

**OPINION No 03/2023**  
**OF THE EUROPEAN UNION AGENCY**  
**FOR THE COOPERATION OF ENERGY REGULATORS**

**of 4 April 2023**

**on the methodological aspects of the ENTSO-E draft Ten-Year  
Network Development Plan 2022**

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY  
REGULATORS,

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<sup>1</sup> (ACER), and, in particular, Article 4(3)(b) 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<sup>2</sup>, and, in particular, Article 30(1)(b) and Article 32(2) thereof,

Having regard to the outcome of the consultation with the Agency's Electricity Working Group,

Having regard to the favourable opinion of the Board of Regulators of 29 March 2023, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942,

Whereas:

## **1. INTRODUCTION**

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<sup>1</sup> OJ L158, 14.6.2019, p. 22.

<sup>2</sup> OJ L 158, 14.6.2019, p.92 and 94.

- (1) According to Article 30(1)(b) of Regulation (EU) 2019/943, the European Network of Transmission System Operators for Electricity ('ENTSO-E') shall adopt and publish a non-binding Union-wide ten-year network development plan (the 'TYNDP') biennially.
- (2) According to Article 48(1) of Regulation (EU) 2019/943, the TYNDP "*shall include the modelling of the integrated network, scenario development and an assessment of the resilience of the system. The Union-wide network development plan shall, in particular: (a) build on national investment plans, [...]; it shall be subject to a cost-benefit analysis using the methodology established as set out in Article 11 of that Regulation<sup>3</sup>; (b) regarding cross-border interconnections, also build on the reasonable needs of different system users and integrate long-term commitments from investors referred to in Articles 44 and 51 of Directive (EU) 2019/944<sup>4</sup>; and (c) identify investment gaps, in particular with respect to cross-border capacities.*"
- (3) Article 32(2), first subparagraph, of Regulation (EU) 2019/943 requires ENTSO-E to submit the draft TYNDP, including the information regarding the consultation process, to the European Union Agency for the Cooperation of Energy Regulators ('the Agency') for its opinion.
- (4) According to Article 31(1) of Regulation (EU) 2019/943 "*While preparing the proposals pursuant to the tasks referred to in Article 30(1), the ENTSO for Electricity shall conduct an extensive consultation process. The consultation process shall be structured in a way to enable the accommodation of stakeholder comments before the final adoption of the proposal and in an open and transparent manner*".
- (5) Article 32(2), second subparagraph, of Regulation (EU) 2019/943 requires that the Agency provide a duly reasoned opinion as well as recommendations to ENTSO-E and to the Commission where it considers that the draft TYNDP submitted by ENTSO-E does not contribute to non-discrimination, effective competition, the efficient functioning of the market or a sufficient level of cross-border interconnection open to third-party access.
- (6) Pursuant to Article 4(5) of Regulation (EU) 2019/942, the Agency shall, based on matters of fact, provide a duly reasoned opinion as well as recommendations to ENTSO-E, the European Parliament, the Council and the Commission, where it considers that the draft TYNDP does not contribute to non-discrimination, effective competition and the efficient functioning of the market or a sufficient level of cross-border interconnection open to third-party access, or does not comply with the relevant provisions of Regulation (EU) 2019/943 and Directive (EU) 2019/944.

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<sup>3</sup> Refers to Regulation (EU) No 347/2013, which was repealed by Regulation (EU) No 2022/869

<sup>4</sup> OJ L 158, 14.6.2019, p. 168-169 and p. 174-175.

- (7) On 31 January 2023, ENTSO-E submitted the draft TYNDP 2022 to the Agency for its opinion.

## **2. DOCUMENTS OF THE DRAFT ENTSO-E TYNDP 2022 CONSIDERED FOR THIS OPINION**

- (8) For the purpose of the present Opinion, the Agency considered the following documents within the scope of the draft TYNDP 2022:
- The TYNDP 2022 main report.
  - The TYNDP 2022 Project Sheets.
  - System Needs Study- Opportunities for a more efficient European power system in 2030 and 2040 (hereafter SNS).
  - The TYNDP 2022 CBA implementation guideline (hereafter IG).
  - System Needs Study Implementation Guidelines (hereafter SNS-IG).
  - Identification of offshore hybrid needs in the TYNDP’s identification of system needs phase – methodology (hereafter Off-Shore Needs Methodology).
  - The Stakeholders Engagement report.
  - A table listing all project-level indicators submitted by project promoters and ENTSO-E’s assessment of whether each submission is compliant with the CBA 3.0 Guideline.
  - The TYNDP 2022 Scenario Report, on which the Agency issued a separate Opinion<sup>5</sup>.
  - The ENTSO-E document “*TYNDP 2022 Guidance for applicants - transmission and storage project promoters - Criteria for applications and their treatment*” (hereafter “TYNDP Inclusion Guidelines”)<sup>6</sup>.

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<sup>5</sup> The Agency’s Opinion No 06/2022 on key elements of ENTSO-E and ENTSG draft TYNDP 2022 Scenario Report is available here:

[https://www.acer.europa.eu/sites/default/files/documents/Official\\_documents/Acts\\_of\\_the\\_Agency/Opinions/Opinions/ACER%20Opinion%2006-2022%20on%20draft%20TYNDP%202022%20Scenario%20Report.pdf](https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2006-2022%20on%20draft%20TYNDP%202022%20Scenario%20Report.pdf)

<sup>6</sup> The TYNDP Inclusion Guidelines are available here: [https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2022/210818\\_TYNDP2022\\_GuidanceforPromoters\\_final.pdf](https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2022/210818_TYNDP2022_GuidanceforPromoters_final.pdf)

The draft TYNDP 2022, in addition to the description of the adopted methodologies and their implementation, contains a description and assessment of 141 electricity transmission projects, corresponding to 291 investment items, and 23 electricity storage projects.

### **3. ASSESSMENT OF THE DRAFT ENTSO-E TYNDP 2022**

- (9) The Agency assessed the draft TYNDP 2022 on the basis of the following main criteria:
- a. The objectives set out in Article 4(3)(b) and 4(5) of Regulation (EU) 2019/942 and Article 32(2) of Regulation (EU) 2019/943.
  - b. The essential requirements of the TYNDP, as specified in Article 48(1) of Regulation (EU) 2019/943.
  - c. The requirements of the consultation process when preparing the draft TYNDP, as specified in Article 31(1) of Regulation (EU) 2019/943.
- (10) Furthermore, the Agency took into account its previous opinions, recommendations and positions, particularly those related to:
- a. The draft TYNDP 2012, draft TYNDP 2014, the draft TYNDP 2016, the draft TYNDP 2018, and the draft TYNDP 2020.
  - b. The scenarios<sup>7</sup> to be used in the draft TYNDP 2022.
  - c. The ENTSO-E draft 3<sup>rd</sup> CBA methodology<sup>8</sup>.
- (11) The Agency acknowledges that the TYNDP process is complex and resource intensive, and needs to be carried out within a two-year timeframe.

