ACER
European Union Agency for the Cooperation of Energy Regulators

PUBLIC

OPINION No 04/2025
OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS

of 26 May 2025

ON ENTSO-E's DRAFT TEN-YEAR NETWORK DEVELOPMENT PLAN 2024 AND ON ENTSO-E's DRAFT INFRASTRUCTURE GAPS REPORT 2024

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 [1] (ACER), and, in particular, Article 4(3)(b) and Article 11(c) thereof,

Having regard to Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity[2], and, in particular, Article 32(2) thereof,

Having regard to Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure, and, in particular, Article 13(3) thereof,

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

Having regard to the favourable opinion of the Board of Regulators of 14 May 2025, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942,

Whereas:

[1] OJ L158, 14.6.2019, p.22.
[2] OJ L 158, 14.6.2019, pp.92 and 94.

EXECUTIVE SUMMARY

A robust Ten-Year Network Development Plan is essential for an affordable energy transition

(1) The EU wide ten-year network development plan (TYNDP) plays a central role in the development of electricity transmission infrastructure in Europe by identifying cross-border infrastructure needs and projects of the highest benefit for the society. The European Commission Action Plan for Affordable Energy[3] and the ACER Electricity Infrastructure Monitoring report[4] highlight the need for significant investments in Europe's electricity infrastructure in the coming years. Given the magnitude of the infrastructure investments required, with grid costs which are expected to become an increasingly important component of electricity costs, a robust and fit for purpose TYNDP is an essential tool to guide efficient grid development.

ACER assessment of ENTSO-E draft Infrastructure Gaps report and draft TYNDP 2024

(2) On 9 April 2025, ENTSO-E submitted the draft TYNDP 2024[5] to ACER for its opinion. The draft TYNDP 2024 also includes the infrastructure gaps identification (IGI) report, along with a description of the adopted methodologies and their implementation. It also contains a description and assessment of 177 electricity transmission projects, corresponding to 347 investment items, and 33 electricity storage projects.

(3) The electricity TYNDP has evolved continuously since its first edition in 2010. ACER welcomes the progress made to date and acknowledges ENTSO-E's commitment to introducing improvements and to enhancing the quality and transparency of each new edition. A notable example is a first effort to analyse in TYNDP 2024 the impact of the internal networks' limits on the optimal target of interconnections. ACER also acknowledges and appreciates ENTSO-E and ENTSOG's ongoing efforts to further align the (already initiated) TYNDP 2026 scenario development with the ACER Scenarios Framework Guidelines[6].

(4) While recognising the complexity and resource-intensive nature of the TYNDP process within its two-year timeframe, some key areas still require improvements, while certain recurring recommendations from previous ACER Opinions remain also unaddressed. This Opinion on ENTSO-E's draft infrastructure gaps report and draft TYNDP 2024, includes actionable targeted recommendations that ACER believes would further enhance the overall value of these deliverables, by improving the transparency, consistency, and relevance of the identified system needs and proposed project solutions,

[3] P.13, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52025DC0079

[4] https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER_2024_Monitoring_Electricity_Infrastructure.pdf

[5] The draft TYNDP 2024 consists of multiple documents and Annexes: https://www.entsoe.eu/outlooks/tyndp/2024/.

[6] https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Framework_Guidelines/Framework%20Guidelines/FG_For_Joint_TYNDP_Scenarios.pdf

thus better supporting investment decisions, policy objectives, and the efficient development of the European electricity grid.

(5) ACER finds that the draft TYNDP 2024 assessments and the projects included in it, generally contribute to the objectives of non-discrimination, and effective competition[7]. However, room for improvement remains and ACER finds that the draft TYNDP 2024 does not sufficiently contribute to the efficient functioning of the electricity market and the sufficient level of cross-border interconnection open to third-party access[8], due to the following aspects:

- Delays in the delivery of the draft TYNDP 2024 were observed, largely caused by delays in the scenario development process. As a result, the selection process for Projects of Common Interest (PCI) and Projects of Mutual Interest (PMI) and the National Regulatory Authorities (NRAs) received the TYNDP information later than in previous cycles. Addressing the roots of these delays would help ensure the TYNDP can be fully and timely used during the PCI/PMI selection process, including sufficient time for NRAs to thoroughly assess project information and related benefits.

- Consultation on key methodological aspects and assumptions could be enhanced in terms of timing and scope. In particular, the infrastructure gaps implementation guidelines were published only in the draft TYNDP package, not allowing stakeholders to provide timely feedback on the proposed assumptions and approaches. Having substantial consultation early enough in the process would allow to consider stakeholders comments duly, before the assessments are performed.

- Transparency and consistency regarding assumptions and project information could be further improved. While recognising efforts and improvements in terms of transparency, it is sometimes unclear how certain assumptions and project information change across different TYNDP steps, e.g., from scenario development to the gaps assessment. Outdated data[9] or inconsistent information[10] may affect the overall robustness of the national and EU-wide assessments, including the PCI/PMI selection process.

- The medium-term focus of the TYNDP should be strengthened. While having scenarios which look at the long-term is important, especially in connection with the carbon neutrality objectives, in ACER's view, priority should be given to study the 10-year or 15-year ahead time horizon, as this is particularly useful to provide the more reliable information to spot infrastructure gaps and assess project benefits through a full CBA.

[7] Referred to in Article 32(2) of Regulation (EU) 2019/943.
[8] Referred to in Article 32(2) of Regulation (EU) 2019/943.
[9] E.g., fuel prices input. See section 2.2.2 of this Opinion.
[10] E.g. on grid assumptions or published project-specific values. See sections 2.2.2 of this Opinion.

- Some relevant CBA indicators envisaged in the 4th CBA Guideline were not assessed in TYNDP 2024 or remained qualitative. ACER finds it important to fully implement the 4th CBA Guideline to capture key indicators, such on balancing, flexibility and redispatch, in order to capture better how projects can contribute to reduce system costs.

- There is scope to further disaggregate the TYNDP 2024 CBA results, ACER considers that publishing CBA results on a country-by-country basis, as opposed to in aggregated form, would facilitate future cost-sharing decisions. This is particularly important when infrastructure projects yield benefits to the relevant Member States differently from the way in which these Member States are expected to contribute to the overall cost according to the traditional "territorial principle".

- There is scope to provide more granular information on infrastructure needs. The infrastructure gaps report identifies needs for 88 GW of cross-border capacities by 2030 and 108 GW by 2040, many of which remain unaddressed by today's planned projects. The TYNDP only publishes ranges of infrastructure needs and only at cross-border level as opposed to precise and locationally detailed information. In ACER's view, more granularity in the IGI results could further help project promoters, and decision-makers, to identify infrastructure needs and prioritise project solutions to address them.

(6) All in all, ACER believes that tackling these elements would further improve the overall value of the TYNDP exercise. ACER remains committed to support ENSTO-E's efforts to address the above listed areas for improvements.

1. INTRODUCTION

(7) Cross-border electricity infrastructure is essential for advancing energy market integration, unlocking related benefits, and achieving the European Union's ambitious decarbonisation goals. The EU wide ten-year network development plan plays a central role in the development of electricity transmission infrastructure in Europe by identifying cross-border infrastructure needs and by assessing projects of the highest benefit for the society.

(8) The European Commission Action Plan for Affordable Energy [11] and the ACER Electricity Infrastructure Monitoring report[12] show that cross-border infrastructure needs are often not matched by concrete projects and highlight the need for significant investments in Europe's electricity infrastructure in the coming years. Given the magnitude of the infrastructure investments required, with grid costs which are expected to become an increasingly important component of electricity costs, a robust and fit for purpose TYNDP is an essential tool to guide efficient grid development.

(9) The TYNDP does not mandate how Member States should develop their electricity networks. However, its methodologies, results and deliverables are often used in the national network and system planning. The TYNDP is also the basis for the selection of European energy infrastructure Projects of Common Interest (PCI) and Projects of Mutual Interest (PMI). Therefore, transparency and robustness of the TYNDP assumptions and results, along with timely delivery, are critical ingredients to ensure quality of national planning and of the PCI/PMI selection process.

(10) On 9 April 2025, ENTSO-E submitted the draft TYNDP 2024[13] to ACER for its opinion. The draft TYNDP 2024 also includes the infrastructure gaps identification (IGI) report, along with a description of the adopted methodologies and their implementation. It also contains a description and assessment of 177 electricity transmission projects, corresponding to 347 investment items, and 33 electricity storage projects.

(11) The present Opinion addresses both the ENTSO-E draft TYNDP 2024 (see sections 2.1, 2.2, 2.3, 2.5, 2.6 and 2.7) and the draft infrastructure gaps report, developed by ENTSO-E within the framework of the TYNDP 2024 (see in particular section 2.4, but also sections 2.1, 2.2, and 2.3).

(12) ACER assessed the draft TYNDP 2024 on the basis of the following main criteria:

[11] P.13, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52025DC0079
[12] https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER_2024_Monitoring_Electricity_Infrastructure.pdf
[13] The draft TYNDP 2024 consists of multiple documents and Annexes: https://www.entsoe.eu/outlooks/tyndp/2024/.

- The objectives set out in Article 4(3)(b) and 11(c) of Regulation (EU) 2019/942 and Article 32(2) of Regulation (EU) 2019/943.

- The essential requirements of the TYNDP, as specified in Article 48(1) of Regulation (EU) 2019/943.

- The requirements of the consultation process when preparing the draft TYNDP, as specified in Article 31(1) of Regulation (EU) 2019/943.

(13) ACER assessed the draft infrastructure gaps report on the basis of the essential requirement of the infrastructure gaps report, as specified in Article 13 of Regulation (EU) 2022/869.

(14) Furthermore, ACER considered its previous Opinions, recommendations and positions on TYNDPs[14], on TYNDP scenarios[15], on the ENTSO-E 4th CBA methodology[16], on electricity TYNDP projects[17], on the consistency across ENTSO-E and ENTSOG CBA methodologies[18] and the input provided by NRAs to a survey conducted from 17 February to 31 March 2025[19].

2. ACER'S ASSESSMENT

2.1. Improvements with respect to the previous TYNDP

(15) ACER acknowledges and welcomes the updates made in this report compared to the previous version, particularly the inclusion of a variant to evaluate the impact of the internal networks' limits on the optimal target of interconnections and the assessment of system needs covering also the 2050-time horizon through a simplified approach as more

[14] I.e., the draft TYNDP 2012, the draft TYNDP 2014, the draft TYNDP 2016, the draft TYNDP 2018, the draft TYNDP 2020 and the draft TYNDP 2022.
[15] Opinion No 05/2024, on the compliance of ENTSO-E and ENTSOG draft TYNDP 2024 Scenarios Report with ACER Scenarios Guidelines, https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER_Opinion_05-2024_ENTSOs_Scenarios_TYNDP_Guidelines.pdf
[16] The ENTSO-E 4th guideline for CBA (version approved by the European Commission on 26 March 2024) is available here: https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/news/2024/entso-e_4th_CBA_Guideline_240409.pdf; ACER's Opinion No 07/2023 on the ENTSO-E draft 4th guideline for CBA published on 18 July 2023 is available here: https://www.acer.europa.eu/sites/default/files/documents/Publications/Opinions/ACER_Opinion_07-2023_on_the_draft_4th_ENTSO-E_Guideline_for_Cost_Benefit_Analysis.pdf
[17] ACER_Opinion_04-2023-Ele_projects_ENTSO-E_draft_TYNDP_2022&NDPs.pdf
[18] https://www.acer.europa.eu/sites/default/files/documents/Position%20Papers/ACER_Consistency%20of%20CBA%20methodologies.pdf
[19] ACER invited NRAs to express their views and provide comments on draft TYNDP 2024 projects and investments located on the territory of the NRAs' Member States. In total, 24 NRAs provided input to the survey conducted from 17 February to 31 March 2025.

subject to uncertainty. ACER also finds that the clarity in the TYNDP finding reports has improved compared to the previous editions.

(16) A summary of all the welcomed changes compared to the previous TYNDP is provided in Annex II.

2.2. Key remarks on the TYNDP package

2.2.1. Delays in TYNDP deliverables publication

(17) Delays are observed in the delivery of the overall TYNDP package. More specifically, the 2024 Scenario Report was delayed by circa eight months compared to ENTSO-E's and ENTSOG's initial proposal[20], while the draft TYNDP 2024 (including the draft infrastructure gaps report, or IGI) was submitted to ACER for its opinion on 9 April 2025, i.e., circa six months later than the targeted date set in ENTSO-E's work programme 2024[21]. As a result of these delays, the scope of the TYNDP was reduced, and the PCI/ PMI selection process and the NRAs received the supporting information later than in previous cycles. ACER calls on ENTSO-E to assess the root causes of continued delays in the TYNDP development process.

2.2.2. Transparency on main assumptions, results and project information

(18) ENTSO-E did not publish the specific "target capacities" for interconnections and storages identified in the infrastructure gaps assessment, sharing only value ranges. In ACER's view this could limit the transparency, replicability and usability of the exercise. ACER asks ENTSO-E to include in the final TYNDP 2024 the actual values of the "target capacities" resulting from the infrastructure gaps identification for all time horizons and recommends for the future TYNDPs to calculate and publish the needs with the maximum level of granularity possible (see also section 2.4.4).

