

**DECISION No 02/2022**  
**OF THE EUROPEAN UNION AGENCY**  
**FOR THE COOPERATION OF ENERGY REGULATORS**  
  
**of 22 February 2022**  
  
**on the European Resource Adequacy Assessment for 2021**

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

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

Having regard to Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators (ACER)<sup>1</sup>, and, in particular, Article 9(1)(a) thereof,

Having regard to Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (Electricity Regulation)<sup>2</sup>, and, in particular, Article 23(7) and Article 27 thereof,

Having regard to the outcome of the consultation with the European Network of Transmission System Operators for Electricity (ENTSO-E),

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 17 February 2022, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942,

Whereas:

## **1. INTRODUCTION**

- (1) The European Resource Adequacy Assessment (ERAA) is a pan-European monitoring assessment of power system resource adequacy of up to 10 years ahead aiming to model and analyse possible events which can adversely impact the balance between supply and

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<sup>1</sup> OJ L 158, 14.6.2019, p. 22.

<sup>2</sup> OJ L 158, 14.6.2019, p. 54.

demand of electric power. The European Network of Transmission System Operators for Electricity (ENTSO-E) carries out the ERAA on an annual basis.

- (2) The purpose of the annual ERAAs is to identify resource adequacy concerns, and to provide a robust and objective basis for policy decisions, in particular when assessing the need for capacity mechanisms. As such, the ERAA is expected to have a major role in resource adequacy policies, and to be more advanced than ENTSO-E's former monitoring assessment for the ten-year timeframe, i.e. the Mid-term Adequacy Forecast (MAF).
- (3) Annual ERAAs must be based on the methodology for the European resource adequacy assessment (ERAA methodology),<sup>3</sup> which was developed by ENTSO-E pursuant to Article 23 of the Electricity Regulation, and approved by ACER on 2 October 2020. The ERAA methodology is expected to be fully implemented by ERAA 2024.
- (4) On 16 November 2021, ENTSO-E submitted to ACER its first ERAA based on this new methodological framework and comprising scenarios, sensitivities, assumptions and the results as required by Article 23(7) of the Electricity Regulation (collectively ERAA 2021).
- (5) This Decision is issued following ACER's assessment of the ERAA 2021, and is structured as follows, including annexes:

**Section 2 Procedure**

describes the key steps leading to this decision, including engagement before the formal submission to ACER

**Section 3 ACER's competence to decide on the ERAA 2021**

sets out the legal basis for this Decision

**Section 4 Summary of the submission**

lists the key elements of ENTSO-E's submission

**Section 5 Summary of the observations received by ACER**

outlines the observations received by ACER during the decision-making procedure

**Section 6 Assessment of the ERAA 2021 and recommendations for the ERAA 2022**

describes the applicable legal framework, ACER's assessment of the ERAA 2021 against this framework followed by conclusions, as well as outlines ACER's recommendations for the next ERAA

**Section 7 Conclusion**

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<sup>3</sup> Annex I to ACER Decision No 24/2020:

[https://ec.europa.eu/energy/sites/default/files/methodology\\_for\\_the\\_european\\_resource\\_adequacy\\_assessment.pdf](https://ec.europa.eu/energy/sites/default/files/methodology_for_the_european_resource_adequacy_assessment.pdf).

summarises ACER's decision

The Decision contains the following annexes:

**Annex I Technical annex**

supplements ACER's assessment in section 6 by providing a comprehensive technical review of the ERAA 2021

**Annex II Summary of ACER's recommendations (for information only)**

provides a table summarising ACER's recommendations for the ERAA 2022 and beyond

## **2. PROCEDURE**

### **2.1. Engagement with ENTSO-E and other parties concerned before the submission of the ERAA 2021**

- (6) ACER started to engage with ENTSO-E on the ERAA 2021 in late 2020, shortly after the approval of the ERAA methodology. This scoping phase lasted until the formal submission of the ERAA 2021 in November 2021, and involved numerous discussions and information exchanges between ACER and ENTSO-E. These discussions and information exchanges allowed ACER to provide input at an early stage of the ERAA development and also review key parts of the draft ERAA 2021 in preparation for its assessment following the formal submission.
- (7) In parallel, ACER held regular discussions with the regulatory authorities about the ERAA 2021 in the context of ACER's related Task Force. In particular, the Task Force developed a document setting out ACER's and the regulatory authorities' minimum expectations for the ERAA 2021. Recognising the four-year timeframe for the implementation of the ERAA methodology, the document outlined the most essential parts of the methodological framework which ENTSO-E should take into account in the ERAA 2021 in order to appropriately reflect the key requirements of the Electricity Regulation. At the same time, the document described simplifications that would be acceptable during the first year of implementation to ensure the feasibility of the assessment, without being legally binding. The purpose of this document was to support the prioritisation of tasks for ENTSO-E for the ERAA 2021 and to steer the four-year implementation of the ERAA methodology.
- (8) In determining their minimum expectations, ACER and the regulatory authorities consulted extensively with ENTSO-E throughout February and March 2021 and took its views into account in the final version of the document, which was shared with ENTSO-E on 19 April 2021.
- (9) During this phase, ACER also engaged with the Member States through the Electricity Coordination Group (ECG). In particular, on 18 June 2021, ACER presented to the ECG its assessment framework of the ERAA 2021 and the expected timeline for ACER's decision on this matter.

## **2.2. Proceedings following the submission of the ERAA 2021**

- (10) On 16 November 2021, ENTSO-E submitted the ERAA 2021 to ACER for approval.
- (11) On 23 November 2021, ACER issued a public notice and invited interested parties to submit observations by 7 December 2021.
- (12) On 23 November 2021, ACER requested ENTSO-E to provide all input data for the ERAA 2021. On 2 December 2021, ENTSO-E provided ACER with access to the pan-European market modelling database (PEMMDB) and the assumptions for the economic viability assessment (EVA).
- (13) On 29 November 2021, ACER requested ENTSO-E to provide quantitative information in order for ACER to assess compliance of the ERAA 2021 with specific requirements of the Electricity Regulation.<sup>4</sup> On 6 December 2021, ENTSO-E responded to ACER's request of 29 November 2021 that providing the necessary information would require either an extensive new data collection across transmission system operators (TSOs) or performing additional quantitative analysis, and that neither approach would be feasible.
- (14) On 2 December 2021, ACER shared its draft preliminary assessment of the ERAA 2021 with the regulatory authorities participating in ACER's Task Force, and invited comments by 8 December. This was followed by discussions at the Task Force meeting on 9 December 2021, allowing ACER to consider the regulatory authorities' views in finalising its preliminary position on the matter.
- (15) On 13 December 2021, ACER notified ENTSO-E, the regulatory authorities (via AEWG) and the Member States (via ECG) of its preliminary position, by sharing the draft Decision and the draft Technical annex for review and comments. The consulted parties provided their views by 7 January 2022. These views are summarised in section 5.
- (16) ACER considered all written comments received on its preliminary position, and further discussed them with individual stakeholders, where necessary. In particular, on 11 January 2022, ACER held an oral hearing with ENTSO-E.
- (17) The AEWG was consulted on the draft ACER Decision on the ERAA 2021 between 26 January and 1 February 2022, and provided its advice on 2 February 2022 (see section 5.3).
- (18) On 17 February 2022, ACER's Board of Regulators issued a favourable opinion pursuant to Article 22(5)(a) of Regulation (EU) 2019/942.

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<sup>4</sup> For more information on the relevant requirements of the Electricity Regulation, see paragraph (67) of the Decision.

### **3. ACER'S COMPETENCE TO DECIDE ON THE ERAA 2021**

- (19) Pursuant to Article 9(1)(a) of Regulation (EU) 2019/942, ACER shall approve and amend, where necessary, the proposals for methodologies and calculations related to the ERAA pursuant to Article 23(7) of the Electricity Regulation.
- (20) Pursuant to Article 23(7) of the Electricity Regulation, the ERAA's scenarios, sensitivities, assumptions and results shall be subject to the prior consultation of Member States, the ECG and relevant stakeholders and approval by ACER under the procedure set out in Article 27 of the Electricity Regulation.
- (21) Pursuant to Article 27(3) in joint reading with Article 23(7) of the Electricity Regulation, ACER has three months from the submission date to either approve or amend the ERAA. In the latter case, ACER shall consult ENTSO-E before approving the amended ERAA.
- (22) On 16 November 2021, ENTSO-E submitted the ERAA 2021 (including scenarios, sensitivities, assumptions and results) to ACER for approval. ACER is competent to decide on the ERAA 2021 based on Article 9(1)(a) of Regulation (EU) 2019/942 as well as Article 27 of the Electricity Regulation.

### **4. SUMMARY OF THE SUBMISSION**

- (23) ENTSO-E submitted the ERAA 2021 to ACER on 16 November 2021. The submission consisted of an Executive Report describing the purpose of the assessment, its main findings and a roadmap for implementing the ERAA methodology, the ERAA 2021 input dataset and related guidelines, and a number of annexes (altogether the Report), including:

Annex 1	Assumptions
Annex 2	Detailed Results
Annex 3	Methodology
Annex 4	Flow-Based Market Coupling (FBMC) – Proof of Concept
Annex 5	Country Comments
Annex 6	Results Benchmarking
Annex 7	Definitions & Glossary

- (24) The Report, additional methodological documentation and data are available on ENTSO-E's website.<sup>5</sup> ENTSO-E published the Report on its website on 23 November 2021.

## 5. SUMMARY OF THE OBSERVATIONS RECEIVED BY ACER

### 5.1. Observations from interested parties

- (25) In response to its public notice of 23 November 2021, ACER received feedback from 15 stakeholders. The feedback received is summarised by ACER in paragraphs (26) to (30).<sup>6</sup> The paragraphs below reflect the main comments received related to the decision and are organised according to the respective topic.
- (26) In relation to the EVA, the majority of stakeholders highlighted that the EVA should be extended beyond 2025, covering the full economic lifetime of the relevant assets, and include an assessment of revenue streams year-by-year over the entire lifetime of each asset. Several stakeholders remarked that there are apparent inconsistencies between the risk indicator results and expected revenues results (as captured by the EVA) that need to be further investigated and explained. One stakeholder questioned why the model does not invest in more new capacity or retain existing capacity in a number of central European countries despite the level of envisaged adequacy risks. Two stakeholders remarked that reducing the number of simulations undermines the models' ability to account for variable climate conditions and recommended that revenues should instead be assessed for all possible climate conditions. Two stakeholders suggested that an integrated approach to modelling the EVA would be better suited for the purposes of the assessment and be more efficient, computationally. Finally, a number of stakeholders commented that the use of a price cap of 15 k€/MWh should be properly justified.
- (27) A number of stakeholders highlighted that the EU's fit-for-55 legislative package is expected to have a significant impact on the demand and supply side, and that the assessment should be updated to account for these changes. Furthermore, some stakeholders suggested that the assessment should examine Member States' National Energy and Climate Plans (NECPs) and not consider that these will be achieved by default, especially for 2025. Some stakeholders observed that considering the significant impact of fuel and carbon prices on the EVA results combined with the volatility in those markets, it is valuable to model sensitivities for these input parameters. One stakeholder recommended that future ERAAs include a sensitivity analysis on future demand levels, considering the expected increased levels of electricity demand driven by electrification of the energy system.

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<sup>5</sup> <https://www.entsoe.eu/outlooks/eraa/eraa-downloads/>.

<sup>6</sup> ACER acknowledges the comment by several stakeholders about the limited time given to submit observations in response to ACER's public notice on the ERAA 2021. ACER will consider how to extend the available time for stakeholders to provide feedback on future ERAAs, without undermining the requirement to decide on the ERAA within three months from the submission date.

- (28) Some stakeholders suggested that the ERAA should reflect currently-available cross-zonal capacities instead of being forward-looking, for example by simulating objectives such as the minimum 70% cross-border capacity target required by Article 16(8) of the Electricity Regulation. Regarding the flow-based approach to assessing cross-zonal capacity, two stakeholders urged for its immediate implementation in the ERAA, whereas one stakeholder commented it is not a priority and should only have limited impact on the results.
- (29) Some stakeholders commented that more details are necessary about demand-side response (DSR) and storage, and that the ERAA assumptions on DSR, particularly for economically viable DSR, should be properly justified. One respondent recommended that the ERAA only considers existing volumes of DSR. One respondent suggested that the assessment could be further improved by considering emergency generators, and flexibility of electric vehicles and heat pumps, that will progressively become more important.
- (30) Regarding the transparency of the ERAA 2021, several stakeholders pointed to the need for greater transparency. Several stakeholders suggested further information and clarifications are necessary on the methodology, assumptions and results to understand the ERAA 2021 and be able to constructively contribute to its development. Respondents highlighted the topics of the EVA, DSR and price caps, as of particular interest for more information. Two respondents suggested that the underlying models and data should be available, to enhance transparency and enable stakeholders to replicate the analysis and undertake additional analysis if desirable. Some stakeholders commented that it would be beneficial to publish more outputs of the model, such as energy prices, the loss of load expectation (LOLE) results of the EVA model and sensitivities, and the baseload and peak demand projections per bidding zone.

## **5.2. Consultation on ACER's preliminary position**

- (31) This section summarises the views of ENTSO-E, the regulatory authorities and the Member States consulted on ACER's preliminary position.

### 5.2.1. Feedback from ENTSO-E

- (32) ENTSO-E highlighted that its feedback reflects mainly future ERAAs.
- (33) In relation to the ERAA 2021, ENTSO-E commented that the ERAA 2021 represents an undeniable leap forward, compared to past adequacy assessments, and a first substantial step towards the intended target of the full ERAA methodology implementation for the ERAA 2024.
- (34) ENTSO-E acknowledged that ACER's methodological approach for the review of the ERAA 2021 is clear.
- (35) ENTSO-E highlighted that it strongly disagrees with ACER's views that the ERAA 2021 is not sufficiently transparent and that ACER is unable to assess certain areas of the ERAA 2021 in relation to the requirements of the Electricity Regulation. ENTSO-E

further stated it considers that ACER has the legal means to request any further information it deems proportionate and necessary in order to perform its tasks. ENTSO-E asserted that the ERAA 2021 provides clear context to readers and the Report as a whole is intended to support understanding by the reader in a fair and transparent manner.