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<sup>7</sup> <https://2022.entsoe-tyndp-scenarios.eu/>

<sup>8</sup> The ENTSO-E draft 3<sup>rd</sup> guideline for CBA (latest version submitted to EC on 27.10.2022) is available here: [https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/CBA/221019-3rd%20CBA\\_Guidelines%20.pdf](https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/CBA/221019-3rd%20CBA_Guidelines%20.pdf)

The Agency's Opinion No 03/2020 on the ENTSO-E draft 3<sup>rd</sup> guideline for CBA is available here: [https://acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Opinions/Opinions/ACER%20Opinion%2003-2020%20on%20ENTSO-E%20Guideline%20for%20cost%20benefit%20analysis.pdf](https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2003-2020%20on%20ENTSO-E%20Guideline%20for%20cost%20benefit%20analysis.pdf)

### **3.1 Improvements with respect to the previous TYNDP**

(12) The Agency acknowledges in particular the following improvements implemented by ENTSO-E:

a. Regarding the TYNDP Inclusion Guidelines, they:

- provided a single time window (i.e. from 15 September until 15 October 2021) to submit project applications for the TYNDP 2022 and did not discriminate projects providing a different CBA assessment based on the time of submission;
- explicitly stated that the project promoters may receive upon request the full TYNDP market and network datasets (after the datasets were available), so that promoters could directly verify their project results<sup>9</sup>;
- remedied some previous misalignments with the ENTSO-E draft 3<sup>rd</sup> CBA methodology<sup>10</sup>;
- Allowed project promoters to receive upon request full TYNDP market and network datasets, so that promoters can directly verify their project results<sup>11</sup>.

b. Regarding the process,

a public consultation was conducted by ENTSO-E before the implementation of the CBA methodology (30-11-2021 to 7-1-2022). Although most of the comments are intended to be considered for the TYNDP 2024 edition, the consultation constitutes an improvement for the future TYNDP process, under the condition that the comments submitted will be actually considered in the development of the TYNDP 2024. In this consultation the views of stakeholders on five elements of the TYNDP 2022 Implementation Guidelines, and on the approaches to be followed in the TYNDP 2024 were requested;

c. Regarding the identification of system needs,

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<sup>9</sup> According to ENTSO-E TYNDP 2022 – Stakeholders Engagement Report (p.9), it appears that such data used can be accessible by any interested stakeholders upon request. This approach allows any other party to carry out analytical work using this data, in line with ACER’s former recommendation.

<sup>10</sup> I.e. that the cost data should be provided at the value of the year of the TYNDP, currently 2022, and not at the commissioning year, as well as the inclusion of the clarification that the cost for the purchase of energy should not be included in the OPEX of storage projects.

significant improvements of the deliverable were noted, especially regarding the following:

- transparency on project costs considered in the exercise, the starting capacities considered, and the presentation of results;
  - a separate starting grid from the ones used for the CBA analysis was used for first time;
  - the use of three additional climate years in 2030 compared to one climate year for the 2020 TYNDP;
  - improved grid reduction clustering with the use of quality indicators<sup>12</sup>, especially on the interconnections;
  - the optimiser minimises also energy-not-served as part of system costs for the 2040 horizon;
  - the methodology used was presented in detail in a separate technical document, providing a clear list of input data for each time horizon, and the process in the form of diagram;
  - better presentation of results (online data platform providing results per country);
  - the inclusion of maps depicting for first time the borders where planned projects, which are expected to become available until 2030, exceed the identified needs (or can be considered competing). Also maps depicting the borders where the identified needs are not covered by TYNDP projects.
- d. Regarding the CBA assessment and the implementation of the 3<sup>rd</sup> CBA methodology, the Agency welcomes:
- the increased geographic perimeter considered for the market model by including the following non-member countries of ENTSO-E: Algeria, Egypt, Libya, Morocco, Moldavia, Malta, Palestine, UK, and Turkey;
  - the improved transparency of the CBA assessment by including in the IG document more information on the assumptions used on the implementation of the 3<sup>rd</sup> CBA methodology, e.g. an appendix on CO<sub>2</sub> emissions per generation type, and more information on the projects included in the reference grids 2030 and 2040;

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<sup>12</sup> Mainly by using a Root Mean Square Error indicator of the flow of all the lines that make up the equivalent link.

- the deletion of the (former) indicator B9 - Avoidance of renewal/replacement cost of infrastructure;
- the improved structure, readability and user-friendliness of the project sheets, and the inclusion of more information, providing more clarity on the CBA assessment, e.g. the introduction of a project's TYNDP history, the inclusion of reference to the investment item number in their description, the distinction between the inception and sustaining CAPEX;

### **3.2 Remarks of Stakeholders provided during the consultation process**

(13) The comments collected during the consultation process of ENTSO-E, which are presented in the Stakeholders Engagement report, in many instances indicate important topics which ENTSO-E should seriously consider to improve the process and the quality of the TYNDP deliverables. In the Agency's view the following remarks are the most noteworthy to be considered by ENTSO-E:

- The role of DSOs in shaping the energy sector should be considered
- The issue of climate change and the need to consider the evolving climatic conditions in the future demand and generation patterns, instead of using only historic data, as well the consequences of the changing climatic condition to elements of the system planning.
- The need the 70% target requirement of Art. 16 (8) of Regulation (EU) 2019/943 to be taken into account in determining cross-border exchanges.
- The need for a more substantial consultation: various stakeholders request that ENTSO-E consults all data and methodologies to ensure transparency, e.g. installed capacities, interconnection capacities, hydro inflows, fuel prices, demand, RES time series and technologies.
- Various improvements to increase the transparency of the process are highlighted:
  - publication of the methodology for the selection of climate years, as well as of the choice to use of 3 climate years and diverse weights to account for their outcomes;
  - publication of the internal reinforcement costs associated to each project;
  - justification of the choice of 15 random outage patterns (for the calculation of the adequacy);
  - justification of the choice of value of lost load;

- make the outcomes of the CBA transparent, so stakeholders can properly react to them.
- The need for ENTSO-E to assess the commissioning year indicated by promoters (to reflect the commissioning delays observed in the Agency’s PCI monitoring report).
- On redispatch calculations, as well as indicators B7 (SoS Flexibility) and B8 (SoS System Stability), many stakeholders express the view that these indicators should be calculated centrally by ENTSO-E and in a transparent way due to their complexities.

