysis, without specifying how those results would be combined with the results related to the ‘main scenario’ does not contribute to the robustness of the methodology. ACER thus found it necessary to clarify that the results derived from sensitivity analyses are to be presented in the final report, although clearly separated from the results of the ‘main scenario’ of the BZR (i.e. the ‘main study’). This amendment is included in Article 13(2)(c).
- (c) ACER found that the inclusion of a provision to estimate ‘uncertainties’ of the study without specifying how to estimate those ‘uncertainties’ and whether or how they would be combined with the results of the BZR does not contribute to the robustness of the BZR methodology. Instead, ACER included a requirement to

¹⁰ For information on these targets, see https://ec.europa.eu/clima/policies/strategies/2030_en.

perform a minimum number of sensitivity analyses, which should aim to study appropriate and foreseeable deviations from the ‘single’ scenario. This amendment is included in Article 4.

- (d) ACER found that limiting the scope of the assessment to the BZRR is not in line with the principle of maximising economic efficiency at the EU level, envisaged in the Electricity Regulation. ACER thus found it necessary to include a number of provisions describing the following principles:
- i. In order to ensure consistency across BZRRs, TSOs are expected to jointly agree on the scope and the granularity of the assessment for each criterion. This has been defined in Article 14 ‘Evaluation criteria: Geographical delimitation’.
 - ii. In line with the objective of maximising EU welfare, the scope of the assessment for each criterion is required to be the EU, by default, or the BZRR, if an alternative BZ configuration is deemed not to have significant impacts outside the BZRR. For the ‘Economic efficiency’ criterion, which reflects monetised welfare impacts, the geographical scope is thus required to be the EU. These aspects have been described in Article 14(1).
- (e) In ACER’s view, including the breakdown of results per MS would allow MSs to be better informed when taking a decision on whether to amend or maintain the status-quo BZ configuration. ACER thus found it necessary to envisage the provision of results per MSs, subject to technical limitations. The necessary amendment is introduced in Article 13 and Article 15.
- (110) The updated BZR proposal envisages three different steps to be taken when proceeding with the evaluation of alternative BZ configurations. ACER’s views on each of the steps and the necessary amendments are described in the following paragraphs (111) to (119).
- (111) ACER considered the evaluation approach described in Step 1 of the updated BZR proposal, to be appropriate; in particular, ACER considers that analysing certain criteria, in a first step, is in line with both the Electricity Regulation and the CACM Regulation, for the following reasons:
- (a) In terms of substance, Article 14(1) of the Electricity Regulation establishes the overriding principle that BZs should be based on long-term, structural congestions in the transmission network and should be designed in such a way as to maximise economic efficiency and to maximise cross-zonal trading opportunities (in accordance with Article 16 of that Regulation), while maintaining security of supply. Moreover, Article 14(5) of the Electricity Regulation prescribes that the BZR methodology should be based on structural congestions which are not expected to be overcome within the following three years. In ACER’s view, these principles are best addressed by the criteria included in Step 1, namely the

‘Economic efficiency’ and the ‘Market outcomes in comparison to corrective measures’ criteria¹¹, given that:

- i. those criteria relate to structural congestions, because such criteria assess the extent to which the various alternative BZ configurations effectively deal with structural congestions in the market; and
- ii. those criteria can be monetised in terms of socio-economic welfare, therefore aiming at identifying which alternative BZ configuration maximises economic efficiency.

In view of this, ACER finds it adequate that a certain alternative BZ configuration may be disregarded, even without further analysis, if such configuration fails to meet the basic principles of addressing structural congestions more efficiently than the status-quo configuration. In sum, Step 1 ensures that the prerequisites for defining BZs are met and, consequently, establishes a basis to determine, in subsequent steps, the alternative BZ configuration that performs the ‘best’, through the criteria listed in Article 33 of the CACM Regulation.

