ACER
European Union Agency for the Cooperation of Energy Regulators

ACER'S REPLY

TO ERAA 2024 CALL-FOR-EVIDENCE ON PRELIMINARY INPUT DATA

DISCLAIMER: This document presents ACER's preliminary views on the assumptions and input data to be used for the upcoming ERAA 2024. The document does not constitute a formal opinion of ACER and is without prejudice to ACER's assessment of the ERAA 2024 finally submitted to ACER.

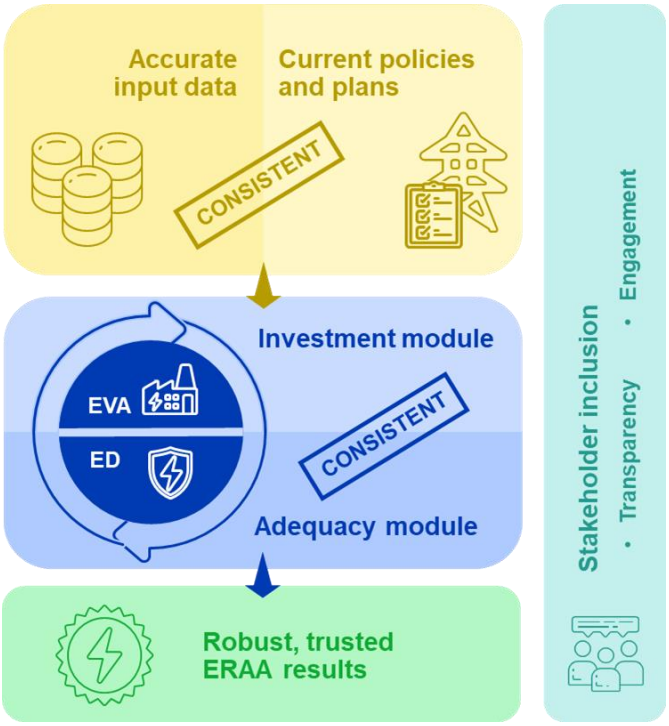
1. INTRODUCTION

1.1. Transparency and stakeholder engagement

Annual European Resource Adequacy Assessment (ERAA) is a demanding, multifaceted project of high importance for the Union's security of electricity supply. ACER appreciates ENTSO-E's efforts to develop the European assessments with increasing transparency and stakeholder involvement. In this context, ACER welcomes the 2024 iteration of the ERAA input data public consultation.

ACER considers *stakeholder inclusion* a critical component of ERAA. Openness and clarity around the essential elements of the assessment (including input data, assumptions, scenario development and the underlying methodology) promotes accountability on the one hand and trust on the other. Further, transparency strengthens stakeholder engagement, as it allows the interested parties to share informed, valuable insights. The resulting mutual understanding and cooperation of ENTSO-E and stakeholders have great potential to drive the necessary improvements and ensure a successful, broadly recognised ERAA.

Figure 1. *The key to robust results: transparency of the consistent input and consistent ERAA modelling as well as engaging with stakeholders throughout.*



The consulted dataset published this year represents progress compared to previous ERAA consultations. The input data file features an interactive dashboard, enabling stakeholders to visualise trends and facilitating stakeholders' understanding of the data. Moreover, ENTSO-E has included more detailed climate data.

ACER believes the scope of data consulted could be further improved in the future. The stakeholders are unable to review certain crucial data before they are used in the model. This includes the assumptions on implicit demand response, such as electric vehicles and heat pumps, capital and operating cost of resources, capacity expansion constraints in the model, and more detailed information on the cross-zonal capacities, for instance, net capacity constraints used in the economic viability assessment. Furthermore, the 2024 public consultation dataset does not contain data regarding thermal properties of generators, data on must-run capacities, forced outage rates and derated non-RES capacities – which were all included in the final 2023 PEMMDB dataset. ACER also regrets that the full dataset on transfer capacities was not published this year, and only minimum and maximum Net

Transfer Capacity (NTC) values were provided. Consulting on this data would have increased the transparency of ERAA and strengthened the robustness of the input.

ACER has also noted that despite the improvements, the consulted datasets are still often inaccessible to the stakeholders who do not have specific expertise in ERAA. ACER believes that better definition of data categories are necessary. In addition, explanations behind national assumptions (e.g. for demand) in form of "country comments" would be necessary to increase transparency and stakeholder engagement.