- (36) ENTSO-E highlighted that it values ACER's feedback in the form of minimum expectations and recommendations for upcoming ERAAs. Nevertheless, ENTSO-E believes that these minimum expectations and recommendations should not be used as requirements to evaluate the ERAA's compliance with the legal framework and ultimately affect the approval of future ERAAs. ENTSO-E highlighted that the ERAA methodology (Articles 12(1) and 12(2) in particular) allows ENTSO-E to gradually implement the substantive requirements of the methodology, which is a technical and practical necessity to achieve its full implementation by the end of 2023 (i.e. for the ERAA 2024). In this spirit, ENTSO-E asserted that in its ERAA 2021 submission, it has sought to comply with the key requirements of (i) the Electricity Market Regulation, in terms of being based on the ERAA methodology; and of (ii) the ERAA methodology, since it respects the gradual implementation process up to the end of 2023. In addition, ENTSO-E expressed its view that the ERAA methodology does not contain any minimum expectations for the ERAA 2021, ERAA 2022 or ERAA 2023 or any other specific restrictions for ENTSO-E in the interim years until the end of 2023, in order to achieve this full implementation in the most efficient and flexible way by the ERAA 2024.<sup>7</sup> Finally, ENTSO-E highlighted that ACER's minimum expectations and recommendations are not legally binding on ENTSO-E and that it has not endorsed them.
- (37) Finally, ENTSO-E highlighted the need for well-interlinked processes and enhanced cooperation between ACER and ENTSO-E for future ERAAs.

#### 5.2.2. Feedback from the regulatory authorities

- (38) Several national regulatory authorities expressed their support to the preliminary position.

#### 5.2.3. Feedback from the Member States

- (39) ACER received feedback from one Member State that supported the preliminary position and the reasoning underlying it, as well as the areas of critical concern identified by ACER.

### **5.3. Consultation of the AEWG**

- (40) This section summarises the views of the regulatory authorities consulted on the draft ACER Decision on the ERAA 2021. The AEWG endorsed the draft ACER Decision on

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<sup>7</sup> These points essentially reiterate ENTSO-E's views on the ERAA 2021 minimum expectations as expressed in a letter to ACER, dated 6 October 2021.



the ERAA 2021. One regulatory authority made a suggestion to add a recommendation for ERAA 2022 that was addressed through a minor amendment to the Decision.

## **6. ASSESSMENT OF ERAA 2021**

### **6.1. Legal Framework**

(41) The relevant provisions governing the ERAA, and therefore also the ERAA 2021, are set out in the Electricity Regulation and the ERAA methodology. Section 6.1.1 describes the intended purpose of ERAA, which is explained in the recitals of the Electricity Regulation and implemented through the relevant provisions of Chapter IV of that Regulation. The ERAA's role must be also read in light of the Electricity Regulation's objectives and key principles. Sections 6.1.2 and 6.1.3 outline substantive and procedural requirements for the ERAA, which are provided in Article 23 of the Electricity Regulation and then taken into account and further specified in the ERAA methodology.

#### 6.1.1. Purpose of the ERAA

(42) Pursuant to Recital (43) and Recital (44) of the Electricity Regulation, ENTSO-E should carry out a robust ERAA to provide an objective basis for the assessment of resource adequacy concerns. The ERAA is mainly used to identify resource adequacy concerns and to assess the need for capacity mechanisms. As such, the resource adequacy concern that capacity mechanisms address should be based on the ERAA, but the ERAA may be complemented by national resource adequacy assessments.

(43) Accordingly, Article 20(1) of the Electricity Regulation requires Member States to monitor resource adequacy within their territory on the basis of the ERAA, and allows them to carry out their national assessments to complement the ERAA.

(44) Pursuant to Article 20(2) and Article 20(3) of the Electricity Regulation, where the ERAA or the national assessment identifies a resource adequacy concern, the Member State concerned shall identify any regulatory distortions or market failures that caused or contributed to the emergence of the concern, and then develop and publish an implementation plan with a timeline for adopting measures to eliminate any identified regulatory distortions or market failures as a part of the State aid process. When addressing resource adequacy concerns, the Member States shall in particular take into account the principles regarding the operation of electricity markets listed in Article 3 of the Electricity Regulation, and shall consider the following measures:

- (a) removing regulatory distortions;
- (b) removing price caps in accordance with Article 10 of the Electricity Regulation;
- (c) introducing a shortage pricing function for balancing energy as referred to in Article 44(3) of Regulation (EU) 2017/2195;
- (d) increasing interconnection and internal grid capacity with a view to reaching at least their interconnection targets as referred in point (d)(1) of Article 4 of Regulation (EU) 2018/1999;

- (e) enabling self-generation, energy storage, demand side measures and energy efficiency by adopting measures to eliminate any identified regulatory distortions;
  - (f) ensuring cost-efficient and market-based procurement of balancing and ancillary services;
  - (g) removing regulated prices where required by Article 5 of Directive (EU) 2019/944.
- (45) Article 21(4) of the Electricity Regulation provides that Member States shall not introduce capacity mechanisms where both the ERAA and the national assessment, or just the ERAA in the absence of a national assessment, have not identified a resource adequacy concern.
- (46) With respect to existing capacity mechanisms, Article 21(6) of the Electricity Regulation requires that no new contracts are concluded under these mechanisms in case both the ERAA and the national assessment, or just the ERAA in the absence of a national assessment, have not identified a resource adequacy concern.
- (47) Pursuant to Article 24(1) and Article 24(3) of the Electricity Regulation, national assessments shall be based on the ERAA methodology. In case the national assessment identifies a resource adequacy concern that was not identified in the ERAA, the Member State shall justify the divergence between the two assessments, and ACER shall provide an opinion on whether the divergence is justified.
- (48) The role of the ERAA in monitoring resource adequacy and identifying resource adequacy concerns should be understood in the context of broader EU objectives, which are referred to in Article 1 of the Electricity Regulation. In particular, pursuant to point (a) of Article 1, the Electricity Regulation aims to set the basis for an efficient achievement of the objectives of the Energy Union and in particular the climate and energy framework for 2030 by enabling market signals to be delivered for increased efficiency, higher share of renewable energy sources, security of supply, flexibility, sustainability, decarbonisation and innovation. The ERAA is expected to provide insights for decisions, which are relevant for achieving these objectives.
- (49) The purpose of the ERAA should be also understood in the context of the general principles of electricity market operation, which are listed in Article 3 of the Electricity Regulation. In fact, the ERAA should consider the relevant market trends which are and will be driven by these principles, such as market integration, free price formation, decarbonisation of the electricity system through the deployment of renewable energy and energy efficiency, increased system flexibility and development of DSR including consumer empowerment.<sup>8</sup> The ERAA should also consider that pursuant to these

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<sup>8</sup> Points (c), (d), (e), (f), (g), (j), (l) and (m) of Article 3 of the Electricity Regulation.

principles, barriers to cross-zonal electricity flows will progressively be removed.<sup>9</sup> Finally, according to these principles, market entry and exit should be based on undertakings' assessments of the economic and financial viability of their operations.<sup>10</sup>

#### 6.1.2. Substantive requirements for the ERAA

- (50) Pursuant to Article 23(1) of the Electricity Regulation, first sentence, the ERAA shall identify resource adequacy concerns by assessing the overall adequacy of the electricity system to supply current and projected demands for electricity at Union level, at the level of the Member States, and at the level of individual bidding zones, where relevant. This requirement is reflected in Article 1 of the ERAA methodology.
- (51) Pursuant to Article 23(1) of the Electricity Regulation, second sentence, the ERAA shall cover each year within a period of 10 years from the date of that assessment. This requirement is reflected in Article 4 of the ERAA methodology defining the study time period.
- (52) Pursuant to Article 23(5) of the Electricity Regulation, the ERAA shall be based on the ERAA methodology, which shall be transparent and ensure that the assessment:
- (a) is carried out on each bidding zone level covering at least all Member States;
  - (b) is based on appropriate central reference scenarios of projected demand and supply including an economic assessment of the likelihood of retirement, mothballing, new-build of generation assets and measures to reach energy efficiency and electricity interconnection targets and appropriate sensitivities on extreme weather events, hydrological conditions, wholesale prices and carbon price developments;
  - (c) contains separate scenarios reflecting the differing likelihoods of the occurrence of resource adequacy concerns which the different types of capacity mechanisms are designed to address;
  - (d) appropriately takes account of the contribution of all resources including existing and future possibilities for generation, energy storage, sectoral integration, demand response, and import and export and their contribution to flexible system operation;
  - (e) anticipates the likely impact of the measures referred to in Article 20(3) of the Electricity Regulation (listed in paragraph (44) above).
  - (f) includes variants without existing or planned capacity mechanisms and, where applicable, variants with such mechanisms;
  - (g) is based on a market model using the flow-based approach, where applicable;
  - (h) applies probabilistic calculations;

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<sup>9</sup> Point (h) of Article 3 of the Electricity Regulation.

<sup>10</sup> Point (n) of Article 3 of the Electricity Regulation.

- (i) applies a single modelling tool;
  - (j) includes at least the indicators referred to in Article 25 of the Electricity Regulation, i.e. expected energy not served (EENS) and LOLE;
  - (k) identifies the sources of possible resource adequacy concerns, in particular whether it is a network constraint, a resource constraint, or both;
  - (l) takes into account real network development;
  - (m) ensures that the national characteristics of generation, demand flexibility and energy storage, the availability of primary resources and the level of interconnection are properly taken into consideration.
- (53) The requirements for the ERAA set out in Article 23(5) of the Electricity Regulation are reiterated in Article 1(2) of the ERAA methodology. These requirements are further specified in the subsequent Articles of the ERAA methodology, in particular:
- (a) Article 4 defines the spatial granularity of the modelled zones and Article 1 requires that explicitly modelled systems are those covering at least the region composed of the EU TSOs, in line with Article 23(5)(a) of the Electricity Regulation.
  - (b) Article 3 sets out the scenario framework and defines central reference scenarios and sensitivities. In particular, it requires that the baseline data for the ERAA is based on national forecasts reflecting national policies and that the EVA is carried out for each central reference scenario. Article 6 specifies how to perform the EVA, implementing the requirement of Article 23(5)(b) of the Electricity Regulation.
  - (c) Article 3 defines two types of central reference scenarios, with and without capacity mechanisms, in consistency with Article 23(5)(c) of the Electricity Regulation. In addition, it allows for additional scenarios and/or sensitivities with EU relevance.
  - (d) Article 4 specifies requirements for modelling of supply, demand and the network, in line with Article 23(5)(d) of the Electricity Regulation.
  - (e) Article 3 requires that the assumptions of the central reference scenarios are aligned with the measures and actions defined by the Member States pursuant to Article 10(5) of Electricity Regulation and with the Member States' implementation plans, reflecting the requirement of Article 23(5)(e) of the Electricity Regulation.
  - (f) Article 3 requires that the ERAA is based on two central reference scenarios, with and without existing or planned capacity mechanisms, in line with Article 23(5)(f) of the Electricity Regulation.
  - (g) Article 4 relates to capacity calculation. In particular, it specifies the requirements for computations based on flow-based approach, where applicable, in line with Article 23(5)(g) of the Electricity Regulation.
  - (h) Article 4 requires the ERAA to use probabilistic calculations as specified therein, in line with Article 23(5)(h) of the Electricity Regulation.
  - (i) Article 4 requires that the assessment is based on a single modelling tool, in line with Article 23(5)(i) of the Electricity Regulation.

- (j) Article 4 requires that resource adequacy is assessed using EENS and LOLE and further defines the two indicators, in line with Article 23(5)(j) of the Electricity Regulation.<sup>11</sup>
- (k) Article 8 requires that ENTSO-E identifies the possible source (or sources) of each resource adequacy concern identified in the ERAA and specifies how these should be assessed, in line with Article 23(5)(k) of the Electricity Regulation.
- (l) Article 3 specifies that the baseline data for the ERAA draws from TSOs' national outlooks which include estimates regarding the state of their national networks, taking into account ENTSO-E's ten-year network development plan (TYNDP) and the most recent national network development plans, reflecting the requirement of Article 23(5)(l) of the Electricity Regulation.
- (m) Article 4 sets out a number of requirements relating to demand, supply, energy storage and network, which ensure that the national characteristics of generation, demand flexibility and storage, as well as the availability of primary resources and the level of interconnection are properly taken into consideration in the ERAA, in line with Article 23(5)(m) of the Electricity Regulation.

#### 6.1.3. Procedural requirements for the ERAA

- (54) Pursuant to Article 23(2) and the second subparagraph of Article 23(4) of the Electricity Regulation, the ERAA shall be conducted by ENTSO-E on an annual basis. This requirement is reiterated in Article 1 of the ERAA methodology. Article 10 of the ERAA methodology further requires that the ERAA is submitted to ACER by 1 November each year.
- (55) Pursuant to the first subparagraph of Article 23(4) of the Electricity Regulation, TSOs shall provide ENTSO-E with the data it needs to carry out the ERAA. Pursuant to the second subparagraph of Article 23(4) of the Electricity Regulation, producers and other market participants shall provide the TSOs with data regarding expected utilisation of the generation resources, taking into account the availability of primary resources and appropriate scenarios of projected demand and supply. The data collection process is further specified in Article 5 of the ERAA methodology, stating the relevant obligations of the TSOs and market participants.
- (56) Pursuant to Article 23(7) of the Electricity Regulation, the ERAA's scenarios, sensitivities and assumptions on which they are based, and the results shall be subject to

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<sup>11</sup> According to the ERAA methodology, LOLE means that in a given modelled zone and in a given time period, the expected number of hours in which resources are insufficient to meet the demand; EENS means that in a given modelled zone and in a given time period, the expected ENS, where the expected ENS means, for a given Market Time Unit and modelled zone, the energy which is not supplied due to insufficient capacity resources to meet the demand.

the prior consultation of Member States, the ECG and relevant stakeholders and approval by ACER under the procedure set out in Article 27 of the Electricity Regulation.