- (b) In terms of procedural efficiency, it is also legitimate and reasonable in a complex economic and/or technical assessment to start with assessing those criteria that can be more easily quantified (monetised) and, as such, more efficiently compared. The criteria to be considered for monetised benefits in Step 1 refer to criteria listed in Article 33 of the CACM Regulation that, on the one hand meet the objectives described in point (111)(a) and, on the other hand, can be monetised.
 - (c) In terms of overall inclusiveness, Step 1 does not preclude the possibility, already included in the updated BZR proposal, for TSOs to proceed with the next steps of the assessment and consider also other criteria even if the monetised benefits of a given alternative BZ configuration, compared to the status quo, are negative in Step 1. Therefore, all criteria listed in Article 12 of the BZR methodology, and accordingly all of Article 33 of the CACM Regulation, can be considered effectively for the evaluation under Article 13 of the BZR methodology.
- (112) ACER found it necessary, for the sake of completeness, to include in Step 1 other criteria that can be potentially monetised and thus contribute to the assessment of the two above mentioned requirements: i) the need to address structural congestions, and ii) the need of maximising economic efficiency. This includes the security of supply criterion and the sub-criterion related to the operation and efficiency of the balancing

¹¹ The ‘Firmness cost’ and ‘Degree of uncertainty in cross-zonal capacity calculation’ criteria are also implicitly included in Step 1, as they are considered to be monetised as part of the ‘Economic efficiency’ criterion. Additionally the criteria described in paragraph (112) are also included in Step 1; however, the monetisation of these criteria is subject to technical feasibility.

mechanisms. ACER thus amended Article 13 to envisage the possibility of monetising these additional criteria, subject to technical feasibility.

- (113) ACER found it necessary to amend Article 13 to annualise ‘transition costs’ in a more robust manner. In particular, ACER considers that instead of annualising the transition costs over an assumed lifetime period of three years, the minimum lifetime of a given BZ configuration should be estimated. Such an estimation should be the lifetime needed for a given alternative BZ configuration to pay back the transition costs in light of the monetised benefits that it may render compared to the status quo configuration. This approach avoids predetermining the expected lifetime of a BZ configuration as it would be up to MSs to determine it. ACER thus introduced the corresponding amendment in Article 13(1)(a)(ii) and Article 13(1)(d)(v).
- (114) ACER found it necessary to amend Article 13 to envisage the possibility of ‘generating’ additional alternative BZ configurations which simultaneously reflect multiple approved alternative BZ configurations, in order to consider the option of assessing the impact of multiple simultaneous changes of BZ configurations. ACER thus introduced this possibility, which is optional for TSOs, in Article 13(1)(a)(iii)(3).
- (115) ACER found it necessary to introduce the following amendments to the Step 2 of the evaluation process to refine the granularity of the assessment of non-monetised criteria: First, ACER amended Article 13(1)(b)(ii) to envisage a more granular scale (other than “+”, “0”, “-“) when qualifying the performance of alternative BZ configurations compared to the status quo; second, ACER amended Article 13(1)(d)(v)(4) to require TSOs to provide a more detailed outcome of the assessments performed pursuant to this second step.
- (116) ACER found it necessary to split the third step of the updated BZR proposal into Step 3 and Step 4, to ensure a more detailed description of the process to reach a conclusion within the BZR.
- (117) With regard to Step 3, ACER found it necessary to introduce the following amendments, aiming to ensure a more robust identification of alternative BZ configurations that perform below 'acceptable' levels:
- (a) First, ACER introduced some general principles on how TSOs should make a preliminary identification of configurations performing below ‘acceptable’ levels. This is reflected in Article 13(1)(c)(ii)(1).
 - (b) Second, ACER found it necessary to ensure that both stakeholders’ and regulatory authorities’ views are adequately considered for TSOs to conclude on the ‘acceptability’ of the various alternative BZ configurations. ACER found that considering these views through consultation was a more transparent method than through an ‘expert workshop’, while the latter is not necessarily excluded. Thus, ACER replaced the expert workshop with a requirement to consult stakeholders on a set of minimum aspects, followed by a requirement to subsequently consult the relevant authorities. ACER finds this approach in line with the requirements of Articles 14(3) of the Electricity Regulation which requires performing the BZR

in a coordinated manner with the involvement of affected stakeholders in accordance with the CACM Regulation, while the latter further specifies, in its Article 12 and Article 32(4)(b)(ii), the need to consult stakeholders, including the relevant authorities. The corresponding amendments are described in Article 13(1)(c)(ii)(3) and Article 13(1)(c)(ii)(4) and in Article 17(4).

