European Union Agency for the Cooperation of Energy Regulators

ACER`s Reply to ERAA 2023 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 2023. The document does not constitute a formal opinion of ACER and is without prejudice to ACER's assessment of the ERAA 2023 finally submitted to ACER.

1. Introduction

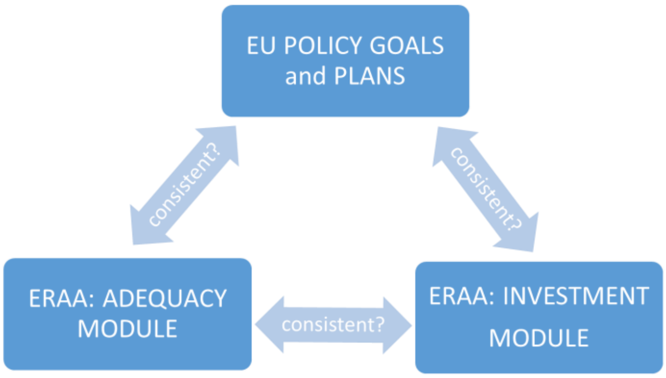
ACER appreciates ENTSO-E`s efforts to consult on the 2023 European Resource Adequacy Assessment (ERAA 2023) input and assumptions. Robust results come from robust input data and stakeholder involvement is key in ensuring it.

ENTSO-E carries out ERAA, the annual pan-European assessment of power system resource adequacy. ERAA is submitted for ACER's decision by 1 November each year. ACER did not approve the first two ERAAs submitted in 2021 and 2022. The ACER decisions[1] provided recommendations to ENTSO-E to improve their subsequent ERAA.

Taking into account the experience gained in the first two years of ERAA, ACER has decided to also reply to the ENTSO-E consultation. The aim is to transparently and concretely reinforce ACER`s key data-related concerns to allow ENTSO-E to address them before their submission of the draft ERAA 2023 to ACER later this year.

In its 2022 decision, ACER considered the lack of data consistency as a major impediment to robust results. To improve the assessment, data input needs to be, on the one hand, (i) consistently applied within the two modules of the ERAA model, and, on the other hand, inputs should be (ii) consistent with relevant EU and national policy targets and plans.

Figure 1 ACER's focus is consistency of input between ERAA modules and consistency with policy goals



[1] DECISION No 02/2022, DECISION No 04/2023

(i) Consistency of input between ERAA modules

The ERAA model, as implemented by ENTSO-E, relies on two modules, the so-called Investment (economic viability or EVA) and Adequacy (economic dispatch or ED) modules. To ensure that the ERAA delivers robust results, consistency between the data used in the two modules is paramount. In the below section, ACER highlights this problem via the asymmetric application of cross-zonal capacities and climate variables in the two modules.

(ii) Consistency with policy goals

To represent a coherent view of the future, the ERAA inputs and assumptions need to be consistent with other ENTSO-E deliverables and broader European policy goals and targets. In this reply, ACER highlights the following:

- ERAA should reflect the best estimates about the future state of the network based on the latest national development plans and ENTSO-E's Ten-Year Network Development Plan (TYNDP).
- The minimum 70% cross-border capacity target should be appropriately and transparently reflected in the net transfer capacity values available for cross-zonal trade.
- Transmission System Operators (TSOs) should strive to provide data that reflects the EU greenhouse gas emissions policy commitment regarding, among others, renewable shares.

The quality and consistency of input (i.e., consistency within the model and with policies) is fundamental to promote trust in and ensure the robustness of the results. In the following, ACER gives concrete examples where data and assumptions should be improved.

2. Cross-zonal capacities

Cross-zonal electricity exchange represents an important adequacy resource. As a way of example, imports from the European neighbours helped relieving stress from the French power system this winter[2]. This is why the quality of data and assumptions regarding cross-zonal capacities and of the underlying interconnectors are crucial.