- (57) Pursuant to Article 27(2) in joint reading with Article 23(7) of the Electricity Regulation, before the submission of the ERAA to ACER, ENTSO-E shall carry out a consultation involving all relevant stakeholders, including regulatory authorities and other national authorities. It shall duly take the results of that consultation into consideration.
- (58) In relation to this, Article 41(2) of the Electricity Regulation requires that ENTSO-E operates in full transparency towards stakeholders and the general public. Article 31, in joint reading with Article 30(1)(c) of the Electricity Regulation, specifies consultation requirements for the ERAA. Pursuant to Article 31(1) of the Electricity Regulation, ENTSO-E shall conduct an extensive consultation process which enables it to accommodate stakeholder comments before the final adoption of the ERAA and in an open and transparent manner, involving all relevant stakeholders. ENTSO-E's consultation shall also involve regulatory authorities and other national authorities, supply and generation undertakings, system users including customers, distribution system operators, including relevant industry associations, technical bodies and stakeholder platforms. It shall aim at identifying the views and proposals of all relevant parties during the decision-making process. Pursuant to Article 31(2) of the Electricity Regulation, ENTSO-E shall make public all the documents and minutes related to its consultation. Pursuant to Article 31(3) of the Electricity Regulation, before adopting the ERAA, ENTSO-E shall indicate how the observations received during the consultation have been taken into consideration, and provide reasons where observations have not been taken into account. The degree of stakeholder involvement required for each ERAA is further specified in Article 9 of the ERAA methodology, including the establishment of adequate stakeholder interaction channels at different stages of the ERAA development process.
- (59) Pursuant to Article 27(3) in joint reading with Article 23(7) of the Electricity Regulation, ACER has three months from the submission date to either approve or amend the ERAA. In the latter case, ACER shall consult ENTSO-E before approving the amended ERAA. ACER shall publish the approved ERAA on its website within three months of the date of receipt of the submission.

#### 6.1.4. Implementation of the ERAA methodology

- (60) Article 12 of the ERAA methodology allows for a progressive implementation of the ERAA methodology until the end of 2023. In particular, as stated in Article 12(2), the ERAA methodology may be implemented through a gradual process, whereby 'proof of concept' testing and impact assessment of the different methodological elements should ensure that they are mature enough before they become an integral part of the ERAA. Such an approach strikes a balance between accuracy and feasibility of the targeted improvements.
- (61) As further explained in Recital 12 of the ERAA methodology, this gradual approach is intended to allow for some temporary (and properly justified) methodological

simplifications during the implementation phase, in order to help ENTSO-E to continuously learn and gain experience over time and thus ensure efficient implementation of the ERAA methodology in the longer run.

## **6.2. Assessment of the ERAA 2021**

- (62) This section sets out ACER's assessment of the ERAA 2021 in light of the applicable legal framework as described in the previous section. This assessment covers both content-related (i.e. substantive) and procedural aspects and, for ease of reading, groups them into thematic categories listed in the first column of Table 1. Each category is then discussed in more details in subsections 6.2.1.2 to 6.2.2.3 and some of them are further developed in the Technical annex (i.e. Annex I to this Decision).
- (63) The Electricity Regulation defines the purpose of the yearly ERAAs and sets out high-level requirements primarily in Article 23, as described in sections 6.1.2 and 6.1.3, for their content and development process. The ERAA methodology details what these requirements mean in technical terms in order for the ERAA to serve its intended purpose, i.e. to become an exemplary monitoring assessment for objective, evidence-based decision-making. ACER acknowledges the complexity and the level of effort involved in producing an ERAA, which fully meets this high methodological standard. With this eventual goal in mind, ACER has allowed for a gradual implementation of the ERAA methodology by 2023, expecting that the first assessments demonstrate progressive implementation of the methodological framework, reaching the full standard in the ERAA 2024 at the latest. However in any case, even if only gradual, the implementation of the ERAA methodology has to be consistent with the legal purpose of the yearly ERAAs and the legal high-level requirements for their content and development process. The ERAA to be conducted by ENTSO-E in accordance with the ERAA methodology has to be assessed in light of this purpose and those high-level requirements.
- (64) Considering that the ERAA 2021 is the first deliverable in this four-year implementation phase, ACER recognises that, in gradually implementing the ERAA methodology, certain methodological simplifications are unavoidable this year. ACER mainly checks this year whether the ERAA 2021 considers all high-level requirements of Article 23 of the Electricity Regulation and meets the intended purpose of an ERAA. This approach is consistent with ACER's and the regulatory authorities' minimum expectations for the ERAA 2021, communicated to ENTSO-E in April 2021 (see paragraph (7)).<sup>12</sup>
- (65) While simplifications in the ERAA 2021 are expected, and in many cases ACER considers those applied by ENTSO-E as justified and acceptable, they inevitably affect, to some degree, the quality of the assessment and the robustness of its results. ACER

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<sup>12</sup> The framework may evolve for future ERAA approvals, in line with the progressive implementation of the ERAA methodology and ACER's recommendations.

recognises the salient role of the ERAA in monitoring resource adequacy in Europe and, in particular, in providing robust and objective findings for important policy decisions pursuant to Chapter IV of the Electricity Regulation (see section 6.1.1). In particular, the ERAA is expected to support decisions regarding new capacity mechanisms, the phase-out or prolongation of existing ones, as well as market reforms envisaged in the national implementation plans.<sup>13</sup> Also for the high-level compliance check, it is therefore necessary to carefully assess whether, and to what extent, such simplifications may actually undermine the purpose of the ERAA as intended in Chapter IV of the Electricity Regulation. Therefore, in case of simplifications or deviations from the methodological framework, ACER considers their potential impacts on the functionality of the assessment in terms of its relevance for policy-making. In particular, ACER examines whether such simplifications or deviations compromise the robustness of the assessment to the extent that they would materially affect the accuracy and reliability of its results, leading to incorrect findings of resource adequacy concerns, and by extension, incorrect policy decisions.

- (66) Considering the above, ACER has assessed the ERAA 2021 against the applicable legal framework based on a combination of three factors: (1) the ERAA 2021 should have regard to the objectives and requirements of the Electricity Regulation, in particular it should reflect the requirements of Article 23; (2) certain methodological simplifications may be allowed in this period; and (3) any such simplifications may not however render the assessment unfit for its intended purpose. The conclusions from ACER's assessment are provided in the fourth column of Table 1, and the colours used are explained below.

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<sup>13</sup> As of 2020, 12 Member States had capacity mechanisms in place, such as strategic reserves and market-wide capacity mechanisms. The costs of capacity mechanisms are expected to double from 2020 to 2022 to over 5 bln €. For more information, see Chapter 6 of ACER-CEER's Market Monitoring Report – Electricity Wholesale Volume, available on:

[https://extranet.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER%20Market%20Monitoring%20Report%202020%20%E2%80%93%20Electricity%20Wholesale%20Market%20Volume.pdf](https://extranet.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Market%20Monitoring%20Report%202020%20%E2%80%93%20Electricity%20Wholesale%20Market%20Volume.pdf)



**Table 1: Summary of ACER’s assessment of the ERAA 2021**

Colour coding:

	Compliance with the applicable requirements.
	Simplification acceptable in 2021 given that impacts on the ERAA’s purpose are limited.
	Simplification or deviation unacceptable given material impacts undermining the ERAA’s purpose.
	Unable to assess due to limited information available.

Aspect of the ERAA 2021 (relevant section)	Applicable requirements (ER <sup>14</sup> , ERAAM <sup>15</sup> )	Full compliance with requirements <sup>16</sup>	ACER’s assessment
<b>Geographical scope</b> (section 6.2.1.1)	Art. 23(1) ER Art. 23(5)(a) ER Art. 1 ERAAM Art. 4 ERAAM	YES	Compliant with the requirements.
<b>Temporal scope</b> (section 6.2.1.2)	Art. 23(1) ER Art. 4 ERAAM	NO	Simplification acceptable in 2021. Impact: Limited value for identification of resource adequacy concerns since only two years are modelled.
<b>Scenario framework</b> (section 6.2.1.3)	Art. 23(5)(b) ER Art. 23(5)(f) ER Art. 23 (5)(c) ER Art. 3 ERAAM	NO	Compliant for 2025, but incompliant for 2030. Impact: Lack of central reference scenarios for 2030 means that the ERAA 2021 cannot be used to identify resource adequacy concerns for this year.
<b>Scenario framework and greenhouse gas (GHG) target</b> (section 6.2.1.4)	Art. 23(5)(b) ER Art. 3 ERAAM	YES	Compliant with the requirement since the EU GHG target has been updated when the ERAA 2021 was already in development. However, there are impacts of not considering the most recent target. <sup>17</sup>
<b>Energy efficiency measures</b> (section 6.2.1.5)	Art. 23(5)(b) ER Art. 3 ERAAM	?	Unable to assess due to limited information.

<sup>14</sup> Applicable paragraphs of Article 23 of the Electricity Regulation.

<sup>15</sup> Applicable provisions of the ERAA methodology which implement a given requirement of the Electricity Regulation.

<sup>16</sup> Full compliance with the applicable legal requirements is expected by the ERAA 2024.

<sup>17</sup> The forecast is not aligned with the most recent GHG target, which undermines the robustness of scenarios and results.

<b>Economic viability assessment (EVA)</b> (section 6.2.1.6)	Art. 23(5)(b) ER Art. 23(5)(d) ER Art. 3 ERAAM Art. 4 ERAAM Art. 6 ERAAM Art. 7 ERAAM	NO	Simplification unacceptable due to considerable impacts on the ERAA's results. The EVA fails to appropriately reflect risks and opportunities, leading to overestimation of resource adequacy risks.
<b>Storage</b> (section 6.2.1.7)	Art. 23(5)(d) ER Art. 23(5)(m) ER Art. 4 ERAAM	NO	Broadly consistent with the applicable framework, however, lack of information prevents comprehensive review. Any potential impacts of the approach on the purpose of the ERAA are expected to be limited.
<b>Interconnection and network development</b> (section 6.2.1.8)	Art. 23(5)(b) ER Art. 23(5)(l) ER Art. 23(5)(m) ER Art. 3 ERAAM Art. 4 ERAAM	?	Unable to assess due to limited information available.
<b>Cross-zonal capacity calculation</b> (section 6.2.1.9)	Art. 23(5)(g) ER Art. 23(5)(d) ER Art. 4 ERAAM	NO	Simplification unacceptable due to considerable impacts on the ERAA's results. The simplification leads to overestimation of adequacy risks and incorrect description of the characteristics of such risks.
<b>Demand-side response and sectoral integration</b> (section 6.2.1.10)	Art. 23(5)(d) ER Art. 23(5)(m) ER Art. 4 ERAAM	NO	Simplification unacceptable due to considerable impacts on the ERAA's results. Underestimation of DSR and the level of flexibility in the assessment leading to overestimation of adequacy risks.
<b>Implementation plans</b> (section 6.2.1.11)	Art. 23(5)(e) ER Art. 3 ERAAM	?	Unable to assess due to limited information available.
<b>Probabilistic assessment</b> (section 6.2.1.12)	Art. 23(5)(h) ER Art. 23(5)(j) ER Art. 4 ERAAM	NO	Minor simplification of the applicable requirements. Impact: simplifications expected to have limited impact.
<b>Single modelling tool</b> (section 6.2.1.13)	Art. 23(5)(i) ER Art. 4 ERAAM	NO	Compliant for central reference scenarios. Deviation for the flow-based proof of concept, acceptable in 2021. Impact: The use of different tools for the economic dispatch and EVA in the flow-based proof of concept likely leads to inconsistent results, however with impacts solely on the proof of concept.
<b>Out-of-market capacity resources</b> (section 6.2.1.14)	Art. 23(5)(d) ER Art. 7 ERAAM Art. 8 ERAAM	NO	Simplification acceptable in 2021. Impact: Some limited impact on the accuracy of identification of resource adequacy concerns as ignoring out-of-market measures overestimates the risks of consumer disconnections.
<b>Identification of sources of resource adequacy concerns</b> (section 6.2.1.15)	Art. 23(5)(k) ER Art. 8 ERAAM	NO	Simplification unacceptable due to considerable impacts on usefulness of the assessment as an input for policy-making.
<b>Transparency</b> (section 6.2.1.16)	Art. 41 ER Art. 11 ERAAM	NO	Level of transparency unacceptable due to considerable impacts on stakeholder engagement, ACER's approval process and usefulness of the assessment as an input for policy-making.

<b>Timeline for submission</b> (section 6.2.2.1)	Art. 23(4) ER Art. 10 ERAAM	NO	Compliant with the requirement of the annual ERAA. Slightly delayed submission had limited impact on this year's assessment.
<b>Data collection</b> (section 6.2.2.2)	Art. 23(4) ER Art. 5 ERAAM Art. 10 ERAAM	YES	Compliant with the requirements.
<b>Stakeholder engagement</b> (section 6.2.2.3)	Art. 31 ER Art. 23(7) ER Art. 27 ER Art. 9 ERAAM Art. 10 ERAAM	NO	Process acceptable for 2021 only. Impact: To some extent mitigated for the ERAA 2021 since ENTSO-E considered input from consultation on the ERAA methodology in developing key aspects of the ERAA 2021.