1.2. Consistency in the ERAA model

Robust results hinge upon using homogeneous data in both modules of the ERAA model – economic viability assessment (EVA) and economic dispatch (ED). Therefore, consistency has become a focal point for the discussion on ERAA improvement.

In this year's data consultation, according to the priority improvement areas formulated for ERAA 2024, ACER focused on cross-zonal capacities. Accurate data on cross-zonal capacities is particularly crucial for strengthening consistency, both with the external factors, such as development plans and policies, and internally between the two modules.

In this response, ACER also provides additional insights on demand-side response and on electricity demand projections. Analysis of the demand-side response data draws from the ongoing development of these resources and a broad interest in this topic expressed by the stakeholders. Analysis of demand projections aims to highlight the importance of accurate and transparent assumptions of this key input variable.

2. CROSS-ZONAL CAPACITIES

2.1. Consistency with network development plans

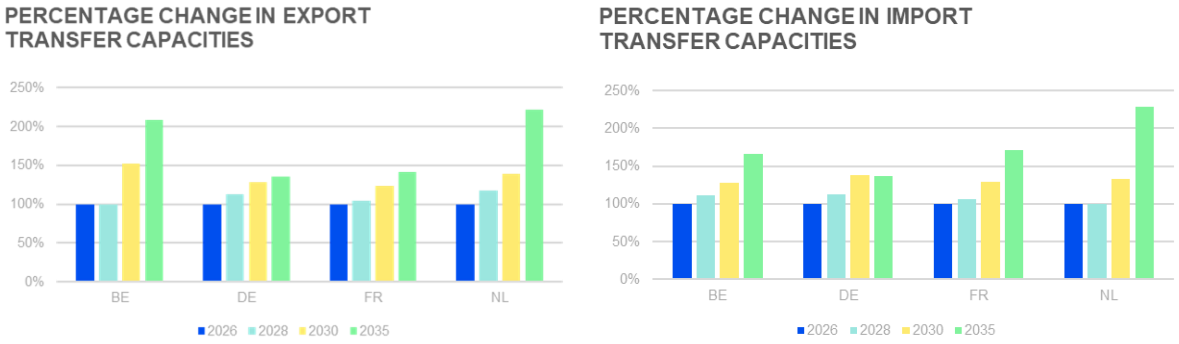
In the process of deriving the cross-zonal capacities for ERAA 2024, it is essential to consider the best estimates regarding the state of the grid reflecting the Ten-Year Network Development Plan (TYNDP) and the most recent national development plans for 2026-2035. In this context, known project delays or rescheduling should be transparently considered.

The previous ERAA, ERAA 2023 applied different capacity calculation methods. The EVA module uses an NTC-based approach to allocate cross-zonal capacities. The ED relied on the flow-based capacity calculation method for the target year 2025. All the assumed network developments from 2025 onwards were considered with a simplified approach expanding the flow-based domains based on the trends identified in Net Transfer Capacities provided by the TSOs for EVA.

Regarding this consultation, ACER notes that while ERAA 2023 Executive Report (Figure 15) indicates that flow-based will also be implemented in the EVA module of ERAA 2024, the inclusion of Net Transfer Capacities in this public consultation could imply the intention to keep on using Net Transfer Capacities.

Similar to ERAA 2023, the relative year-on-year increases shown in Figure 2 indicate that infrastructure developments have a considerable impact on the amount of cross-zonal capacities for the CORE region over 2026-2035. The Net Transfer Capacities provided for ERAA 2024 show an even more significant increase of capacities across the target years, even exceeding 200% increase for some Member States (BE, NL), as shown in Figure 2. Therefore, it is of paramount importance that in ERAA 2024 flow-based domains are derived for each target year, considering the substantial increase of cross-zonal capacities. Nevertheless, ACER lacks information to verify whether the Net Transfer Capacity values provided are correct in absolute terms.