### **3.3 Key remarks on the TYNDP package**

- (14) In the Agency’s view, a significant improvement is noted regarding the 2022 needs identification study (SNS and SNS-IG documents). However, there are still areas where significant improvement is needed regarding the overall process, as well as specific methodological elements. In the Agency’s view the following areas are of the most importance for the improvement of the quality of the TYNDP.
- a. Timing and content of the TYNDP consultations: ENTSO-E hosted several public workshops on the development of the TYNDP to consult the associated documents and results. However, the timing of the consultation of the deliverables came after they were completed and pertained to the results of the studies and not to the assumptions and approaches to be adopted, which could have had a significant impact on the outcomes of the studies. More specifically, as mentioned in page 49 of the SNS, “*Most comments, including those regarding the methodology itself will be taken into account in the development of the next edition of the System needs study, because time does not allow to re-run the study*”. Regarding the IG document, which includes the main assumptions and choices made for the CBA assessment, although some main elements were consulted before the start of the CBA calculations, only five of the consulted questioned pertained to the TYNDP 2022 edition. Furthermore, it is unclear whether the comments received had any impact on the draft TYNDP 2022, while the majority of the questions, according to ENTSO-E were intended to be considered for future TYNDP editions.
  - b. Development timeline of the TYNDP: delay is noted in the delivery of the TYNDP package. More specifically, the 2022 Scenario Report was delayed by four months compared to ENTSO-E’s initial work programme 2021<sup>13</sup> (April 2021 vs. December 2020), and the submission of the draft TYNDP 2022 to the Agency for

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<sup>13</sup> [https://eepublicdownloads.azureedge.net/clean-documents/Publications/ENTSO-E%20general%20publications/201022\\_ENTSO-E\\_AWP\\_2021.pdf](https://eepublicdownloads.azureedge.net/clean-documents/Publications/ENTSO-E%20general%20publications/201022_ENTSO-E_AWP_2021.pdf)



its Opinion took place on 31 January 2023, despite the legal requirement for the adoption of the TYNDP every two years.

- c. Use of scenarios for the cost benefit analyses: According to section 2.2 of the 3<sup>rd</sup> CBA methodology, the analysis should cover multiple scenarios and time horizons, at least one for the mid-term horizon and one for the long-term and very long-term horizon. Despite the above stipulations, and the fact that three scenarios were prepared for each of the two study horizons, i.e. for the years 2030 and 2040, there was a considerable reduction of the scope of the CBA analyses in the TYNDP 2022 edition. More specifically, for the 2030 horizon a full implementation of the CBA methodology was only conducted for one scenario (for NT 2030), while for scenario DE 2030<sup>14</sup> the quantities of losses were not calculated, and there were no analyses for GA 2030. For the 2040 horizon the analysis was limited to DE 2040 scenario, and only for indicator B1 (and the sub-indicators B2 and B3), limiting the visibility of the projects' benefits over a longer horizon.
- d. Construction and use of the starting and reference grids: Given that the “starting grid” is used as a starting point for the calculation of infrastructure needs, and the “reference grid” is used as counterfactual<sup>15</sup> in the TYNDP CBA for the calculation of project benefits, they have a strong (and potentially distorting) impact on the needs identified and the overall CBA results, respectively. After reviewing the lists of projects included in the starting grid<sup>16</sup> and the reference grids<sup>17</sup> used for the TYNDP 2022, the Agency noted that some of these projects either do not meet the criteria set by ENTSO-E in the SNS-IG<sup>18</sup> for the construction of the starting grid and in the IG<sup>19</sup> for the construction of the reference grids or it is ambiguous whether they meet these criteria. On the other hand, some TYNDP 2022 projects that meet the set criteria are not included in the starting or reference grids. More specifically:
- Regarding the starting grid, according to p.38 of the IG, “*only projects which, at their time of submission to the TYNDP, are in the construction phase or those which have successfully completed the environmental impact assessment*”

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<sup>14</sup> Also, for the “gas price sensitivity” DE 2030, only indicator B1 (and sub-indicators B2 and B3) were calculated.

<sup>15</sup> Market and network models simulations with the project under examination either added to the reference grid or removed from it, are compared to the reference grid situation to calculate the various benefits of the project.

<sup>16</sup> Appendix 1 of the SNS-IG

<sup>17</sup> Annex II of the IG

<sup>18</sup> Section 3.1 of the SNS-IG

<sup>19</sup> Section 2.5 of the IG

*can be part of the starting grid*". Despite the above, there are three projects<sup>20</sup> which are still in a *"planned but not yet in permitting"* status, and therefore do not meet the criterion set in the SNS-IG. Furthermore, there are five projects<sup>21</sup>, in a *"permitting"* phase, for which there is no reference and/or evidence that they have completed the environmental impact assessment. Also, for seven projects<sup>22</sup>, which are not included in the TYNDP 2022 neither were included in the TYNDP 2020, there is no information whether they fulfil the set criteria or not. On the other hand, three projects<sup>23</sup> which met the criteria for inclusion in the starting grid were left out by ENTSO-E.

- Regarding the reference grid for 2030 study horizon, according to p. 38 of the IG, *"only projects which, at their time of submission to the TYNDP, are at minimum in "planned but not yet in permitting" phase and have a commissioning date by the end of 2028 can be part of the 2030 reference grid"*. Despite the above criteria set in the IG, one project<sup>24</sup> included in the reference grid has an indicated commissioning date beyond 2028, therefore it is not eligible to be part of the reference grid, and for six projects<sup>25</sup> which are not included in the draft TYNDP 2022 neither were included in the TYNDP 2020, there is no information whether they fulfil the set criteria or not. On the other hand, one project<sup>26</sup> which met the criteria for inclusion in the reference grid was left out by ENTSO-E.
- Regarding the reference grid for 2040 study horizon, according to p. 38 of the

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<sup>20</sup>Project 228 - Muhlbach – Eichstetten in status *"Planned but not yet in permitting"*, project 378 – Transformer Gatica in status *"Planned but not yet in permitting"* and project 379 – Transformer Gatica in status *"Planned but not yet in permitting"*.