(19) As also requested by other stakeholders during the consultation window[22], it would be beneficial to further enhance the visibility and accessibility of the assumptions used across the various TYNDP 2024 deliverables, ensuring stakeholders understand the basis for the assessment as well as ensuring its replicability. This includes making explicit

[20] According to the timeline presented in July 2022 by ENTSO-E and ENTSOG in the TYNDP 2024 Scenarios Kick-off Workshop (slide 18), the draft scenario report was expected to be published for ACER and Member States' opinions in October 2023. Instead, it was published in May 2024. The final scenario report, after the European Commission approval was published in January 2025, instead of April 2024 as initially planned. https://2024.entsos-tyndp-scenarios.eu/wp-content/uploads/2023/07/2022-07-20-TYNDP-2024-Scenarios-Storyline-Workshop.pdf

[21] P.32, https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/General%20ENTSO-E%20documents/ENTSO-E%20Work%20Programme/ENTSO-E_AWP2024_231106.pdf

[22] https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2024/foropinion/TYNDP2024-consultation-summary-report.pdf

when and how scenario assumptions have been modified during the gaps and projects analysis.

(20) ENTSO-E did not fully consult beforehand the composition of the starting grid (for gaps analysis) and of the reference grids (for the cost benefit analysis)[23]. This weakens the robustness of the related assessments. In the future, ENTSO-E should always consult well in advance, and at least with ACER and NRAs, the composition of the starting grid, and the reference grids used in the TYNDPs.

(21) ACER could not find where the relevant evidence on how the projects met the criteria described in the 4th CBA Guideline under section 2.5 ("Reference Network")[24] were published. If not done already, ENTSO-E should explain in the final TYNDP 2024 how the projects included in the starting grid and in the reference grids, have successfully met the criteria for their inclusion. ACER also recommends ENTSO-E to ensure that from the TYNDP 2026 the required information is collected from the beginning (for more details see sections 2.4.1, 2.5.1 and 2.7.1).

(22) Any discrepancies between the project data published in the project sheets and the information used in the assessment should also be clearly identified and justified: a systematic approach could be introduced to track and disclose changes in project information throughout the TYNDP process (i.e., starting already from the scenarios).

(23) Also, ACER recommends that a project update from project promoters, regarding costs, timelines and, when applicable, project technical features, is carried out by September of the TYNDP year, in order to include fresh information in the TYNDP project fiches made available for public consultation.

(24) ACER agrees with the comments made by other stakeholders as part of the consultation, that having TYNDP information spread across multiple online platforms makes it sometimes difficult to navigate and retrieve relevant data. Further improvements on this point are therefore encouraged.

(25) Finally, ENTSO-E should improve the clarity of the adopted methodologies and guidelines and make them available adjusted to different stakeholder needs and capabilities, while always ensuring that the shared documentation cover all the steps performed in the gaps identification and in the overall TYNDP in a clear and comprehensive manner.

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[23] As part of the public consultation on "TYNDP 2024 Scenarios input datasets & methodologies" run by ENTSO-E and ENTSOG from 4 July 2023 to 8 August 2023, both the hydrogen reference grid and the electricity reference grid were published but "*for information purposes only*" (as indicated in the published file), hence not consulted: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2F2024.entsos-tyndp-scenarios.eu%2Fwp-content%2Fuploads%2F2023%2F07%2F20230704-Electricity_and_Hydrogen_Reference_Grid__Investment_Candidates-02.xlsx&wdOrigin=BROWSELINK

[24] I.e., (a) in the construction phase; (b) having successfully completed the environmental impact assessments; (c) in 'permitting' or 'planned, but not yet permitting'.

2.2.3. Timing and content of the consultations

(26) The consultation for the IGI Implementation Guidelines was carried out after the draft report was completed. In the future TYNDPs, ENTSO-E should publish the IGI Implementation Guidelines well in advance of the IGI report drafting and publication, allowing stakeholders sufficient time to provide feedback and ensuring its consideration by ENTSO-E and its implementation in the draft submitted for ACER's opinion.

(27) Regarding the CBA Implementation Guidelines document, which includes the main assumptions and choices made for the CBA assessment, although many elements were consulted between 11 September and 16 October 2023[25], i.e., well-ahead of the draft TYNDP 2024 publication, the feedback received during the consultation was not published. In view of the publication of the final TYNDP 2024, ENTSO-E should make publicly available the feedback received to the consultation held in 2023 and how this feedback was considered. For TYNDP 2026, ACER recommends that all the elements of the CBA Implementation Guidelines are duly consulted before their actual implementation and the feedback received timely published.

(28) As already mentioned, in the future, ENTSO-E should always consult, at least with ACER and NRAs, the composition of the starting grid, and the reference grids used in the TYNDPs.

2.2.4. Use of scenarios

(29) Even though three scenarios[26] were prepared for TYNDP 2024, the IGI exercise was performed only on one scenario for each time-horizon (i.e., NT+ for 2030 and 2040 time-horizons while DE for 2050 time-horizon). To properly consider future uncertainties and to prioritise key upcoming decisions on infrastructure development, ACER recommends that all scenarios, up to a 15-year horizon, are used in the IGI[27]. For the very long-term horizon until 2050, the results of the infrastructure gaps should be considered as having an indicative value only, as such very long-term perspective is inherently subject to great uncertainty.

(30) Regarding the CBA, and in line also with the principles described in the ACER Scenarios Framework Guidelines[28], ACER recommends that for TYNDP 2026, a full CBA (i.e. including market indicators and network indicators) should be conducted as follows: only

[25] https://www.entsoe.eu/news/2024/03/15/entso-e-publishes-an-updated-version-of-the-cost-benefit-analysis-implementation-guidelines-for-tydnp-2024/
[26] I.e., National Trends+ ('NT+') for 2030 and 2040, Distributed Energy ('DE') and Global Ambition ('GA'), both for 2040 and 2050.
[27] From TYNDP 2026, and in line with the ACER Scenario Framework Guidelines, ENTSO-E and ENTSOG are expected to develop for TYNDP a central scenario based on NECPs and two stress-test variants (pp.10-11 of ACER Scenario Framework Guidelines).
[28] https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Framework_Guidelines/Framework%20Guidelines/FG_For_Joint_TYNDP_Scenarios.pdf

for the central scenario in the short term (e.g., 2030) and for all scenarios in the medium term (e.g., 2035) and long term (e.g., 2040).

(31) As stated in its Opinion "on the compliance of ENTSO-E and ENTSOG draft TYNDP 2024 Scenario Report with ACER Scenarios Guidelines"[29], while acknowledging the temporal misalignment between the TYNDP 2024 scenario development and the NECP publications, ACER remains concerned that some assumptions in the TYNDP 2024 scenarios are outdated (most of the price input are based on 2022 reports, from IEA 2022 World Energy Outlook and 2022 Booze&co), which for example still reflect pre-crisis gas prices), or not fully aligned with the NECPs. This creates an obvious mismatch as the identified needs as well as the CBA results are inevitably affected by outdated input and cannot be fully consistent with the NECP-based scenarios.

(32) In the absence of final NECPs at the time of developing the TYNDP 2024 scenarios, the CO2 and commodities prices should have been at least aligned with the European Commission's recommended harmonized NECP parameters for fuel and CO2 prices[30]. This is also aligned with the feedback provided by TYNDP scenarios Stakeholders Reference Group, included in the Annex 3 of the final TYNDP 2024 Scenarios report[31].

(33) In view of future TYNDPs, ACER expects ENTSO-E (and ENTSOG) to comply with the guidelines and recommendations respectively included in ACER Scenario Framework Guidelines and in the ACER Opinion "on the compliance of ENTSO-E and ENTSOG draft TYNDP 2024 Scenario Report with ACER Scenarios Guidelines". In this regard, with the TYNDP 2026 scenarios development already underway, ACER acknowledges and appreciates ENTSO-E and ENTSOG's commitment and ongoing efforts to align with the ACER Scenarios Guidelines.

2.3. Other remarks on the TYNDP package

(34) *Inclusion of a hydrogen grid and of hydrogen aspects*: ACER welcomes the inclusion of a hydrogen topology and hydrogen market aspects in ENTSO-E TYNDP 2024. ACER understands that the hydrogen grid assumed in the TYNDP 2024 IGI and CBA analyses is the same as the one used in the joint TYNDP 2024 scenarios. In ACER's view, the hydrogen grid considered in the scenarios is overly optimistic[32], as it includes all the hydrogen projects submitted to the ENTSOG TYNDP 2022 and its composition was

[29] Opinion No 05/2024, https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER_Opinion_05-2024_ENTSOs_Scenarios_TYNDP_Guidelines.pdf

[30] https://www.eionet.europa.eu/reportnet/docs/govreg/projections/govregart18_ec_parameters_projections_2021.zip/view

[31] https://2024.entsos-tyndp-scenarios.eu/annex-3/

[32] See ACER Opinion on ENTSOG TYNDP 2022, p.14-15: https://acer.europa.eu/sites/default/files/documents/Publications/Opinions/ACER_Opinion_06-2023_ENTSOG_draft_TYNDP_2022.pdf

never properly consulted[33]. ACER is concerned about the distortions and inconsistencies this choice may cause to the ENTSO-E TYNDP 2024 assessment. Therefore, ACER recommends the use of a more realistic hydrogen grid in the future TYNDPs.

(35) *Choice of climatic years and consistency with ERAA*: The climatic years used in TYNDP 2024 scenarios and TYNDP 2024 market simulations are 1995, 2008 and 2009[34]. Those might differ from the ones considered in ENTSO-E ERAAs. ACER understands that the climatic years in TYNDP 2024 are based on historical data, whereas those in ERAA adopt a more forward-looking approach that takes also climate change into account. The latter approach is, in ACER's view, better suited to identify climatic years which are also representative of the future. Given the TYNDP's long-term perspective, ACER recommends that ENTSO-E further aligns the methods used in TYNDP to the ones used in ERAA which takes also into account climate change. In case of differences in the representative years chosen between TYNDP and ERAA, these should also be clearly justified and consulted.

(36) *70% grid capacity targets*: as in its previous Opinions, ACER recommends that ENTSO-E explores how to consider the impact of the requirement of Article 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.

2.4. Key remarks on the infrastructure gaps identification (IGI)

2.4.1. Construction and use of the starting grid for IGI

(37) Differently from TYNDP 2022[35], in TYNDP 2024 a single grid for the 2030 horizon was used by ENTSO-E for both IGI and CBA. ACER underlines the importance of properly reflecting the different purposes of the starting grid for IGI and the reference grids for CBA. In this respect, the IGI 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. As such, ACER recommends

[33] As part of the public consultation on "TYNDP 2024 Scenarios input datasets & methodologies" run by ENTSO-E and ENTSOG from 4 July 2023 to 8 August 2023, both the hydrogen reference grid and the electricity reference grid were published but "*for information purposes only*" (as indicated in the published file), hence not consulted: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2F2024.entsos-tyndp-scenarios.eu%2Fwp-content%2Fuploads%2F2023%2F07%2F20230704-Electricity_and_Hydrogen_Reference_Grid__Investment_Candidates-02.xlsx&wdOrigin=BROWSELINK

[34] Respectively with the following weights: 0.233; 0.367; 0.4.

[35] The use, for the first time, of a separate and more conservative starting grid in the needs assessment, different from the grids used for the CBA analysis was identified by ACER as a significant improvement in TYNDP 2022.

that the IGI starting grid (for all the assessed time horizons) should be composed only by projects which are in the construction phase.

(38) The information concerning the initial capacities (i.e. the existing grid at the time of performing the IGI) and the additional projects considered on top of it for building the IGI starting grid for year 2030 was not included in the draft IGI report submitted to ACER[36]. Similarly, the cross-zonal capacities for all study years where a zonal model was used were not published. ACER calls ENTSO-E to publish this information in the final 2024 IGI report.

2.4.2. Expansion steps and projects candidates

(39) In TYNDP 2024, the IGI capacity expansion simulations are based on two consecutive steps. The first step considers any real projects, collected from TSOs and from project promoters. The second step considers as candidates the real projects not used by the model in the first step and other conceptual candidates collected from TSOs but only where either there is already an existing exchange capacity or there are projects submitted. As this approach can prevent the identification of capacity needs on borders where no exchange capacity currently exists or where no project has been submitted ACER recommends that all cross-zonal borders (within a realistic distance) are considered in the expansion.

(40) The TYNDP 2024's IGI capacity expansion also considers internal reinforcements and the related costs. Information concerning the internal reinforcements are collected from TSOs, also in those cases when the cross-border project triggering potential internal reinforcements is proposed by third-party project promoters.

(41) In ACER's view, the infrastructure gaps identification should be carried out by running a single optimisation step at all cross-zonal borders where the candidates are based on actual project proposals and unit investment costs defined by ENTSO-E, in consultation with relevant stakeholders. On the border where no projects are submitted, a standard capacity, centrally and transparently defined by ENTSO-E, should instead be considered for the expansion. The starting point of the expansion (the so-called starting grid) would include existing capacities and projects which are under construction (see section 2.4.1).

(42) Until a single step approach is implemented, ACER recommends that:

- all projects which are not included in the starting grid or that have not yet successfully completed the environmental impact assessment [37] are treated like conceptual

[36] https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Feepublicdownloads.blob.core.windows.net%2Fpublic-cdn-container%2Ftyndp-documents%2FTYNDP2024%2Fforopinion%2FStartingGrid2030.xlsx&wdOrigin=BROWSELINK

[37] It must be noted that even among projects with completed environmental impact assessment, some may still face significant delays or may ultimately never be built.

candidates (i.e., as part of the second loop), as the risk of these project not being realised or being significantly delayed remains high.

- for all projects not included in the starting grid, the costs submitted by project promoters could be in theory considered, if the information is not outdated and if confirmed by the concerned NRAs. In the absence of updated and confirmed costs information, the costs for these projects should be centrally computed by ENTSO-E based on unit investment costs defined by ENTSO-E in consultation with relevant stakeholders.

- the corridors resulting from the Offshore Network Development Plans (ONDP)[38] and the onshore conceptual candidates should also be treated equally in the system expansion. This would allow to assess the parallel expansion of both onshore and offshore system without unfairly prioritising one over the other.

- a standard methodology should be created by ENTSO-E to identify all required internal reinforcements [39] and related costs, in a transparent, fair and non-discriminatory way.