(67) ACER was able to assess 16 out of 19 aspects of the ERAA 2021 listed in Table 1. Due to limited information provided, ACER was not in a position to assess: (1) energy efficiency measures, (2) interconnection and network development, and (3) consideration of national implementation plans.<sup>18</sup> Out of the remaining 16 aspects:

- (a) **three aspects are marked “green”**, indicating that they comply with the applicable requirements. These aspects include: (1) geographical scope, (2) scenario framework and GHG target and (3) data collection.
- (b) **seven aspects are marked “yellow”**, indicating that they represent acceptable methodological simplifications, since their impacts are limited enough not to undermine the ERAA’s purpose and therefore are currently consistent with the applicable legal requirements. In other words, despite their impacts, these aspects of the ERAA 2021 are sufficiently robust to be relied upon for policy-making. These aspects include: (1) temporal scope, (2) storage, (3) probabilistic model, (4) single modelling tool, (5) consideration of out-of-market capacity resources, (6) timeline for submission, and (7) stakeholder engagement.
- (c) **six aspects are marked “red”**, indicating that they do not comply with the applicable legal requirements and represent a deviation from the methodological framework or a simplification which cannot be accepted by ACER due to its material impacts on the functionality of the ERAA (and the accuracy and reliability of its results, in particular) to the extent that it undermines the purpose of the assessment. These aspects include: (1) scenario framework, (2) EVA, (3) cross-zonal capacity calculation, (4) consideration of DSR and sectoral integration, (5) identification of resource adequacy concerns, and (6) transparency of the assessment.

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<sup>18</sup> ENTSO-E communicated that the ERAA 2021 fully reflects these three aspects and complies with the Electricity Regulation. ACER requested quantitative information, in order to assess compliance with them. For more information on ACER’s request, see paragraph (13) of the Decision. ENTSO-E was unable to provide the relevant information within such reasonable time that would have allowed ACER to undertake the respective evaluation with this Decision.

- (68) ACER's assessment of the above aspects is discussed in more detail in the next sections. Where applicable, ACER refers to the Technical annex for further details.

6.2.1. Assessment of substantive requirements

6.2.1.1. *Geographical scope of the ERAA 2021*

- (69) Article 23(1) of the Electricity Regulation provides that adequacy is assessed at Union level, at the level of the Member States, and at the level of individual bidding zones, where relevant. Article 23(5)(a) of the Electricity Regulation further requires that the ERAA is carried out on each bidding zone level covering at least all Member States. This requirement is further specified in Article 1 and Article 4 of the ERAA methodology.
- (70) The ERAA 2021 includes all EU-27 Member States based on the current bidding zone delineation, and provides results for individual Member States and bidding zones, and in this respect complies with the applicable requirements. The ERAA 2021 also considers a larger geography, covering the entire area of ENTSO-E's membership, including among others the United Kingdom, Norway and the Energy Community countries.

6.2.1.2. *Temporal scope of the ERAA 2021*

- (71) Article 23(1) of the Electricity Regulation requires that the ERAA covers each year within a period of ten years from the date of that assessment; this essentially means the period 2022-2031 for the ERAA 2021. Article 4 of the ERAA methodology implements this requirement by defining the study time period and requiring to simulate each target year in this period.
- (72) Within the study time period, the ERAA 2021 models two years, 2025 and 2030. The ERAA 2021 also includes a qualitative assessment by the TSOs, describing key changes in the power systems of their respective Member States and the potential evolution of resource adequacy risks across the entire ten-year horizon. Overall, this is a simplified approach to reflect the requirement of the Electricity Regulation.
- (73) This simplification has some impact on the functionality of the ERAA 2021. The Electricity Regulation prescribes that a Member State may only introduce a capacity mechanism or sign new contracts in an existing mechanism, if the ERAA or a national assessment identifies a resource adequacy concern (see paragraphs (45) and (46) above). Pursuant to Article 8(1) of the ERAA methodology, a resource adequacy concern is identified for a given target year if the resource adequacy risk is greater than the reliability standard set by the Member State. Therefore, the ERAA 2021 can only identify resource adequacy concerns for years modelled in detail, i.e. 2025 and 2030, but cannot do it for the remaining eight years. As such, the value of the ERAA 2021 for identifying resource adequacy concerns is rather limited, however with no impact on the accuracy of the

results for the modelled years alone.<sup>19</sup> Therefore, ACER considers this simplification acceptable in the first year of the implementation period.

#### *6.2.1.3. Scenario framework*

- (74) Article 23(5)(b) of the Electricity Regulation requires that the ERAA is based on appropriate central reference scenarios. Article 23(5)(c) requires that the assessment contains separate scenarios reflecting the differing likelihoods of the occurrence of resource adequacy concerns which the different types of capacity mechanisms are designed to address. Article 23(5)(f) of the Electricity Regulation requires that the assessment includes variants without existing or planned capacity mechanisms and, where applicable, variants with such mechanisms. These requirements are reflected in Article 3 of the ERAA methodology, which specifies, in particular, that the ERAA must rely on two central reference scenarios, with and without capacity mechanisms.
- (75) The ERAA 2021 treats the two modelled years in a different manner with regard to central reference scenarios. For 2025, the assessment considers two central reference scenarios, which is consistent with the requirements of Article 23(5)(b) and Article 23(5)(f) of the Electricity Regulation and Article 3 of the ERAA methodology. The two central reference scenarios reflect the differing likelihoods of the occurrence of resource adequacy concerns, which the different types of capacity mechanisms are designed to address, and hence meet the requirement of Article 23(5)(c) of the Electricity Regulation and Article 3 of the ERAA methodology. For 2030, the assessment does not consider any central reference scenario, and therefore fails to consider this requirement, not even in a simplified manner.
- (76) Article 23(5)(b) of the Electricity Regulation also requires that the ERAA is based on appropriate sensitivities on extreme weather events, hydrological conditions, wholesale prices and carbon price developments. Article 3 of the ERAA methodology allows for the assessment to consider additional scenarios and sensitivities. These scenarios and sensitivities can reflect a range of elements, such as different economic and policy trends, including variations on fuel and carbon prices, and uncertainties in network investments. The consideration of additional scenarios and sensitivities in the ERAA 2021, such as the National Estimates scenarios and the sensitivity on CO<sub>2</sub> prices, is thus in line with the applicable requirements.
- (77) The lack of central reference scenarios for 2030 means that the ERAA 2021 can identify resource adequacy concerns only for one year, namely 2025. Given that the main purpose of the ERAA is to identify resource adequacy concerns over a ten-year time horizon, ACER considers that restricting this purpose to one year only has such a material impact on the functionality of the assessment that it cannot be accepted.

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<sup>19</sup> The intertemporal scope of the ERAA is important for the robustness of the EVA. This point is further discussed in section 6.2.1.6.

*6.2.1.4. Scenario framework and the greenhouse gas emissions reduction target*

- (78) Article 23(5)(b) of the Electricity Regulation requires that the ERAA is based on appropriate central reference scenarios of projected demand and supply. Article 3 of the ERAA methodology further specifies that the central reference scenarios must be in line with national objectives and targets, and the National Energy and Climate Plans.
- (79) The current EU greenhouse gas emissions target for 2030 is to reduce emissions levels by at least 55% from 1990 levels. This new target has been recently introduced by the European Climate Law<sup>20</sup> which entered into force in July 2021, at the time when the ERAA 2021 was already in development. The ERAA 2021 considers previous climate legislation with a lower target for 2030, namely a reduction of at least 40% from 1990 levels.<sup>21</sup>
- (80) As this new binding target was set late in the process for developing the ERAA 2021, ENTSO-E could not have taken it into account in this year's assessment. In this respect, the ERAA 2021 complies with Article 23(5)(b) of the Electricity Regulation and Article 3 of the ERAA methodology, as it is based on scenarios of projected demand and supply which were appropriate at the time of its development.
- (81) Having said that, ACER expects that the new target of 55% will result in increased deployment of renewable energy sources, storage and energy efficiency measures, among others. These measures, in turn, will have a material impact on the EU electricity system both on the demand and supply side, with considerable implications for adequacy risks. Therefore, by not reflecting this new target, the ERAA 2021 is clearly misaligned with the current European and national climate policies for the next ten years. This misalignment, which increases the further out in the future, impacts the scenarios and the robustness of the results, particularly for 2030 and to a lesser extent for 2025.

*6.2.1.5. Energy efficiency measures*

- (82) Article 23(5)(b) of the Electricity Regulation requires that the central reference scenarios include measures to reach energy efficiency targets. Article 3 of the ERAA methodology further specifies that the central reference scenarios need to reflect Member States' NECPs, including national objectives, targets and contributions, and other projections related to energy efficiency.

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<sup>20</sup> Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), OJ L 243, 9.7.2021, p. 1.

<sup>21</sup> Legislation implementing the 40% target (agreed in 2014) consisted, inter alia, of the EU Emission Trading Scheme (Directive 2003/87/EC), Regulation (EU) 2018/842 introducing national targets for reduction of greenhouse gas emissions by 2030, and Regulation (EU) 2018/841 requiring Member States to balance greenhouse gas emissions and removals from land use, land use change and forestry.

- (83) The Report contains limited information on energy efficiency measures. This information is restricted to some TSO statements that energy efficiency measures are considered in the projections for energy demand. It is unclear whether energy efficiency measures are considered for all Member States, in consistency with their NECPs, and how. The Report does not provide any quantification of the impacts of energy efficiency measures on the assumptions.
- (84) Based on the limited information set out in the submitted documentation, ACER is not able to appropriately assess whether the ERAA 2021 complies with the applicable requirements regarding energy efficiency measures, even in a simplified manner, and what are the impacts of the approach taken by ENTSO-E in terms of the ERAA's purpose. Despite ACER's request, ENTSO-E was unable to provide the relevant information within such reasonable time that would have allowed ACER to undertake the respective evaluation with this Decision.<sup>22</sup>

*6.2.1.6. Economic viability assessment (EVA)*

- (85) Article 23(5)(b) of the Electricity Regulation requires that the central reference scenarios include an EVA. Article 23(5)(d) of the Electricity Regulation requires that the ERAA appropriately considers the contribution of all existing and potentially future resources. The EVA-related requirements are further specified in Articles 3 to 7 of the ERAA methodology.<sup>23</sup>
- (86) The EVA approach in the ERAA 2021 is based on a minimisation of overall system costs, a simplification which is in line with Article 6 of the ERAA methodology. The assessment applies the EVA for 2025 only, meaning that investment decisions are based on the economic viability of resources for this single year. As such, the assessment only considers a subset of potential decisions, namely market entry and exit,<sup>24</sup> for a subset of possible resources.<sup>25</sup> An appropriate assessment of economic decisions for capacity resources needs to consider the expected revenues and costs of the relevant assets over their economic lifetime.<sup>26</sup> In summary, applying the EVA for a single year has by default

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<sup>22</sup> For more information on ACER's request see paragraph (13) of the Decision.

<sup>23</sup> Beyond the central reference scenarios, the EVA is optional for additional scenarios and sensitivities. None of the additional scenarios consider an EVA, while some of the sensitivities consider an EVA.

<sup>24</sup> The EVA does not include the options of mothballing and de-mothballing, or prolongation of the lifetime of resources as per Article 6(7) of the ERAA methodology.

<sup>25</sup> The EVA includes investment decisions only for two types of gas fired generation units (open cycle and combined cycle) and for explicit DSR resources. It also includes decommissioning of existing coal, lignite, oil and gas fired capacity (on top of any existing phase out policies). Renewables and nuclear generation technologies are considered as technologies driven by national policies. Batteries and CHPs are not considered as possible candidates for entry or exit, since major routes of revenues for this technologies (i.e. heat and ancillary services respectively) are not taken into account in the EVA, according to the Report.

<sup>26</sup> In this regard, the EVA may also reflect the costs and revenues beyond the ten year study period of an ERAA, as per Article 6(16) of the ERAA methodology.

significant limitations, thereby substantially reducing confidence in the results of the ERAA 2021.

- (87) Besides, the EVA uses generic economic parameters, including hurdle rates, across all modelled zones. Pursuant to Article 6(10) and Article 5(10) of the ERAA methodology, economic and technical data shall be estimated per modelled zone, while the cost of capacity shall be consistent with the CONE calculations performed (at least) at the Member State level.<sup>27</sup>
- (88) As stated in the Report, due to the complexity of performing a comprehensive EVA, the ERAA 2021 applies a number of simplifications to make this exercise computationally manageable. These simplifications include the consideration of a limited number of climate years and the modelling of forced outages in a deterministic way.<sup>28</sup> Due to these simplifications, the EVA diverges significantly from the economic dispatch, used to assess the risks to resource adequacy.<sup>29</sup>
- (89) ACER's analysis (based on ENTSO-E's data) shows that the adequacy risks perceived by the EVA are generally significantly lower than the risks reported by the assessment (the outcome of the economic dispatch). Effectively, this means that the EVA does not consider a representative set of expected prices, which is required by Article 6 of the ERAA methodology. The resulting resource mix of the EVA underestimates the available resources in 2025 and leads to an overestimation of the risks to resource adequacy in the ERAA 2021. Due to these impacts, ACER considers that the level of simplification of the EVA in the ERAA 2021 is not acceptable.<sup>30</sup>

#### *6.2.1.7. Storage*

- (90) Article 23(5)(d) of the Electricity Regulation requires that the assessment appropriately takes account of the contribution of energy storage, including its contribution to flexible system operation. Article 23(5)(m) of the Electricity Regulation requires that the assessment ensures that the national characteristics of energy storage are properly taken into consideration. These requirements are reflected in Article 4 of the ERAA methodology.

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<sup>27</sup> At the time of development of the ERAA 2021, however, implementation of the calculation of CONE was in progress in some Member States and results were not readily available.

<sup>28</sup> The EVA only considers 7 climate years and a single forced outage profile, while the economic dispatch considers 35 climate years combined with a high number of Monte Carlo simulations to reflect forced outages of generation and network assets. Overall, the EVA considers 7 simulations for target year 2025, while the economic dispatch considers more than 700 simulations.

