



European Union Agency for the Cooperation
of Energy Regulators

ACER

Report on the result of monitoring the margin available for cross-zonal electricity trade in the EU in the second semester of 2020

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PLEASE CONTACT THE MARKET MONITORING TEAM (MARGIN AVAILABLE FOR CROSS-ZONAL CAPACITY)
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Executive summary

Maximising the cross-zonal electricity interconnection capacity offered to the market is key for the completion of Europe’s internal electricity market.

- (1) The development of European rules for the calculation and allocation of cross-zonal capacities on electricity interconnectors is an integral step, within the European legal and regulatory framework, for the completion of Europe’s internal electricity market, and, more broadly, for the achievement of the European Union’s (EU) ambitious energy and climate policy targets. A larger amount of cross-zonal capacity made available for trade increases cross-border competition and enhances the integration of renewable energy sources. The ultimate aim is for consumers to benefit from the cheapest sources of electricity available in the market while safeguarding operational security.
- (2) European legislation governs how cross-zonal capacity is calculated and allocated, and how network congestion is managed. Over the last decade, significant progress has been made to improve the allocation of the capacity that is made available. On the other hand, progress in maximising the capacity that is available for cross-zonal trading has been much slower. To address this, the Clean Energy for All Europeans¹ Package (CEP) sets a minimum level of capacity – also called margin available for cross-zonal trade (MACZT) – to be reached by transmission system operators (TSOs). This so-called ‘minimum 70% target’ took effect on 1 January 2020. The Electricity Regulation², as part of the CEP, also allows Member States to adopt transitory measures, i.e. action plans or derogations, to reach gradually the minimum 70% target, by the end of 2025 at the latest.
- (3) The present report, produced in the context of the European Union Agency for the Cooperation of Energy Regulators’ (ACER) tasks to monitor the internal electricity market³, identifies the scope for improvement to meet the minimum 70% target. This report, which has been produced biannually in 2020 and will be published annually from 2021 onwards, covers the second semester of 2020.

Key findings

- (4) In summary, ACER’s monitoring of the minimum 70% target in the second semester of 2020 led to similar findings as for the first semester. In particular:
 - On direct current (DC) borders, the 70% target was met most of the time but with a few notable exceptions. Moreover, a justification when TSOs do not offer all the capacity that is physically available on the interconnector, i.e. 100% of the maximum admissible flow, was often missing.

¹ The Commission’s Clean Energy for All Europeans legislative proposal covers energy efficiency, renewable energy sources generation, the design of the electricity market, security of electricity supply and governance rules for the Energy Union. Relevant material along with the adopted directives and legislation is available at: <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans>

² Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast), available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943&from=EN>

³ Article 15(1) of the ACER 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, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0942>

- On alternating current (AC) borders, there is still a very diverse picture with significant room for improvement to meet the 70% target for most regions and borders.
- As for the first semester of 2020, derogations and/or actions plans were adopted by most Member States⁴. As highlighted in the previous edition of this report and reiterated in paragraph (14) below, there is a diverse picture and significant room for further harmonising those temporary measures across the EU.
- The monitoring of the MACZT by ACER and national regulatory authorities (NRAs) depends critically on TSOs providing robust and extensive data. Compared to the first semester of 2020, the quality of TSOs' data improved; however further improvements are still necessary.
- ACER's report does not formally assess the legal compliance of TSOs' actions, which is the remit of regulatory authorities. The report includes, in annex⁵, an overview of the approaches that NRAs are following or plan to follow when assessing compliance. For the NRAs that have informed ACER on the approach they intend to take, the overview shows that most NRAs, with some exceptions, intend to use ACER's monitoring approach.

Overall, the quality of the data provided by TSOs to monitor the margin available for cross-zonal trade improved compared to the first semester of 2020. However, data quality issues remain in some regions and TSOs need to tackle them urgently.

- (5) Compared to the first semester of 2020, ACER observed several improvements in the quality of the data provided by TSOs, in particular for Denmark, on its borders with Continental Europe, and France.
- (6) However, as mentioned in the first report, virtually no monitoring was possible in the Nordic and Baltic regions and, despite some improvements, the monitoring was only possible for less than half of the hours for the Italy North region. ACER expects the Nordic TSOs to provide the data necessary to monitor the MACZT in the near future, and calls for major efforts by the Italy North TSOs to ensure completeness in the provision of data.
- (7) Finally, the ability of TSOs to provide good quality data for monitoring the MACZT appears to be dependent on the methodology applied for capacity calculation. Where the flow-based method applies, TSOs can guarantee the quality of the data; where net transfer capacity (NTC)-based method applies, TSOs would need to improve the capacity calculation process aiming at ensuring that the MACZT can be estimated on all network elements, and

⁴ Throughout this report, the MACZT is consistently compared to the minimum 70% target, also where a derogation or action plan applies. Where action plans or derogations apply, the minimum 70% target is not yet binding; instead, transitional targets apply. Where information about the transitional capacity target(s) is available, additional figures comparing the MACZT to such transitional target(s) are included in the annexes. The description of action plans and derogations for 2020 and 2021 is available at:

https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publications%20Annexes/ACER%20Report%20on%20the%20result%20of%20monitoring%20the%20MACZT%20Generic/ACER%20Report%20on%20the%20result%20of%20monitoring%20the%20MACZT%20Derogations.pdf

⁵ The overview of the approaches to compliance is available at:

https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publications%20Annexes/ACER%20Report%20on%20the%20result%20of%20monitoring%20the%20MACZT%20S2%202020/ACER%20MACZT%20Report%20S2%202020_Annex%20NRAs%20assessment.pdf

not only on the limiting ones, in line with the ACER's recommendation⁶ (hereafter 'the Recommendation').