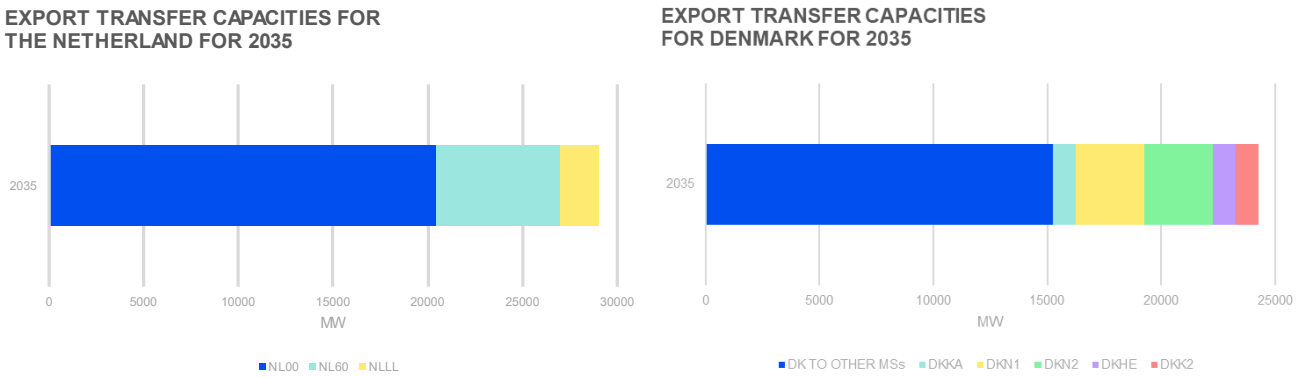
Figure 2. *Changes in export and import capacity (2026=100%) for indicative 4 Member States (MSs) of the CORE region, for each target year in ERAA 2024.*



Note: For each Member State the graph shows the relative difference between the capacity in 2035 and the capacity in 2026.
Source: ENTSO-E preliminary ERAA 2024 PEMMDB Transfer Capacities (ACER calculations).

In addition, in the ERAA 2024 preliminary input data, new market nodes have been introduced for certain Member States, such as the Netherlands (market nodes NL60, NLLL, NLA0) and Denmark (market nodes DKKA, DKN1, DKN2, DKHE, DKK2) without further information in the input data. This creates difficulties and confusion for stakeholders when evaluating the transfer capacities. The additional transfer capacities introduced by these market nodes result in substantial increases to the transfer capacities, if, fore example, these are aggregated, as can be seen in Figure 3, which shows the export transfer capacities for the Netherlands and Denmark for the target year 2035. Furthermore, Net Transfer Capacities are provided for each border and direction twice from both sides of the border, and most of these Net Transfer Capacities differ, creating confusion as to which Net Transfer Capacities will be considered in the ERAA 2024.

Figure 3. *Export transfer capacities for the Netherlands and Denmark for the target year 2035.*



Source: ENTSO-E preliminary ERAA 2024 PEMMDB Transfer Capacities (ACER calculations).

According to the ERAA 2024 preliminary input data the list of CNECs is provided. However, these appear to correspond to the ERAA 2023 target years (2025, 2028, 2030, 2033) and not to the ERAA 2024 ones. Furthermore, no flow-based domains are provided. Therefore, there is no way for stakeholders to evaluate the flow-based data.

Conclusion: It is crucial to consider the network developments in ERAA 2024 by properly identifying flow-based domains for each target year in the ED. Furthermore, for increased transparency, more information should be provided regarding the transfer capacities and the definition of the newly introduced market nodes.

2.2. Consistency between EVA and ED data input

Another important aspect is the alignment of cross-zonal capacities between the two modules of ERAA. For example, if more cross-zonal capacity is applied in EVA than in ED, that could lead to overestimating adequacy risks and underestimating investments in resources.

ERAA 2023 used flow-based market coupling in the ED model and Net Transfer Capacities in the EVA model. However, this approach creates inconsistences between the two modules. To improve the consistency between the cross-zonal capacities of EVA and ED for the same target year, ENTSO-E in ERAA 2023 have identified typical market positions in the flow-based market coupling in the ED module and used this information as additional input data in the EVA module that uses Net Transfer Capacities.

ENTSO-E in its ERAA 2024 call for evidence on preliminary input data has published Net Transfer Capacity data for each border but no net position constraints. Furthermore, the comparison of cross-zonal capacity values is difficult as the ED uses a flow-based approach whereas the EVA applies an NTC-based approach. Where capacities are allocated based on the flow-based approach (CORE region), corresponding Net Transfer Capacity values can only be derived by the TSOs, therefore stakeholders have no way of validating the proposed values.