2.1. Consistency with network development plans

The TYNDP represents the TSOs' vision of the European network for the next 10 years. If the huge investments foreseen in this plan are not considered in ERAA, this will automatically lead to overestimating adequacy risk.

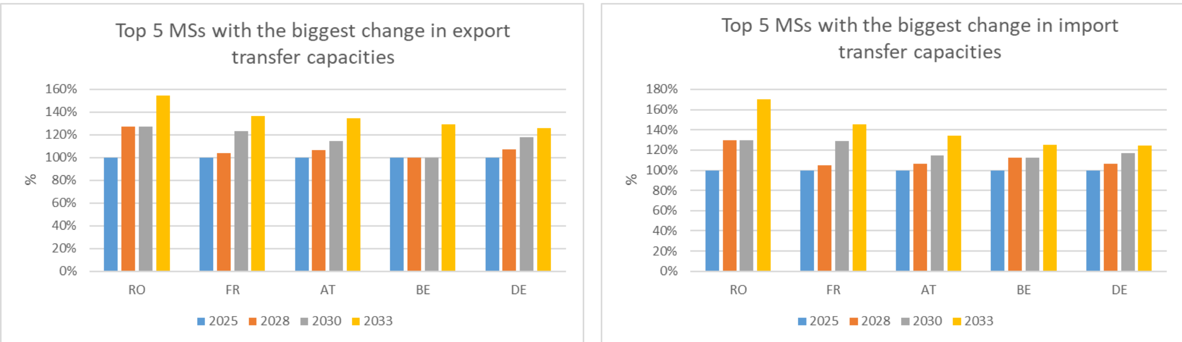
Regarding the Economic Dispatch (ED) module, for the CORE capacity calculation region ('CORE region'), ERAA 2023 is expected to apply the flow-based (FB) capacity calculation. According to the information provided in this consultation, the grid model used for the calculation of the flow-based domains is based on the infrastructure planned for the year 2025

[2] ENTSO-E Wrap Up - 17 March 2023 (mailchi.mp)

from the TYNDP 2020 National Trends scenario. Furthermore, it is ACER`s understanding that the flow-based domains calculated for 2025 would be used across all other target years, i.e. 2028, 2030 and 2033. Therefore, it can be surmised that infrastructure developments within the CORE region over the period 2025-2033 are not be considered in the ED module.

Regarding the Economic Viability Assessment (EVA) module, ERAA 2023 applies a Net Transfer Capacity (NTC) approach. From the consultation it is clear that in the EVA module – contrary to the ED module - there are substantial increases of cross-zonal capacities across the target years. While ACER lacks information to verify whether the NTC values used in the EVA are correct in absolute terms, 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 the period 2025-2033.

Figure 2 Changes in export and import capacity (2025=100%) for the top 5 Member States (MSs) with the biggest change, for each target year in ERAA 2023.



Note: considering borders in the CORE region. Ordered by the relative difference between the capacity in 2033 and the capacity in 2025.

Source: ENTSO-E ERAA 2023 PEMMDB Transfer Capacities (ACER calculations).

Conclusion: The omission of network developments in the ED will likely have a relevant impact on the results by overestimating adequacy risks.

2.2. Consistency between EVA and ED data input

If cross-zonal capacities are not aligned in the two modules of ERAA, the results will be skewed. For example, if more cross-zonal capacity is applied in EVA than in ED, that could lead to overestimating adequacy risks and underestimating investments into resources.

The comparison of cross-zonal capacity values is difficult as the ED uses a FB approach whereas the EVA applies an NTC-based approach. Where capacities are allocated based on the flow-based approach (CORE region), corresponding NTC values can only be derived by the TSOs, therefore stakeholders have no way of validating the proposed values.

It is known from ENTSO-E`s analysis of 2021[3] that there are significant differences between the NTCs used in the EVA and the NTCs derived from the FB domains. For many countries, the TSOs provided substantially higher NTCs for the EVA module than the NTCs derived from FB domains in the ED. For some countries, such as Germany and Belgium, the difference is more than 100%.