- (c) Third, ACER found it necessary that stakeholders and relevant authorities are specifically consulted on measures that could mitigate negative impacts related to certain criteria, in case of a BZ change. This aims to more robustly consider possible market design improvements and other regulatory measures, including enhanced oversight, that would be beneficial in case of a BZ change. The corresponding amendments are included in Article 13(1)(c)(ii)(3).
 - (d) Fourth, ACER found it necessary that stakeholders are specifically consulted on practical considerations which may need to be considered in case of a possible BZ configuration change as set forth in Article 14(10) of the Electricity Regulation, including possible timescales for implementation of alternative BZ configurations. The corresponding amendments are included in Article 13(1)(c)(ii)(4) and Article 13(2)(a).
- (118) To address TSOs' concerns about the possibility to refine the final recommendation in view of aspects that could not have been fully considered in the BZR methodology, otherwise potentially leading to an inconsistent outcome, ACER found it adequate to introduce the option for TSOs:
- (a) to recommend an alternative BZ configuration that is not the one ranking first in terms of monetised benefits compared to the status quo, if TSOs can justify the recommendation; or
 - (b) to recommend maintaining the status quo configuration, if they can duly justify that this is a better option than any of the 'acceptable' alternative BZ configurations.
- (119) Finally, ACER found it adequate to suggest a template to display the final results of the study, to ensure a harmonised and consistent consolidation and presentation of the results of the BZR. The corresponding amendment is described in Article 13(1)(d)(v).

6.4.16. Amendments to Article 14 Evaluation criteria: Geographical delimitation

- (120) ACER found it necessary to amend this article to:
- (a) Differentiate the requirements with regard to the geographical scope of the assessments from the ones with regard to the geographical granularity of the assessments.
 - (b) Require TSOs to ensure a consistent approach, with regard to the above-mentioned requirements, across BZRRs. This is in line with the view, expressed by a majority of stakeholders during the public consultation, that there is a need for further pan-European consistency in the updated BZR proposal.

- (c) Specify when the geographical scope of the analysis has to be the EU and when it may be limited to the BZRR; and require that, specifically for the ‘Economic efficiency’ criterion, the geographical scope of the analysis must be the EU. This is in line with the objective of maximising welfare at the EU level, rather than only at the BZRR level.
- (d) Include, for the sake of completeness, a wider range of options regarding the geographical granularity of the assessments.

6.4.17. Amendments to Article 15 Evaluation approach per criterion

- (121) ACER found it necessary to amend Article 15(1) related to the 'Operational security' criterion, in order to:
 - (a) Explicitly require the use of the proposed indicators, instead of an optional analysis, for the sake of certainty and robustness.
 - (b) Include an additional indicator, ‘congestion index’, to assess the severity of the congestions identified following the day-ahead market dispatch. The indicator measures the extent to which the various BZ configurations contribute to keep the system within operational security limits by dealing with congestions in the market rather than at a later stage.
- (122) ACER found it necessary to amend Article 15(2) related to the 'Security of supply' criterion, in order to:
 - (a) Replace the deterministic approach to assess security of supply, as envisaged in the updated BZR proposal, by a probabilistic approach in line with the updated framework to assess resource adequacy set forth in Article 23 of the Electricity Regulation.
 - (b) Add a requirement to consider the network within BZs rather than only the network between BZs, as the former is particularly relevant when assessing security of supply in the framework of a BZR.
 - (c) Include, as a transitional option, the possibility of considering that alternative configurations perform the same as the status quo with regard to the security of supply criterion, until the approach to assess security of supply described in Article 15(2) is technically feasible for TSOs.
- (123) ACER found it necessary to amend Article 15(3) related to the 'Degree of uncertainty in cross-zonal capacity calculation' criterion, in order to:
 - (a) Ensure consistency between the analysis performed to assess this criterion and the flow reliability margins (FRMs) used in capacity calculation pursuant to Article 6 of the BZR methodology. Thus, a link between Article 15 (3) and Article 6 was reflected in the methodology.
 - (b) Reflect that this criterion is implicitly modelled and monetised as part of the ‘Economic Efficiency’ criterion.