<sup>21</sup> Project 183 – DKW-DE Westcoast with phase *"In permitting"*, project 200 – CZ Northwest-South corridor with a phase *"In permitting"*, project 230 – Gerpole power bridge I with phase *"In permitting"* regarding investment item 355, project 254 - HVDC Ultranet Osterath to Philippsburg with phase *"In permitting"* and project 313 - Isar/Altheim/Ottenhofen (DE) - St.Peter (AT) with phase *"In permitting"*.

<sup>22</sup> Project 13 - Baza project, project 134 - North-South Corridor in Western Germany (section South), Project 135 N-S Western DE parallel line, project 191 - OWP TenneT Northsea Part 2, project 209 - Reinforcement Northeastern DE, project 255 - Connection Navarra-Basque Country and project 337 - Conneforde-Merzen.

<sup>23</sup> Project 170 - Baltic States Synchronization with Continental Europe, project 207 – Reinforcement Northwestern DE and project 350 – South Balkan Corridor.

<sup>24</sup> Project 126 - SE North-south short-term reinforcements with a commissioning date 2035,

<sup>25</sup> Project 134 - North-South Corridor in Western Germany (section South), Project 135 N-S Western DE parallel line, project 191 - OWP TenneT Northsea Part 2, project 209 - Reinforcement Northeastern DE, project 255 - Connection Navarra-Basque Country and project 337 - Conneforde-Merzen.

<sup>26</sup> Project 124 – NordBald phase 2 with commissioning date 2026

IG in conjunction with the stipulations of p. 27 of the 3<sup>rd</sup> CBA methodology, only projects being at least in “planned but not yet in permitting” phase and having a commissioning date by 2038 can be part of the 2040 reference grid. Despite the above criteria set in the IG, there are six projects<sup>27</sup> included in the reference grid with an indicated status “*under consideration*”, and for six projects<sup>28</sup> which are not included in the TYNDP 2022, neither were included in the TYNDP 2020, there is no information whether they fulfil the set criteria or not.

- For 17 projects<sup>29</sup> which are included in the starting grid but seem to be missing from the reference grid lists, ENTSO-E clarified after the TYNDP submission that they were considered as part of the reference grids for the CBA assessment.
- e. Transfer Capability calculations: Contrary to the practice followed in the last TYNDP editions, no  $\Delta$ NTC calculations were performed by ENTSO-E for the draft TYNDP 2022, endangering the evaluation of benefits due to capacity increases. The draft TYNDP 2022 accepts without verification the capability calculations conducted by the promoters themselves for all projects, raising concerns about the consistency of the presented data. Furthermore, the draft TYNDP 2022 does not provide information on the modelling assumptions used by the project promoters for these calculations (e.g. on the selected climate year(s)) and on the used modelling approaches (e.g. use of year-round simulation or points in time, use of load or generation shifts), despite the clear stipulation of the IG<sup>30</sup>.

### 3.4 Other remarks

#### 3.4.1 Other remarks on the TYNDP process

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<sup>27</sup> Project 243 - New 400 kV interconnection line between Serbia and Croatia, project 280 - FR-BE: study Lonny-Achene-Gramme, project 377 - Upgrade BE-NL interconnector VanEyck-Maasbracht, project 1074 – Pannonian corridor, project 1119 - Bisamberg (AT) - Wien SO (AT) - Parndorf (AT), project 1120 - Wien SO (AT) – Ternitz (AT) – Hessenberg (AT)

<sup>28</sup> These are the same projects mentioned in footnote 20.

<sup>29</sup> Projects 13, 21, 48, 62, 75, 77, 78, 172, 173, 203, 208, 236, 245, 251, 262, 269 and 320

<sup>30</sup> While it is stated in IG (p.18) that “*For deltaNTC calculations, only one market output for a given climate year will be used,*” and that “*additional modelling information on NTC will be given in a separate document to be published with the TYNDP 2022 package later in the process,*” the Agency is not aware of any such document.

- (15) The Agency has taken note of the concerns raised by some stakeholders<sup>31</sup> regarding the lack of transparency and clarity of input data (mostly concerning scenarios data) and of certain results. It is recommended that ENTSO-E makes all relevant TYNDP 2022 inputs accessible in a clear and easily understandable format as part of the final TYNDP 2022 publication.

#### 3.4.2 Other remarks on the TYNDP Guidelines for the inclusion of projects in the TYNDP 2022

- (16) The Agency acknowledges that the TYNDP Inclusion Guidelines in general ensure the equal treatment of projects and the transparency of the inclusion process as set out in Annex III.2 (5) of Regulation (EU) 2022/869.
- (17) Also, the Agency considers that the TYNDP Inclusion Guidelines can properly serve the objectives of transparency and non-discrimination and eventually improve the quality and credibility of the TYNDP, if they are duly and consistently applied by ENTSO-E and the results of their application are clearly described in the TYNDP.
- (18) Nevertheless, in the Agency's view, the comprehensiveness of the TYNDP may be improved, as it is noted that some investments which fall within its scope seem to be missing from the TYNDP, due to the voluntary basis of the candidate projects' submission. More specifically, these investments are those which were included in the TYNDP 2020, but were not proposed by the project promoters for the draft TYNDP 2022<sup>32</sup> or investments which are included only in the NDPs, but are claimed by their promoters to have cross-zonal relevance. Therefore, the identification of projects should be revised to include all projects of cross-zonal relevance in the future TYNDPs.
- (19) Additional considerations with regard to individual project (including their divergence from the TYNDP Inclusion Guidelines) and additional recommendations are provided in ACER Opinion 04/2023 on electricity projects in the draft ENTSO-E TYNDP 2022 and in the NDPs.

#### 3.4.3 Other remarks on the TYNDP scenarios and their use for cost benefit analyses

- (20) The ENTSOs published their draft scenario report on 11 April, 2022. On 15 July, the Agency published its Opinion on key elements of ENTSO-E and ENTSOG draft TYNDP 2022 Scenario Report. In this Opinion, the Agency noted urgent improvements to be

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<sup>31</sup> Page 11 and 12 of ENTSO-E TYNDP 2022 Stakeholders Engagement Report, <https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2022/ACER-opinion/stakeholders-engagement-report.pdf>

<sup>32</sup> 96 investment items included in the TYNDP 2020, are missing from the draft TYNDP 2022

made by the ENTSOs in light of the Russian aggression on Ukraine. Specifically, the Agency called on ENTSO-E to develop at least one scenario to amend the gas prices considered and as far as possible update the RES integration levels according to the new policies.