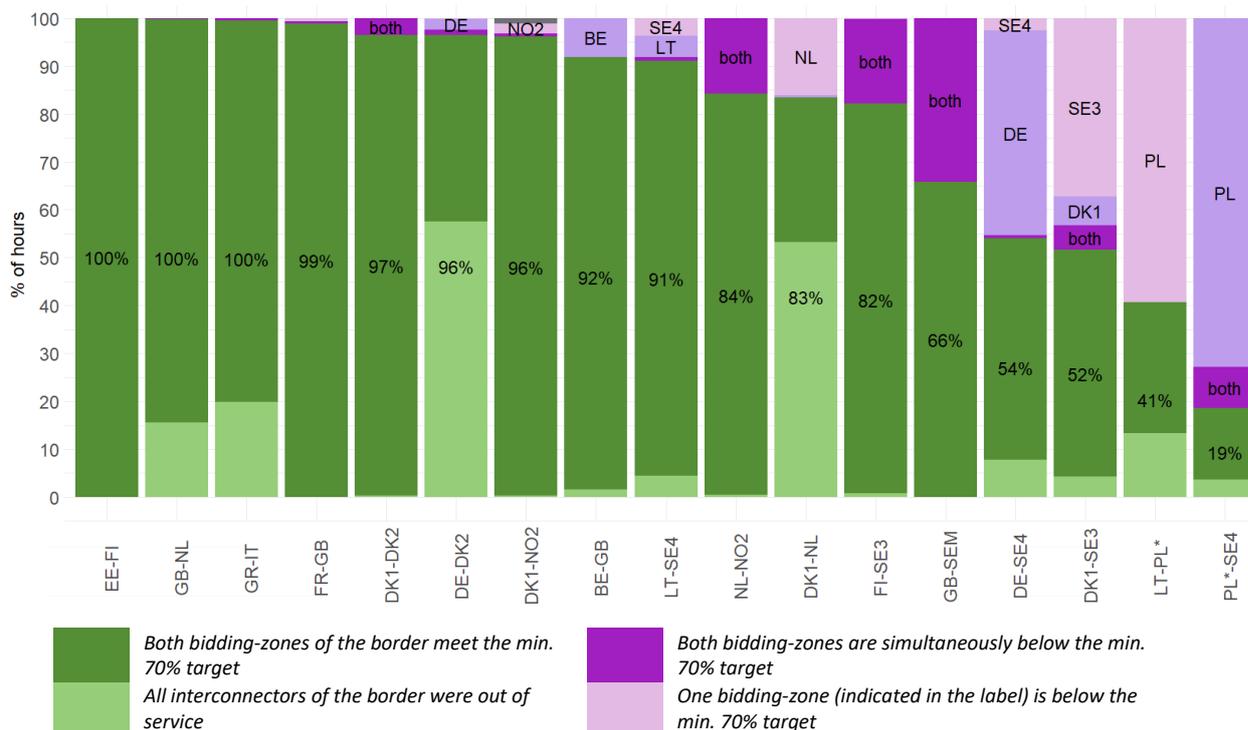
On DC borders, the margin available for cross-zonal trade reached the minimum 70% target most of the time. However, a few substantial exceptions remain in the second semester of 2020. When TSOs reduce the capacity below the maximum admissible flow, further transparency is needed.

- (8) Figure 1 displays the percentage of the hours when MACZT reached the minimum 70% target on the DC interconnectors, for the second semester of 2020. Overall, it indicates that the MACZT reached the minimum 70% target most of the time on many DC borders, with a few substantial exceptions:
- The Polish borders with Lithuania and with Sweden, where the minimum 70% target was reached 41% and 19% of the time respectively. The reductions of the capacity offered on these borders mostly relate to the application of allocation constraints in Poland.
 - The border between Denmark¹ and Sweden³ (Konti-Skan), where the minimum 70% target was reached for 52% of the hours, mainly due to constraints on the Swedish network.
 - The border between Germany and Sweden⁴ (Baltic Cable), where the minimum 70% target was reached 54% of the time in the second semester. The relevant German TSO (TenneT) attributes the reductions of the capacity offered on this border to the presence of congestions, at the distribution network level, on the German side.
 - The border between Great Britain and the Irish single energy market (SEM), where the minimum 70% target was reached for 66% of the hours in the direction from Irish SEM to Great Britain⁷. Unfortunately, the location of the constraints leading to reduced capacities could not be precisely identified with supporting hourly data from the TSOs.