(43) Finally, in view of the publication of final TYNDP 2024, ENTSO-E should publish further information on how the estimation of the project costs in the case of conceptual projects was derived, together with the related timestamps when the cost information was collected. The published information should clearly distinguish between the cross-border project and the required internal reinforcements.

2.4.3. Role of storages in the infrastructure gaps identification

(44) ACER has identified some lack of clarity and potential inconsistencies in the way the approach to handling batteries as part of the grid is described[40].

[38] https://www.entsoe.eu/outlooks/offshore-hub/tyndp-ondp/. It is ACER's understanding that in TYNDP 2026 the ONDP will be directly integrated in the infrastructure gaps assessment.

[39] Which would be necessary for the cross-border capacity increases. According to the ENTSO-E Implementation Guidelines, "*The capacity increases listed in this appendix include projects in the TYNDP 2024 portfolio and conceptual increases that do not correspond to existing projects. 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.*".

[40] For the 2030-time horizon ENTSO-E explains in its infrastructure gaps report that "[…] *56 GW of storage capacity would be cost-efficient to reinforce Europe's power system in 2030.*" While 47 GW of this capacity comes from the NT scenario for 2030, the origin of the extra 9 GW of storage capacity increase remains unclear. To model the 2040-time horizon the respective capacities assumed in the scenarios are taken out of the model and considered as potential investments proposed to the expansion tool. The resulting storage capacities needs for 2040 is 227 GW, which is largely aligned with the data from NT scenario for 2040. Finally, for the 2050-time horizon, the IGI Implementation Guidelines (p.21) explain that "[…] *battery generation capacities - are estimated based on optimization process with starting point of 2050 National Trends Scenario as a starting point with investment expansion with target of 2050 Distributed Energy Scenario generating capacities.*" , while in the

(45) In general, according to ACER, for the short-term (e.g., 2030) and medium-term (e.g., 2035) the flexibility options should be defined in the joint TYNDP scenarios and in line with the targets included in the NECPs. For these time horizons, 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 and potentially incompatible with the joint scenarios results which feed into both ENTSO-E and ENTSOG TYNDPs. For the long-term (e.g., 2040) and very long-term (e.g., 2050), as not all NECPs might cover these time horizons and they might not be able to provide a complete and more certain overview of the possible storage capacities evolution, it could be indeed worth to run a sensitivity where storages are also considered in the optimisation performed under the needs identification exercise.

2.4.4. Zonal model and internal constraints

(46) In TYNDP 2024 IGI, ENTSO-E performed simulations based on NTC model for the 2030-time horizon while it performed simulations with cross-zonal model for the 2040-time horizon and 2050-time horizon (although a simplified zonal market model was used for the latter). While acknowledging the challenges of using a more detailed grid model, ACER believes that applying different models between the study horizons does not support consistency and comparability of results and a cross-zonal model should have been used across all study years, and at least for all study years within the medium-term analysis (i.e., 10-year or 15-year ahead time horizon). In line with its previous recommendations. ACER also suggests that ENTSOE assesses and presents pros and cons of transitioning fully nodal, in order to reach a wide stakeholder agreement on the way forward[41].

(47) Additionally, in ACER's understanding, the IGI exercise currently provides grid optimisation only at the borders of countries, while, in ACER's view, optimisation also at the internal boundaries between zones (or interzones) should be performed as input for the TSOs planning tasks and concerned decision makers and competent authorities. The target capacities at the level of internal boundaries between interzones, as results of the infrastructure gaps assessment, should also be published.

(48) ACER supports the introduction in the TYNDP of an analysis variant exploring where reinforcement would be required to enable the identified cross-border needs, based on the cross-zonal model. For TYNDP 2024, such analysis focused on six Members States and on the 2040-time horizon only. In view of TYNDP 2026, ACER recommends

infrastructure gaps report (p.41) it is explained that "*The System Needs study finds that by 2050 investing in an additional […] 540 GW of storage capacity (including 312 GW of battery storage capacity in scenario DE 2050 and 228 GW of storage capacity increase) would maximise the cost-efficiency of Europe's carbon-neutral electricity system.*". This seems to be an inconsistency between the approach described in the Implementation Guidelines and the description provided in the infrastructure gaps report.

[41] As part of its R&D activities, ENTSO-E could begin by developing both zonal and nodal models for the same study years, comparing their results before fully implementing the nodal model in the TYNDP.

ENTSO-E to expand the analysis to all Member States, for all scenarios covering medium-term (e.g., 2035) and long-term (e.g., 2040). When performing this exercise, ENTSO-E should build and align to the extent possible with the latest available National Development Plans. The analysis could be potentially complemented by also including the short term (e.g., 2030), but focusing on the contribution of smart grid investments, as the timeframe would be too short for a transmission project to be fully realized and meet the needs.

2.5. Key remarks on the calculation of costs and benefits (CBA)

2.5.1. Construction and use of the reference grids

(49) As mentioned in section 2.4.1, ACER recommends that the approach to build the CBA reference grids differ from the ones used to build the IGI starting grid. The CBA reference grid should be the expected grid at the study year which would serve as basis for assessing the benefits of projects[42]. Stricter criteria should be applied when selecting projects for the CBA reference grids representing the short- and mid-term horizon, compared to those used for the long-term horizon. In other words, less mature projects should be excluded from the short- and mid-term grids to ensure a more realistic and reliable assessment.

(50) Fictive interconnectors to UK (being a third country in ENTSO-E TYNDP geographical perimeter) were introduced in the reference grid to mimic the possible impact of future interconnectors to the UK. ACER does not agree that introducing fictive projects delivers a more realistic reference grid. ENTSO-E should have instead consulted the concerned project promoters and NRAs. Additionally, in ACER's view, no fictive project should be included in the reference grid for the short-term, as it is likely that these projects would have low maturity.

2.5.2. Transfer Capability calculations for project CBAs

(51) In TYNDP 2024, the ΔNTC values continued to be primarily based on project promoters' submission. ACER recommends that, in the future, the ΔNTC calculations should always be centrally performed by ENTSO-E for all TYNDP projects and based on a transparent and consulted method[43]. Also, ACER recommends that such computation is performed with granularity which goes beyond the yearly granularity (e.g. at least seasonal) and for all submitted projects, including those "under construction", as the NTC values for projects included in the reference grid can affect the CBA of all other projects.

[42] Different study years would use different reference grids.

[43] ACER welcomes and supports ENSTO-E's initiative envisaged in its TYNDP 2026 draft guidelines for projects inclusion: "[…] *ENTSO-E will compute the dNTC increase value that will be used in TYNDP 2026 studies. The computations will be compliant with the 4th ENTSO-E CBA methodology and the latest CBA implementation guidelines* […]".

(52) Until a centralised ΔNTC computation is performed by ENTSO-E, ACER calls for:

- more transparency on how the methodologies to compute the ΔNTC are implemented by project promoters and subsequently checked by ENTSO-E, by publishing the criteria and the minimum requirements used by ENTSO-E to check such compliance, as well as the results of the performed verification.
- a single combination of assumptions, such as scenario, grid model, climatic years, time horizon, etc. should be used by all project promoters when computing the contribution of a project to the NTC between two zones.
- a verification of the collected ΔNTC data to be performed by ENTSO-E on all submitted projects, including those "under construction.
- for ENTSO-E to develop specific criteria for the consistent selection of the critical branches / critical outages and make them available in the Implementation Guidelines. 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.

2.6. Other remarks on the calculation of costs and benefits (CBA)

(53) *Clustering of projects*: Investments that strongly rely on each other may be clustered together to one project. The criteria for the clustering of investments are outlined in the 4th CBA Guideline[44] and the TYNDP CBA Implementation Guidelines. ACER has identified inconsistencies in the application of the clustering rules, especially with regard to criteria related to the allowed differences in maturity levels and the allowed differences in the commissioning dates between investments, as well as missing or insufficient justifications regarding the necessity of clustering. In view of the publication of the final TYNDP 2024, ACER recommends that ENTSO-E properly explains where and why exceptions were made in clustering. For future TYNDPs the clustering of investments should be carried out in line with the 4th CBA Guideline.

(54) *Scrutiny on cost assumptions provided by project promoters*: Since infrastructure investments being more costly than anticipated is the norm rather than the exception, investment costs given by project promoters, and for any maturity status, should be compared related to the projects length and transmission capacities. The outliers,

[44] As stated in the 4th CBA Guideline (p.22), investments can only be clustered together if they are no more than one level of maturity (status) apart. Additionally, their commissioning dates must not differ by more than five years, and investments labelled "under consideration" cannot be clustered with those at a different maturity (status).

especially at the lower end, should be subject to scrutiny, since assuming costs that are too low can distort the outcome of the CBA[45].

(55) *Impact of climate related extreme events on infrastructure resilience*[46]: ACER welcomes that in TYNDP 2024 ENTSO-E introduced the request to project promoters to provide information about adaptation to an investment to cope with possible extreme weather conditions caused by climate change[47]. Yet, it remains unclear (1) for which project the CAPEX information were actually collected, (2) whether the CAPEX information collected from project promoters should be included in the CBA assessment and (3) whether and how changes in climate related extreme weather events and their impact on infrastructure resilience were taken into account when calculating adequacy[48]. ACER recommends ENTSO-E,

- to publish in the final TYNDP 2024 the costs information collected from project promoters for the adaptation of their projects to extreme climate events.
- to clarify that the CAPEX information collected should be included in the Net Present Value (NPV) and the Benefit to Cost Ratio (BCR) computations.
- to further explore, in view of TYNDP 2026, how to comply with the Annex IV (3)(c) requirement.

(56) *Calculation of the value of an investment*: Despite the inclusion in the 4th CBA Guideline of specific methodology and formulas[49] to calculate the NPV and BCR indicators, such indicators are missing from the TYNDP 2024 published information. ACER calls for ENTSO-E to publish the NPV and BCR information as part of the final TYNDP 2024 and to establish this as standard approach for future TYNDPs.

(57) *Beneficiaries vs Cost Bearers*: Annex V (7) of Regulation (EU) 2022/869 requires that the CBA "*shall ensure that the Member States on which the project has a net positive impact, the beneficiaries, the Member States on which the project has a net negative impact, and the cost bearers, which may be Members States other than those on which territory the infrastructure is constructed, are identified*". However, the TYNDP 2024 CBA results were only presented in aggregated form at European level or for the ENTSO-E geographical perimeter. ACER considers that having CBA results on a country-by-country basis, as opposed to in aggregated form, would facilitate future cost-sharing decisions. As such, ACER recommends ENTSO-E to align TYNPDs to these legal provisions.

[45] At pp.110-111 of the CBA Implementation Guidelines, a list of "project standard costs" is published. However, the Guidelines also clarified that these values are mainly outdated, making its actual use limited.
[46] As stipulated in Annex V of Regulation (EU) 2022/869.
[47] P.89 of CBA Implementation Guidelines.
[48] As stipulated in Annex IV (3)(c) of Regulation (EU) 2022/869.
[49] Section 3.2.5 of ENTSO-E 4th CBA Guideline.

(58) *Value of lost load (VOLL)*: It is unclear from the guidelines why for TYNDP 2024 a standard value of 10,000 euro/MWh is used for indicator B6 ("SoS - adequacy to meet demand"), where no specific country data was available, while, at the same time, a value of 3,000 euro/MWh is used for all the other indicators. ACER calls for ENTSO-E to provide more details in the final TYNDP 2024 on the actual use of the 3,000 euro/MWh VOLL, the reasoning behind the choice of using different values between indicators and where these values were derived from. Additionally, also considering the countries values included in p.138 of the CBA Implementation Guidelines, a VOLL value of 3,000 euro/MWh seems unrealistically low.

(59) *Concerning indicator B1 (SEW)*:

- the CBA Implementation Guidelines describe approaches to calculate the SEW for internal projects depending on whether the internal project's main impact is cross-border (i.e. the internal reinforcement facilitates an increase in NTC) or it also brings internal benefits. It remains however unclear how and which of the methods proposed in the Implementation Guidelines[50] were used to calculate the SEW for internal projects. As the choice of the method can have an impact on the outcomes of the calculation, ENTSO-E should provide in the final TYNDP 2024 this information for each of the affected internal project.

- furthermore, ACER understands that project promoters were asked to directly conduct the redispatch simulations for assessing internal projects. Considering the challenges some promoters may face in performing this task and obtaining the necessary network data, as well as considering the need to ensure consistency across projects, ACER believes that ENTSO-E should be centrally computing the redispatch benefit.

- the SEW was calculated as "Total Surplus", thus covering consumer and producer surplus for both electricity and hydrogen sectors as well as benefits related to cross-sectorial rents. However, only one aggregated value was published. For transparency, ACER recommends that in the final CBA results, the components of indicator B1 are presented both per sector and in an aggregated form

(60) *Concerning indicator B2 (Additional societal benefit due to CO2 variation)*: The values of avoidance cost used in TYNDP 2024 are taken from *the "European Commission DG MOVE Handbook on the external costs of transport*" and from the "*EIB Climate Bank Roadmap Progress report*"[51]. Given the high level of uncertainty characterising this quantification, ACER welcomes that the TYNDP 2024 CBA uses a range of values (i.e., low, central and high) instead of a single value. As indicated in its previous Opinions about the cost benefit analysis methodology, ACER recommends prudence in the definition of this value and, in particular, using values at the low-end of the spectrum of

[50] Pp.58-63 of the CBA Implementation Guidelines.
[51] P.66 of the CBA Implementation Guidelines.

estimates. For consistency purposes, similar values should be applied to the ENTSO-E and ENTSOG TYNDPs

(61) *Concerning indicator B5 (Variation of losses)*:

- for the Global ambition scenario, no valuation of losses was performed. For the Distributed Energy scenario, the network model used for the calculation of the losses was built on the National Trends scenario while the monetisation of the losses was based on the marginal cost resulting from the Distributed Energy scenario market simulation outputs. ACER recommends using a consistent set of assumption for the calculation and monetisation of the losses.