- (21) Following the above recommendations, ENTSO-E conducted a sensitivity analysis of a higher gas price on the DE2030 scenario. In this sensitivity analysis, the increased RES integration levels according to the REPowerEU<sup>33</sup> policy update were not considered, limiting considerably the relevance of the results. The Agency considers that the lack of trust in TYNDP 2022 scenario assumptions makes the TYNDP analysis of limited value.

#### 3.4.4 Remarks on the identification of infrastructure investment needs

- (22) The Agency notes that, similarly to the previous TYNDP edition, the following remarks are still pertinent:
- the needs identification was based on only one scenario (i.e. the National Trends scenario), while it should be applied to all scenarios;
  - although the Agency acknowledges the challenges incurred when using a more detailed grid model, in the Agency's view the approach to use different models for the 2030 and 2040 study horizons (i.e. a more detailed zonal model for 2030 and NTC model for 2040) does not promote the consistency and comparability of the results; in this respect the Agency suggests that ENTSO-E should evaluate the evolution towards a fully nodal modelling for future TYNDP infrastructure gaps reports;
  - uncertainty remains regarding the estimation of the project costs in the case of conceptual projects, as well as in which cases the costs indicated in Appendix 2 of the SNS-IG include assumed costs of reinforcement of internal networks (that would be necessary for the cross-border capacity increases)<sup>34</sup>;

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<sup>33</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_3131](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131)

<sup>34</sup> According to Appendix 3 of the SNS-IG “*Cost assumptions are theoretical assumptions that include the assumed costs of reinforcement of internal networks that would be necessary for the cross-border capacity increases*”

(23) The Agency reiterates its view expressed in its Opinion 3/2021<sup>35</sup> regarding the following issues (detailed information on these remarks and recommendations is provided in Annex I):

- on the importance that needs are identified for all TYNDP scenarios;
- on the need to use the same definition of zones for all study horizons for the needs exercise, as well as for the CBA exercise;
- on the need for ENTSO-E to set up principles about the calculation of the costs used in the needs exercise, and to provide transparency on how the values were derived, by distinguishing the costs for internal reinforcements from the overall project cost.

(24) Furthermore, the Agency notes the following additional remarks:

- Storage and CO<sub>2</sub>-free peaking units were included in the list of investment candidates of the needs exercise, for the first time in TYNDP 2022. The Agency notes that according to recital 24 of the Framework Guidelines for the joint TYNDP scenarios to be developed by ENTSO for Electricity and ENTSO for Gas<sup>36</sup>, the flexibility options are expected to be defined in the joint TYNDP scenarios, based on the targets included in the NECPs. Therefore, including storage and other flexibility solutions in the optimisation to be performed under the needs identification exercise could produce results, which may not be compatible with the national assumptions set in the NECPs or updated later for these solutions. Therefore, the Agency believes that the needs exercise should focus on identifying the infrastructure gaps, by optimising transmission candidates only and by considering the flexibility options (like storage and peaking units) as they are determined in the joint TYNDP scenarios. Additionally, it is not clear from SNS-IG how these storage and peaking units were identified and localised.
- The needs exercise currently provides grid optimisation only at the borders of countries, while optimisation also at country internal boundaries between zones should be performed as in input for the TSOs planning tasks.

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[https://acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Opinions/Opinions/ACER%20Opinion%2003-2021%20on%20the%20methodological%20aspects%20of%20the%20ENTSO-E%20draft%20TYNDP%202020.pdf](https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2003-2021%20on%20the%20methodological%20aspects%20of%20the%20ENTSO-E%20draft%20TYNDP%202020.pdf)

<sup>36</sup>

[https://www.acer.europa.eu/sites/default/files/documents/Official\\_documents/Acts\\_of\\_the\\_Agency/Framework\\_k\\_Guidelines/Framework%20Guidelines/FG\\_For\\_Joint\\_TYNDP\\_Scenarios.pdf](https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Framework_k_Guidelines/Framework%20Guidelines/FG_For_Joint_TYNDP_Scenarios.pdf)

- Although the starting grid transfer capacities are presented in Appendix 1 of the SNS-IG, the storage starting capacities per country (i.e. storage considered in 2025) are not presented and should be included in the final version of TYNDP 2022 after Agency's opinion.

#### 3.4.5 Other remarks on the calculation of costs and benefits

(25) The Agency reiterates its views expressed in the previous opinions<sup>37</sup> regarding the following modelling issues, specific benefit indicators, sensitivity analyses and the calculation of an investment value (detailed information on these remarks and recommendations is provided in Annex I):

- market modelling tools used;
- the calculations of the transfer capability;
- comparison between AC and DC power flow analysis;
- the consideration of the impact of the 70% target requirement of Art. 16 (8) of Regulation (EU) 2019/943;
- indicator B1 (SEW) and of sub-indicators B1-RES and B1-CO<sub>2</sub>;
- indicator B5 (Variation in losses);
- indicator B6 (Security of supply: adequacy to meet demand);
- indicator B7 (Security of supply - flexibility), and especially B7.1 - Balancing energy exchange;
- indicator B8 (Security of supply – system stability);
- indicator B9 (Reserves for re-dispatch power plants);
- sensitivity analyses;
- calculation of the value of an investment by combining the project's costs and benefits, i.e. the Net Present Value (NPV) and the Benefit to Cost Ratio (BCR) indicators.

(26) Furthermore, the Agency notes the following additional remarks:

- The information provided for the capacities considered for building the starting grid for the needs and the reference grid for the CBA implementation is not clear. In

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<sup>37</sup> I.e. Opinion No. 11/2019 on the draft ENTSO-E TYNDP 2018 and Opinion No. 03/2021 on the draft ENTSO-E TYNDP 2020

particular, in page 12 of the System needs Report it is mentioned “*The grid model to be used as base case for IoSN 2030 of TYNDP 2022 is built from the grid model of TYNDP 2020, which came with 2027 MAF NTCs used as a starting point. Several projects have then to be disconnected in order to reach the grid corresponding to the reference base case NTCs for the scenario NT2030 (MAF 2025 NTCs)*”. However, after reviewing the capacities displayed in Appendix I of the SNS-IG the Agency notes that at least for some instances the displayed capacities do not match the data available to the Agency. For example, the IT-AT border capacity (in the starting grid) displayed in figure 0.3 of the SNS is 800 MW, which is higher than the expected 715 MW<sup>38</sup>); furthermore, the year-averaged NTC in the direction AT-IT would be expected to be slightly lower than the 660 MW year-averaged NTC assumed in the direction SI-IT. Also, it is not clear whether NTCs differentiated by direction were used in the modelling. Last, the cross-zonal capacities internal to a country are not visible in the starting grid. Therefore, more transparency is necessary on the capacities considered for the current grid, the starting grid and the reference grid. In particular, the starting grid capacities should be built based on currently available transfer capacity, plus capacity increases of projects which are certain to be built, minus capacity reductions of projects to be dismissed, to reduce risks of incorporating misalignments from former TYNDP assumptions.