Conclusion: ACER encourages ENTSO-E to use consistently the cross-zonal capacities in the ED and EVA modules, ideally by applying flow-based market coupling in both modules consistently across all target years in the relevant capacity calculation regions.

2.3. Consistency with the minimum 70% requirement

In the time horizon covered by ERAA 2024, TSOs will need to ensure that at least 70% of the transmission capacity is available for cross-zonal trade. ERAA model must consider this interconnection capacity available to markets for flows induced by commercial exchanges - otherwise, it can miscalculate the adequacy risks, particularly in the later target years.

The past ERAA edition used the adjustment for minimum Remaining Available Margin (minRAM) requirement as a way of reaching compliance with the binding 70% requirement for the borders where capacity is calculated using a flow-based approach. In the EVA, where the NTC approach was used, the capacities submitted by the TSOs are expected to comply with the requirement.

ACER found that, similar to last year, the consulted data does not contain information on TSOs' methods to ensure the submitted Net Transfer Capacity values comply with the 70% requirement. This includes the actual conditions, grid elements, and assumptions considered by the TSOs. Additionally, it is unclear whether system operators coordinate their approaches to calculate Net Transfer Capacities compliant with the 70% requirement.

To enable stakeholders to effectively assess the compliance of flow-based domains with the 70% requirement, it would be helpful to consider relevant data such as the maximum flow for each critical network element and assumed cross-border exchanges outside the CORE region. This would facilitate a more comprehensive evaluation of the domains and allow for better decision-making.

Conclusion: ACER suggests that ENTSO-E shares additional data that would enable stakeholders to review the shares of interconnector capacities made available for cross-zonal trade.

2.4. Consistency with the real-life capacities

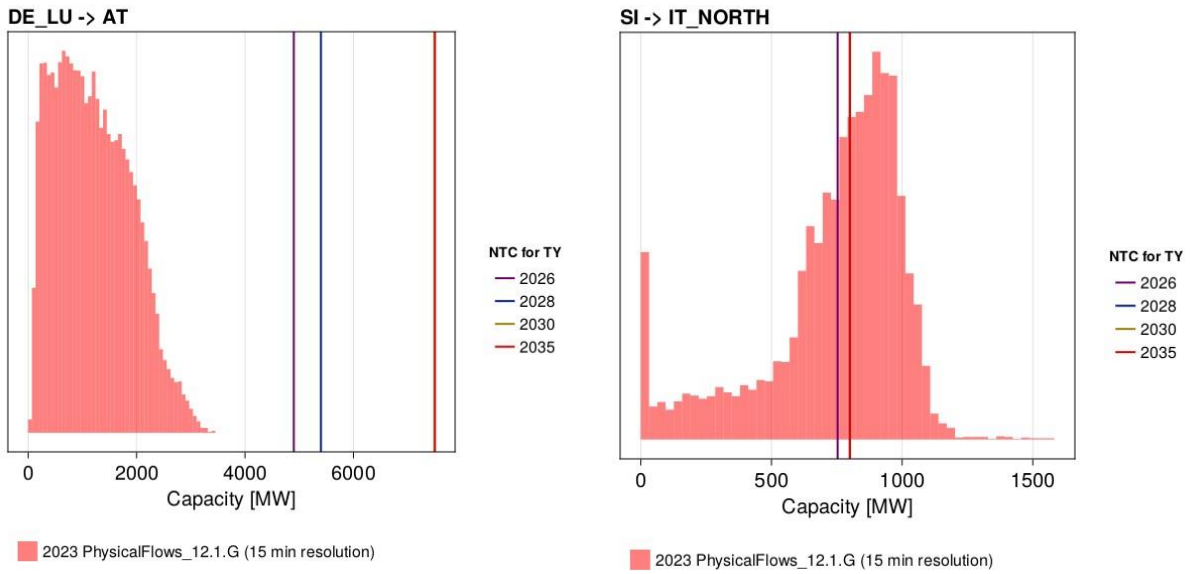
Previously, ERAA editions used an NTC approach for capacity allocation in the EVA module, including the CORE region where the flow-based approach is followed in the actual system operation. Yet, providing Net Transfer Capacities for the ERAA model is intrinsically complex for the TSOs of this region because that they do not calculate these capacities for their operations. Furthermore, reviewing the

consulated data is equally complicated due to the absence of an evident benchmark that could assist with comparison. Relevant information on the method followed to calculate Net Transfer Capacities in the CORE region is not published.