<sup>29</sup> As an example the ERAA 2021 LOLE indicators for Belgium, Germany and France are 4 hr/year, 7 hr/year and 4 hr/year respectively while the same indicators from the EVA are 0.3 hr/year, 0.1 hr/year and 0.0 hr/year respectively.

<sup>30</sup> See Chapter 3 of the Technical annex for details.



(91) The ERAA 2021 considers pumped-storage hydro and battery storage, in line with Article 4(5) of the ERAA methodology. The ERAA 2021 aims at dispatching storage when electricity prices are expected to be high and storing energy when prices are expected to be low, thus reflecting their flexible use. Overall, the approach to optimising the use of storage is broadly consistent with the applicable framework of the Electricity Regulation. The Report lacks information to allow for a comprehensive review of the approach for taking the contribution of storage into account. Nevertheless, ACER considers that the ERAA 2021 sufficiently reflects the requirement of Article 23(5)(d) of the Electricity Regulation regarding the consideration of storage in the assessment, potentially with limited impacts on the accuracy of the results.<sup>31</sup>

#### *6.2.1.8. Interconnection and network development*

(92) Pursuant to the Electricity Regulation, the ERAA must properly take into consideration the level of interconnection, interconnection targets, and real network development (requirements of Article 23(5)(m), Article 23(5)(b) and Article 23(5)(l) respectively). Article 3 of the ERAA methodology specifies that the assessment must reflect best estimates about the future state of the network based on the latest national development plans and ENTSO-E's TYNDP. Article 4 of the ERAA methodology specifies the modelling framework for the electricity network.

(93) The ERAA 2021 offers limited information about the assumed network development for 2025 and 2030 within the country comments provided by the TSOs. The Report does not include any comprehensive section explaining the future state of the network, the interconnectivity levels and consistency with the relevant plans. The assessment provides information about the net transfer capacity (NTC) values assumed (and flow-based domains in the proof of concept analysis). It is however not possible to derive the assumed network configuration from these assumptions. As a result, ACER is unable to evaluate whether the assessment fulfils the relevant requirements of the Electricity Regulation related to interconnection levels, interconnection targets and network development, based on the available information in the Report, nor examine whether the approach taken by ENTSO-E has a material impact on the purpose of the ERAA. Despite ACER's request, ENTSO-E was unable to provide the relevant information within such reasonable time that would have allowed ACER to undertake the respective evaluation with this Decision.<sup>32</sup>

#### *6.2.1.9. Cross-zonal capacity calculation*

(94) Pursuant to Article 23(5)(g) of the Electricity Regulation, the ERAA must be based on a market model using the flow-based approach, where applicable. Pursuant to Article 23(5)(d) of the Electricity Regulation, the ERAA must appropriately take into account the contribution of imports and exports to adequacy, by accurately reflecting the

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<sup>31</sup> See section 2.4.4 of the Technical annex for details.

<sup>32</sup> For more information on ACER's request see paragraph (13) of the Decision.

capacity calculation approach used on each bidding zone border. These requirements are further specified in Article 4 of the ERAA methodology.

- (95) Two capacity calculation regions (CCRs) are expected to apply the flow-based capacity calculation approach in 2025 (and 2030): the Core and the Nordic CCRs. The central reference scenarios of the ERAA 2021 however do not reflect this approach, for neither of the two CCRs nor the two modelled years. Instead, ENTSO-E has only conducted a proof of concept, which applies the flow-based approach in the Core CCR in 2025 for part of the modelling. In this proof of concept, the EVA relies on the NTC capacity calculation approach and one modelling tool, and the economic dispatch relies on the flow-based approach and another modelling tool.<sup>33</sup> Compared to the NTC approach, the flow-based approach would allow to better depict situations of simultaneous scarcity among bidding zones, and would likely affect the EVA. Furthermore, the flow-based proof of concept relies on different approaches for the different sets of flow-based domains used, hampering the consistency and comparability of the results for this proof of concept.
- (96) Besides, ACER considers that the approach used in the ERAA 2021 does not appropriately reflect the minimum 70% cross-border capacity target required by Article 16(8) of the Electricity Regulation, thereby underestimating the volume of capacity available for cross-zonal trade.<sup>34</sup> As a result, ACER considers that the ERAA 2021 overestimates resource adequacy concerns on some bidding zone borders.<sup>35</sup> This overestimation, in turn, undermines the purpose of the ERAA 2021, as it may lead to incorrect policy choices such as introducing capacity mechanisms where they are not needed. Further details on ACER's assessment of the ERAA 2021 in terms of capacity calculation are provided in the Technical annex.<sup>36</sup>
- (97) ACER's assessment of the capacity calculation approach in the ERAA 2021 is based on incomplete information. In particular, the documentation submitted to ACER lacks information regarding differences between the grid models used for the TYNDP and for the ERAA, and justifications for key parameters underlying flow-based calculations.<sup>37</sup> In addition, information on how NTCs were calculated, e.g. whether they reflect applicable capacity calculation methodologies, is also missing from the submission. ACER was

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<sup>33</sup> See section 6.2.1.13 for single modelling tool.

<sup>34</sup> Particularly on alternative current borders, see section 2.4.5.2 of the Technical annex. Furthermore, the ERAA 2021 did not model the impact of this minimum target on the countertrading and redispatching needs of the system, thus ignores instances when capacity resources are set aside from the wholesale electricity market, in order to provide countertrading or redispatching services. This assumption tends to slightly alleviate the overestimation of resource adequacy concerns.

<sup>35</sup> On bidding zone borders where NTC forecasts for 2025 are below 2020 NTCs, the ERAA 2021 overestimates concerns. Furthermore, the modelling of the minimum 70% target would likely lead to a reduction of resource adequacy concerns, but it may also lead to increase concerns in some cases, e.g. due to high redispatching requirements to ensure the minimum target.

<sup>36</sup> See section 2.4.5 of the Technical annex for details.

<sup>37</sup> See Chapter 5 of the Technical annex for details.

unable to undertake a comprehensive assessment based on the ERAA 2021 and further information provided by ENTSO-E. The information provided in the submission is however sufficient for ACER to establish with a high degree of confidence that the ERAA 2021, by simplifying the approach to capacity calculation, overestimates resource adequacy concerns in certain aspects, thus affecting its purpose in a material way.

*6.2.1.10. Demand-side response (DSR) and sectoral integration*

- (98) The Electricity Regulation requires that the assessment appropriately takes account of the contribution of all resources including demand response, and properly reflects national characteristics of demand flexibility (requirements of Article 23(5)(d) and Article 23(5)(m) of the Electricity Regulation respectively). Article 4 of the ERAA methodology further specifies this requirement. In particular, Article 4(3) of the ERAA methodology requires that the ERAA considers both implicit and explicit demand-side response (DSR). In addition, Article 23(5)(d) of the Electricity Regulation requires that the assessment appropriately takes account of the contribution of sectoral integration, including its contribution to flexible system operation.
- (99) The ERAA 2021 relies on simplifications and assumptions that underestimate DSR. This approach disregards the fact that promoting DSR lies within the key objectives of the Electricity Regulation<sup>38</sup> and that market rules must promote its development.<sup>39</sup> Underestimation of DSR potential results in an overestimation of resource adequacy risks, thereby affecting the purpose of the ERAA.
- (100) Regarding sectorial integration, the assessment considers electric vehicles and heat pumps.<sup>40</sup> Both technologies are considered on the demand side and their operation (e.g. charging of electric vehicles) is determined exogenously from the model, i.e. it is pre-determined by ENTSO-E or TSOs, and does not respond to market prices. For electric vehicles, the assessment implicitly exploits their inherent flexibility to some degree, whereby charging is performed outside peak hours to a greater or lesser extent. On the other hand, the ERAA 2021 omits the potential for flexible operation of heat pumps.
- (101) Due to these impacts, ACER considers that the level of simplification for the consideration of DSR and sectoral integration is not acceptable. The Technical annex sets

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<sup>38</sup> Article 1(d) of the Electricity Regulation

<sup>39</sup> Market rules must foster the development of demand flexibility and consumer empowerment in the energy market and energy transition (Article 3(c) and Article 3(d) of the Electricity Regulation).

<sup>40</sup> The ERAA 2021 does not consider other sectoral integration technologies, such as technologies for power-to-gas and power-to-hydrogen conversions. ACER notes that such technologies are expected to play a role in the later years of the ten-year horizon of the assessment and especially in the longer-term development of the energy sector. See for example: Sectorial integration: Long-term perspective in the EU energy system: [https://op.europa.eu/en/publication-detail/-/publication/a0868328-4f06-11eb-b59f-01aa75cd71a1/language-en?WT.mc\\_id=Searchresult&WT.ria\\_c=37085&WT.ria\\_f=3608&WT.ria\\_ev=search](https://op.europa.eu/en/publication-detail/-/publication/a0868328-4f06-11eb-b59f-01aa75cd71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=37085&WT.ria_f=3608&WT.ria_ev=search).

out ACER's assessment of the DSR approach (including electric vehicles) in the ERAA 2021.<sup>41</sup>

#### *6.2.1.11. National implementation plans*

(102) Article 23(5)(e) of the Electricity Regulation requires that the ERAA anticipates the likely impact of the measures referred to in Article 20(3) of the Electricity Regulation, which are set out in Member States' implementation plans (see paragraph (44) above).<sup>42</sup> This requirement is further specified in Article 3 of the ERAA methodology, which requires that the assumptions of the central reference scenarios are aligned with the actions and measures taken to eliminate restrictions to wholesale price formation<sup>43</sup> and with the Member States' implementation plans.

(103) By the time ENTSO-E started working on the ERAA 2021 (in October 2020), some Member States had already adopted their implementation plans (Belgium, Ireland, Lithuania and Poland) and some published their draft versions at around the same time (Italy and Finland). It is unclear which of these implementation plans are reflected at all in the ERAA 2021 assumptions, and how.<sup>44</sup> The Report does not provide any quantification of the impacts of the national implementation plans on the assumptions.

(104) Similarly, the ERAA 2021 does not consider any reforms that would directly affect price formation in the market (and its modelling in the ERAA), such as the implementation of a shortage pricing function for balancing energy. ACER notes that some Member States have committed in their plans to implement an administrative shortage pricing function (Poland and Lithuania) and provided timelines for this implementation.

(105) Based on the limited information set out in the submitted documentation, ACER is not able to appropriately assess whether the ERAA 2021 complies with the applicable requirements, even in a simplified manner. Despite ACER's request, ENTSO-E was unable to provide the relevant information within such reasonable time that would have allowed ACER to undertake the respective evaluation with this Decision.<sup>45</sup>

#### *6.2.1.12. Probabilistic assessment*

(106) Article 23(5)(h) of the Electricity Regulation requires that the ERAA applies probabilistic calculations. Article 23(5)(j) of the Electricity Regulation requires that the

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<sup>41</sup> See section 2.4.2 of the Technical annex for details.

<sup>42</sup> Information on the implementation plans pursuant to Article 20(3) of the Electricity Regulation is available on: [https://ec.europa.eu/energy/topics/markets-and-consumers/capacity-mechanisms\\_en](https://ec.europa.eu/energy/topics/markets-and-consumers/capacity-mechanisms_en).

<sup>43</sup> These measures and actions are defined by the Member States pursuant to Article 10(5) of Electricity Regulation, and aim to eliminate or mitigate those measures or policies which restrict wholesale price formation.

<sup>44</sup> In some cases, the Report explicitly asserts that the implementation plan is reflected in the assumptions, without providing any further information (e.g. Belgium). In other cases, the Report is silent on whether the implementation plans have been reflected in the assumptions or not (e.g. Ireland).

<sup>45</sup> For more information on ACER's request see paragraph (13) of the Decision.

ERAA includes at least the two indicators – LOLE and EENS. These requirements are further specified in Article 4 of the ERAA methodology.

- (107) The ERAA 2021 uses a probabilistic approach to assess the risks to resource adequacy. The approach encompasses climate years, which are consistent sets of climate-dependent input variables, such as demand, wind and solar availability. These climate years are combined with multiple sets of random outages for generation and interconnector assets. The latter represent the probability that these assets might be forced out of operation for a certain amount of time due to a failure. The combination of climate years with random outages of generation and interconnector assets form the so-called Monte Carlo sample years.
- (108) The aforementioned construct produces LOLE and EENS, which are the two key outputs of the probabilistic assessment. The assessment runs a high number of Monte Carlo sample years for each modelled year (e.g. 2025) to ensure the convergence (or stability) of the risk indicators. This convergence is monitored through the so-called ‘coefficient of variation’, which measures how much the results change between subsequent Monte Carlo sample years. The ERAA 2021 uses a simplified way to confirm model convergence.<sup>46</sup> However, it appears that the different scenarios have converged sufficiently, with some exceptions, based on the information provided in the Report.
- (109) Based on the above, ACER considers that the ERAA 2021 broadly meets the requirement for a probabilistic assessment, with the current minor simplifications expected to have a limited impact at most on the accuracy of the results.

#### *6.2.1.13. Single modelling tool*

- (110) Article 23(5)(i) of the Electricity Regulation requires that the assessment applies a single modelling tool, which is then reflected in Article 4 of the ERAA methodology.
- (111) The ERAA 2021 uses the same modelling tool for all scenarios and sensitivities except for the flow-based proof of concept, where ENTSO-E relies on different tools for the EVA and economic dispatch. The difference in the tools used for this proof of concept, combined with other methodological differences,<sup>47</sup> leads to major inconsistencies between the EVA and economic dispatch in the proof of concept.
- (112) In addition, the ERAA 2021 uses four additional modelling tools to run the central reference and other scenarios, in order to validate the results. ACER is not able to assess

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<sup>46</sup> Article 4(2) of the ERAA methodology prescribes that the ERAA uses a criterion for stopping the probabilistic assessment after a sufficiently large number of Monte Carlo years and under the condition that the relative increment of  $\alpha$  is below a given threshold value. The ERAA 2021 does not utilise a stopping criterion and hence is not compliant with the methodology. However, it appears that the different scenarios have converged sufficiently based on the information provided in the Report.