Conclusion: ACER encourages ENTSO-E to assess and inform stakeholders whether the NTCs used in the EVA are compatible with the FB domains used in the ED. An extraction of NTC values from the FB domains would allow stakeholders to identify potential inconsistencies. Providing this important comparison would enable stakeholders to provide more meaningful feedback.

2.3. Consistency with the minimum 70% target

The TSOs are required to ensure that at least 70% of the transmission capacity is offered for cross-zonal trade while respecting operational security limits. If this binding target is not effectively considered, the ERAA model can overestimate adequacy risks.

The Electricity Regulation[4] introduced a minimum 70% target for capacity available for cross-zonal trade. ERAA 2023 applies an NTC-based approach for the EVA and a flow-based approach for the ED.

NTC values are provided by the TSOs with no information regarding the methodological approaches used to ensure that the 70% target is met. Therefore, it is very difficult to verify the compliance with the 70% rule.

For the flow-based approach in the CORE region, a description on how the 70% target was fulfilled and additional data on the FB domains would be necessary to verify compliance with the 70% target. This data encompasses the maximum flow for each critical network element, and the assumed cross-border exchanges outside the CORE region.

Conclusions: ACER stresses the need for ENTSO-E to provide additional information for stakeholders to understand whether the 70% target is respected in ERAA or not.

3. EU greenhouse gas reduction targets

3.1. Consistency with renewable generation targets

To reliably inform stakeholders about the future adequacy risk levels, ERAA needs to reflect the EU-wide policy objectives. The current EU greenhouse gas (GHG) emissions target for 2030 is to reduce emissions levels by at least 55% from 1990 levels (the so-called ‘fit-for-55’).

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[3] See Figure 11 of ERAA 2021 Annex 1 – Assumptions. This figure compares NTCs submitted by TSOs for the EVA module vs. NTCs derived from the FB domains in the ED module.
[4] Regulation (EU) 2019/943

In its ERAA 2022 decision, ACER highlighted the misalignment with the EU climate and energy objectives for a large number of Member States. ACER notes that forming some of the input assumptions based on the past commitment of 40% GHG emissions reduction target and others on the established fit-for-55 target leads to an incoherent scenario that cannot reliably inform Member States and stakeholders about adequacy risks under an accelerated decarbonisation future.

To assess progress, ACER has compared the ERAA 2023 assumptions for renewable capacity data with the ERAA 2022 assumptions. ACER has also compared the preliminary ERAA 2023 assumptions with the European Commission's fit-for-55 MIX scenario[5]. The European Commission's MIX scenario provides a reference point for delivering the European Green Deal or, in other words, a possible pathway towards reaching the fit-for-55 targets. The scenario does not determine renewable targets for individual Member States on the other hand.

ACER`s analysis highlights significant variability of assumptions on a Member State level both regarding the progress against 2022 and the alignment with the European Commission's MIX scenario. Assumptions for a significant number of Member States align closely with the fit-for-55 targets, and at times exceed those targets, while a smaller number of Member States appear to be considerably misaligned with the set policy objectives (e.g. Bulgaria, Croatia, Cyprus, France and Slovakia), as measured by the divergence with the European Commission's MIX scenario (see Annex).

Conclusion: Overall, the levels of assumed renewable capacity have increased compared to ERAA 2022 (e.g. by 120 GW in 2030) and align more closely with the fit-for-55 targets. ACER welcomes the progress in the preliminary ERAA 2023 scenarios, however stresses that the assumptions for some Member States appear still considerably misaligned with the fit-for-55 targets.