- (124) ACER found it necessary to amend Article 15(4) related to the 'Economic efficiency' criterion, in order to:
- (a) Clarify the scope of the 'Economic efficiency' criterion. In particular, aspects related to the energy transition are either internalised as part of the market and redispatch simulations, i.e. CO₂ emissions costs, or analysed separately in a dedicated criterion, i.e. the effects on RES integration.
 - (b) Require a more detailed breakdown of socio-economic welfare, as an output of the assessment of this criterion.
- (125) ACER found it necessary to amend Article 15(6) related to the 'Market liquidity and transaction costs' criterion, to ensure that: i) the assessment reflects liquidity impacts for both the long-term and the short-term market timeframes, rather than only on the latter; and ii) the assessment is made, as much as possible in a holistic manner, considering interdependences with other criteria, such as those related to the level of market competition and iii) the assessment duly takes stakeholders' feedback into account. In line with these objectives, ACER introduced the following changes, in order to:
- (a) Request that the assessment includes an analysis of liquidity for both the long-term and the short-term market timeframes.
 - (b) Reflect that the analysis of liquidity and transaction costs in long-term timeframes should be based on a study conducted at EU level, and that it should aim to capture the impacts of long-term markets liquidity on the existence of sufficient hedging opportunities for market participants, in order to ensure a robust assessment of this topic.
 - (c) Describe a minimum set of analysis and indicators that must be performed to analyse liquidity and transaction costs in long-term timeframes, to ensure a robust and complete analysis. The indicators include traded volumes and bid-ask spreads. More specifically the lowest bid-ask spread per period that is relevant for market participants with hedging needs is required, because this is a relevant measure when assessing hedging opportunities¹².
 - (d) Require that the analysis for long-term timeframes is performed in a holistic manner, including the consideration of elements related to expected changes in competition.
 - (e) Require that the analysis for long-term timeframes identify practical considerations to consider in case of a BZ configuration change as set forth in Article 14(10) of the Electricity Regulation, including possible timescales for implementation of alternative BZ configurations.

¹² More information can be found in the consultancy study referenced in footnote 3.

- (f) Require that the analysis for long-term timeframes considers the outcome of the public consultation conducted pursuant to Article 17(4) of the BZR methodology.
 - (g) Reflect that the analysis of liquidity and transaction costs in short-term timeframes should be based on a study conducted at EU level, to ensure consistency among BZRRs.
 - (h) Describe a minimum set of analysis and indicators that have to be considered to assess liquidity and transaction costs in short-term timeframes.
 - (i) Require that the analysis considers, where relevant, the possible effect of intra-company transactions on short-term liquidity following a BZ configuration change.
 - (j) Include the possibility that the analysis of liquidity and transaction costs in short-term timeframes incorporates timeframes beyond the day-ahead market timeframe.
 - (k) Include the possibility for TSOs to consult regulatory authorities on market liquidity and transaction costs, in which case TSOs must duly take regulatory authorities' opinion into account.
- (126) ACER found it necessary to amend Article 15(7) related to the 'Market concentration and market power' criterion, in order to:
- (a) Split the criterion into two sub-criteria to enable differentiated conclusions for each of the identified aspects within the scope of the said criterion. This includes the following aspects and sub-criteria: i) related to 'market concentration and market power' in the various market timeframes, including long-term to short-term markets; and ii) related to 'market concentration and market power' in the TSOs' mechanism to resolve physical congestions. Such a differentiation is important in order to reflect the fact that a higher (respectively lower) level of market concentration may potentially increase (respectively reduce) the scope for exerting market power in the markets spanning from the long-term to short-term, but it would in turn potentially decrease (respectively increase) the need for TSOs' to apply remedial actions, and thereby the scope for exerting market power in the TSOs' mechanism to resolve physical congestions.
 - (b) Clarify that the analysis must rely on at least one of the two proposed indicators.
 - (c) Include the calculation formulas for the proposed indicators, to avoid ambiguity.
 - (d) Adapt the Herfindal-Hirschman-Index (HHI) to better identify the relevant market areas, which may be different for each market time unit based on the geographical scope of price convergence.
 - (e) Describe specifically how the results of the analyses should be interpreted, differently for each of the sub-criteria, in view of the possible values obtained for the required indicators.