- Transparency of the information regarding the use of the market modelling tools further decreased, as the draft EU TYNDP no longer provides the per-project list of specific tools used.
- It is unclear what is the Value of Lost Load used in the market models, as there are conflicting references in the IG. In p.70 of the IG it is mentioned regarding the monetisation of indicator B6 “*For countries where it is not yet available, the VoLL will be based on expert judgement at 10 k€/MWh for the monetisation of B6 indicator, in line with common values found in the literature*”. However, in p.2 of the IG it is mentioned that “*The VoLL used in the market models has been updated from 10.000 to 3.000 EUR/MWh. Due to very high ENS<sup>39</sup> in the market models, it is proposed to lower the VoLL to 3.000 EUR/MWh to solve some of the ENS*”. However, the Agency notes that the latter statement seems unreasonable, as underestimating the ENS-related problems is not a solution to them.

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<sup>38</sup> The existing (year 2022) winter peak capacity on the IT-AT border is 325 MW. If we add 300 MW plus 90MW, which are the capacity increases expected to be incurred by 2023 with the commissioning of projects 26 and 336 listed in Appendix I to the SNS-IG, respectively, the capacity of the starting grid is expected to reach 715MW.

<sup>39</sup> Energy Not Served



- It is unclear whether an assessment of the resilience of the system, as stipulated in in Article 48(1) of Regulation (EU) 2019/943 was performed. Furthermore, it is unclear whether and how changes in climate related extreme weather events and their impact on infrastructure resilience were taken into account when calculating adequacy, as stipulated in Annex IV (3)(c) of Regulation (EU) 2022/869<sup>40</sup>.

### 3.4.6 Other remarks on the Interlinked Model progress

- (27) Article 11 of Regulation (EU) 2022/869<sup>41</sup> states that by 24th June 2025 ENTSO-E and ENTSOG have to develop a consistent and progressively integrated model (hereinafter “Interlinked Model”). The Regulation also prescribes that this model shall cover at least the relevant sectors’ interlinkages at all stages of infrastructure planning, specifically scenarios, technologies and spatial resolution, infrastructure gaps identification in particular with respect to cross-border capacities, and projects assessment.
- (28) In May 2021, ENTSO-E and ENTSOG published a progress report<sup>42</sup> on the Interlinked Model joint development. That report introduces the concept of dual assessment and joint assessment for projects submitted to the respective TYNDPs.
- (29) The Agency appreciates the efforts of ENTSO-E and ENTSOG to implement a common screening and a dual assessment methodology as part of the Interlinked Model. However, the Agency highlights that, practically, the Interlinked Model included in the TYNDP is still primarily limited to the joint TYNDP scenario exercise. The Agency regrets that the dual assessment methodology of the needs identification and projects’ assessment described in the Interlinked Model progress report is not yet planned by the ENTSOs.
- (30) Given the legal deadlines outlined in Regulation (EU) 2022/869, and the fact that at scenarios level the work for TYNDP 2024 has already started, the Agency is concerned about the timely implementation of the Interlinked Model and calls on ENTSO-E and ENTSOG to continue their work and expand it to the full scope that is envisaged by Regulation (EU) 2022/869 and to involve early in the process all relevant stakeholders.

HAS ADOPTED THIS OPINION:

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<sup>40</sup> OJ L 152, 3.6.2022, p. 97

<sup>41</sup> OJ L 152, 3.6.2022, p. 72-74

<sup>42</sup> <https://eepublicdownloads.azureedge.net/tyndp-documents/ILM%20Investigation%20Document.pdf>

1. The Agency finds that the draft TYNDP 2022 assessments and the projects included in it generally contribute to the objectives of non-discrimination, and effective competition, referred to in Article 32(2) of Regulation (EU) 2019/943.
2. However, the Agency finds that the draft TYNDP 2022 does not sufficiently contribute to the efficient functioning of the market, and secure functioning of the internal electricity market mainly due to the following shortcomings presented in more details in section 3.3 above:
  - a. Insufficient and untimely consultations of the main methodological elements of the TYNDP package, i.e. the scenarios methodology, the needs methodology and the implementation of the CBA methodology.
  - b. Delays to the delivery of the draft TYNDP 2022 resulting in out-of-date data and calculations results at the time of their publication, and causing delays to the PCI selection process.
  - c. Insufficient scope of CBA analysis, focusing on the 2030 study year, and mainly on one scenario.
  - d. The starting grid, used as a starting point for the calculation of infrastructure needs, and the reference grids, used as counterfactual in the TYNDP CBA for the calculation of the project benefits, are not fully in line with the criteria set for them by ENTSO-E.
  - e. Inconsistent data regarding the transfer capabilities
3. In addition, the Agency is not able to assess whether the draft TYNDP 2022 complies with the requirement of Article 48(1) of Regulation (EU) 2019/943 to include an assessment of the resilience of the system and with the requirement of Annex IV (3)(c) of Regulation (EU) 2022/869 to include an evaluation of the impact of individual projects in terms of resilience against extreme weather events and climate change impacts.
4. Based on the remarks presented in the preamble to this Opinion, the Agency considers that ENTSO-E should enhance the draft TYNDP 2022 by implementing the following recommendations:
  - a. ENTSO-E should make all relevant TYNDP 2022 inputs accessible in a clear and easily understandable format as part of the final TYNDP 2022 publication.
  - b. ENTSO-E should provide transparency on how the investment costs for the needs identification were derived, by distinguishing the costs for internal reinforcements from the overall project cost.