3.2. Demand and consistency with energy efficiency targets

Similarly to renewables, ACER has reviewed the demand projections of ERAA 2023 against the demand projections of ERAA 2022 and the European Commission's fit-for-55 MIX scenario. ACER notes that the demand database is largely incomplete, as the consultation includes preliminary data for nine Member States only.[6]

Demand projections of ERAA 2023 tend to be higher than the European Commission's fit-for-55 scenarios and at instances significantly higher. This in principle implies that the assumed renewable capacity should be higher in the ERAA 2023 scenarios too.

The preliminary ERAA 2023 assumptions are in general similar to the ERAA 2022 assumptions, i.e. up to a few percentage points higher or lower. In limited cases, the assumptions are considerably different between the two. From the consultation documentation, it is unclear what is driving these differences.

[5] For more details on the scenarios underpinning the fit-for-55 legislative proposals see the European Commission's Policy scenarios for delivering the European Green Deal.

[6] Information as of 21 March 2023.

Conclusion: It is not possible to draw solid conclusions about the preliminary demand projections and their alignment with fit-for-55, due to their incompleteness and the lack of explanation about the main drivers affecting projections (e.g.: energy efficiency, electrification, energy crisis). ACER recommends that ENTSO-E provides additional information in the ERAA 2023 report explaining, in particular, how the demand projections are aligned with the policy framework, and considers this recommendation in future consultations.

4. Demand-side response

ENTSO-E's consultation on the preliminary ERAA 2023 data contains TSOs' projections for explicit demand-side response (DSR) within the National Estimates datasets. These projections are determined exogenously and represent the TSOs' best estimates.

ACER observes that the TSOs' best estimates of the levels of explicit DSR are in general similar to ERAA 2022, with some notable exceptions, such as Spain (2.7 GW of DSR compared to no explicit DSR in the previous two ERAAs). For some Member States, the ERAA 2023 assumptions are either higher (e.g. Germany across the timeframe) or lower (e.g. Italy in 2030) than in ERAA 2022. The consultation documentation would have benefited from additional information on what the best estimates by TSOs represent (e.g. current DSR volumes, capacity market contracts) as well as on the potential for additional explicit DSR (e.g. capital costs, opportunity or short-term marginal costs).

On the other hand, the consultation lacks any information about implicit DSR (e.g. flexibility assumptions about electric vehicles and heat pumps).

Conclusion: **The ERAA 2023 consultation would have benefited from more information about DSR input and assumptions. This is all the more important given the enhanced role of DSR envisaged in an increasingly decarbonised power system. ACER recommends that ENTSO-E provides additional information in the ERAA 2023 report and considers this recommendation in future consultations.**

5. Climate years

The input data set includes climate variables related to at least 35 years. It is known from previous ERAAs that, due to computational limitations, only a subset of the climate years are used in the EVA. In ERAA 2022, only three climate years were used. It is paramount that the subset of climate years used in the EVA preserve representativeness with respect to adequacy risks and revenues.

The climate years should also give appropriate weight to the effects of climate change, for example, the increasing occurrence of dry conditions coupled with higher than average temperatures as seen in recent years.