- (127) ACER found it necessary to amend Article 15(8) related to the 'Facilitation of effective competition' criterion to:
- (a) Split the criterion into sub-criteria, to enable differentiated conclusions for each of the identified aspects within the scope of the said criteria. This includes the following aspects and related sub-criteria: i) short-term competition, ii) long-term competition and iii) competition for cross-zonal capacity.
 - (b) Clarify how to perform a differentiated analysis for the short-term and long-term competition sub-criteria.
 - (c) Describe and request a specific analysis for the assessment of the 'Competition in the access to cross-zonal capacity' sub-criterion. This analysis aims to identify the extent to which some BZs, e.g. due to their relative smaller size, face structural disadvantages when competing for cross-zonal capacity with other BZs. 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'¹³. The paper acknowledged that, in the absence of interventions in the market coupling algorithm, which likely lead to sub-optimal outcomes¹⁴, welfare may be 'lost in the smaller areas in favour of the bigger areas in a structural manner'. Such an effect can be mathematically related to systematic differences in the average PTDFs among BZs competing for the same cross-zonal capacity. ACER thus found it necessary to introduce an indicator which quantifies this effect.
- (128) ACER found it necessary to amend Article 15(9) related to the 'Price signals for building infrastructure' criterion, in order to:
- (a) Consider the concept of 'infrastructure' more broadly, including: i) generation or demand assets and ii) network infrastructure.
 - (b) Relate the assessment of price signals to build generation or demand assets, to the assessment of the 'Accuracy and robustness of price signals' criterion, pursuant to Article 15(10), because accurate and robust price signals are crucial to ensure efficient assets investment decisions.
 - (c) Remove the indicators which refer to the magnitude of the price differentials and congestion revenues. In ACER's view, the price differentials and congestion revenues do not always inform whether and where network infrastructure should be built. In particular, price differentials (and the related congestion revenues) on a given BZ border may suggest that network infrastructure is needed on the

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

¹⁴ The paper also 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 lead to reduce global welfare.

physical border, while the physical congestions may occur somewhere else, e.g. within the BZ. ACER thus found it necessary to propose an alternative indicator, as described and justified in point (128)(d).

- (d) Include, in line with point (128)(c) above, an indicator aiming to assess the extent to which market congestions and physical congestions are aligned, indicating whether the market provides relevant signals to build network infrastructure, because this better pursues the objectives, in Recital 30 of the Electricity Regulation, of providing effective price signals and steering efficiently necessary investments .

(129) ACER found it necessary to amend Article 15(10) related to the 'Accuracy and robustness of price signals' criterion, in order to:

- (a) Include an adequate definition of 'accuracy and robustness'. In particular, 'robustness' should not be interpreted in a way that two opposing objectives are pursued under the same criterion. In this respect, the updated BZR proposal interprets 'robustness' as a situation where prices are not sensitive to changes in the surrounding 'political or economic conditions', which would be in conflict with the definition of 'accuracy'. ACER thus found it necessary to provide compatible definitions for these terms and that are in line with the objective of ensuring effective price by means of BZs that reflect structural congestion, as envisaged in Recital 30 of the Electricity Regulation. ACER thus provided updated definitions in Article 15(10) of the BZR methodology.

In line with the paragraph (128) and contrary to the observation of TSOs and one regulatory authority, ACER considers that the 'higher occurrence of low or negative prices' does not imply that price signals are less robust and thus ACER did not incorporate such observation in the BZR methodology.

- (b) Replace the indicators included in the updated BZR proposal by an indicator better reflecting the accuracy and robustness of price signals, in line with point (129)(a).

(130) ACER found it necessary to amend Article 15(11) related to the 'Transition costs' criterion, in order to:

- (a) Decouple 'transition costs' from 'transaction costs' because these two type of costs are conceptually different, in line with paragraph 6.4.15 of the present Decision.
- (b) Refine the scope of 'transition costs', considering that these costs may be impacted by the fact that MSs are required, when deciding on the implementation date of an eventual bidding zone change, to balance the need for expeditiousness with practical considerations, including forward trade of electricity, in line with Article 14(5) of the Electricity Regulation.
- (c) Describe how the estimated 'transition costs' should be used to calculate the minimum lifetime of a BZ configuration in line with paragraph (113) of the present Decision.