- in case of PINT projects, the marginal costs of the case with the project[52] is used to monetise the losses, while for TOOT projects, the marginal costs of the case without the project[53] is used. As this approach could lead to unexpected complexities with some marginal costs, and it requires the introduction of caps for each scenario, ACER recommends using the hourly marginal costs regarding the reference case (which ENTSO-E used to indicate to be an adequate system condition). The hourly marginal costs used for these calculations should then be published.

- ACER also finds that the current presentation of the results for indicator B5 in the project sheets could lead to a misinterpretation of the projects' CBAs. Typically, an increase in losses should correspond to a negative benefit (and vice versa), but in the project fiches, both the variation in quantified network losses (i.e., in GWh/y) and the variation of the monetized network losses benefit (i.e., in million euros/year) are shown with the same sign. ACER calls ENTSO-E to correct this information in view of the publication of the final TYNDP 2024.

(62) *Concerning indicator B6 (SoS - adequacy to meet demand)*: Compared to TYNDP 2022, a security of supply loop to calibrate the scenarios before the CBA assessment has been introduced. Aim of this change is to avoid over-adequacy or very low adequacy in the initial grid without the project and to achieve realistic levels of LOLE[54] in the starting results of market models to be used for the B6 indicator calculations. Also, the methodology for the B6 indicator has been amended to reduce the computational time and to have more reliable EENS[55] estimation. ENTSO-E also explains that the SoS quantification is based on standard methodology similar to one used within ERAA. Nevertheless, the following improvements should be considered:

- the TYNDP CBA Implementation Guidelines allow to choose whether to add balancing reserves to the consumption or to derate from the hydro generation or the thermal generation. ACER recommends setting the latter as the default option, also

[52] Referred as “s’h,i” in the CBA Implementation Guidelines (p.73).
[53] Referred as “sh,i” in the CBA Implementation Guidelines (p.73).
[54] Loss of Load Expectation.
[55] Expected Energy Not Supplied.

used in the ERAA modelling, because the resulting dispatch is closer to reality (as reserves are allocated to specific generation technologies).

- for each country it is assumed that the LOLE should be below or equal the existing adequacy criterion (3 hours as default) and above 2 hours (unless removal of capacities does not allow to reach it)[56]. The CBA Implementation Guidelines do not explain why a low threshold is applied. Also, ACER notices that there are some countries like Sweden or Spain where the LOLE is lower than 2 hours[57].

- to calculate the indicator B6, "*Instead of running several loops with different outage patterns, the installed capacity of the power plants (excluding RES) is multiplied by a capacity factor. The capacity factor is an average of the available capacity over different outage patterns.*" [58]. To ensure a more consistent approach, ACER recommends in the future to use the capacity factors from the ERAA exercise.

(63) *Concerning indicator B7 (SoS – flexibility)*: Regarding the indicator B7.1 - Balancing energy exchange, this indictor remains qualitative as in TYNDP 2022 and it can be delivered by the relevant project promoter. However, it is not clear whether ENTSO-E runs any check on the data collected from project promoters vis-à-vis the methodology described in section 5.7 of ENTSO-E 4th CBA Guideline. Finally, to ensure adequate transparency, ENTSO-E should publish the monetary information collected from project promoters as well as the methodology used by them[59].

(64) *Concerning indicator B8 (SoS – system stability)*:

- ACER welcomes the inclusion of a methodology to assess indicator B8.1. It remains unclear whether and how ENTSO-E checked if the methodology used by the project promoters was in line with the principles described in the 4th CBA Guideline. Also, the CBA Implementation Guidelines (p.80) do not clarify how the input parameter for the rate of change of frequency (RoCof) calculations obtained from the TYNDP 2024 market simulations are made available to project promoters and why project promoters should be allowed to calculate the RoCof only for 2030 National Trend+ scenario if projects' CBA is also performed for the 2040-time horizon. ACER calls for the inclusion of these information in the final TYNDP 2024 package.

- it is also noted that the CBA Implementation Guidelines do not provide further methodology or guidance on how the sub-indicators B8.0 and B8.2 should have been

[56] P.13 of the CBA Implementation Guidelines.
[57] https://acer.europa.eu/electricity/security-of-supply/monitoring-energy-supply
[58] The capacity factor is derived from National Grid ESO Capacity Market Auction Guidelines and ELIA PRODUCT SHEET CAPACITY REMUNERATION MECHANISM documents (p.130 of TYDNP 2024 CBA Implementation Guidelines).
[59] For example, the B7.1 indicator methodology described in the ENTSO-E 4th CBA Guideline foresees the possibility to calculate the balancing bids and offers in four different ways, but no indication is provided in the CBA results regarding which method was used.

calculated by promoters. ACER recommends that ENTSO-E should provide further guidance in the Implementation Guidelines of future TYNDPs on how these indicators should be calculated.

(65) *Concerning indicator B9 (Reserves for re-dispatch power plants)*: According to ENTSO-E 4th CBA Guideline, p.59, "[…] *In principle, this methodology 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. If such a mechanism does not exist for the respective countries, an assumption for the allocation-costs has to be made within the study-specific Implementation Guideline.*". 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. Given the difficulties that project promoters might face in performing redispatch simulations and obtaining the necessary network data[60], in ACER view, ENTSO-E should centrally calculate and monetise this benefit in the future TYNDPs, as a result of ENTSO-E's re-dispatch studies.

(66) *Non-mature indicators*: ENTSO-E has yet to develop a methodology for the so called, in the CBA Implementation Guideline, non-mature indicators. Indicators B7.2 ("Balancing capacity exchange/sharing"), B8.3 ("Black start services") and B8.4 ("Voltage/reactive power services"), like in TYNDP 2022, are not assessed in TYNDP 2024. Already envisaged by the 4th CBA Guideline and by the 3rd CBA Guideline before, ENTSO-E should further develop their concept as part of the TYNDP 2026 CBA Implementation Guidelines.

(67) *Concerning the assessment of hybrid projects:* ENTSO-E should indicate where in the final TYNDP 2024 the "objective information" collected from project promoters to determine the hybrid projects' cases to be applied is published, along with a reasoned explanation by ENTSO-E for accepting the submitted evidence (p.100 of the CBA Implementation Guidelines).

2.7. Remarks on TYNDP 2024 projects and project inclusion guidelines

2.7.1. TYNDP guidance for applicants and project inclusion

(68) ACER acknowledges that the TYNDP 2024 guidance for applicants[61] in general ensures the equal treatment of projects, the transparency of the inclusion process as set out in Annex III.2 (5) of Regulation (EU) 2022/869, and eventually improve the quality and

[60] This is also somehow confirmed by the fact that the B9 indicator was computed by only 7 transmission projects and 11 storage projects.

[61] Link to the guidance of applicants: https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2024/2300828_TYNDP2024_GuidanceforPromoters_final_version.pdf

credibility of the TYNDP, if it is duly and consistently applied by ENTSO-E. However, based on the below remarks, some improvements can still be made for future editions.

(69) In some cases, the TYNDP 2024 guidance for application did not request all the necessary information to evaluate a project's inclusion in TYNDP 2024 or its inclusion in the starting/reference grid. As a result, it was impossible to verify whether a project met all relevant criteria. For instance, promoters were not asked to provide evidence of a successfully completed environmental impact assessment[62], despite this being a criterion for inclusion in the TYNDP 2024 starting/reference grid. For TYNDP 2026, ENTSO-E should ensure that all required information for assessing project inclusion in both the TYNDP and the starting/reference grids is properly collected.

(70) It is unclear how radial, or hybrid projects can provide the information on whether the enabled generation capacity is already included in the TYNDP scenarios, being these either derived from the NECPs or developed top-down by ENTSO-E. ACER recommends that this is further clarified in the final TYNDP 2024 and in future TYNDPs' guidance for applicants. In ACER view ENTSO-E should implement a harmonised standard approach for those cases.

(71) In 2024, ENTSO-E published a provisional list of collected projects, but with limited information[63]. To ensure adequate transparency on key project details used in the TYNDP assessment, ACER recommends that the provisional project list for TYNDP 2026 includes all relevant project information[64] and that this information is pre-consulted, at least with ACER and the relevant NRAs[65], before the IGI and CBA development. Additionally, the future TYNDPs' guidance for applicants should clearly specify the minimum information to be published in this list[66] and define a deadline for its publication (e.g., three months after the check and validation phase closes).

(72) ACER is also of the view that all commissioned (or closed to be commissioned) investments should enter the subsequent EU TYNDP for monitoring purposes, by providing all relevant information such as final commissioning date, final capacity and

[62] I.e., that the project has received the approval of the environmental impact assessment (EIA) by the country competent authority.
[63] https://tyndp.entsoe.eu/resources/tyndp-2024-draft-portfolio
[64] As an example, here the link to ENTSOG TYNDP 2024 draft Annex A: https://www.entsog.eu/sites/default/files/2024-07/TYNDP%202024%20Annex%20A%20-%20List%20of%20projects.xlsx
[65] Before the publication of the draft project list, ENTSO-E should share the (validated) preliminary list of collected projects with NRAs to allow promoters to correct certain information (as an example, see p.9 of ENTSOG TYNDP 2024 final guidelines for project inclusions, https://www.entsog.eu/sites/default/files/2023-10/TYNDP%202024%20Guidelines%20for%20Project%20Inclusion_for%20Publication_0.pdf).
[66] At least the following information should be published with the draft project list: technical information; maturity status; dNTC and affected borders; costs information; inclusion in previous PCI/PMI/TYNDP; commissioning years, project schedules & delays; information on how the project meets the criteria for inclusion in the starting and reference grids.

final incurred costs, (i.e., without a CBA assessment). ENTSO-E should adapt the guidance for applicants accordingly.

2.7.2. Consistency of draft TYNDP 2024 project information

(73) ACER assessed the consistency of project and investment information as provided in the TYNDP 2024 Projects Sheets[67]. Specifically, ACER's assessment focused on the application of TYNDP project inclusion criteria (as outlined in the guidance for applicants), the application of criteria for inclusion in the reference grids, and the clustering of investments (as outlined in the CBA Implementation Guidelines). It also addressed inconsistencies identified when comparing TYNDP 2024 data with TYNDP 2022 data, as well as data provided at project level with corresponding data provided at investment level.

(74) The guidance for applicants (pp.12-15 and pp.18-20) specifies the information that must be provided to meet the criteria for project inclusion in the TYNDP 2024. ACER notes that this requirement is not met by all projects, as some necessary information is missing or insufficient, particularly concerning the technical descriptions, commissioning dates, and initial estimates of transfer capacity increase. ACER emphasizes the importance of consistently applying the guidance for applicants, including the submission of all required data and urges ENTSO-E to amend and complete any insufficient or incomplete information already in the final TYNDP 2024.

(75) Similarly, ACER has identified inconsistencies in the project eligibility for their inclusion in the reference grids, along with a lack of transparency in how ENTSO-E has applied and verified the relevant inclusion criteria. In particular,

- the updated draft CBA Implementation Guidelines (p.48) define maturity criteria for the inclusion of projects in the two reference grids for the 2030 and 2040 horizons.[68] However, the draft TYNDP 2024 includes projects in both time-horizons' grids that are questionable in terms of meeting these maturity criteria – such as projects in the planning and permitting phases included in the 2030 reference grid, and "under consideration" projects included in the 2040 reference grid. ACER emphasizes that being in the permitting or planning phase does not provide sufficient evidence of a project's maturity. As delays or cancellations can still occur during this stage, the inclusion of these projects in the reference grids can significantly distort the

[67] ACER assessed the version of the TYNDP 2024 Project Sheets available on 14 April 2025 under the following link: https://tyndp.entsoe.eu/european-projects.

[68] According to the draft CBA Implementation Guidelines (p.48): "*The reference grid for the 2030 horizon, which corresponds to the mid-term horizon, is based on criteria a) and b) as defined within the 4th CBA Guideline. This means that 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 can be part of the 2030 reference grid. The reference grid for the long-term horizon (2040) on top of that includes projects fulfilling the criteria listed under c) within the 4th CBA Guideline.*".

assessment. Moreover, projects "under consideration" should not be considered in the reference grids.

- the TYNDP CBA Implementation Guidelines (p.48) define project commissioning cut-off dates for the inclusion in both reference grids[69], "*excluding all projects with planned commissioning dates later than these cut-offs*" to ensure that "*only projects with a strong chance of being commissioned at the dates of the respective scenarios are part of the reference grid*". ACER agrees with the inclusion of cut-off dates for project inclusion in the grid. However, ACER notes that some projects were included in both reference grids despite their expected commissioning date exceeding the defined cut-off dates outlined in the TYNDP CBA Implementation Guidelines. ACER considers it important that the cut-off date is consistently applied to all projects.

(76) A comparison of the TYNDP 2024 with the TYNDP 2022 data reveals inconsistencies, particularly concerning the reported progress of investments in relation to their reported commissioning dates. ACER recommends that ENTSO-E, for the purpose of consistency, reviews the information and revises it where necessary in the final TYNDP 2024.

(77) ACER has found inconsistencies in the same projects' sheet, when comparing the draft TYNDP 2024 project-level data with the corresponding data provided at investment level (e.g., discrepancies in the commissioning dates).

(78) ACER is of the view that information regarding the hosting country(ies) should be provided at the investment level, as this is critical for a comprehensive assessment of the projects and allocation of costs and benefits.

(79) The project information was collected by ENTSO-E in the second half of 2023. As the TYNDP is now being finalised in mid-2025, there is a severe risk of having included outdated information, especially due to the recurring increases in the cost of assets. For future TYNDPs, ENTSO-E should implement a project update window (regarding at least the status, the expected commissioning date and the expected costs) in order to provide more accurate information at the time of the TYNDP consultation.