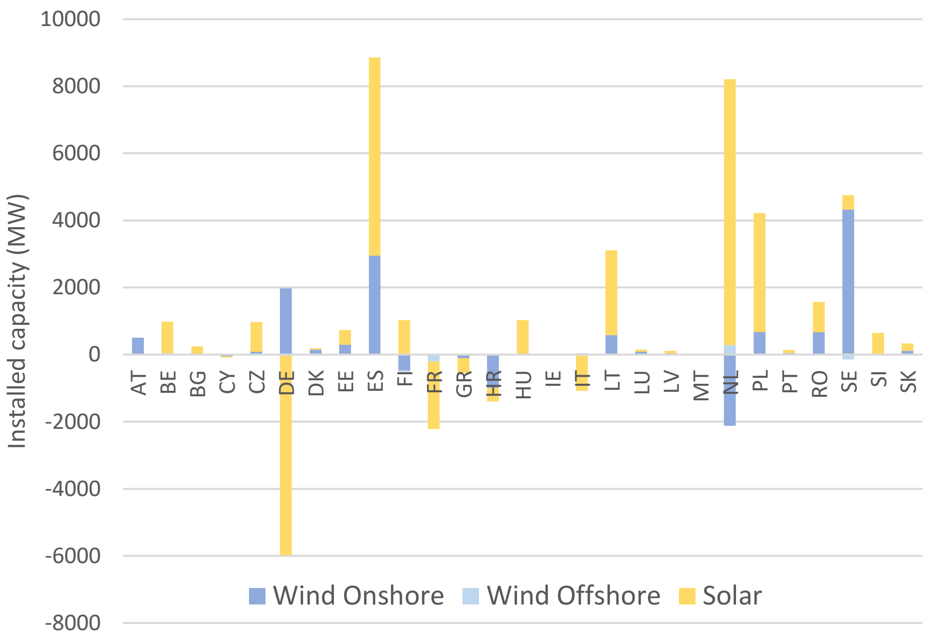
Due to its potential impact on the ERAA results, the selection of climate years for the EVA should be made, and transparently communicated to, and consulted with stakeholders, together with the publication of data and assumptions at the start of the ERAA process.

6. Annex – Additional figures

6.1. Comparison of ERAA 2023 with ERAA 2022

For 2025, the assumed renewable capacity increases for a high number of Member States, while for a limited number of Member States (e.g. France, Croatia) it decreases. ACER expects that the differences in projected capacity relate to national specificities.

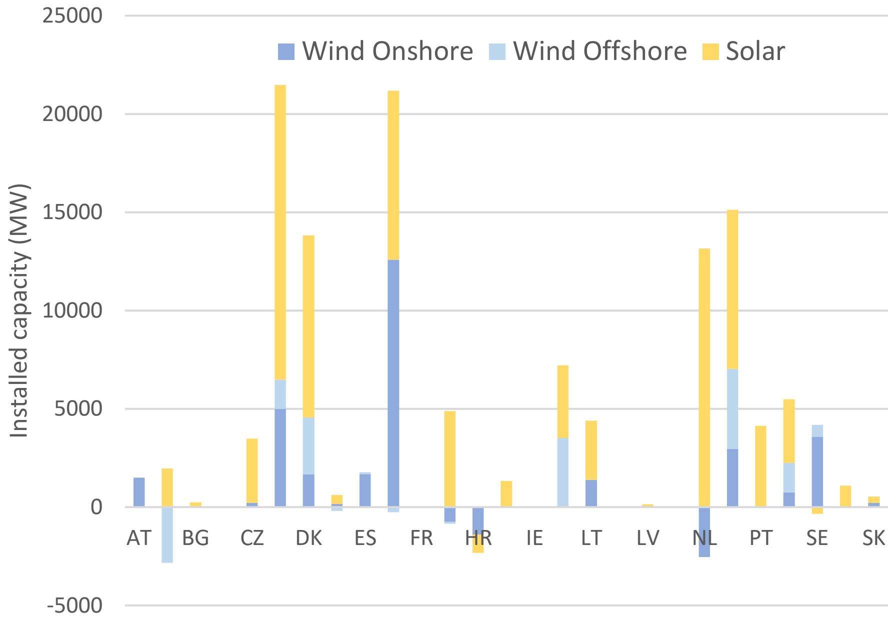
Figure 3: Differences in installed renewable capacity between ERAA 2023 and ERAA 2022 for 2025



Source: ACER calculations based on preliminary ERAA 2023 input data and ERAA 2022 input data (PEMMDB National estimates), published by ENTSO-E.

For 2030, the assumed renewable capacity increases for the majority of Member States with some exceptions, where assumptions have either remained the same (e.g. France, Latvia) or decreased (e.g. Croatia, Belgium). The differences for 2030 are higher to those for 2025 in absolute numbers.