<sup>47</sup> E.g. the tool used for the economic dispatch is combined with additional constraints underlying capacity allocation (adequacy patch, see Chapter 5 of the Technical annex).

the added value of the validation exercise without further information on the differences between the methodological approaches used by the models, and more information and interpretation on the differences of the results.

(113) Overall, the ERAA 2021 broadly meets the requirement of a single tool, with a deviation regarding the flow-based proof of concept. For the latter, the use of different tools for the EVA and economic dispatch may lead to inconsistent results, but this impact is limited to the proof of concept and thus does not undermine the purpose of the assessment as a whole.

#### *6.2.1.14. Out-of-market capacity resources*

(114) Article 23(5)(d) of the Electricity Regulation requires that the assessment appropriately considers the contribution of all resources. In this respect, Article 7(10) of the ERAA methodology requires that the assessment projects the risks in the absence of any out-of-market capacity resources and after their activation. Moreover, pursuant to Article 8(1) of the ERAA methodology, the assessment can only identify resource adequacy concerns after considering the impacts of out-of-market resources.

(115) The Report explains relevant resources and measures that the TSOs have at their disposal for dealing with supply shortfalls in real-time.<sup>48</sup> ACER highlights the usefulness of the ERAA 2021 in enhancing transparency around the availability of out-of-market resources to the TSOs. In ACER's view, it is highly important to provide clear and transparent information about the tools available to system operators to avoid consumer disconnections. ACER considers that the list of out-of-market measures is incomplete, however.<sup>49</sup>

(116) Having said that, the ERAA 2021 does not appropriately consider out-of-market capacity resources when estimating the adequacy risk indicators. In the first year of the ERAA implementation, this simplified approach to out-of-market measures may still be considered acceptable, as it is expected to have limited impact on the accuracy of identification of resource adequacy concerns.<sup>50</sup>

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<sup>48</sup> These measures include, for example, strategic reserves (i.e. type of capacity mechanism where resources are kept outside the market), voltage regulation, a TSO operational practice, as well as bilateral emergency contracts between TSOs. For details, see section 1.2 and Appendix 1 of Annex 1 of the Report.

<sup>49</sup> For example, the German TSOs can use a large share of the Frequency Restoration Reserves (FRR) prior to resorting to other measures, such as the use of strategic reserves and eventually consumer disconnections. This consists of 100% of manual FRR and 60% of automatic FRR. For more information, see: <https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/auswirkungen-der-deutschen-kapazitaetsreserve-auf-die-benachbarten-mitgliedsstaaten.html>. The latest German National Resource Adequacy Assessment assumes 1.3 GW of balancing capacity being available for this purpose. Available on: <https://www.bmwi.de/Redaktion/EN/Publikationen/Studien/monitoring-the-adequacy-of-resources-in-the-european-electricity-markets-2021.html>

<sup>50</sup> This will depend on the existence of such capacities in a Member State, the need to resort to these capacities and their availability in real-time.

(117) Specifically, ACER notes that ignoring these measures may overestimate the risks of consumer disconnections. Therefore, incorporating these mitigating measures in future ERAAs would give a more accurate assessment of these risks and improve the validity of the ERAA results in this respect.

*6.2.1.15. Identification of sources of resource adequacy concerns*

(118) Article 23(5)(k) of the Electricity Regulation requires that the assessment identifies the sources of possible resource adequacy concerns, in particular whether it is a network constraint, a resource constraint, or both. Article 8 of the ERAA methodology elaborates on the potential drivers to be assessed, including methodological approaches for carrying out the assessment.

(119) The ERAA 2021 includes limited analysis of the simultaneity of supply shortfalls between the neighbouring Member States, i.e. periods during which supply does not meet demand. The analysis does not consider the individual drivers leading to shortfalls (e.g. high demand levels or generation outages), but rather their collective impact as reflected by the risk indicators in each Member State. While it is difficult to identify the drivers of simultaneous scarcity, the analysis enables understanding how such periods correlate between the Member States. ACER notes the limited scope and usefulness of this analysis and considers that it is a significant oversimplification of the applicable methodological framework. ACER cannot accept this simplification as consistent with the legal requirements since it has considerable impacts on the usefulness of the assessment as an input for policy decisions.

*6.2.1.16. Transparency*

(120) Article 41(2) of the Electricity Regulation requires that ENTSO-E operates in full transparency towards its stakeholders. Article 11 of the ERAA methodology sets out requirements ensuring that the ERAA is a transparent assessment and that the Report facilitates stakeholders' understanding of the assessment, including inputs, data, assumptions and scenario development.

(121) Regarding publication of data, the ERAA 2021 meets the requirements to a significant degree. For example, the Report contains the Pan-European Climate Database, the high-level scenario assumptions, such as fuel and CO<sub>2</sub> prices, and the LOLE and EENS results. On the other hand, ENTSO-E has not published certain required data items,<sup>51</sup> or has published them with a different (lower) level of granularity.<sup>52</sup>

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<sup>51</sup> For example, ENTSO-E has not published the assumptions underlying the measures pursuant to Article 20(3) of the Electricity Regulation and the distribution of LOLE and EENS across all Monte Carlo simulations.

<sup>52</sup> Such as DSR potentials per bidding zone and simultaneous ENS situations at regional level.

(122) Regarding the level of information provided, the ERAA 2021 represents a significant improvement to its predecessor, the mid-term adequacy forecast (MAF) 2020. The Report includes new chapters and sections (e.g. assumptions chapter, out-of-market measures section) and offers additional information regarding other aspects of the assessment. At the same time, however, the Report fails to provide essential information to enable a comprehensive understanding of the assessment. For example, the ERAA 2021 does not sufficiently explain:<sup>53</sup>

- (a) the methodological approaches used for different parts of the model (e.g. the EVA and flow-based approaches) and the reasons for certain methodological choices (e.g. choices for estimating DSR potentials and associated costs);
- (b) how the assumptions are derived in certain cases (e.g. NTCs for cross-zonal capacities, forced outage rates) and how certain statements (e.g. consideration of national implementation plans) are supported with quantitative information;
- (c) how to interpret the results of the assessment (e.g. the underlying reasons that lead to market entry and exit of resources, the risk indicator results of the EVA and simultaneous ENS results).

(123) Insufficient information on the ERAA impedes the understanding of its results and their key drivers. Ensuring full transparency is important at all stages of the ERAA process, namely:

- (a) when developing the ERAA, it enables effective stakeholder engagement (section 6.2.2.3);

Given that stakeholder engagement on the ERAA 2021 was limited in the first place (see section 6.2.2.3), ACER considers that providing complete and clear information to stakeholders in the Report should be even more important, since this is the primary source of information for stakeholders. This is essential as ENTSO-E runs a consultation on the ERAA 2021 after its publication, with the main purpose of feeding into the development of the ERAA 2022. In the context of ACER's public notice, several stakeholders highlighted the need for greater transparency in order to understand the assumptions, methodology and results of the ERAA 2021 among others and to provide constructive feedback for the development of future ERAAs.<sup>54</sup>

- (b) when approving the ERAA, it enables ACER to appropriately assess the ERAA and take an informed decision;

Insufficient information provided in the Report and during the approval process has impeded ACER's assessment of key aspects of the ERAA 2021, and has a bearing on ACER's decision (see section 6.3).

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<sup>53</sup> References to specific aspects of the ERAA 2021 which lack sufficient explanations are provided under the respective headings of section 6.2 and in the Technical annex.

<sup>54</sup> For more information, see paragraph (30).



- (c) when using the ERAA, it increases stakeholders' confidence in the results and enables policy-makers to appropriately interpret the ERAA's findings;

Insufficient information in the Report would hamper the understanding of the ERAA 2021's results and thus undermine the usefulness of the assessment for informed policy-making.

- (124) In light of these consequences, and considering ENTSO-E's obligation to operate in full transparency towards stakeholders and the general public,<sup>55</sup> ACER considers that the level of transparency in this year's ERAA is not acceptable.

#### 6.2.2. Assessment of the procedural requirements

##### 6.2.2.1. *Timeline for submission*

- (125) The ERAA 2021 complies with Article 23(2) of the Electricity Regulation, requiring assessments on an annual basis. The ERAA 2021 presents the first of the annual ERAAs, and has been developed by ENTSO-E approximately within one year following the adoption of the ERAA methodology. ENTSO-E submitted the ERAA 2021 15 days after the deadline of 1 November set out in Article 10(2) of the ERAA methodology. This is not a substantial delay and was communicated to ACER with sufficient notice. Therefore, ACER considers this delay as acceptable for the first year of implementation.

##### 6.2.2.2. *Data collection requirements*

- (126) Article 23(4) of the Electricity Regulation requires TSOs to provide ENTSO-E with the data it needs to carry out the ERAA. Article 5 and Article 10 of the ERAA methodology specify that ENTSO-E must provide national TSOs with data collection guidelines to ensure coherency of the input data across the assessment and publish these guidelines, respectively. ENTSO-E has collected data from national TSOs for the ERAA 2021 and has published the data collection guidelines alongside the Report. The ERAA 2021 is therefore in line with these requirements.

##### 6.2.2.3. *Stakeholder engagement*

- (127) Article 31 in joint reading with Article 30(1)(c) of the Electricity Regulation requires that ENTSO-E conducts an extensive consultation process and takes into consideration stakeholders' comments when finalising the annual ERAAs. Article 23(7) of the Electricity Regulation requires that the ERAA is subject to the prior consultation of Member States, the ECG and relevant stakeholders before it is submitted to ACER for approval. Article 27 of the Electricity Regulation requires ENTSO-E to consult relevant stakeholders, including regulatory authorities and other national authorities. ENTSO-E shall duly take the results of that consultation into consideration. The requirements are further specified in Article 9 of the ERAA methodology. In particular, ENTSO-E is

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<sup>55</sup> Article 41(2) of the Electricity Regulation.

required to establish adequate interaction channels (such as public consultations, workshops and webinars) to enable stakeholders to contribute at every step of developing the ERAA in a way that is transparent, open, accessible, inclusive, efficient and well-structured.

(128) For the ERAA 2021, ENTSO-E has consulted the ECG on the high-level scenario framework and assumptions. This consultation lasted around 6 weeks, between 18 June and 30 July, and included the initial TSOs' estimates on the available resource mix, assumptions on fuel and emission prices and the high-level approach to the EVA, among others.<sup>56</sup>

(129) ACER also understands that ENTSO-E heavily relied on inputs from its recent public consultation on the ERAA methodology when developing the scenarios, sensitivities and assumptions for the ERAA 2021. Given close proximity of that consultation in time and scope to ENTSO-E's work on the ERAA 2021, and considering that the ECG consultation took place, ACER accepts this approach on an exceptional basis. However, ACER notes that this level of stakeholder engagement is not acceptable in the long run in view of ENTSO-E's consultation obligations according to the Electricity Regulation. Going forward, ENTSO-E must provide sufficient opportunities for all relevant stakeholders to get involved and feed into developing the annual ERAAs.

### **6.3. ACER's conclusions**

(130) This section provides ACER's conclusions in light of its assessment described in the previous section.

(131) Article 27(3) in joint reading with Article 23(7) of the Electricity Regulation provides that within three months of the date of receipt of the ERAA 2021, ACER either approves it, or amends it and, following a consultation of ENTSO-E, approves the amended ERAA 2021. Considering these options, ACER has come to the conclusion that it can neither approve the ERAA 2021 as submitted nor amend it in such way that it can approve an amended ERAA 2021, for the following reasons:

#### **6.3.1. ACER cannot approve the ERAA 2021**

(132) ACER acknowledges that the ERAA 2021 represents a significant improvement to MAF 2020. Most notably, the ERAA 2021 includes an EVA and explores the application of a flow-based approach through a proof-of-concept. The ERAA 2021 also considers the impacts of climate change on temperatures and subsequently on demand.<sup>57</sup> ACER recognises that the development of an EVA is a highly challenging undertaking,

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<sup>56</sup> ENTSO-E did not consult on detailed elements of the assessment such as the EVA and DSR modelling (e.g. sources for determining DSR potential and relevant costs).

<sup>57</sup> For more information, see section 2.4.6 of the Technical annex.

compounded by the size and interconnectivity of the geographical area considered in the ERAA 2021. Moreover, the ERAA 2021 is the first assessment that considers the application of a flow-based capacity calculation approach across the Core region,<sup>58</sup> which is a complex exercise particularly in the absence of real-life experience with flow-based in the entire region. Both developments therefore represent significant first steps towards the full implementation of the ERAA methodology.

(133) ACER also acknowledges that the ERAA methodology has a four-year implementation period. As such, the ERAA 2021 is not (and should not be) expected to fully comply with this methodology, and certain methodological simplifications should be allowed, in particular at this early implementation stage.

(134) However, as shown in Table 1 (see paragraph (66)), ACER considers that some simplifications of, and deviations from, the methodological framework taken by ENTSO-E in the ERAA 2021 compromise the accuracy and reliability of the assessment to the extent that they undermine its purpose as intended in Chapter IV of the Electricity Regulation and therefore do not comply with the applicable legal requirements.<sup>59</sup> In particular, ACER considers that the ERAA 2021 overestimates resource adequacy concerns by underestimating the level of resource adequacy that the interconnected wholesale markets would likely deliver. In ACER's view, using the ERAA 2021 for the purpose of Chapter IV of the Electricity Regulation would thus be ill-considered. It would also be inconsistent with the objectives of the Electricity Regulation, in particular in that it would not provide appropriate market signals for increased efficiency and security of supply.<sup>60</sup> Indeed, incorrect identification of resource adequacy concerns would send incorrect signals and could lead to misplaced regulatory interventions in the market, such as capacity mechanisms. Implementing unnecessary national capacity mechanisms could lead to fragmentation of the single electricity market and subsequently slow down market integration across Europe, raise obstacles for market entry and participation of new and flexible resources in the market, increase the costs for end-consumers and hamper the reduction of GHG emissions.