- c. ENTSO-E should publish a spreadsheet displaying for each cross-zonal boundary and per each flow direction:
    - the transfer capacity of the “current grid”, indicating its timestamp<sup>43</sup>;
    - the transfer capacity of the “starting grid” for the purpose of needs identification;
    - the transfer capacity of the “reference grid” for 2030 and for 2040.
  - d. Without prejudice to a more accurate assessment of Value of Lost Load in future TYNDPs, ENTSO-E should use the 10.000 Euro/MWh VOLL (where no specific data is available) for finalising TYNDP 2022.
  - e. ENTSO-E should explain how an assessment of resilience, if any, was carried out in the TYNDP 2022 (potentially including improvements for future TYNDPs).
5. In view of the foregoing, the Agency considers that ENTSO-E should enhance the future TYNDPs by implementing the following main recommendations:
- a. A substantial consultation of the important methodological elements and parameters considered in the various deliverables of the TYNDP (including the horizons to be studied, the zonal and nodal modelling, the climatic data to be used, and the scope of the CBA benefits assessed) should be conducted early enough in the process in order to enable taking into account stakeholders comments.
  - b. The TYNDP development process should be restructured in order to be completed (including taking into consideration the Agency’s opinion) by December of the year of the TYNDP.
  - c. The benefits of projects should be calculated according to all the joint scenarios developed by ENTSOs, and for all relevant time horizons to ensure adequate consideration of uncertainty.
  - d. The modelling of the grid should be based and on an appropriate starting grid (for the needs exercise) and reference grids (for the CBA assessments) by including only

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<sup>43</sup> The capacities of the “current grid” are meant as the capacities of the “starting grid” for the purpose of needs identification minus the capacities of future projects included in the starting grid, as listed in Appendix I to the System Needs Study Implementation Guidelines. The timestamp depends on actual assumptions used by ENTSO-E. For the future, it could be 31 December of the year before the TYNDP.

- the projects which strictly comply with the rules set in the respective implementation guidelines.
- e. The additional transfer capabilities of each project should be calculated by ENTSO-E with more granularity instead of calculating a yearly NTC (e.g. at least seasonal NTCs). Furthermore, ENTSO-E should improve the transparency of the NTC calculations<sup>44</sup>.
  - f. The impact of the requirement pursuant to Article 16(8) of Regulation (EU) 2019/943 on the internal electricity market must be taken into account by ENTSO-E in the modelling of the power system for the development of the scenarios, the needs identification exercise and the calculation of project benefits, where relevant.
  - g. Last, ENTSO-E should consider for the future TYNDPs the remarks and recommendations provided in section 3.4 of this Opinion.

This Opinion is addressed to ENTSO-E.

Done at Ljubljana, on 4 April 2023.

**- SIGNED -**

*For the Agency*  
*The Director*  
C. ZINGLERSEN

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<sup>44</sup> By providing more information on the selection of the critical branches / critical outages, clarifications on the selected climatic year, and by making available within the TYNDP package full details on the power or load shift applied, especially for the projects of third party promoters.

**Annex I: Remarks and recommendations included in the Agency’s Opinion 3/2021 on the draft TYNDP 2020 which are still relevant for the draft TYNDP 2022**

<b>Remark or Recommendation included in the ACER Opinion 3/2021</b>	<b>Recital in Opinion No. 3/2021</b>
Regarding the scenario used for the needs exercise, the Agency notes that the single scenario used for the needs exercise is a step backwards compared to the needs identification for the TYNDP 2018, when needs were identified for all available scenarios.	Recital 31, 6 <sup>th</sup> bullet
All scenarios should be used in the CBA analysis in a balanced way	Operative part, 4.c
The exercise for 2030 and 2040 was performed using different definitions of zones (NTC model for 2030 and zonal model for 2040), resulting in incomparable outcomes. The consistency and comparability of the results should be ensured in the future, e.g. by using the same definition of zones for all study horizons for the needs exercise, as well as with the CBA exercise	Recital 31 (1 <sup>st</sup> bullet)
More transparency is needed regarding the assumed costs. Uncertainty remains regarding the estimation of the project costs in the case of non-mature projects, and in which cases the indicated costs include the assumed costs of reinforcement of internal networks that would be necessary for the cross-border capacity increases. For the future TYNDPs, ENTSO-E should set up principles on how to construct the costs used in the needs exercise, and provide further information on how the values were derived.	Recital 31 (4 <sup>th</sup> bullet)
The main features and differences of the different market monitoring tools (for TYNDP 2022: Antares, APG Tool, BID3, Plexos, PowerSym and Plexos) along with potential impact on the calculated benefits and the modelling assumptions considered in the various tools are not presented.  ENTSO-E should provide the main features and the differences of the various market modelling tools used together with an assessment of the impact of the modelling options on the estimated benefits.	Recital 33
Regarding the network simulations, it is stated in the IG (EU TYNDP 2022: p.16 and 17) that “DC load-flow approximation may also be used for [...] losses and NTC calculations”, that “since an AC load-flow for large power	Recital 34

<p><i>systems require typically more iterations to converge towards a solution and higher computation times for calculating Jacobians in each iteration, an AC load-flow exhibits computational limitations.”</i></p> <p>The EU TYNDP should provide more concrete information (on the computational times and on the performed analysis, including the presentation of the results of both analysis for a selected number of cases) that would facilitate a comparison between AC and DC power flow results.</p>	
<p>Regarding the calculations of the transfer capability, ENTSO-E should develop specific criteria for the consistent selection of the critical branches / critical outages and make them available in the IG. Also, in case of manual addition or removal of network elements from the CB/CO lists, these changes should be provided within the TYNDP package for transparency reasons.</p> <p>It should also be explained why seasonal NTCs are not calculated, despite the fact that the grid model takes into account seasonality.</p> <p>The wide spectrum of the distribution methods of the generation power shift available for each project raises questions on the consistency of the NTC calculation across projects. ENTSO-E, after assessing each of the available methods, should conclude on the preferred method(s), and in case more than one remains in the proposed ones, the criteria for the method selection should be instructed and not be left at the TSOs’ discretion. Also, the Agency deems necessary for transparency that ENTSO-E should make available full details on the power-shift applied, especially for the projects of third party promoters.</p>	<p>Recital 35</p>
<p>Consideration of the impact of the requirement of Art. 16 (8) of Regulation (EU) 2019/943 (regarding the 70% target obligation on the volume of interconnection capacity to be made available to market participants) in the modelling of the power system for the development of the scenarios, the needs identification exercise and the calculation of project benefits, where relevant.</p>	<p>Operative part of the opinion, point 4.g</p>
<p>Regarding the calculation of the indicator B1 (SEW), the calculation of sub-indicators B1-RES and B1-CO<sub>2</sub> and their relation with the total SEW indicator should be clarified. In addition, it is not clarified whether the SEW values calculated for internal projects with an NTC cross-border impact derive by implementing method 2 (i.e. applying re-dispatch simulations</p>	<p>Recital 40.a</p>