Figure 4: Differences in installed renewable capacity between ERAA 2023 and ERAA 2022 for 2030

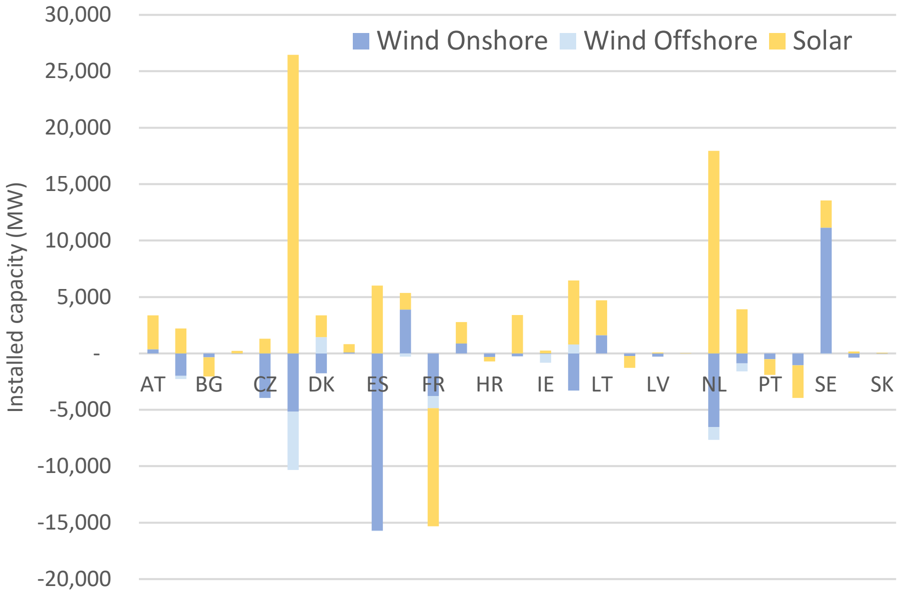


Source: ACER calculations based on preliminary ERAA 2023 input data and ERAA 2022 input data (PEMMDB National estimates), published by ENTSO-E).

6.2. Comparison of ERAA 2023 with the European Commission's fit-for-55

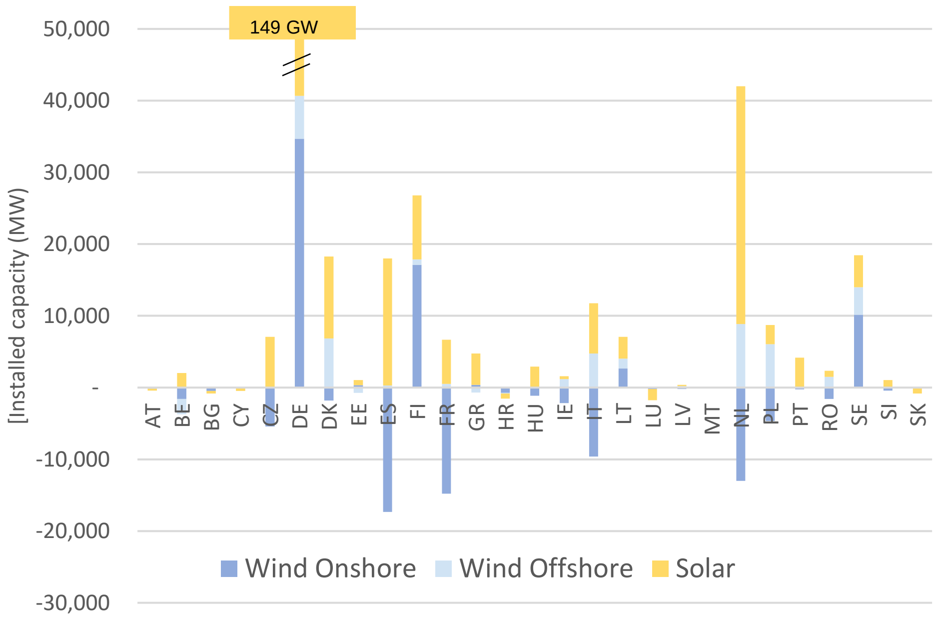
When comparing the preliminary ERAA 2023 assumptions for renewable capacity with the European Commission's fit-for-55 mix scenario, ACER observes that the mix of technologies varies between the two scenarios, with solar power and offshore wind being significantly higher in ERAA 2023 and onshore wind being lower (see Figure 5 and Figure 6).