- (131) ACER found it necessary to amend Article 15(12) related to the 'Infrastructure cost' criterion, in order to:
- (a) Reflect the need to consider 'infrastructure costs' as a criterion which is sensitive to alternative BZ configurations, because BZ configurations reflecting structural congestions steer investments in a cost-efficient manner, as described in Recital 30 of the Electricity Regulation.
 - (b) Relate, for consistency reasons, the assessment of this criterion to two other criteria related to price signals to attract investments in the 'right' locations, i.e. i) 'Accuracy and robustness of price signals' and ii) 'Price signals for building infrastructure'.
- (132) ACER found it necessary to amend Article 15(14) related to the 'Adverse effects of internal transactions on other BZs' criterion, in order to:
- (a) Describe the specific indicators to be used, aiming to quantify both average loop flow values and the number of occurrences of loop flows values above a given threshold, in line with applicable redispatching and countertrading cost sharing methodologies, pursuant to Article 74 of the CACM Regulation.
 - (b) Specify that the network elements where the loop flows indicator should be quantified is: i) network elements with congestions identified following the day-ahead market dispatch, and ii) network elements with congestions identified following the operational security analysis.
 - (c) Request an assessment of impacts derived from inaccurate price signals, potentially leading to inefficient investments in other BZs. These impacts are assessed through the 'Accuracy and robustness of price signals' and the 'Price signals for building infrastructure' criteria. ACER found that the additions included in this paragraph and in point (132)(b) above allow for a more comprehensive assessment of the adverse effects of internal transactions.
- (133) ACER found it necessary to amend Article 15(15) related to the 'Impact on the operation and efficiency of the balancing mechanisms and imbalance settlement processes' criterion, in order to:
- (a) Split the criterion into two sub-criteria, to enable differentiated conclusions for each of the identified aspects within the scope of the criterion. This includes the following aspects and sub-criteria: i) the operation and efficiency of the balancing mechanisms and ii) the imbalance settlement process.
 - (b) With regard to the sub-criterion i), request a comprehensive analysis, subject to technical limitations, of the welfare impacts in the balancing timeframe for the alternative BZ configurations, compared to the status-quo configuration. ACER found that analysing only 'reserve requirements' (as required in the updated BZR proposal) would potentially lead to incorrect conclusions, as it would disregard several other impacts associated to the operation of the balancing mechanism, such

as the effects on remedial actions costs to prevent violations of OSLs, related to the geographical distribution of balancing reserves.

- (c) Include, as a transitional option, the possibility of considering that alternative configurations perform the same as the status quo with regard to the 'Impact on the operation and efficiency of the balancing mechanisms', until the approach to assess this criterion, described in Article 15(15), is technically feasible for TSOs.
 - (d) Relate the assessment of the sub-criterion ii) to the 'Accuracy and robustness of price signals' criterion, because accurate and robust imbalance prices correctly incentivise balance responsible parties (BRPs) to support an efficient balancing of the system when and where they are needed.
- (134) ACER found it necessary to amend Article 15(16) related to the 'Stability and robustness of BZs over time' criterion, in order to explicitly request a minimum number of sensitivity analyses, as a firm requirement rather than as optional assessment. ACER considers that alternative quantitative analyses are more robust than only an 'expert discussion'.
- (135) ACER found it necessary to amend Article 15(18) to reflect that the 'Assignment of generation and load units to BZs' criterion is essentially a prerequisite to be met and that such a prerequisite should be ensured when defining alternative BZ configurations; additionally it should be confirmed during the BZR.
- (136) ACER found it necessary to amend Article 15(19) related to the 'Location and frequency of congestion (market and grid)' criterion, in order to request two indicators which better reflect the criterion. In particular, the assessment should aim to detect whether the BZ configurations are consistent with the location of congestions, i.e. that they are designed in such a way that i) most physical congestions are detected in the market, and ii) congestions lay mostly on BZ borders and only residually inside BZs.
- (137) ACER found it necessary to split the analysis of the impacts on energy transition into three criteria related to i) short-term effects on CO₂ emissions; ii) short-term effects on RES integration; and iii) long-term effects on low-carbon investments.
- (a) With regard to i), ACER found it necessary to incorporate an additional criterion, rather than considering the analysis 'for information', as described in Article 15(20).
 - (b) With regard to ii), ACER did not make any substantial change.
 - (c) With regard to iii), ACER found it necessary to describe the analysis to be performed, in Article 15(22). Specifically, ACER requested to rely on two other criteria, namely: i) the 'Accuracy and robustness of price signals' and ii) 'Price signals for building infrastructure'. ACER found that these two criteria indicate the effectiveness of price signals: i) for generation capacity, including RES; ii) demand response and iii) transmission infrastructure, in line with the arguments provided in paragraph (128) and (129). In particular, effective price signals to incentivise the uptake of demand response and investments in transmission

infrastructure contribute to the cost-efficient integration of RES and other low-carbon investments in the long-term.