In a bid to evaluate the Net Transfer Capacities submitted by the TSOs, ACER compared the values border per border with the actual physical flows realised in 2023. By comparing the distribution of cross-border flows throughout the year and the consulted Net Transfer Capacities,[1] the analysis showed that the large share of the NTCs seemed to reflect future network development and convergence towards the 70% requirement. However without additional data published in the consultation this cannot be verified.

Nevertheless, outliers were also identified illustrated byFigure 4. In one case (border between Germany and Austria), it shows an increase of the Net Transfer Capacities submitted for ERAA 2024 (vertical lines) compared to the distribution of physical flows (pink area in the Figure). Additional information regarding the network development is essential to understand which factors explain these differences. In another case (Slovene border with the Italy North bidding zone), Net Transfer Capacities for all ERAA 2024 target years are lower than physical flows in 2023.

Figure 4. *Comparison of the consulted NTC values with actual cross-border physical flows in 2023.*



Source: ENTSO-E preliminary ERAA 2024 PEMMDB Transfer capacities and ENTSO-E Transparency Platform (ACER calculations).

Conclusion: It is critical that the CORE region TSOs provide accessible and comprehensible information on the NTC-calculation methods employed. Furthermore, including in the consulted dataset a list of network development projects considered/removed in the assumptions will further strengthen transparency. ENTSO-E should review and consolidate the data set with particular attention to outliers.

[1] Where the consultation dataset contains two NTC values for the same directional border and year (values provided by the two TSOs), the lower of the two values is considered.

3. DEMAND-SIDE RESPONSE

The consultation dataset (PEMMDB National Estimates) contains the TSOs' projections for explicit demand-side response (DSR).

The consultation dataset does not include all relevant assumptions on demand-side response. ACER made the same observation last year, in its response to the public consultation on preliminary ERAA 2023 input data[2]. Such complete data would include assumptions for market-based development of DSR in EVA (DSR potentials, CAPEX, activation prices), as well as assumptions on implicit DSR (such as shares of flexible consumers). ACER regrets that this data is not included this year either.

Conclusion: ACER suggests that ENTSO-E make available (sufficiently ahead of the simulations) the assumptions on market-based development of explicit DSR and assumptions on implicit DSR

3.1. Data availability

ACER's analysis therefore only focuses on exogenous assumptions on explicit DSR. Initially, ACER finds that these assumptions are only available for 17 Member States[3]. The consultation dataset lacks the assumptions for 10 Member States[4]. Given the dataset's structure, ACER cannot determine whether the DSR assumptions were given by TSOs of these 10 MSs as 0 MW or if, the DSR assumptions were not provided. For a similar set of Member States, exogenous assumptions of explicit DSR were already lacking last year.

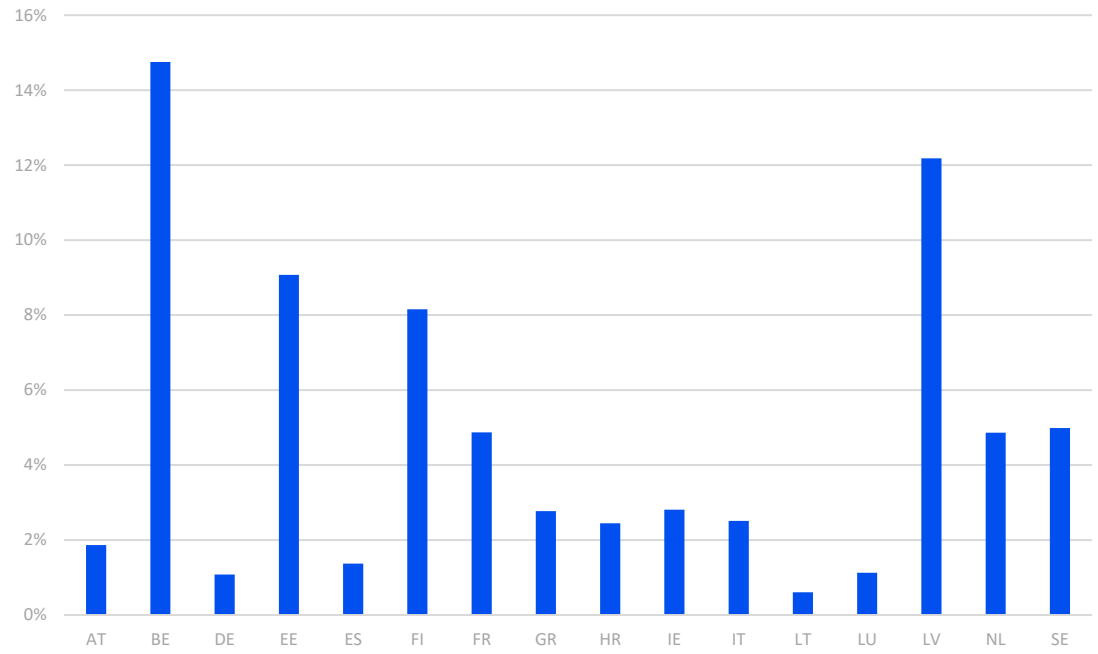
Conclusion: The dataset should include explanations on whether and why specific TSOs assume no DSR development. As a general observation (applicable to other datasets, such as Transfer Capacities, discussed in Section 2), the datasets should allow the user to clearly distinguish data points that have been provided as 0 (zero) from data points for which a value has not yet been provided.