Figure 5: Differences in installed renewable capacity between ERAA 2023 and the European Commission's fit-for-55 scenario for 2025



Source: ACER calculations based on preliminary ERAA 2023 input data (PEMMDB National estimates) published by ENTSO-E and the projections within the fit-for-55 MIX scenario (Summary report: Energy, transport and GHG emissions) published by the European Commission.

Figure 6: Differences in installed renewable capacity between ERAA 2023 and the European Commission's fit-for-55 scenario for 2030

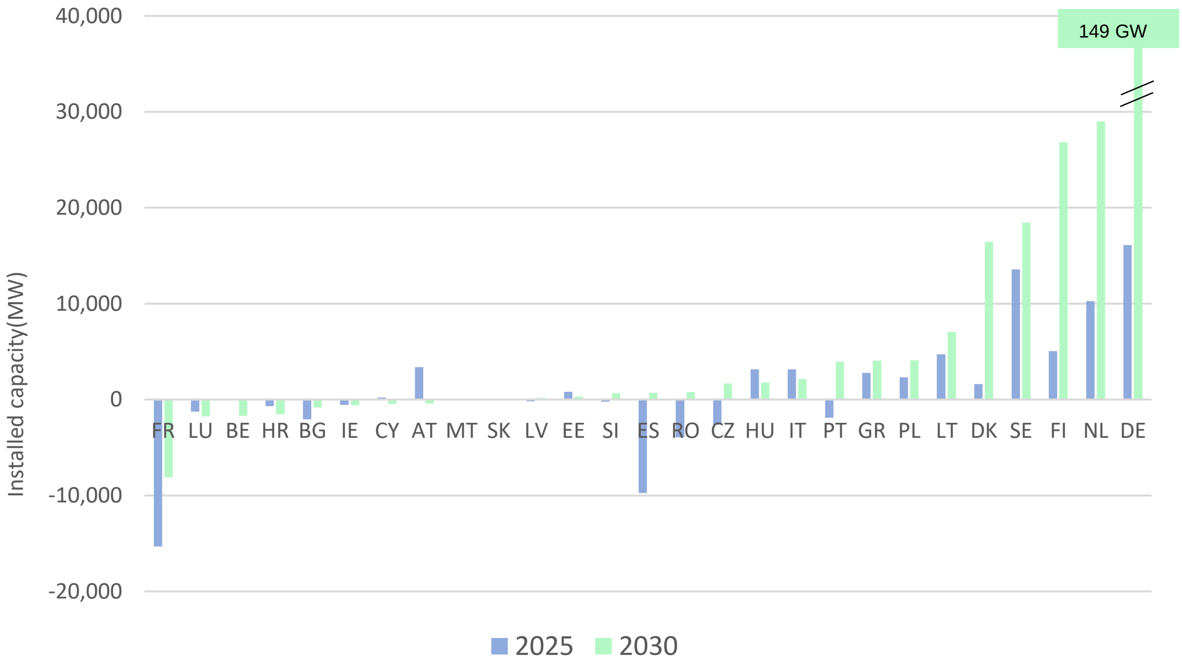


Source: ACER calculations based on preliminary ERAA 2023 input data (PEMMDB National estimates) published by ENTSO-E and the projections within the fit-for-55 MIX scenario

(Summary report: Energy, transport and GHG emissions) published by the European Commission.