(80) ACER conducted a survey from 17 February to 31 March 2025 to collect NRAs' views and comments regarding TYNDP 2024 projects and investments located within the territory of the NRAs' Member State.

(81) NRAs from 24 Member States[70] provided input, in particular regarding the inclusion and non-inclusion of projects in the TYNDP, views on the inclusion of projects in the reference grids, and inconsistencies identified when comparing the TYNDP 2024 project

[69] I.e. 31. December 2030 for the 2030 reference grid and 31. December 2035 for the 2040 reference grid.
[70] Member States that provided input to the questionnaire: AT, BE, BG, CZ, DE, EE, ES, FI, FR, GR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, RO, SE, SI and SK

and investment information with the latest NDP (or more recent information available to the NRAs).

(82) Annex IV details all inconsistencies identified by ACER, while Annex V provides an overview of the NRAs' review of projects. In view of the publication of final TYNDP 2024, ACER requests ENTSO-E to consider the outcome of this review, as outlined in Annex IV and Annex V, and update, where appropriate, the projects' and the corresponding investments' information,

HAS ADOPTED THIS OPINION:

1. ACER finds that the draft TYNDP 2024 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, ACER also finds that the draft TYNDP 2024 does not sufficiently contribute to the efficient functioning of the electricity market and the sufficient level of cross-border interconnection open to third-party access, due to the aspects described in this Opinion.

3. In view of the publication of the final TYNDP 2024, ACER considers that ENTSO-E should make all relevant TYNDP 2024 inputs and output accessible in a clear and easily understandable format. The information included in Annex III of this Opinion should be clarified and published.

4. For TYNDP 2026, ACER recommends ENTSO-E to implement the following improvements:

    a. Concerning the TYNDP process in general,

        i. the TYNDP planning should be adjusted to ensure the publication of the final TYNDP (i.e., after ACER opinion on the draft TYNDP) by December of the relevant TYNDP year. This would allow for its full and timely use in the PCI/PMI selection process, while also providing NRAs with sufficient time to properly assess both projects' information and the associated benefits.

        ii. a substantial consultation of the important methodological elements and parameters considered for the infrastructure gaps identification and CBA should be conducted early enough in the process, to duly consider stakeholders comments before the assessments are performed.

        iii. the level of transparency and consistency regarding assumptions and project information should be further improved. ENTSO-E should also adopt a systematic approach to track and disclose changes in any assumption or in project information throughout the TYNDP process.

iv. priority should be given to study up to the 15-year ahead time horizon, as this is particularly useful to provide the more reliable information to spot infrastructure gaps and to assess project benefits.

b. Concerning the infrastructure gaps report,

i. there should be proper differentiation between the starting grid used for the identification of infrastructure gaps and the reference grids for CBA analyses. The starting grid should comprise the reasonably expected grid assets and it should not include projects that are not yet in construction phase.

ii. ENTSO-E should adopt a fully zonal modelling approach at least for all time horizons covering the medium-term (i.e., 10-year or 15-year ahead time horizon), optimise the internal zones and publish the infrastructure gaps accordingly (i.e., with locationally detailed information). Also, ENTSO-E should explore, together with stakeholders, the transition to a fully nodal model for future TYNDP infrastructure gap reports. In ACER view, providing more granularity in the infrastructure gap identification results could help decision-makers and project promoters more easily identify priority future infrastructure needs and the corresponding project solutions to address them.

c. Concerning the cost and benefit analyses,

i. the assessment of projects should be based on appropriate reference grids by including only projects that strictly comply with the rules set in the 4th CBA Guideline and respective Implementation Guidelines.

ii. a project update from project promoters, regarding costs, timelines and, when applicable, project technical features, should be carried out by September of the TYNDP year, in order to include the most updated information in the TYNDP project fiches for public consultation.

iii. ENTSO-E should publish the CBA results per country, to better support the PCI/PMI selection process. In ACER view this would also better support cost-sharing decisions by identifying when benefits lie beyond the hosting country principle.

iv. improve the CBA indicators as described in section 2.6 of this Opinion, with particular attention on the indicators still less mature, as this could improve ENTSO-E TYNDP capability to capture the increasing role of projects' contribution to balancing, system flexibility and redispatch costs reduction.

d. Concerning the scenarios,

i. ACER expects ENTSO-E (and ENTSOG) to comply with the guidelines and recommendations respectively included in ACER Scenario

Framework Guidelines[71] and in ACER Opinion "on the compliance of ENTSO-E and ENTSOG draft TYNDP 2024 Scenario Report with ACER Scenarios Guidelines"[72].

This Opinion is addressed to ENTSO-E, the Commission and Member States.

Done at Ljubljana, on 26 May 2025.

- SIGNED -

For the Agency
The Director

C. ZINGLERSEN

71 https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Framework_Guidelines/Framework%20Guidelines/FG_For_Joint_TYNDP_Scenarios.pdf

72 https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER_Opinion_05-2024_ENTSOs_Scenarios_TYNDP_Guidelines.pdf

ANNEX I – Legal background

Concerning the Union-wide network development plan:

- 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, ('Union-wide network development plan'), (hereafter the 'TYNDP'), biennially.
- 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*[73]*; (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* [74]*; and (c) identify investment gaps, in particular with respect to cross-border capacities.*".
- Article 32(2) of Regulation (EU) 2019/943, first subparagraph, 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 for its opinion.
- 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.*".
- Article 32(2) of Regulation (EU) 2019/943, second subparagraph, requires that, within two months of the ENTSO-E's submission, ACER provides 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.
- Pursuant to Article 4(3)(b) of Regulation (EU) 2019/942, ACER may provide an opinion to the ENTSO for Electricity in accordance with the first subparagraph of Article 32(2) of Regulation (EU) 2019/943, and to the ENTSO for Gas in accordance with the first subparagraph of Article 9(2) of Regulation (EC) No 715/2009 on the draft annual work programme, on the draft Union-wide network development plan and other relevant documents referred to in Article 30(1) of Regulation (EU) 2019/943 and Article 8(3) of Regulation (EC) No 715/2009, taking into account the objectives of non-discrimination,

[73] Refers to Regulation (EU) No 347/2013, which was repealed by Regulation (EU) No 2022/869.
[74] OJ L 158, 14.6.2019, pp.168-169 and pp.174-175.

effective competition and the efficient and secure functioning of the internal markets for electricity and natural gas.

- Pursuant to Article 4(5) of Regulation (EU) 2019/942, ACER 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.

Concerning the infrastructure gaps report:

- According to Article 13(1) of Regulation (EU) 2022/869, "*Within six months of approval of the joint scenarios report pursuant to Article 12(6) and every two years thereafter, the ENTSO for Electricity and the ENTSO for Gas shall publish the infrastructure gaps reports developed within the framework of the Union-wide ten-year network development plans.*"
- According to Article 13(1) of Regulation (EU) 2022/869, prior to the submission of its draft infrastructure gaps report to ACER and the European Commission and Members states for their opinion, ENTSO-E shall conduct an extensive consultation process involving all relevant stakeholders.
- Pursuant to Article 13(3) of Regulation (EU) 2022/869, "*Within three months of receipt of the infrastructure gaps report together with the input received in the consultation process and a report on how it was taken into account, the Agency shall submit its opinion to the ENTSO for Electricity […], the Commission and Member States and make it publicly available.*".

ANNEX II – Improvements with respect to the previous TYNDP

Regarding the identification of system needs (or infrastructure gaps), ACER acknowledges in particular the following improvements:

- The inclusion of a variant to evaluate the impact of the limits of internal networks on the optimal target of interconnections.
- Improved clarity and simplification of the TYNDP finding reports.
- Improved online data visualisations.
- The assessment of system needs covering also the 2050 horizon.

Regarding the CBA assessment and the implementation of the 4th CBA methodology, ACER welcomes:

- The publication for consultation of the TYNDP 2024 Implementation Guidelines ahead of the actual draft TYNDP 2024 preparation and publication, complemented by a dedicated stakeholder workshop[75];
- Improved verification of the compliance of dNTC values from project promoters with the criteria and methods described in the ENTSO-E CBA Implementation Guidelines;
- The inclusion of a methodology on how to assess the commissioning years;
- The consideration of additional hydrogen aspects in the market simulations, expanding the power market model with a hydrogen market model;
- The inclusion in an Annex of a detailed methodology for B6 indicator;
- The inclusion in the CBA Implementation Guidelines of a methodology to calculate the indicator B8.1;
- The update of the reliability standards table based on the ACER report;
- The request to project promoters to provide information about the required adaptation to an investment to cope with possible extreme weather conditions caused by climate change, and related CAPEX.
- Inclusion of an example concerning B7.1 (Balancing Energy Exchange) as well as for indicator B9 (Reduction of Necessary Reserve for Re-Dispatch Power Plants).

[75] ENTSO-E ran a consultation on the TYNDP 2024 Implementation Guidelines between 11 September 2023 and 16 October 2023. In addition, ENTSO-E held a dedicated workshop on 9 October 2023. Following the consultation and the dedicated workshop, an updated version of the guidelines was published in March 2024.

Regarding the projects and guidance for applicants, ACER welcomes:

- The publication of a list of projects which are no longer included in the draft EU TYNDP 2024 in comparison to the previous edition, including a valid explanation for their non-inclusion[76].

- Improvements in data completeness, particularly regarding the explanations for delays of investments that are reported as delayed.

[76] Following ACER's recommendation in recital 70, recently commissioned projects should be included in the subsequent EU TYNDP for monitoring purposes, by providing all relevant information (such as commissioning date, final capacity, final incurred costs).

ANNEX III – Information to be published and/or updated in the final TYNDP 2024

Based on the recommendations put forward in this Opinion, the following list includes all the information ACER urges ENTSO-E to correct and publish as part of the final TYNDP 2024:

- The specific value of the "target capacities" as result of the infrastructure gaps identification.
- The transfer capacity of the "current grid", indicating its timestamp as well as the interzonal capacities where a zonal model was adopted.
- The feedback received in the consultation on the draft CBA Implementation Guidelines run between 11 September 2023 and 16 October 2023 as well as the feedback received from the dedicated workshop on 9 October 2023.
- A complete list of the input directly taken from scenarios and a list of those cases where different values were used compared to the scenarios data (together with the justification for such a choice).
- Explanation on how projects met the criteria for their inclusion in the infrastructure gaps identification and CBA grids, and justification when exceptions were made.
- Explanation on how the project costs assumed in the case of conceptual projects were derived, distinguishing the cost information regarding the project and the required internal reinforcements which would be necessary for the cross-border capacity increases.
- The steps performed to check the validity of the dNTC values submitted by project promoters, as well as the information collected from them.
- The Net Present Value and Benefit Cost Ratio information resulting from the projects' CBA assessments.
- Where and why exceptions were made in clustering projects for CBA.
- Why different VOLL values are used for indicator B6 and the other indicators, and the sources used to establish these values.
- The choice of the method to calculate the SEW for internal projects and whether those were calculated by ENTSO-E or by the concerned project promoters.
- The sectorial components of indicator B1, per sector and not only in an aggregated form.
- The hourly marginal costs used for the monetisation of losses under B5.
- The presentation of indicator B5 in the project sheets, concerning the losses and the monetised losses, to avoid misinterpretation of projects' CBAs.
- Proper description of the methodologies applied by project promoters for indicators B7 and B8 and what checks were performed by ENTSO-E to ensure compliance with the CBA Guideline. ENTSO-E should also publish the information collected from project promoters.
- The list of projects for which costs for adaptation to cope with possible extreme weather conditions were collected, the costs values collected from project promoters and how those were considered in the CBA assessment.

- The "objective information" collected from project promoters to determine the hybrid projects' cases to be applied, along with a reasoned explanation by ENTSO-E for accepting the submitted evidence.
- The list of projects enabling generation for which the promoter declared that the generation was either already included in scenarios or not, together with the justification provided by the project promoter.
- The CBA indicators' results per country, as outlined in Annex V (7) of Regulation (EU) 2022/869.
- Updated investment and project information in the TYNDP 2024 Projects Sheets, addressing the inconsistencies identified by ACER (Annex IV) and NRAs (Annex V), specifically regarding investments' commissioning dates, cost data, investments' progress, project's hosting countries, among others.
- Information on missing transfer capacity increases and on missing or insufficient investment descriptions in the TYNDP 2024 Projects Sheets.
- Information on hosting countries at investment item level in the TYNDP 2024 Projects Sheets.
- As the project information published in the respective Project Sheets seem to be more updated than the project information included in the CBA Implementation Guidelines Appendix B.1 "Overview of the projects included in the reference grids for 2030 and 2040 time horizons", align the content of the two documents by updating the project information included in the CBA Implementation Guidelines Appendix B.1 with the most updated data.

ANNEX IV – ACER assessment of TYNDP 2024 projects and investments

This annex provides detailed information on ACER's assessment of the consistency of investment and project data provided by ENTSO-E in the TYNDP 2024 Projects Sheets[77].

A. Inconsistencies identified in the reference grids for CBA

Based on the CBA Implementation Guidelines for TYNDP 2024 (p.48), two different reference grids are defined for the 2030- and 2040-time horizons. The project inclusion in the 2030 reference grid is based on criteria "a)" and "b)", i.e. only projects that are "under construction" or that have successfully completed the environmental impact assessment (EIA) should be included, as defined in the 4th CBA Guideline. The 2040 reference grid includes also projects which met the inclusion criteria "c)"[78]. The Implementation Guidelines specify cut-off dates, with projects commissioned by December 31, 2030, being eligible for the 2030-time horizon, and projects commissioned by December 31, 2035, being eligible for the 2040-time horizon.