<p>without considering the <math>\Delta</math>NTC contribution of the project that derives from the market simulation) described in p. 28<sup>45</sup> of the IG, or method 3 (i.e. applying re-dispatch simulations taking into consideration the <math>\Delta</math>NTC contribution of the project that derives from the market simulations) described in p. 30<sup>46</sup> of the IG. The choice of the method can have an impact on the outcomes of the calculation, and therefore for transparency reasons ENTSO-E should provide this information for each project affected.</p>	
<p>Regarding the indicator B5 (Variation in losses), ACER welcomes the partial adoption of the ACER recommendation in its Opinion 03/2020 to simplify the losses monetisation by using (as a second best option) the hourly marginal costs obtained in market simulations. However, it is noted that instead of using the marginal costs of the reference case, as was recommended, the marginal costs of the case with the project <math>s'_{h,i}</math> is used for PINT projects, and the marginal costs of the case without the project <math>s_{h,i}</math> is used for TOOT projects. As this approach could lead to unexpected complexities with some marginal costs, and requires the introduction of caps for each scenario, it is proposed to use the hourly marginal costs regarding the reference case (which ENTSO-E used to indicate to be an adequate system condition). Also, the hourly marginal costs used for the calculations should be published in the TYNDP.</p>	<p>Recital 40.b</p>
<p>Regarding the indicator B6 (Security of supply: adequacy to meet demand), in p. 41<sup>47</sup> of the IG it is stated that <i>“In order to properly model the loss of load probabilities, [...] adequacy simulations must be performed with 510 Monte Carlo years, resulting of the matching of the full set of the 34 PECD climate years and 15 outage patterns time series”</i><sup>48</sup>. Although the definition of the outage patterns can have a significant impact on the outcomes of the</p>	<p>Recital 40.c</p>

<sup>45</sup> Page 53 in the IG of TYNDP 2022

<sup>46</sup> Page 55 in the IG of TYNDP 2022

<sup>47</sup> Page 68 in the IG of TYNDP 2022

<sup>48</sup> The text is slightly changed in the IG of TYNDP 2022 (without changing the Agency’s remark) as follows: *“To properly model the loss of load probabilities, the hazards must be simulated in detail. This is achieved through a Monte Carlo analysis, requiring a large number of years to be modelled in order to reach the convergence of the outputs. Consequently, for the TYNDP, adequacy simulations must be performed with 525 Monte Carlo years, resulting from the matching of the full set of the 35 PECD climate years and 15 outage patterns time series.”*

<p>adequacy simulations, no information is provided on how the selected 15 outage patterns were selected out of numerous possible patterns.</p>	
<p>Regarding the indicator B7 (Security of supply - flexibility), and especially B7.1 - Balancing energy exchange, given the lack of concrete methodology resulting in high uncertainties in the results of its calculation, it is positively noted that this indicator remains qualitative. However, the methodology presented on pages 44-45<sup>49</sup> of the IG, based on which the “range thresholds” are set to assign the qualitative value (i.e. 0,+,,++) to the benefit is not clear, and clarifications should be provided on how the “<i>SEW due to balancing market integration</i>” and the “<i>Long Term + Day Ahead cross-border trade social welfare</i>” are calculated, as well as why the 7,5% ratio was selected, and why the €1mil and €15 mil thresholds<sup>50</sup> were applied to assign the qualitative values to the benefits.</p>	<p>Recital 40.d</p>
<p>Regarding the indicator B8 (Security of supply – system stability), it is noted that the text on p. 46-47<sup>51</sup> of the IG [...], does not provide further methodology or guidance on how the sub-indicators B8.0, B8.1, B8.2 and B8.3 should have been calculated by promoters. Calculations for this benefit were submitted to ENTSO-E for 7 storage projects<sup>52</sup> (either for frequency stability or black start services) and only for one transmission project<sup>53</sup> (for which, only the black start services part was accepted by ENTSO-E as “compliant with CBA 3”), showing a very low interest, especially by transmission project promoters. ENTSO-E should provide further guidance in the IG of future TYNDPs on how the indicator should be calculated by promoters.</p>	<p>Recital 40.e</p>

<sup>49</sup> Pages 71-72 in the IG of TYNDP 2022

<sup>50</sup> The thresholds were €1.4mil and €14 mil in the IG of TYNDP 2022

<sup>51</sup> Pages 74-75 in the IG of TYNDP 2022

<sup>52</sup> In TYNDP 2022 only 5 storage projects provided a calculation for B8.2 indicator (Black start services), and only one out of them was accepted by ENTSO-E.

<sup>53</sup> In TYNDP 2022 only 1 transmission project provided a calculation for B8.1 indicator (frequency stability), and was accepted by ENTSO-E.



<p>Regarding the indicator B10<sup>54</sup> (Reserves for re-dispatch power plants), according to the 3<sup>rd</sup> CBA methodology, page 91<sup>55</sup>, it “<i>can only be applied for projects located in countries that have a specific mechanism for contracting redispatch reserve power plants or connecting countries where at least one country has such a mechanism</i>”. However, this limited approach does not safeguard consistency across projects assessed and does not reveal the socio-economic benefit of a project irrespective of whether a specific mechanism for contracting redispatch reserve exists or not. Also, the lack of transparency regarding the projects for which the re-dispatch costs were included in the analysis of indicator B1 entails a risk of double counting benefit with indicator B1. ENTSO-E should calculate this benefit in the future TYNDPs for all countries deemed relevant, and as a result of ENTSO-E’s re-dispatch studies.</p>	<p>Recital 40.g</p>
<p>Although the Agency, in its Opinion No 11/2019 on the draft TYNDP 2018, had requested ENTSO-E to identify the most important parameters for sensitivity analyses for the mid-term studies and include these sensitivity analyses in the next TYNDPs, no such identification was performed for the TYNDP 2020, and a sensitivity analysis is missing [...]</p>	<p>Recital 41</p>
<p>Despite the inclusion in the 3rd CBA Methodology of specific methodology and formulas<sup>56</sup> to calculate the value of an investment by combining the project’s costs and benefits, i.e. the Net Present Value (NPV) and the Benefit to Cost Ratio (BCR) indicators, such indicators are missing from the TYNDP 2020, making it harder for stakeholders to compare (possibly competing) projects.</p>	<p>Recital 43</p>

<sup>54</sup> Indicator B10 in the TYNDP 2020 corresponds to indicator B9 of TYNDP 2022

<sup>55</sup> Page 104 in the most recent version of the draft 3<sup>rd</sup> CBA methodology, submitted to the Commission in October 2022.

<sup>56</sup>Section 3.2.5 of the most recent version of the draft 3<sup>rd</sup> CBA Methodology