(135) In addition to that, ACER is not able to assess three aspects which may also have potentially significant impacts on the ERAA's results.<sup>61</sup> The level of information provided to ACER is insufficient to take an informed decision on these aspects, and thus on the ERAA 2021 as a whole.

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<sup>58</sup> Previous adequacy assessments, such as the Pentilateral Energy Forum's Generation Adequacy Assessment 2020, considered the flow-based approach across a sub-region of Core, Central-West Europe.

<sup>59</sup> These aspects include: (1) scenario framework, (2) EVA, (3) cross-zonal capacity calculation, (4) consideration of DSR and sectoral integration, (5) identification of resource adequacy concerns, and (6) transparency of the assessment.

<sup>60</sup> Article 1(a) of the Electricity Regulation.

<sup>61</sup> These aspects include: (1) energy efficiency measures, (2) interconnection and network development, and (3) consideration of national implementation plans.

(136) For the above reasons, ACER cannot approve the ERAA 2021 as submitted.

6.3.2. ACER cannot amend the ERAA 2021 and approve an amended ERAA 2021

(137) The reason why ACER also cannot amend the ERAA 2021 is twofold:

- (a) First, amending the ERAA 2021 would not be feasible within the required decision-making timeframe of three months, given the extensive scope of the amendments necessary to make the ERAA 2021 fit for purpose. At minimum, ACER would need to amend the six ‘red’ aspects from Table 1, where simplifications or deviations have material impact on the ERAA’s purpose. This would involve far-reaching changes in the methodology of the ERAA 2021, requiring significant time and resources.

For example, amending the EVA to make it fit for purpose would imply identifying the causes for the significant divergences of risks between the EVA and economic dispatch. This identification would require investigating the EVA results in detail and testing the effects of different simplifications on the results, followed by re-running the model with amendments to these simplifications until consistency between the EVA and economic dispatch is achieved.<sup>62</sup> It is uncertain how much time this process might require.<sup>63</sup> ACER would need to request ENTSO-E to re-run the model, as ACER has neither access to it nor the required expertise for running such simulations. Similarly, enhancing transparency would require expanding significantly the content of the Report, by providing, for example, comprehensive explanations of the methodological approach followed for different parts of the model in the ERAA 2021. By default, ACER lacks the necessary information and is not in a position to enhance transparency without inputs from ENTSO-E and the TSOs. The level of complexity in amending the ERAA 2021 is exemplified by ENTSO-E’s plan to enhance a number of these elements for the ERAA 2022 and over a longer timeline, as communicated in the Report.<sup>64</sup>

- (b) In addition, even if ACER were to disregard the prescribed three-month decision-making period, ACER considers it not certain that it could deliver, with ENTSO-E’s necessary involvement, an improved ERAA 2021 within a period that would be still feasible to use the yearly ERAA for its purpose. Any such amended ERAA 2021

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<sup>62</sup> ACER understands that one of the simplifications leading to the significant divergences between the EVA and economic dispatch results is the limited number of climate years used in the former (7 climate years) compared to the latter (35 climate years). ENTSO-E has communicated that doubling the number of climate years would require at least twice as much time to run the model and possibly more, and that the overall time required to run the ERAA 2021 required more than a month, including validation of the results.

<sup>63</sup> ACER notes that achieving greater consistency between the EVA and economic dispatch is one of the key aims for the ERAA 2022, according to ENTSO-E.

<sup>64</sup> As part of the roadmap for the long-term implementation of the ERAA methodology, ENTSO-E intends to enhance the modelling for DSR, implement Flow-Based at least in the Core region, and undertake a more comprehensive analysis for identifying the sources of resource adequacy for the ERAA 2022, among other goals. Separately, ENTSO-E has communicated that it plans to improve the consistency of the EVA and economic dispatch.

would have very limited actual value, as the assessment could only be used to identify resource adequacy concerns for a single year, i.e. 2025.<sup>65</sup> Also, any such amended ERAA 2021 would be based on outdated data, given the recently adopted European Climate Law and other developments. As explained in section 6.2.1.4, the ERAA 2021 misalignment with the current European and national climate policies impacts the scenarios and the robustness of the results. Finally, ENTSO-E has already started working on the ERAA 2022 and is in the early stages of developing the following assessment, collecting data and developing methodological improvements to the assessment (e.g. modelling of DSR). Focusing ACER's and ENTSO-E's resources on improving certain aspects of the 2021 assessment would not only compromise the development of a significantly more ambitious ERAA 2022, but may also risk delaying the further implementation of the ERAA methodology.

(138) Accordingly, ACER is also not able to approve the submitted ERAA 2021 in an amended form.

#### **6.4. Recommendations for the ERAA 2022**

(139) In order to facilitate the preparation of the ERAA 2022, and to avoid that the same or similar shortcomings as identified in this Decision occur also for the ERAA 2022, ACER considers it appropriate to provide recommendations to ENTSO-E on how to further develop the assessment, and to engage with ENTSO-E throughout the development of the ERAA 2022.

(140) This section provides recommendations for the ERAA 2022. While these recommendations are not legally binding, they reflect ACER's key expectations for progressive alignment with the methodological framework in the second year of the implementation phase. Further recommendations, also going beyond 2022, are specified in the Technical annex (i.e. Annex I). For convenience and clarity, Annex II provides a table summarising all the recommendations, differentiating between those relating specifically to the ERAA 2022 and subsequent ERAAs. ENTSO-E should dedicate, and be provided with sufficient resources to deliver on these recommendations. Where the ERAA 2022 cannot meet a recommendation, ACER invites ENTSO-E to clearly explain the reasons and the challenges faced, and justify the alternative approach taken, alongside its implications on the purpose of the ERAA. ACER will engage closely with ENTSO-E to determine appropriate solutions where challenges arise in implementing the recommendations for the ERAA 2022.<sup>66</sup>

##### **6.4.1. Consistency of inputs and assumptions across the TSOs**

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<sup>65</sup> Amending target year 2030 would require substantial efforts, in light of the lack of central reference scenarios.

<sup>66</sup> In the context of this Decision, ENTSO-E has confirmed that the majority of these recommendations are within the scope of ENTSO-E's plan for the ERAA 2022. ENTSO-E has also highlighted the risk of meeting a limited number of recommendations, such as fully reflecting the new GHG emissions target across the European Union and the implementation of the flow-based approach for the Nordics region.

- (141) The scenarios for the ERAA 2021 largely depend on inputs and assumptions submitted by the TSOs. Aside a small number of assumptions that apply uniformly across the assessment (e.g. CO<sub>2</sub> and fuel prices), the TSOs are responsible for deciding on the rest of the assumptions.
- (142) ACER notes that TSOs often derive these assumptions based on their own uncoordinated methodologies. This approach might lead to inconsistencies within the ERAA and impair the assessment's coherency, which can hinder realising one of the key potential benefits of performing a European assessment.
- (143) On this basis, ACER considers there would be significant value in investigating existing TSO practices and the scope for further aligning them, to improve consistency across the assessment. ACER invites ENTSO-E and the TSOs to consider harmonisation of methodologies for determining national assumptions, where appropriate. Such harmonisation should not however compromise the appropriate consideration of national objectives and targets and national energy market specifics.

#### 6.4.2. Modelled years and scenario framework

- (144) ACER welcomes ENTSO-E's commitment to model four years in the ERAA 2022. In light of ERAA's central role for decisions on capacity mechanisms, ACER expects the assessment to cover at least four years, including key years related to these decisions, i.e. for the application of capacity mechanisms in the short-term (next one to two years) and medium-term (next three to five years). Having this in mind, ACER suggests that the next ERAA models 2024 and 2027, in addition to 2025 and 2030.
- (145) Doubling the number of modelled years would be in line with the intended gradual increase of the number of modelled years in forthcoming ERAAs towards the full implementation of the ten-year horizon by the end of 2023. Given the amount of work involved in modelling additional years (e.g. collecting data), ACER considers this gradual increase of modelled years in subsequent assessments to be a reasonable and feasible course of action towards meeting the requirement for the temporal scope.
- (146) In addition, ACER expects the ERAA 2022 to consider central reference scenarios for all modelled years. ACER invites ENTSO-E to consider the inclusion of relevant and meaningful additional scenarios and sensitivities in line with the ERAA methodology (i.e. Article 3), in consultation with stakeholders and taking into account recent trends and developments.

#### 6.4.3. Scenario framework and emissions reduction target

- (147) As explained in section 6.2.1.4 of the Decision, the European Climate Law adopted in 2021 sets a new binding target for a reduction of net greenhouse gas emissions (emissions after deduction of removals) by at least 55% by 2030 compared to 1990. The new target represents a significant increase in ambition compared to the previous target.
- (148) ACER thus expects that the ERAA 2022 reflects this new target, to ensure consistency with the EU climate policies. Bearing in mind that the fine details of how to achieve the

55% target are yet to be determined, the ERAA 2022 may consider simplifications for reflecting the target.<sup>67</sup>

(149) Moreover, in the course of 2021, Member States established or developed national recovery and resilience plans, as part of the Recovery and Resilience Facility that was established earlier in the year.<sup>68</sup> The Member States have allocated a significant share of the funding for climate purposes and the energy transition (a minimum of 37%), such as the development of renewables and storage, and renovation of buildings.<sup>69</sup> These measures are highly relevant for the evolution of the power system and adequacy, particularly in the short- to medium-term.<sup>70</sup> ACER thus expects the ERAA 2022 to reflect Member States' recovery and resilience plans, possibly in a simplified manner.

#### 6.4.4. Single modelling tool

(150) As highlighted in section 6.2.1.13, the ERAA 2021 uses a single modelling tool for the bulk of scenarios and sensitivities, and additional modelling tools for validation of the results.

(151) It is key that the ERAA uses a single modelling tool to report the risk indicators, for consistency purposes within a year's assessment but also from one ERAA to the next. Applying the single modelling tool is of importance for decision-making purposes too. The single modelling tool must be able to incorporate both the EVA and economic dispatch in a consistent manner. Finally, ACER notes that the use of four additional modelling tools for the validation of the results requires significant resources that may undermine progress in other areas of the assessment. ACER therefore invites ENTSO-E to reassess the need for such an extensive validation exercise.

#### 6.4.5. Cross-zonal capacity calculation

(152) In order to improve transparency of cross-zonal capacity calculation in the ERAA, ACER first expects that ENTSO-E provides more information about the state of the network expected for the various years modelled in detail. In particular, ACER expects information about the commissioning and decommissioning of the network elements that

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<sup>67</sup> For example, the ERAA 2022 can consider the modelling results of the scenarios developed by the European Commission for delivering the European Green Deal, available on: [https://ec.europa.eu/energy/data-analysis/energy-modelling/policy-scenarios-delivering-european-green-deal\\_en](https://ec.europa.eu/energy/data-analysis/energy-modelling/policy-scenarios-delivering-european-green-deal_en)

<sup>68</sup> For more information, see the European Commission's Recovery and Resilience Facility, available here: [https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility\\_en](https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en).

As of 5 October 2021, the European Commission assessed and approved the Recovery and Resilience plans of 22 Member States. More information, available on:

[https://ec.europa.eu/energy/sites/default/files/state\\_of\\_the\\_energy\\_union\\_report\\_2021.pdf](https://ec.europa.eu/energy/sites/default/files/state_of_the_energy_union_report_2021.pdf)

<sup>69</sup> Ibid. Member States with approved plans were planning at least EUR 177 billion for climate-related investments, and to foster necessary reforms to support the climate and energy transition.

<sup>70</sup> Financing for reforms and investments is available until the end of 2026, in the context of Recovery and Resiliency facility.

significantly affect cross-zonal capacity. Furthermore, ACER expects ENTSO-E to detail and justify the main differences underlying the TYNDP and ERAA grid models.

- (153) The Electricity Regulation requires that the ERAA uses a flow-based approach, where relevant. Therefore, ACER expects the ERAA 2022 to fully apply the flow-based approach across all target years and for the Core and Nordic CCRs.<sup>71</sup> The flow-based approach should also rely on a single modelling tool (for both the EVA and economic dispatch), to ensure overall consistency of the results. This improvement would ensure a more realistic representation of available cross-zonal capacities in the model.
- (154) ENTSO-E used two different approaches for Core flow-based modelling with the proof of concept. In order to ensure consistency and comparability of results, ENTSO-E should rely on a single flow-based approach for Core.
- (155) The ERAA 2022 must also reflect the impact of the minimum 70% target on cross-zonal capacities, i.e. cross-zonal capacities should reflect the minimum target and expected action plans and derogations for each modelled year. ACER also expects more transparency about the methodology that ENTSO-E uses to model the minimum 70% target.
- (156) In order to improve the robustness of the EVA and economic dispatch modelling, ACER expects ENTSO-E to consider the adequacy patch in at least all central reference scenarios. This modelling should ensure a realistic forecast of energy not served and consistency with other assumptions used within the economic dispatch.

#### 6.4.6. Economic viability assessment (EVA)

- (157) The EVA in the ERAA 2021 considers a single year to make decisions about market entry and exit. As commented in section 6.2.1.6, this approach represents a major simplification with considerable impacts on the ERAA results. In reality, market players take decisions based on expectations over a longer period of time, especially when these decisions relate to significant upfront costs and long-lived assets. In this sense, capturing a longer period in the EVA is important.
- (158) ACER welcomes ENTSO-E's intention to model a multi-year EVA in the ERAA 2022. The EVA should consider all the years that are explicitly modelled in the assessment, in line with ACER's recommendation on the number of modelled years (section 6.4.2), to better reflect decision-making in the sector. Eventually, the EVA will have to consider costs and revenues across the entire ten-year horizon, and possibly beyond. A multi-year EVA will enable considering all decision-making options pursuant to Article 23(5)(b) of the Electricity Regulation and Article 6(7) of the ERAA methodology. In addition, the

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<sup>71</sup> For target year 2030, which is currently outside the decision-making period related to capacity mechanisms, ENTSO-E may use the NTC approach for FB CCRs, as a simplification to ensure feasibility of the ERAA 2022.