2030 reference grid

The following table lists all projects that either have the status "in planning but not permitting" or "in permitting". These projects must meet criteria "b)" of the CBA IG, i.e. having successfully completed the environmental impact assessment (EIA) in order to be eligible for inclusion in the 2030 reference grid. However, ACER and NRAs could not find where the proof of EIA is provided for any of these projects, making it impossible for ACER and NRAs to check the actual compliance with criteria "b)". If criteria "b)" was not met, all these projects should not have been part of the 2030 reference grid.

For the TYNDP 2026, ENTSO-E should ensure that all required information for assessing project inclusion in both the TYNDP and the starting/reference grids, including proof of completion of EIA, is properly collected.

Table 1: ACER's assessment: Projects included in the 2030 reference grid based on criteria b) of the CBA IG, which lack evidence of successful completion of EIA

Project number	Commissioning year	Status
81	2029	In Permitting
120	2029	In Permitting
126	2035	In Planning but not permitting
127	2029	In Permitting
130	2027	In Permitting

[77] Based on the data from the TYNDP 2024 Project Sheets, as assessed on 14 April 2025, available at https://tyndp.entsoe.eu/european-projects.

[78] I.e., projects that are in "permitting" or "planned, but not yet in permitting" status and their timely realisation is most likely

Project number	Commissioning year	Status
132	2027	In Permitting
144	2029	In Permitting
170[79]	2030	In Planning but not permitting
176	2029	In Permitting
210	2029	In Permitting
227	2027	In Permitting
228	2027	In Permitting
235	2028	In Permitting
254	2026	In Permitting
313	2027	In Permitting
323	2026	In Permitting
324	2026	In Permitting
328	2028	In Planning but not permitting
329	2028	In Permitting
340	2030	In Permitting
378	2027	In Planning but not permitting
379	2026	In Planning but not permitting

The following project is included in the 2030 reference grid but appears to not meet the inclusion criteria.

Table 2: ACER's assessment: Projects included in the 2030 reference grid based on criteria b) of the CBA IG, which appear to not meet the cut-off date

Project number	Commissioning year	Status	Included in 2030 reference grid?
126	2035	In Planning but not permitting	Yes

The following table lists projects that appear to meet all the inclusion criteria but were not included in the 2030 reference grid.

[79] The Lithuanian NRA clarified that for project 170 all relevant EIAs were completed. However, due to extreme price increase and unacceptable timeline proposed by the cable producers project 170 investment item 1034 interconnector "Harmony link" technical solution was updated and lead to rescheduling of the project and change of overall project status to In Planning but not permitting. This change was implemented and approved by relevant NRAs in mid-2024. NRAs approved that updated technical solution has no impact to the initial project CBA and CBCA, thus all calculation provided in TYNDP 2024 are valid and shall not be seen as inconsistent.

Table 3: ACER's assessment: List of projects that are not included in the 2030 grid but appear to meet the inclusion criteria

Project number	Commissioning year	Status	Included in 2030 reference grid?
28	2027	Under Construction	No
339	2028	Under Construction	No
1085	2026	Under Construction	No
1086	2026	Under Construction	No

2040 reference grid

The following tables list projects that appear to meet (not meet) the inclusion criteria but are not included (are included) in the 2040 reference grid.
For the TYNDP 2026, ENTSO-E should ensure that all required information for assessing project inclusion in both the TYNDP and the starting/reference grids, including proof of completion of EIA, is properly collected.

Table 4: ACER's assessment: List of projects that are included in the 2040 reference grid but appear to not meet the inclusion criteria

Project number	Commissioning year	Status	Included in 2040 reference grid?
243	2038	Under Consideration	Yes
276[80]	2035-2036	Under Consideration	Yes
377	2032	Under Consideration	Yes

Table 5: ACER's assessment: List of projects that are not included in the 2040 reference grid but appear to meet the inclusion criteria

Project number	Commissioning year	Status	Included in 2040 reference grid?
1085	2026	Under Construction	No
1086	2026	Under Construction	No

[80] The Spanish NRA clarified that this project was initially included in the 2040 reference grid based on the data available at the time of the project's submission.

B. Inconsistencies identified in the clustering of investments

Investments that strongly rely on each other may be clustered together to one project. The criteria for the clustering of investments are outlined in the 4th CBA Guideline (p.22) and the TYNDP CBA Implementation Guidelines (p.52)[81] The following table lists inconsistencies identified by ACER regarding the application of these criteria. ACER recommends that ENTSO-E properly explains where and why exceptions were made in clustering for the TYNDP 2026.

Table 6: ACER's assessment: Projects for which the clustering of investments does not align with the criteria set out in ENTSO-E's TYNDP 2024 CBA Implementation Guidelines, without any accompanying explanation for the exception

Clustering issue	Project number	Project name
Necessity for clustering is not provided	1046	Finnish North-South reinforcement
	1134	GiLA
	1200	Hybrid interconnector Norway-Sørvest F Windfarm-Continent (DK, DE or BE)
Investments' commissioning dates are more than 5 years apart	138	Black Sea Corridor
	170[82]	Baltic States Synchronization with Continental Europe
	227	Transbalkan Corridor
	1094	Estlink 3
	1209[83]	Latvia and Lithuania cross-border strengthening project
	1239	Interconnection Ukraine-Slovak Republic
Investments are more than one maturity stage apart	170[84]	Baltic States Synchronization with Continental Europe
	1104	Bauler - Roost
"Under consideration" investments are	270	FR-ES project -Aragón-Atlantic Pyrenees
	276	FR-ES project -Navarra-Landes
	330	4th 400kV CZ-SK interconnector

[81] As stated in the TYNDP CBA implementation guidelines (p.52), investments can only be clustered together if they are no more than one level of maturity (status) apart. Additionally, their commissioning dates must not differ by more than five years, and investments labelled "under consideration" cannot be clustered with those at a different maturity (status). Furthermore, a justification regarding the necessity of clustering shall be provided.
[82] The Lithuanian NRA clarified that due to extreme price increase and unacceptable timeline proposed by the cable producers project 170 investment item 1034 technical solution was updated and project commissioning date rescheduled. However, it does not affect the CBA results since new technical solution is designed to adhere the same benefits as it was identified in the initial calculations. In addition, this change was approved by Lithuanian, Latvian, Estonian and Polish NRAs in July of 2024 and confirmed by European Commission and CINEA as not effecting initial CBA results. Thus, project shall not be seen as inconsistent.
[83] The Lithuanian NRA clarified that the project is still in early stage of development, thus investment commissioning dates are still indicative. More concrete implementation timeline will be confirmed when project will reach permitting stage. Thus, project shall not be seen as inconsistent.
[84] See footnote 82

Clustering issue	Project number	Project name
clustered with more mature investments		
No justification of necessity of clustering provided	1046	Finnish North-South reinforcement
	1134	GiLA
	1200	Hybrid interconnector Norway-Sørvest F Windfarm-Continent (DK, DE or BE)

C. Inconsistencies identified in the reported commissioning dates

The following tables shows inconsistencies between the commissioning date of the (least mature) investment item and that of its corresponding project (Table 7) and erroneous commissioning dates (Table 8). ACER requests ENTSO-E to update the commissioning date information in the TYNDP 2024 projects sheets, where necessary.

Table 7: ACER's assessment: Inconsistencies between the commissioning date of the (least mature) investment item and the corresponding project

Project number	Commissioning year of (least mature) investment	Commissioning year of corresponding project	Project number	Commissioning year of (least mature) investment	Commissioning year of corresponding project
1	2024	2025	1059	2029	2030
4	2024	2025	1092	2032	2036
33	2025	2026	1097	2032	2036
81	2025	2029	1110	2026	2027
85	2025	2024	1123	2032	2033
120	2030	2029	1124	2030	2031
127	2028	2029	1126	2031	2032
227	2030	2027	1127	2032	2033
247	2028	2030	1157	2030	2032
250	2025	2027	1162	2034	2035
276	2037	2035-2036	1163	2035	2037
285	2025	2030	1164	2035	2037
299	2027	2029	1165	2034	2037
309	2026	2027	1167	2030	2031
338	2028	2029	1182	2030	2031
346	2029	2030	1203	2036	2040
350	2024	2026	1213	2035	2037
1041	2029	2030	1231	2035	2036
1055	2024	2025			

Table 8: ACER's assessment: Investment items with missing, unjustified or erroneous commissioning dates

Investment number	Investment name	Corresponding project number	Commissioning date
1014	Greenconnector	174	02-0296
2024	Upgrade Cantegrit-Marsillon	270	00-0000
1207	Upgrade Cantegrit-Saucats	276	00-0000

D. Inconsistencies identified in the reported progress of investments

The following table lists all transmission investment items and storage projects for which ACER identified inconsistencies in the progress since TYNDP 2022 in relation to their reported commissioning dates. ACER requests ENTSO-E to update the commissioning dates and/or the reported progress in the TYNDP 2024 projects sheets, as appropriate.

Table 9: ACER's assessment: Inconsistency in the reported progress of projects and investments since TYNDP 2022 and the reported commissioning dates

Transmission Investment number	Commissioning date		Reported progress	Transmission Investment number	Commissioning date		Reported progress
	TYNDP 2022	TYNDP 2024			TYNDP 2022	TYNDP 2024	
18	06-2024	06-2024	Delayed	1688	06-2026	06-2026	New
498	06-2024	06-2024	Delayed	1689	06-2027	06-2027	New
499	06-2024	06-2024	Delayed	1697	06-2028	06-2028	New
38	12-2027	12-2028	On time	1780	06-2028	06-2028	New
1503	12-2026	12-2027	On time	1781	06-2030	06-2030	New
635	12-2028	01-2028	On time	1706	12-2029	12-2031	New
650	12-2040	12-2040	Rescheduled	1707	12-2030	10-2030	New
689	12-2030	12-2030	Delayed	1717	06-2024	09-2024	On time
462	11-2025	11-2025	Delayed	645	12-2029	12-2029	Rescheduled
1493	11-2025	11-2025	Delayed	1727	12-2028	12-2029	New
810	03-2027	03-2027	Rescheduled	1736	07-2036	11-2035	New
1783	12-2026	12-2026	Delayed	1740	06-2031	07-2037	New
1784	12-2027	12-2027	Delayed	1741	06-2031	07-2037	New
665	12-2025	12-2027	On time	1752	12-2025	06-2026	New
238	12-2025	12-2025	Delayed	1753	12-2026	06-2026	New
1827	12-2029	12-2029	Rescheduled	1754	12-2025	06-2026	New
616	12-2042	12-2042	Delayed	1755	12-2030	12-2035	On time
1010	12-2025	12-2025	Ahead of time	1758	12-2030	12-2035	New
1011	12-2025	12-2024	On time	1761	12-2030	12-2035	On time
1661	12-2025	12-2027	New	1760	06-2040	06-2035	New
1662	12-2025	12-2027	New	1769	12-2028	12-2028	New

Transmission Investment number	Commissioning date		Reported progress
	TYNDP 2022	TYNDP 2024	
1663	07-2023	05-2023	New
1664	12-2023	12-2027	New
1665	12-2023	12-2025	New
1703	12-2025	12-2025	New
995	12-2026	12-2029	On time
1409	12-2026	12-2029	On time
1107	12-2038	12-2037	On time
1282	12-2030	12-2035	On time
1241	12-2040	06-2038	Rescheduled
1384	03-2025	03-2025	Delayed
1211	09-2030	12-2041	On time
1206	12-2030	12-2037	On time
1383	12-2025	12-2025	Delayed
1628	06-2026	06-2026	Delayed
1472	12-2025	12-2025	Delayed
1483	06-2034	06-2035	On time
1629	12-2026	12-2028	On time
1630	12-2026	12-2028	On time
1498	12-2035	12-2035	New
1499	12-2026	12-2035	New
1521	12-2028	12-2028	New
1795	12-2028	12-2028	New
1544	06-2029	06-2029	Delayed
1642	07-2027	12-2029	New
1646	07-2027	12-2029	New
1652	07-2027	12-2029	New
1653	07-2027	12-2029	New
1622	12-2023	12-2024	New
1623	12-2023	12-2023	New
1555	12-2035	12-2035	New
1559	06-2035	12-2035	On time
1584	12-2027	12-2027	Rescheduled
1677	12-2028	09-2030	New
1770	12-2028	12-2028	New
1771	12-2029	12-2029	New
1774	12-2030	12-2030	New
1775	12-2030	06-2035	New
1785	06-2040	06-2031	New
1762	06-2035	06-2032	New
1765	01-2032	01-2032	New
1778	12-2030	12-2030	New
1766	08-2028	08-2028	New
1772	12-2027	12-2022	New
1773	12-2030	12-2025	New
1782	12-2029	12-2031	New
1793	12-2029	12-2029	New
1794	12-2029	12-2030	New
1796	12-2032	12-2032	New
1797	12-2035	12-2035	New
1798	12-2026	12-2026	New
1805	12-2029	12-2030	New
1810	09-2031	03-2032	On time
1812	11-2029	09-2030	On time
1808	09-2030	03-2031	On time
1809	09-2030	12-2031	On time
1813	12-2030	03-2032	On time
1944	-	12-2037	On time
2017	-	12-2026	On time
Storage projects			
1003	2030	2030	Delayed
1025	09-2028	12-2030	Project on time
1035	2024	2027	Project on time
1050	06-2031	2030	Project on time
1052	04-2028	04-2028	New Project
1054	2027	2030	Project on time

E. Additional inconsistencies identified by ACER

The following table includes transmission and storage projects that have the same TYNDP project number. ACER recommends ENTSO-E to apply unique identification numbers for projects included in future TYNDPs.