- (138) Contrary to the observation of TSOs, ACER did not find it necessary to include additional assessments to reflect risks or other negative impacts associated to the 'higher occurrence of low or negative prices'. First, in line with point (129)(a), ACER does not find that the higher occurrence of low or negative prices implies that the price signals are less robust, as long as such occurrences accurately reflect the underlying market fundamentals. And second, ACER considers that the (already included) assessment of market liquidity, in particular of the existence of sufficient hedging opportunities, is an adequate analysis to evaluate the described risks.
- (139) Additionally, for each of the criterion included in Article 15, ACER found it necessary to describe how the results of the analyses should be interpreted in view of the different values of the various indicators assessed for each alternative BZ configuration in comparison with the status-quo, in order to ensure consistency among BZRRs.

6.4.18. Removal of the Article 14 of the updated BZR proposal

- (140) ACER found it necessary to remove Article 14 of the updated BZR proposal, as this article referred to: i) the process to adopt the BZR methodology pursuant to Articles 14(5) of the Electricity Regulation, and ii) to the obligation for TSOs to submit a joint proposal to relevant MSs to amend or maintain the bidding zone, pursuant to Article 14 (6) of the Electricity Regulation; however these two aspects are not within the scope of the BZR methodology itself.

6.4.19. Amendments to Article 16 Transparency

- (141) ACER found it necessary to introduce a specific article on transparency to ensure 'a coherent, objective and reliable determination of BZs via a transparent process' as envisaged in Recital 30 of the Electricity Regulation. In this respect, ACER found it necessary to remove Article 16(2) of the updated BZR proposal that considers that all information handled during the BZR is, by default, market sensitive and therefore needs to be treated as confidential, as it is not in line with the objective described.
- (142) The Article introduced by ACER also ensures that the transparency requirements imposed on TSOs are proportionate to the aim pursued (e.g. by only requiring to publish certain detailed data upon request) and that the said requirements preserve confidentiality where relevant (e.g. confidential information under a given jurisdiction has to be published, for that jurisdiction, with the minimum level of aggregation, protecting confidentiality interests). In general, the addition of this Article is in line with the view, expressed by a majority of stakeholders during the public consultation, that there is a need for strengthening transparency in the updated BZR proposal.

6.4.20. Amendments to Article 17 Stakeholder involvement and consultation

(143) ACER found it necessary to introduce Article 17 to ensure a sufficient level of interaction and consultation with stakeholders, including the relevant authorities, in line with the legal arguments provided in point (60)(d). This is in line with the view, expressed by a majority of stakeholders during the public consultation, that there is a need for strengthening stakeholders' engagement in the updated BZR proposal.

6.4.21. Amendments to Article 18 Coordination among BZRRs

(144) ACER found it necessary to introduce Article 18 to ensure a sufficient level of coordination among BZRR, in line with the consultation with stakeholders, including relevant authorities. In line with the view expressed by a majority of stakeholders during the public consultation, this coordination ensures further harmonisation and pan-European consistency. In general, the addition of this Article is in line with the view, expressed by a majority of stakeholders during the public consultation, that there is a need for increased coordination across the EU in the updated BZR proposal.

6.5. Other changes to the BZR proposal

(145) ACER made several editorial changes to the BZR proposal with the aim to correct a number of typos and to ensure consistency throughout the BZR methodology, in particular in view of the substantive changes introduced by ACER.

7. REQUEST FOR ADDITIONAL INFORMATION TO DECIDE ON ALTERNATIVE BIDDING ZONE CONFIGURATIONS

(146) Pursuant to Article 3(2) of Regulation (EU) 2019/942, at ACER's request, which can take the form of a decision, TSOs shall provide to ACER the information necessary for the purpose of carrying out ACER's tasks under this Regulation, unless ACER has already requested and received such information.

(147) As explained in paragraphs (62) to (68), ACER requires data from a LMP analysis to take a decision on alternative BZ configurations; however TSOs have not performed this analysis and have not provided this data yet.

(148) In the course of these proceedings, ACER discussed with TSOs the need for the LMP analysis, the technical requirements and the feasibility in a reasonable timeline. In this respect, TSOs made a number of suggestions on such requirements in relationship with the timeline. Taking into account these suggestions, ACER specified the technical requirements and timeline for the provision of the requested data as set out in Annex II of this Decision.

(149) Given that the technical requirements defined by ACER do not go beyond what is strictly necessary for assessing the proposed alternative BZ configurations, that the timeline set by ACER leaves the TSOs sufficient time to provide the information, and that TSOs' suggestions were taken into account, ACER considers that the request for data set out in Annex II of this Decision is proportionate.