3.2. Level and evolution of demand-side response

The TSOs' estimates of DSR levels differ, based, among others, on national characteristics. For comparability, ACER assessed the level of exogenous explicit demand-side response vis-à-vis the projected average[5] peak demand in the respective Member State[6]. Figure 5 shows the ratio between the exogenous DSR assumption for TY2026 and the corresponding peak hourly demand (both in MW). Values vary between Member States, with several Member States projecting that more than 8% of the domestic peak demand in TY2026 could be covered by DSR, while estimates in other MSs are lower or unavailable (as indicated in Section 3.13.2). Further information on what the estimates by TSOs represent (e.g. current DSR volumes, capacity mechanism contracts) would be beneficial and could provide context to understand the differences.

[2] The document is available here.
[3] These are AT, BE, CZ, DE, EE, ES, FR, GR, HR, IE, LU, LT, LV, IT, NL, and SE.
[4] These are BG, CY, DK, HU, MT, PL, PT, RO, SK, and SI.
[5] Across all climate years.
[6] The analysis was performed at the MS level (i.e. demand and DSR estimates in zones pertaining to the same MSs were summed).

Figure 5: *Percentage of explicit DSR in peak demand according to TSOs' best estimates for target year 2026.*



Source: ENTSO-E preliminary ERAA 2024 PEMMDB National Estimates and Demand Data (ACER calculations).

ACER also looked at the evolution of demand response across the four target years. In most of the 17 MSs that do assume a contribution of explicit demand in their estimates, the trend across the target years shows a gradual increase in explicit DSR levels. Conversely, in some Member States (such as HR, IE and LV), the level of explicit DSR is remains constant across target years. The dataset does not enable one to understand these differences without information on the national context.

Conclusion: Given the variety in the level of explicit DSR estimates across EU MSs, it would be beneficial if the dataset included information on what the different TSOs' DSR estimates represent and what assumptions they are based on.

3.3. Comparison with other ERAA editions

ACER looked at the DSR estimates for target year 2030 and compared them with the assumptions in ERAA 2023. Notable changes include Belgium (the DSR estimate in ERAA 2024 is 1.7 GW higher than in ERAA 2023), Czech Republic (no DSR estimate in ERAA 2023 and 0.245 GW in ERAA 2024), Finland (the DSR estimate in ERAA 2024 is 3 GW lower than in ERAA 2023), France (the estimate in ERAA 2024 is 0.7 GW higher) and Ireland (the estimate in ERAA 2024 is 0.5 GW lower) and the Netherlands (the DSR estimate is 0.9 GW higher).

In ERAA 2023, the Economic Viability Assessment of ERAA 2023 resulted in an additional expansion of DSR on top of the initial TSO's best estimates in 11 MSs[7], including some of the Member States mentioned in the paragraph above. As the input data contextualising the potential for additional DSR expansion were not included in the 2024 consultation dataset, ACER was unable to compare these assumptions with other ERAA editions.

[7] The EVA of ERAA 2023 resulted in additional expansion of DSR capacity in 12 zones: Austria, Croatia, Czechia, Denmark (both zones), Finland, Germany, Hungary, The Netherlands, Portugal, Slovakia and Slovenia.