ERAA 2022 should consider storage as a potential candidate for market entry, and ideally renewables too, without prejudice to any developments linked to policy objectives

- (159) To the extent that ENTSO-E will continue to use the simplified approach for the EVA, the risks perceived by the EVA should align with those considered in the economic dispatch. In this respect, the ERAA should ideally consider the same Monte Carlo years. If this is not possible, a more representative set of climate years and (probabilistic) forced outage patterns should be used. An ex-post evaluation of the profitability of the capacity mix (based on the economic dispatch results and considering all revenues as per Article 6(9) of the ERAA methodology) may be used to assess the need to re-consider the simulated Monte Carlo years.
- (160) ACER expects the ERAA 2022 to assess the economic parameters (e.g. fixed costs, hurdle rates) used in the EVA at least per Member State, in order for the EVA to reflect differences in economic decision-making across the modelled zones. Pursuant to Article 6(6)(a) and Article 6(10) of the ERAA methodology, ENTSO-E should ensure consistency between the cost assumptions (including WACC) used in the ERAA and the assumptions used in the calculation of CONE/CORP in the Member States, where applicable.
- (161) ENTSO-E should consider reviewing the simplified EVA approach taken in the ERAA 2021 evaluating the advantages and disadvantages against alternative EVA methods, especially against the EVA approach described in Article 6(2)(a) of the ERAA methodology. ENTSO-E should communicate the findings to ACER and stakeholders according to Article 6(19) of the ERAA methodology.

#### 6.4.7. Demand-side response

- (162) One of the key objectives of the EU climate and energy framework for 2030, reflected also in the Electricity Regulation, is to place consumers at the centre of the energy transition.<sup>72</sup> DSR, currently largely untapped, is widely recognised as a significant resource to meet future system needs, including for securing supplies.
- (163) ACER expects ENTSO-E to make significant progress on the topic of DSR for the ERAA 2022. Ideally, the 2022 assessment would rely on a comprehensive methodology for assessing DSR potential and cost parameters in every Member State. In the absence of such a methodology, the assessment should rely on the best available information to model DSR, including detailed national studies on DSR. Considering the characteristics of DSR, the ERAA 2022 should ensure consistency with the studies conducted by the Member States to set their reliability standard (in particular regarding CONE and VOLL), as required by the ERAA methodology (e.g. Article 5(10)). The ERAA 2022 should also

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<sup>72</sup> See, in particular, Article 1(b), Article 3(d) and Article 3(e) of the Electricity Regulation.

fully reflect any existing capacity mechanism-related contracts for DSR, in line with the ERAA methodology (i.e. Article 3).

- (164) Finally, the ERAA 2022 should consider implicit DSR as envisaged in the ERAA methodology. In ACER's view, the assessment should preferably use a combination of information to derive the expected impact of implicit DSR, such as information about: (1) the levels of current implicit DSR and effects of retail tariffs; (2) the rate of adoption of retail tariffs, including new, dynamic tariffs and other time-varying tariffs; and (3) analysis of the effects of dynamic tariffs on consumer behaviour, coupled with information about the adoption of smart technology. ACER invites ENTSO-E to investigate thoroughly these aspects for the ERAA 2022 and beyond, jointly with relevant stakeholders, such as policymakers and regulatory authorities, consumer associations, aggregators and technology providers (e.g. e-mobility service providers).
- (165) In the absence of a detailed methodology and as a simplification, the ERAA 2022 may rely on published work assessing demand elasticity at the day-ahead stage, in line with the ERAA methodology. The ERAA 2022 could use the same methodological approach as the bidding zone review for this purpose.<sup>73</sup>
- (166) For new, flexible uses, such as electric vehicles and heat pumps, ACER considers that the assessment's assumptions should capture their inherent flexibility to the maximum extent in the central reference scenarios. In addition, the assessment could consider sensitivities with different assumptions about the charging of electric vehicles and use of heat pumps. This approach would allow to better understand the effects of their potential use on resource adequacy.

#### 6.4.8. Out-of-market capacity resources

- (167) As explained in section 6.2.1.14, the ERAA 2021 usefully summarises out-of-market capacities available to system operators to deal with supply shortfalls, but does not consider any of these capacities when assessing resource adequacy concerns.
- (168) The ERAA 2022 should go one step further and consider out-of-market capacities in the assessment.<sup>74</sup> These capacities should include any capacity mechanism-related resources held outside the market (such as strategic reserves)<sup>75</sup> and measures that are explicitly defined in national legislation. Beyond these, ACER expects ENTSO-E to consider

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<sup>73</sup> More specifically, Article 5(g) of Annex I to ACER Decision No 29/2020: [https://extranet.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Individual%20decisions%20Annexes/ACER%20Decision%20No%2029-2020\\_Annexes/ACER%20Decision%2029-2020%20on%20the%20BZR%20-%20Annex%20I%20-%20%20BZR%20methodology.pdf](https://extranet.acer.europa.eu/Official_documents/Acts_of_the_Agency/Individual%20decisions%20Annexes/ACER%20Decision%20No%2029-2020_Annexes/ACER%20Decision%2029-2020%20on%20the%20BZR%20-%20Annex%20I%20-%20%20BZR%20methodology.pdf)

<sup>74</sup> The ERAA methodology prescribes that the annual ERAAs must report the risk indicators before and after the activation of out-of-market capacity resources for each scenario and sensitivity (Articles 7 and 11).

<sup>75</sup> Any CM-related resources should be considered for the scenario with CMs only if the scenario without CMs identifies a resource adequacy concern (without prejudice to any already signed contracts that should be reflected in both central reference scenarios of the assessment).

thoroughly which out-of-market measures would likely be activated before consumer disconnections and reflect them appropriately in the assessment, in order to ensure a robust and consistent identification of resource adequacy concerns.

#### 6.4.9. National implementation plans

- (169) The ERAA 2021 is unclear and lacks transparency with regard to the consideration of national implementation plans. The ERAA 2022 should provide concrete and quantitative information about how the measures set out in the national implementation plans affect the assumptions or modelling, or both.
- (170) On top of this, ACER expects the ERAA 2022 to consider the implementation of a shortage pricing function for balancing energy where relevant. A shortage pricing function for balancing energy can have a significant impact on the price signals to market players, including on their hedging strategies and revenues. Currently, the ERAA model sets prices (and thereafter revenues) based on the short-run marginal cost of the marginal unit clearing the market. The implementation of a shortage pricing function means that wholesale prices would be expected to deviate significantly from this principle when the system is getting tight; that is, when the system cannot fully meet the demand for energy and reserves. This behaviour in turn is expected to have a sizable effect on the economic viability of resources.
- (171) For the ERAA 2022, ACER expects the assessment to include a sensitivity considering the implementation of shortage pricing function where it is already planned (e.g. Poland) as per the national implementation plans of the relevant Member States or other related initiatives and decisions. Where the concrete parameters of the function itself are still unclear, the assessment may use a generic formulation of the function, taking into consideration the VOLL estimate of the Member State. This sensitivity would pave the way for implementing a shortage pricing function for balancing energy, as soon as it becomes concrete policy in a given Member State.

#### 6.4.10. Stakeholder engagement

- (172) ACER is of the view that extensive stakeholder engagement is essential to ensure a robust ERAA. This is all the more important in these early stages of the assessment, because ENTSO-E needs to decide on many key choices for the implementation of the ERAA methodology. In particular, appropriate stakeholder engagement would help to explore available expertise and knowledge. Going forward, ACER expects ENTSO-E to establish a formal process to engage and consult with the relevant stakeholders and publicly inform them about it. This process should enable appropriate consideration of stakeholders' views, as required by the Electricity Regulation.
- (173) For the ERAA 2022, ACER expects ENTSO-E to consult properly and in a timely manner on the assessment's methodology, scenarios and assumptions, and to consider stakeholders' feedback prior to finalising the respective elements. ENTSO-E has consulted on the ERAA 2021 after its publication; this included the current methodological approach, scenarios and assumptions, and the roadmap for the full

implementation of the ERAA methodology. ACER understands that the responses to this consultation will be used to inform the ERAA 2022. As noted in section 6.2.1.16 of the Decision, the Report provides insufficient information to appropriately assess and provide meaningful feedback on the ERAA 2021, which may undermine the usefulness of this consultation for developing the ERAA 2022.

- (174) According to the Report, ENTSO-E plans to conduct a separate consultation on the scenarios and assumptions for the ERAA 2022, in May 2022. The timing of the consultation should allow ENTSO-E to consider feedback from stakeholders prior to finalising the inputs for the assessment. ACER understands that ENTSO-E needs to start the model runs for the ERAA 2022 by June 2022. It is therefore unclear whether the May 2022 consultation can achieve the goal of feeding into the final ERAA 2022 scenarios and assumptions. ACER invites ENTSO-E to consider conducting this consultation at an earlier time to allow for sufficient time between receiving stakeholders' feedback and finalising the scenarios and assumptions for the ERAA 2022.
- (175) It is essential that the consultation enables the review of a comprehensive set of the ERAA assumptions, thus promoting the effective engagement of stakeholders. Article 9(4)(a) of the ERAA methodology determines a minimum set of assumptions for the public consultation of the scenarios, sensitivities and assumptions for forthcoming assessments.
- (176) ACER also expects that ENTSO-E engages closely with stakeholders regarding the methodology for the EVA and DSR, as a minimum, in the run-up to finalising the ERAA 2022. These aspects represent two of the most important aspects of the assessment that are currently under development. ACER acknowledges that ENTSO-E is planning to host ad-hoc webinars on the methodological approaches to the EVA and DSR. However, the Report provides insufficient information about the scope of these webinars. ACER expects that this engagement ensures stakeholders are aware of the way ENTSO-E has considered comments received during the public consultation for the ERAA 2021, the different options considered and ENTSO-E's proposed approach on the way forward. The engagement should also allow stakeholders to provide feedback and comments to the proposed approach, and to propose alternatives. Finally, after this engagement, ENTSO-E should explain how it took stakeholders comments into account for the ERAA 2022.
- (177) Overall, ACER expects ENTSO-E to further enhance stakeholder engagement and consultation for the ERAA 2022, in line with ENTSO-E's obligation to operate in full transparency towards stakeholders and the general public, and in line with ENTSO-E's consultation requirements in the Electricity Regulation.<sup>76</sup>

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<sup>76</sup> Article 23(7), Article 27(2), Article 31 and Article 41(2) of the Electricity Regulation.

#### 6.4.11. Transparency

(178) Despite the increased transparency of the ERAA 2021 in comparison to MAF, ACER still sees significant scope to enhance transparency of the assessment.<sup>77</sup> ACER expects ENTSO-E to provide complete information in the ERAA 2022 regarding the high-level requirements of the Electricity Regulation for which ACER was unable to assess compliance of the ERAA 2021.<sup>78</sup> In addition, ACER expects that the ERAA 2022 provides a comprehensive description of the methodology used and level of alignment with the ERAA methodology (including any simplifications thereof) and an explanation of the methodological choices made. The ERAA 2022 should also offer more information about the sources and analyses used to derive the assessment's assumptions and a more comprehensive and detailed explanation and interpretation of the results.

### 7. CONCLUSION

(179) The ERAA 2021 is the first assessment in the four-year implementation period of the ERAA methodology, and inevitably includes a number of methodological simplifications. While being a significant improvement to its predecessor, in ACER's view, certain simplifications or deviations from the methodological framework compromise the robustness of the assessment to the extent which materially affects the accuracy and reliability of its results, leading to incorrect identification of resource adequacy concerns. This undermines the purpose of the ERAA as envisaged in Chapter IV of the Electricity Regulation. Approving the ERAA 2021 could lead to incorrect policy decisions, in particular regarding capacity mechanisms, and would be inconsistent with the Electricity Regulation's objectives. Therefore, in view of ACER's assessment, ACER cannot approve the ERAA 2021.

(180) Amending the ERAA 2021 would not be feasible within the required decision-making timeframe of three months and would require significant time and efforts to address the critical issues identified by ACER. Amending the ERAA 2021 would expectedly compromise the delivery of a significantly more ambitious ERAA 2022, and potentially delay the implementation of the ERAA methodology, while being of limited added benefit for the purpose of the ERAA 2021.

(181) ACER considers it appropriate to provide recommendations on how to eliminate these shortcomings in the following assessment, and to steer the implementation process so that subsequent ERAAs are progressively consistent with the methodological framework until the full implementation by the ERAA 2024. ACER therefore invites ENTSO-E to follow the recommendations for the ERAA 2022 to facilitate next year's approval process

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<sup>77</sup> Detailed recommendations for enhanced transparency are provided across the Technical annex.

<sup>78</sup> Namely, these high-level requirements include the following three aspects: (1) energy efficiency measures, (2) interconnection and network development, and (3) consideration of national implementation plans.

and also to consider ACER's recommendations beyond 2022 for the timely implementation of the full ERAA methodology,

HAS ADOPTED THIS DECISION:

*Article 1*

ACER does not approve the ERAA 2021 as submitted, nor is able to amend it and approve an amended ERAA 2021.

*Article 2*

This Decision is addressed to ENTSO-E.

Done at Ljubljana, on 22 February 2022.

**- SIGNED -**

*For the Agency  
The Director*

C. ZINGLERSEN

Annexes:

Annex I – Technical annex

Annex II (for information only) – Summary of ACER's recommendations

*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 the Agency 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.*