- (150) ACER considers that the request to perform a LMP analysis needs to be addressed to all TSOs for the following reasons:
- (a) First, as long as there are structural, physical or commercial, congestions within the area operated by a TSO, such geographical area should be subject to a BZR process that considers alternative BZ configurations for the said area, in line with point (52)(b), requiring ‘all structural congestions’ to be analysed.
 - (b) Second, the analysis of structural congestions should not be limited to identify the presence of structural physical congestions within a given BZ, but it should also analyse structural commercial congestions, in line with paragraphs (65) to (67).
 - (c) Third, the arguments provided by TSOs are, in general, insufficient to conclude that their BZs contain no structural congestions and in particular, to establish a cause-effect relationship between physical and commercial structural congestions. In particular, ACER considers that, as a first step, a LMP analysis is necessary to identify the BZs, and in particular the network areas, significantly contributing to structural physical congestions.
- (151) ACER also considers that, in the specific case of United Kingdom, the relevant TSO(s) may be exempted from performing the LMP analysis if the TSO envisages that the Electricity Regulation and the CACM Regulation are not expected to apply in this MS for the target year of the BZR.
- (152) In order to ensure robust and timing delivery of the data request, TSOs are recommended to organise, during the LMP simulations, frequent interactions with regulatory authorities and ACER, including:
- (a) discussions and brief consultation on the input data;
 - (b) discussions to agree on the specific formats to be used by TSOs when delivering the data to ACER;
 - (c) clarifications on the modelling assumptions; and
 - (d) discussions and brief consultation on metrics to assess reliability and robustness of the results.
- (153) For all those reasons, ACER considers it necessary, in order to be able to decide on the proposed alternative BZ configurations according to Article 5(7) of Regulation (EU) 2019/942 and Article 14(5) of Regulation (EU) 2019/943, to request, in accordance with Article 3(2) of Regulation (EU) 2019/942, all TSOs to provide the information as specified in Annex II to this Decision.

8. CONCLUSION

- (154) For the above reasons, ACER considers the following:
- (a) The part of the updated BZR proposal referring to the BZR methodology and assumptions is in line with the requirements of the Electricity Regulation,

provided that the amendments described in section 6.4 and 6.5 above are integrated in the BZR methodology and assumptions, as presented in Annex I in conjunction with Annexes Ia and Ib, to this Decision. Therefore, ACER approves the BZR methodology and assumptions subject to the necessary amendments. Annex I, together with Annexes Ia and Ib, to this Decision sets out the BZR methodology and assumptions as amended and approved by ACER.

- (b) Additional information is needed for ACER to assess whether the part of the updated BZR proposal concerning alternative BZ configuration is in line with the requirements of the Electricity Regulation. Therefore, ACER considers it necessary that TSOs submit additional information to enable ACER to take a decision on alternative BZ configurations. The scope and requirements, including submission deadlines, of the requested information is defined in Annex II to this Decision,

HAS ADOPTED THIS DECISION:

Article 1

The methodology and assumptions that are to be used in the bidding zone review process in accordance with Article 14(5) of Regulation (EU) 2019/943 are adopted as set out in Annex I in conjunction with Annex Ia and Annex Ib, to this Decision.

Article 2

The transmission system operators shall provide ACER with the information as set out in Annex II to this Decision.

This Decision is addressed to:

50Hertz - 50Hertz Transmission GmbH
Amprion - Amprion GmbH
APG - Austrian Power Grid AG
Augstsprieguma tīkls - AS Augstsprieguma tīkls
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 Systemen 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 prenosová 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 Elettrica 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 24 November 2020.

- SIGNED -

*For the Agency
The Director*

C. ZINGLERSEN

Annexes:

Annex I – Methodology and assumptions that are to be used in the BZR process in accordance with Article 14(5) of the Electricity Regulation

Annex Ia – List of minimum data to be published in accordance with Article 16 of the BZR methodology and assumptions pursuant to Annex I

Annex Ib – Template to consolidate the results of the BZR, for each BZRR in accordance with Article 13(1)(d) of the BZR methodology and assumptions, pursuant to Annex I

Annex II – Detailed requirements, including submission deadlines, of the data request to TSOs, issued as part of the present Decision

Annex III (for information only) – Evaluation of the responses received in the context of the public consultation launched by ACER on 1 April 2020 with a view to support the approval of the BZR proposal

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

In accordance with Article 29 of Regulation (EU) 2019/942, the addressee 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.