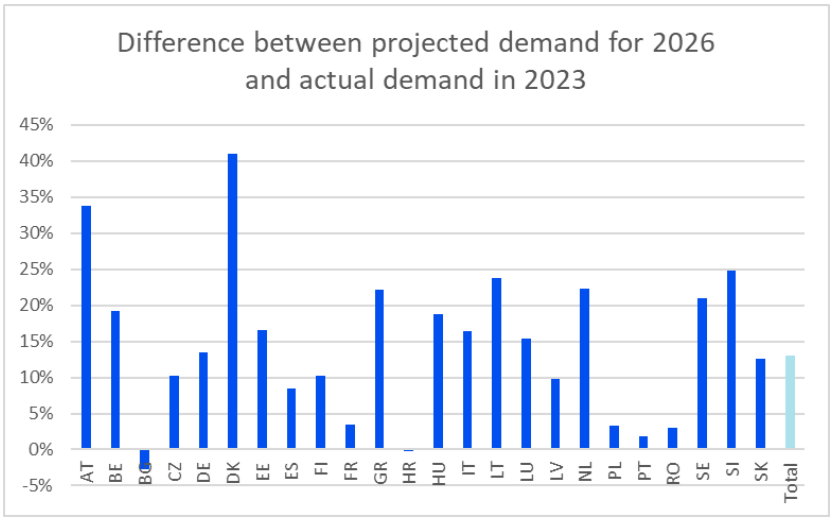
4. DEMAND PROJECTIONS

The consultation dataset contains the TSOs' projections (best estimates) of hourly electricity demand.

4.1. Total demand

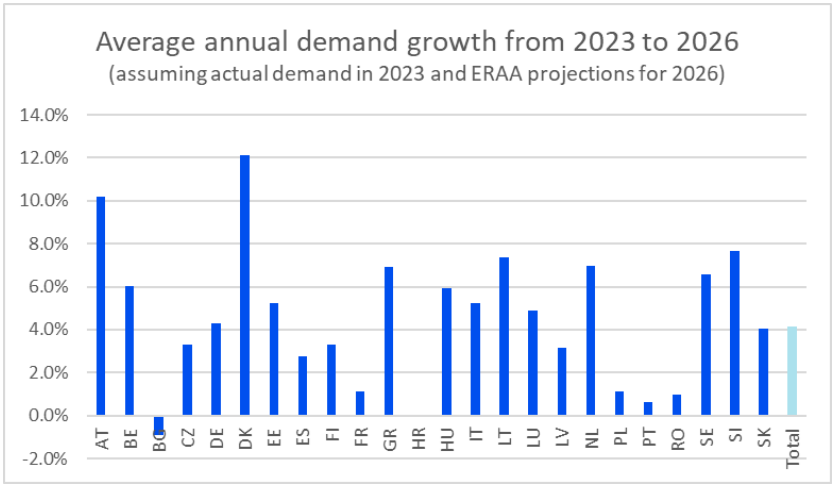
ACER compared the total demand projected by the TSOs for 2026 (the target year closest to the present) and compared it with the actual demand in 2023[8]. Figure 6 shows the comparison per Member State. Figure 7 translates the difference into the implied annual demand growth. To reach the 2026 estimates, demand in some Member States would have to grow at an annual rate of up to 12% every year from 2024 to 2026.

Figure 6. *Difference (in %) between projected total demand for 2026 and actual demand in 2023*



Source: ENTSO-E preliminary ERAA 2024 PEMMDB Demand Data and ENTSO-E TP (ACER calculations).
Note: The figure compares the average (across climate years) projected total demand in 2026 and actual total demand in 2023.