When treating all technologies as equivalent, ACER's analysis shows that for the majority of Member States, the total installed renewable capacity is greater in the preliminary ERAA 2023 scenario, especially for 2030, compared to European Commission's fit-for-55 MIX scenario (see Figure 7 and Figure 8). For a limited number of Member States, the assumed installed capacity in ERAA 2023 is lower, and at instances considerably (e.g. France, Bulgaria) or significantly lower (e.g. Slovakia, Cyprus, Croatia).[7]

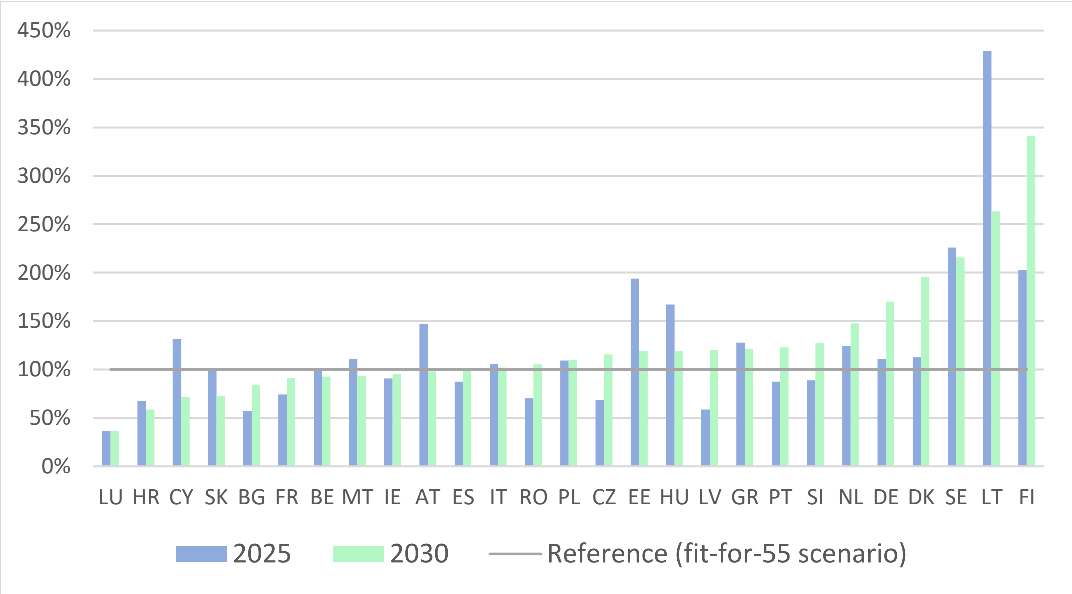
Figure 7: Absolute difference in total installed renewable capacity between ERAA 2023 and the EC's fit-for-55 scenario for 2025 and 2030



Source: ACER calculations based on preliminary ERAA 2023 input data (PEMMDB National estimates) published by ENTSO-E and the projections within the fit-for-55 MIX scenario (Summary report: Energy, transport and GHG emissions) published by the European Commission.

[7] ACER notes that these figures are for illustration purposes only. Specifically caution is required when comparing the differences between technologies, as installed capacity is not equivalent in energy terms. Capacity factors vary across technologies and Member States, but in general, they tend to be higher for wind (higher for offshore than onshore wind) and lower for solar power; this means that the same amount of installed wind capacity tends to produce more energy than the same amount of installed solar capacity. Subsequently, this implies that a negative difference for installed wind power needs to be counterbalanced by a higher positive difference for installed solar power to meet the same renewable energy target. For more information, see ACER's ERAA 2022 Decision – Annex I.

Figure 8: Relative difference in total installed renewable capacity between ERAA 2023 and the EC's fit-for-55 scenario (baseline at 100%) for 2025 and 2030



Source: ACER calculations based on preliminary ERAA 2023 input data (PEMMDB National estimates) published by ENTSO-E and the projections within the fit-for-55 MIX scenario (Summary report: Energy, transport and GHG emissions) published by the European Commission.