Table 10: ACER's assessment: Storage and transmission projects with the same project number

Number	Transmission project name	Storage project name
1041	GREGY Green Energy Interconnector	Purifying-Pumped Hydroelectric Energy Storage "Velilla del Río Carrión" (P-PHES VELILLA)
1046	Finnish North-South reinforcement	Online Grid Controller "PSKW-Rio"
1048	Greece - Africa Power Interconnector (GAP Interconnector)	WSK PULS (PHES)
1050	Tarchon Energy Ltd	SE Integrator
1052	Lienz (AT) - Malta (AT) - Obersielach (AT)	Purifying -Pumped Hydroelectric Energy Storage Buseiro (P-PHES BUSEIRO)
1054	220-kV Westtirol (AT) - Zell/Ziller (AT)	REVERSIBLE HYDROELECTRIC POWER PUMP "AGUAYO II"
1066	Bulgaria - Turkey	Kemijoki PSP
1067	New AC 400 kV interconnection line Greece - Turkey	PSP CONSO II
1068	LaSGo Link	Hydro-pumped electricity storage GIRONÉS & RAÏMATS
1074	Pannonian Corridor	Construction of pumped-storage hydropower plant "Batak", which utilizes the pre-existing dams of the "Batashki hydroelectric cascade" - (PSHPP "Batak")

The following tables list projects with missing or insufficient information in the required documentation, as specified in the guidance for applicants, specifically, in transfer capacity (Table 11) and investment description (Table 12). ACER requests ENTSO-E to complete this information in the TYNDP 2024 projects sheets.

Table 11: ACER's assessment: Missing information regarding the transfer capacity increase as required by the guidance for applicants.

Project number	Project name
335	North Sea Wind Power Hub
378	Transformer Gatica
379	Uprate Gatica lines
1139	380-kV Westtirol (AT) – Zell/Ziller (AT)
1155	380-kV Burgenland North (AT) - Sarasdorf (AT) - Greater Vienna (AT)
1156	380-kV Greater Vienna (AT) - Hessenberg (AT)
1158	380-kV Bisamberg (AT) – Gaweinstal (AT) – Zaya (AT)
1159	220-kV Bisamberg (AT) – Wien Südost (AT)
1192	HansaLink - Phase 1
1193	HansaLink - Phase 2
1214	Hybrid Interconnector Denmark-Germany
1217	Further Development of Offshore Renewables (MOG 3)
1236	Power-to-Gas for Austria (P2G4A)
1239	Interconnection Ukraine-Slovak Republic

Project number	Project name
1240	Interconnection Ukraine-Romania

Table 12: ACER's assessment: Insufficient information regarding the investment description, which is a required documentation according to the guidance for applicants. The third column indicates the only text information provided by the project promoters for the specific investment, which was deemed by ACER being insufficient.

Investment number	Investment name	The project promoter provided the following text
650[85]	BE-LUX-DE Long-Term perspective	"*The technical solution is subject to further studies*"
1763	Beznau - Mettlen	"*Line*"
1847	Transformers Mettlen	"*Transformers*"
1942	Transformer Lachmatt	"*Transformers*"
1768	Bickigen - Chippis	"*Line*"
1913	HG Adriatic Corridor	"*HG Adriatic Corridor*"
1917	HG Central link	"HG Central link"
1918	HG Ionian-Tyrrhenian Corridor:Ionian Link	"*HG Ionian-Tyrrhenian Corridor: Ionian Link*"
1919	HG Ionian-Tyrrhenian Corridor:Rossano-Montecorvino-Latina	"*HG Ionian-Tyrrhenian Corridor:Rossano-Montecorvino-Latina*"
1921	SAPEI 2	"*SAPEI 2*"
2001	Beznau - Laufenburg	"*Line*"
2002	Beznau - Breite	"*Line*"

The following table *shows projects with* discrepancies between the listed hosting countries and *the* project details. ACER requests ENTSO-E to update the information regarding the hosting countries in the TYNDP 2024 projects sheets, as appropriate.

Table 13: ACER's assessment: Discrepancy between projects' information/map visualisation and reported hosting countries

Project number	Project name	Reported hosting countries
1226	North-South Electricity Corridor in Eastern Europe	BG, CZ, GR, HU, MK, PL, RO, SK
124	Ekhyddan-Nybro-Hemsjö	LT, LV, SE
1169	SAPEI 2	(none)

[85] The Luxembourgish NRA clarified that the lack of information provided is due to the fact that the project is still under consideration.

ANNEX V – NRAs' assessment of TYNDP 2024 projects and investments

This annex details NRAs' views on projects and inconsistencies identified when comparing project and investment data provided by ENTSO-E in the TYNDP 2024 Projects Sheets with the national NDPs (or more recent information available to the NRAs). The input is based on a survey conducted by ACER from 17 February to 31 March 2025, with contributions from 24 NRAs. The data review is based on the TYNDP 2024 version that was subject of the public consultation conducted by ENTSO-E from January 31 to March 14, 2025. Any subsequent changes to the project portfolio after this version are not reflected in the responses.
ACER requests ENTSO-E to consider NRAs' input and update the TYNDP 2024 projects sheets and/or use the information for the TYNDP 2026, as appropriate.

Table 14: NRAs' disagreement with any investment inclusion in the TYNDP 2024

Reporting NRA's MS	Investment number	Investment name	NRA comment
Austria	2010[86]	Power-to-Gas for Austria (P2G4A)	Strong opposition by E-Control. There is no derogation according to Art. 54 (2) of the directive. Therefore, APG cannot be a promoter of that project type. Also, the project promoter states the ÖNIP as the Austrian NDP which is incorrect (besides that, the project is not mentioned in the ÖNIP). Projects of this type could potentially only qualify as storage in the TYNDP (ENTSO-E needs to adapt the project inclusion guidelines accordingly).
Bulgaria	2011	400kV OHL, Maritsa East (BG) - Nea Santa (GR)	Missing in NDP
	2013	400kV OHL, Blagoevgrad (BG) - Lagadas (GR)	
	2014	400kV OHL, Tsarevets (BG) - Draganesti Olt (RO)	
	2015	400kV OHL, Svoboda (BG) - Bucuresti Sud (RO)	
	2016	400kV OHL, Tsarevets (BG) - Zlatitsa (BG)	

[86] Investment item 2010 was removed from the TYNDP 2024 project portfolio after the completion of the NRA project review.

Table 15: NRAs' disagreement with including an investment in the TYNDP 2024 in any status other than "under consideration"

Reporting NRA's MS	Investment number	Investment name	NRA comment
Austria	1483	Upgrade Obersielach (AT) - Podlog (SI)	Investments are not approved in the NDP 2023 yet (mentioned as possible future investment). In NDP 2025 those investments could potentially be approved by the NRA.
	1854	380-kV Westtirol (AT) – Zell/Ziller (AT)	
	1855	380-kV St. Peter (AT) - Dürnrohr (AT)	
	1844	380-kV Obersielach (AT) - Hessenberg (AT)	
	1863	380-kV Greater Vienna (AT) - Hessenberg (AT)	
	1869	380-kV Bisamberg (AT) – Gaweinstal (AT) – Zaya (AT)	
Belgium	650	BE-LUX-DE Long-Term perspective	The investment has not yet been approved as part of the NDP
	1107	2nd interconnector between Belgium and Germany	The investment has not yet been approved as part of the NDP
	1561	BE-NL interconnector: upgrade VanEyck-Maasbracht	The investment has not yet been approved as part of the NDP
	1706	Converter Stations & Subsea Cabling	The investment is not part of the NDP
	1759	Connection between Belgium and the Danish Energy Island	The investment has been approved conditionally as part of the NDP but the condition has not yet been met to take the final investment decision.
Hungary	1986	HVDC Arad-Albertirsa	The project (1986/1216) is currently not included in the NDP, and it is not advanced enough to be considered a fully developed project suitable for inclusion as an approved investment. The project is still in the study phase. However, the NRA agrees with its inclusion as an investment "under consideration" because the project has regional strategic importance and potential significance. Regional and national consultations are still ongoing.

Reporting NRA's MS	Investment number	Investment name	NRA comment
Italy	1384	Merchant line "Castasegna (CH) - Mese (IT)"	Investment 1384 (third party project) was deemed "under consideration" by ARERA's opinion 4/2025 on the last scrutinised NDP. Therefore, it should be "under consideration"
	1799	GRITA 2	Investments 1799, 1889, 1913, 1918, 1919 and 1921 (TSO projects) have never received a positive opinion of the NRA for construction purposes. Therefore, they have to be deemed "under consideration"
	1889	HVDC Milano-Montalto	
	1913	HG Adriatic Corridor	
	1918	HG Ionian-Tyrrhenian Corridor:Ionian Link	
	1919	HG Ionian-Tyrrhenian Corridor:Rossano-Montecorvino-Latina	
	1921	SAPEI 2	
Romania	1782	Black Sea HVDC submarine interconnection project	Project 1782 - Georgia - Romania Black Sea (submarine) and projects 1986,1987, 2003, 2008 - HVDC Interconnector Romania-Hungary - are also not approved investments. In NDP these projects are part of NDP's Section II - Investments not included in NDP; will be included on basis of a subsequent decision of parties involved
	1986	HVDC Arad-Albertirsa	
	1987	HVDC Arad-Constanta South	
	2003	HVDC Arad-Bucharest	
	2008	HVDC Bucharest - Constanta South	
Slovenia	616	Salgareda - Divaca	Status in NDP: under consideration, possible commissioning beyond 2040;
	1478	Dekani (SI) - Zaule (IT) interconnection	Status in NDP: under consideration, third party projects, exception granted under conditions: construction to start no later than 28.2.2024, commissioning no later than 31.8.2025
	1482	Redipuglia (IT) - Vrtojba (SI) Interconnection	
	1483	Upgrade Obersielach (AT) - Podlog (SI)	Status in NDP: under consideration
	1029 (storage)	PSPP Kozjak	Status: storage hydropower plants are not subject to NRA approval except for the necessary extension of the transmission network, which is foreseen in the NDP for the connection of the storage

Table 16: NRAs' assessment: Investments with cross-border relevance that are not included in the EU TYNDP 2024

Reporting NRA's country	Investment name	Status	Expected commissioning year	Action recommended by NRA
Italy	Dobbiaco (IT) - Sillian (AT)	Planned project	2038	To be included in the TYNDP, if agreed by AT NRA
Romania	400kV OHL Gutinas - Straseni	Under consideration	2033	Include in TYNDP

Table 17: NRAs' objection to project inclusion in the reference grids

Reporting NRA's MS	Project number	Project name	NRA comment
Italy	127	Central Southern Italy (Foggia-Gissi part)	The investment should not be in the 2030 reference grid because it is not in advanced permitting status.
	150	Italy-Slovenia	The project should not be in the 2030 and 2040 reference grids because it is under consideration.
	174	Greenconnector	The project should not be in the 2030 reference grid because it has no final permits on the Swiss side.
	250	Merchant line Castasegna (CH) - Mese (IT)	The project should not be in the 2030 and 2040 reference grid because this third-party project experienced repeated delays in the last years and it is deemed under consideration.
	323	Dekani (SI) - Zaule (IT) interconnection	These projects should not be in the 2030 reference grid because this third-party project experienced repeated delays in the last years
	324	Redipuglia (IT) - Vrtojba (SI) interconnection	
	375	Lienz (AT) - Veneto region (IT) 220 kV	The project should not be in the 2040 reference grid because its commissioning date is currently expected 2036
	1059 (investment 1727)	Montecorvino-Avellino and Nord-Ben. in Campania (investment)	This investment should not be included in the 2030 reference grid because the currently expected commissioning date is 2032
	1109 (investment 1796)	New 400 kV overhead line between Aliano and Montecorvino (investment)	The project should not be in the 2040 reference because its commissioning date is currently expected 2038.

Reporting NRA's MS	Project number	Project name	NRA comment
	1112	GRITA 2	The project should not be included in the 2040 reference grid because it is deemed under consideration.
	1157	HG North Tyrrhenian Corridor	The project should not be included in the 2030 and 2040 reference grid because it is under consideration and the currently expected commissioning date is 2033-2034 (later than the 2030 threshold set by ENTSO-E for the 2030 reference grid inclusion).
	1167	HG Central link	The project should not be included in the 2030 reference grid because the currently expected commissioning date is 2031.
	1168	HG Ionian-Tyrrhenian Corridor	The project and its two investments 1918 and 1919 should not be included in the 2040 reference grid because they are currently under consideration and the commissioning date is currently expected 2040.
Slovenia	616	Salgareda - Divaca	Objection of project inclusion in 2030 reference grid, as commissioning year is beyond 2030.
	1483	Upgrade Obersielach (AT) - Podlog (SI)	
	1029 (storage)		
	323	Dekani (SI) - Zaule (IT) interconnection	Objection of inclusion in 2030 and 2040 reference grids, as these third-party projects have been repeatedly postponed in the past, last exception granted under conditions: construction to start no later than 28.2.2024, commissioning no later than 31.8.2025. According to NRA's information, construction has not yet started.
	324	Redipuglia (IT) - Vrtojba (SI) interconnection	
The Netherlands	335	North Sea Wind Power Hub	The NRA disagrees that the following projects are included in the 2030 or 2040 reference grid: all projects related to North Sea Wind Power Hub. These projects are still under consideration and the plans are still changing.

Table 18: NRAs' views on projects that should have been part of the reference grid

Reporting NRA's MS	Project number	Project name	NRA comment
Italy	1085	Malta-Italy Cable Link No.2	Project 1085, investment 1751, 2nd cable Italy-Malta got permits and is expected to be commissioned in the coming years. It should have been in the reference grid 2030.