Figure 7. *Implied average annual total demand growth from 2023 to 2026*



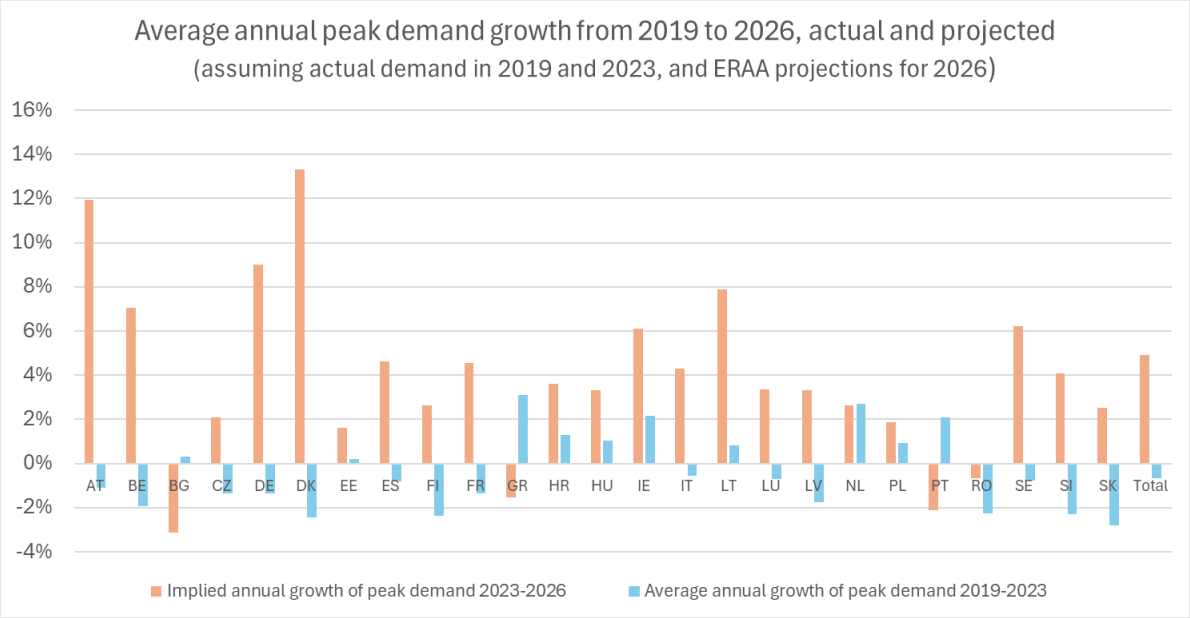
Source: ENTSO-E preliminary ERAA 2024 PEMMDB Demand Data and ENTSO-E TP (ACER calculations).

[8] The analysis was performed at the MS level (i.e. demand estimates in zones pertaining to the same MSs were summed).

4.2. Peak demand

ACER made an analogous comparison for peak demand. Similar trends as those described in Section 4.1 can be observed. Figure 8 shows the implied growth rate which peak demand would have to follow from the actual values in 2023 in order to reach the values projected for 2026.

Figure 8. *Implied peak demand growth from 2023 to 2026 and actual peak demand growth from 2019 to 2023.*



Source: ENTSO-E preliminary ERAA 2024 PEMMDB Demand Data and ENTSO-E TP (ACER calculations).

Note: Figure 8 is based on actual peak demand in 2019 and 2023, and the average (across all climate years) peak demand projection for TY 2026 in ERAA 2024. The "*Average annual growth of peak demand 2019-2023*" is the constant annual growth rate that would correspond to the change from 2019 to 2023 (note: in most MSs, peak demand in 2023 was lower[9] than the demand in 2019). The "*Average assumed annual demand growth from 2023 to 2026*" is the constant annual growth rate which the peak demand should follow if the 2026 projections were to be realized.

ACER received information from the Austrian NRA that while demand values for 2026, 2028 and 2035 seem implausible, the high increase in peak and total demand for 2030 could be a consequence of Austrian decarbonisation plans regarding the heat, mobility, and industrial sector (including plans for the transition of significant industrial users to the electricity sector)[10]. Such contextual information cannot be derived purely from the consultation dataset.

Conclusion: ACER suggest that the datasets provided by the TSOs are accompanied by "country comments" – similar to the final ERAA report – that are concise textual information noting the key impacting factors considered in the demand projection analysis, and which would help understand the most prominent trends.

[9] This can be partly attributed to the differences in electricity prices in the two years considered.
[10] The Austrian National Energy and Climate Plan assumes a significant increase of electricity demand by 2030. Nevertheless, Austrian NRA cannot comprehend the assumed demand values for 2026, 2028 and 2035. The higher growth rates in demand up to 2026 compared to the growth rates from 2026 to 2030 do not appear plausible. More information on the considered user groups and their growth rates is necessary to verify the plausibility of the assumptions behind the demand values.