Table 19: Inconsistencies identified by NRAs when comparing the latest NDP (or the more recent information available to the NRAs) with the draft EU TYNDP 2024 investment information

Reporting NRA's MS	Investment number	Inconsistency identified in the investment information	NRA comment
Austria	1555	Expected commissioning date	Different CD in latest NDP, the TSO informed the NRA, that a 5-to-6-year delay would be necessary according to permitting issues on the Italian side. Due to aging issues the current line (to be replaced by investment 1555) may have to be disconnected earlier, which would cause transfer capacity to decrease for some years.
Belgium	General comment: Concerning the differences in the investment costs, CREG is not able to specify them precisely but the CAPEX values indicated in the draft TYNDP 2024 are systematically lower than the latest information available to CREG.		
	1625	Expected commissioning date, different investment costs/or annual operating costs	Expected commissioning date is 2030.
	1791	Expected commissioning date, different investment costs/or annual operating costs	Expected commissioning date is 2033.
	934	Expected commissioning date, different investment costs/or annual operating costs	Expected commissioning date is 2033.
	1008	Expected commissioning date	Expected commissioning date is 2032.
	1518	Expected commissioning date, different investment costs/or annual operating costs	Expected commissioning date is 2028-2029.
	1519	Expected commissioning date	Expected commissioning date is 2030-2032.
	1759	Expected commissioning date, different investment costs/or annual operating costs	
Bulgaria	1520	Expected commissioning date	Start of investments is expected after 2035
	1736		

Reporting NRA's MS	Investment number	Inconsistency identified in the investment information	NRA comment
Finland	1689	Status	TYNDP status = in permitting. Status according to Fingrid website = under construction (started at end of 2024).
	1781	Technical features	In TYNDP Investment name is Nuojuankangas-Vihtavuori (Metsälinja 2), but it is to be built from Nuojuankangas to Petäjävesi. According to Fingrid's website and the NDP the end substation will be Vihtavuori instead of Petäjävesi.
Greece	1988	Expected commissioning date	According to the latest submitted draft NDP (period 2025-2034) the commissioning date of investment 1988 has to be updated to 06.2031.
Italy	1503	Expected commissioning date, status, investment costs and/or annual operating costs	the commissioning date is still to be identified, pursuant to ARERA's opinion 4/2025 on the Italian NDP. The status should be "planned". The CAPEX estimate is 527 million Euro.
	635	Status, investment costs and/or annual operating costs	She status is inconsistently reported ("under construction" at project level and "in permitting" at investment level). The project completed permitting, but it is still to start construction. It should be probably put in status 3 "in permitting". The CAPEX estimate (850 million euro) is outdated and not aligned with current HVDC costs.
	90	Expected commissioning date	The commissioning date is 2026
	1041	Expected commissioning date	The commissioning date is 2026.
	86	Technical features, expected commissioning date	The length of the pending part (Foggia - Gissi) is about 132 km. The commissioning date is 2029 for Foggia - Gissi part (it was 2016 for Gissi - Villanova part).
	616	Technical features, expected commissioning date, investment costs and/or annual operating costs	The project should be limited to short-medium term interventions and exclude the HVDC link. The commissioning date for the medium-term works should be 2030 and their CAPEX should be 110 million Euro.
	1014	Expected commissioning date	The commissioning year "0296" is wrong.

Reporting NRA's MS	Investment number	Inconsistency identified in the investment information	NRA comment
	1384	Expected commissioning date, status	The commissioning date should be 2029 (both at project level, now 2027, and at investment level, now 2025). The status should be "under consideration" according to ARERA's opinion 4/2025.
	1458	Expected commissioning date	The commissioning date should be 2029 also at investment level. The date at project level is already okay.
	1478	Investment costs and/or annual operating costs	The CAPEX is 30 million euro
	1482	Investment costs and/or annual operating costs	The CAPEX is 50 million euro
	1521	Technical features, expected commissioning date, status	The length is about 250 km. Commissioning date at investment level should be 2029 (already okay at project level). The status is under construction (permitting completed in Jan 2024).
	1555	Expected commissioning date	The commissioning date should be 2036.
	645	Expected commissioning date	The commissioning date should be 2028.
	1727	Expected commissioning date	The commissioning date should be 2032.
	1796	Expected commissioning date, investment costs and/or annual operating costs	The commissioning date should be 2038. CAPEX should be 329 million Euro
	1797	Investment costs and/or annual operating costs	CAPEX should be 76 million Euro
	1798	Expected commissioning date, investment costs and/or annual operating costs	The commissioning date should be 2027 also at investment level (date at project level is already ok). CAPEX should be 250 million Euro.
	1799	Expected commissioning date, status, investment costs and/or annual operating costs	The commissioning date should be 2033/2035. The project status should be "under consideration" according to ARERA's opinion 4/2025.The CAPEX should be 2500 million Euro.
	1889	Technical features, expected commissioning date, status, investment costs and/or annual operating costs	The capacity should be 2100 MW. The commissioning date should be 2033-2034. The project status should be "under consideration" according to ARERA's opinion 4/2025 and ARERA's decision 341/2024. The CAPEX should be 3800 million Euro.

Reporting NRA's MS	Investment number	Inconsistency identified in the investment information	NRA comment
	1913	Technical features, expected commissioning date, status, investment costs and/or annual operating costs	The capacity should be 2100 MW. The commissioning date should be 2033-2034. The project status should be "under consideration" according to ARERA's opinion 4/2025 and ARERA's decision 341/2024. The CAPEX should be 3840 million Euro.
	1917	Expected commissioning date	The commissioning date should be 2031.
	1918	Expected commissioning date, status, investment costs and/or annual operating costs	The commissioning date should be 2040. The project status should be "under consideration" according to ARERA's opinion 4/2025 and ARERA's decision 341/2024. The CAPEX should be 2350 million Euro.
	1919	Expected commissioning date, status, investment costs and/or annual operating costs	The commissioning date should be 2040. The project status should be "under consideration" according to ARERA's opinion 4/2025 and ARERA's decision 341/2024. The CAPEX should be 3072 million Euro.
	1921	Technical features, status, investment costs and/or annual operating costs	The length should be around 600 km. The project status should be "under consideration" according to ARERA's opinion 4/2025 and ARERA's decision 341/2024. The CAPEX should be 2162 million Euro.
	1962	Expected commissioning date	The commissioning date should be 2042.
	1945	Clustering with other investments, investment costs and/or annual operating costs	The two investments should be not clustered together, as they are separate projects. The CAPEX is underestimated. It should be 4600 million Euro (according to the value communicated for the Italian NDP 2025) or even higher due to current market conditions.
	1946	Technical features, clustering with other investments, investment costs and/or annual operating costs	The length is about 690 km (according to the value communicated for the Italian NDP 2025). The two investments should be not clustered together, as they are separate projects. The CAPEX is underestimated. It should be 3850 million Euro (according to the value communicated for the Italian NDP

Reporting NRA's MS	Investment number	Inconsistency identified in the investment information	NRA comment
			2025) or even higher due to current market conditions.
	1957	Technical features, other significant difference	The capacity is overestimated, as deep-sea cables bipolar HVDC links do not allow reaching 2000 MW capacity. Consequently, the transfer capacity increase will also be lower (indicatively, about 1000 MW).
Poland	1034	Clustering with other investments	the technology of implementation of cross-border Harmony Link from HVDC submarine cable to HVAC land cables was change
	1661	Investment costs and/or annual operating costs	different investments costs where in TYNDP they are around 10% higher. Both investments are combined in the NDP. Next NDP will update this accordingly.
	1662	Technical features, investment costs and/or annual operating costs	
	1663	Status	commissioned
	1664	Expected commissioning date	partly commissioned in 2025
Spain	General comment: The Spanish NDP2021-2026 was elaborated before the EU TYNDP 2024 and the following differences are regarding this current NDP and the monitoring in MONIP (February 2025)		
	18	Expected commissioning date	The commissioning date included in the TYNDP2024 is June 2024, but in MONIP platform is April 2025. The TSO will try to update the information in the final TYNDP2024 version.
	496	Expected commissioning date, investment costs and/or annual operating costs, technical features	The commissioning date included in the TYNDP2024 is June 2024, but in MONIP platform is April 2025. In the TYNDP2024, the CAPEX value included is 50,6 M€ and the OPEX value included is 0,16 M€/year. In MONIP platform, the CAPEX value is 80,047 M€ and the OPEX value included is 0,092 M€/y. The length value included in the TYNDP2024 is 133km and in the MONIP platform is 94,71 km. The TSO will try to update the information in the final TYNDP2024 version.
	1211	Expected commissioning date, investment costs and/or annual operating costs	The commissioning date included in the TYNDP 2024 and in MONIP is Dec 2041, but this date has changed significantly regarding the information reported in the

Reporting NRA's MS	Investment number	Inconsistency identified in the investment information	NRA comment
			TYNDP2022 (September 2030). Also, The CAPEX value included in the TYNDP20024 and in MONIP platform is 2.300 M€, but this CAPEX has changed significantly regarding the information reported in the TYNDP2022 (1.149 M€). The TSO has confirmed this final CAPEX value this final commissioning date.
	1212	Expected commissioning date, investment costs and/or annual operating costs	The commissioning date included in the TYNDP24 is September 2030, but in MONIP platform is December 2035. Investments 1214 and 1215: The CAPEX values included in the TYNDP2024 for both investments are different from the values included in MONIP due to a mistake (the values are exchanged). The TSO will try to update the information in the final TYNDP2024 version.
	1214	Expected commissioning date, investment costs and/or annual operating costs	
	1215	investment costs and/or annual operating costs	The CAPEX value included in the TYNDP2024 is different from the values included in MONIP due to a mistake (the values are exchanged). The TSO will try to update the information in the final TYNDP2024 version.
	1206	Expected commissioning date, investment costs and/or annual operating costs	The commissioning date included in the TYNDP24 is December 2037, but in MONIP platform is December 2036. It can be a mistake. Nevertheless, this date has changed significantly regarding the information reported in the TYNDP2022 (December 2030). The TSO has confirmed the commissioning date (2037). The CAPEX value included in the TYNDP20024 and in MONIP platform is 2.300 M€, but this CAPEX has changed significantly regarding the information reported in the TYNDP2022 (1.245M€). The TSO has confirmed this final CAPEX value.
	1210	Expected commissioning date	The commissioning date included in the TYNDP2024 is December 2030,

Reporting NRA's MS	Investment number	Inconsistency identified in the investment information	NRA comment
			but in MONIP platform is December 2035. The TSO will try to update the information in the final TYNDP2024 version.
Sweden	1783	Expected commissioning date, reason for the progress of investment	Expected commissioning date according to the NDP is 2027-2028. Reason for the delay according to the NDP is the ongoing appeal process of the related investment Ekhyddan-Nybro.
	1784	Reason for the progress of investment	Different reason for the progress of the investment. Information in the draft TYNDP states that permit is denied, and appeal process is ongoing. However, permit was granted by the Swedish Energy Markets Inspectorate in October 2024. The granted permit has been appealed, and the appeal process is ongoing.
	403	Other significant difference	Transfer capacity increase is 800 MW according to the NDP.
	995	Expected commissioning date, status, progress of the investment	The project has been cancelled since permit has been denied.
	1241	Expected commissioning date	Expected commissioning date according to the NDP is 2040.
	1675	Status, other significant difference	Transfer capacity increase for the project NordSyd is in total 2700 MW between SE2 and SE3 according to the NDP. Total route length for the project NordSyd is in total 2000 km according to the NDP. Status of the majority of the project is in preparatory phase, while a smaller part of the project is under consideration according to the NDP.
	1764	Status, other significant difference	Transfer capacity increase for the project NordSyd is in total 2700 MW between SE2 and SE3 according to the NDP. Total route length for the project NordSyd is in total 2000 km accordning to the NDP. Status of the majority of the project is in preparatory phase, while a smaller part of the project is under consideration according to the NDP.

Reporting NRA's MS	Investment number	Inconsistency identified in the investment information	NRA comment
	1765	Expected commissioning date, status	Status in the NDP is under consideration. Expected commissioning date according to the NDP is 2036.

Table 20: General NRAs' comments concerning TYNDP 2024 projects

Reporting NRA's MS	Project(/investment) number	Project (/investment) name	NRA comment
Belgium	1759 (investment)	DC-part of Princess Elisabeth Island (investment)	Regarding investment 1791, the final investment decision has still not been taken. The realisation of investment 1791 is necessary for investment 934. CREG notes that this investment is only included in the reference grid 2040 but is assessed under the TOOT approach. Considering the current uncertainties around this project, we would recommend to use the PINT approach. Furthermore, CREG notes a huge increase in results for SEW compared to TYNDP 2022. For CREG, it is not clear how these increases can be explained and if this is due to the change of approach (PINT in TYNDP 2022, and TOOT in draft TYNDP 2024). More generally, regarding the estimated benefits, CREG is not able to assess them since CBAs have not been performed by the Belgian TSO for all projects of the draft TYNDP 2024 or the CBAs which has been performed as part of the last NDP are now outdated (NDP was published in 2023).
Germany	1991	Xlinks DC	This project does not fall under the usual definition of interconnector and/or regulated asset, since it's a privately financed grid-connection of extraterritorial renewable generation and storage, no connection to the non-MS grid is planned. It will be, as of today, included in the upcoming German NDP, however not as a project in the usual sense (no evaluation via CBA because the costs will not be incurred on anyone but the project promoter), but as an input parameter for the market model in one of the scenarios since there is already an existing agreement with TenneT on a grid connection. The NRA does NOT oppose the project, but wants to raise the point that it does not seem to fit in any of the usual definitions.

Reporting NRA's MS	Project(/investment) number	Project (/investment) name	NRA comment
			There also appear to be at least two other items of a similar character (unidirectional energy flows and no grid connection in one country), 1230 - TuNur Malta and 1048 GAP interconnector.
Ireland	1935	South Coast Offshore Transmission Project	The investment of the '1935' project will provide access to new offshore wind, which will support security of supply. Separately, this will bring offshore wind that can be exported to the EU through the interconnectors, thereby, contributing to market integration.