⁶ ACER Recommendation No 01/2019 of 8 August 2019 on the implementation of the minimum margin available for cross-zonal trade pursuant to Article 16(8) of Regulation (EU) 2019/943, available at: https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf

⁷ ACER was informed that constraints on the British side of the Moyle interconnector are the reason for the cross-zonal capacity to be below the minimum 70% target. National regulatory authorities informed ACER of an existing connection agreement between the interconnector owner of Moyle and the connecting TSOs, setting a firm capacity value lower than the maximum admissible flow in the direction of flows from the SEM bidding-zone to the Great-Britain bidding-zone (80 MW, increased to 250 MW from 1 December 2020). The maximum admissible flow considered does not reflect this agreement. This connection agreement and subsequent reduction of the firm capacity have been mentioned to ACER as being in line with the capacity calculation methodology of the Ireland and United Kingdom (IU) region.

Figure 1: Percentage of the time when the minimum 70% target was reached on DC borders – second semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note 1: The percentage of hours when the minimum 70% target is reached refers to the hours when the target is met simultaneously on both directions.

Note 2: The DC borders with Norway, where the minimum 70% target does not yet apply, are displayed for information. On these borders, the indication that ‘both’ countries are limiting is solely based on the information provided by the neighbouring TSO or information from the ENTSO-E Transparency Platform. As information from Norway was not requested, it could not be verified whether the limitation was simultaneously on both sides of the borders or only on the other side of the border.

Note 3: The DC borders Belgium-Germany and Germany-Norway2 went live during the second half of the semester and are not included in the figure.

* On the Polish borders with Sweden and Lithuania, the calculations consider the impact of the allocation constraints limiting the total import (or export) capacity from (or to) Poland. When allocation constraints apply, the interconnectors with Poland can be used to accommodate exchanges between Sweden and Lithuania (via Poland); however, the application of the constraints effectively limits the trading possibilities with Poland.

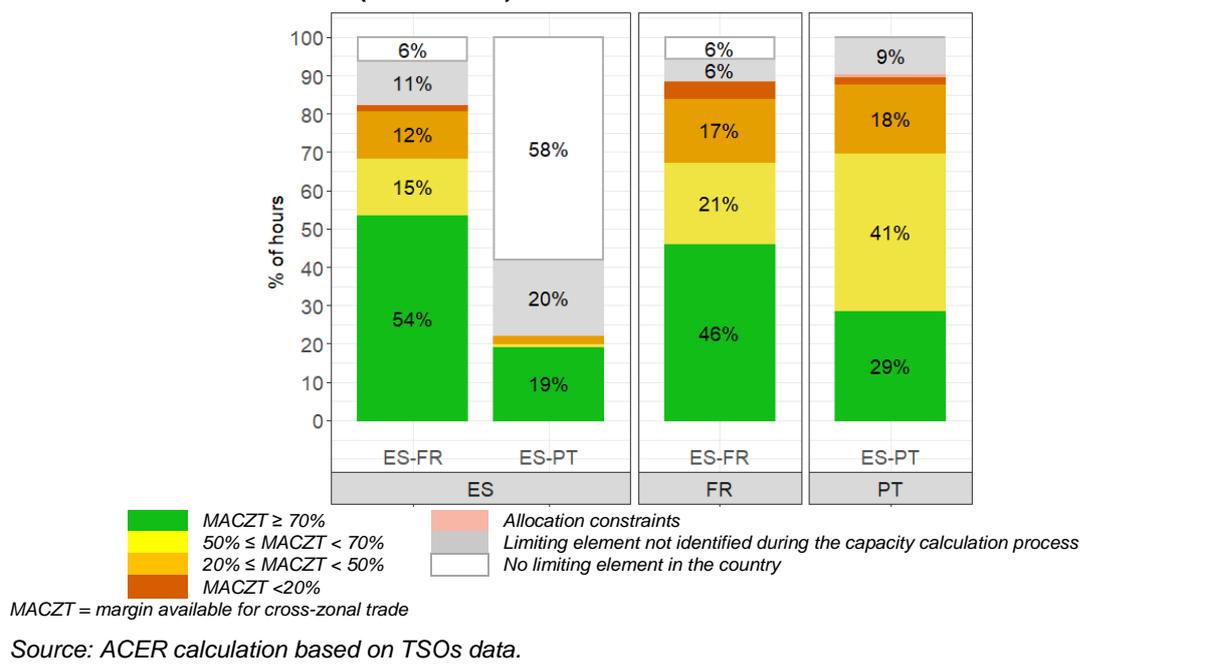
On AC borders, there is still a very diverse picture of the margin available for cross-zonal trade across EU. Significant room for improvement to meet the minimum 70% target remains for most regions and borders.

(9) Figure 2 to Figure 5 below display the results of monitoring the MACZT on AC borders as follows:

- On Figure 2 to Figure 4, the MACZT is analysed for regions, or coordination areas⁸, where a coordinated capacity calculation applied in the second semester of 2020: the South West Europe (SWE), Italy North and Central West Europe (CWE) regions;
- On Figure 5, the MACZT is analysed for the remaining geographical areas, where a coordinated capacity calculation does not apply yet.

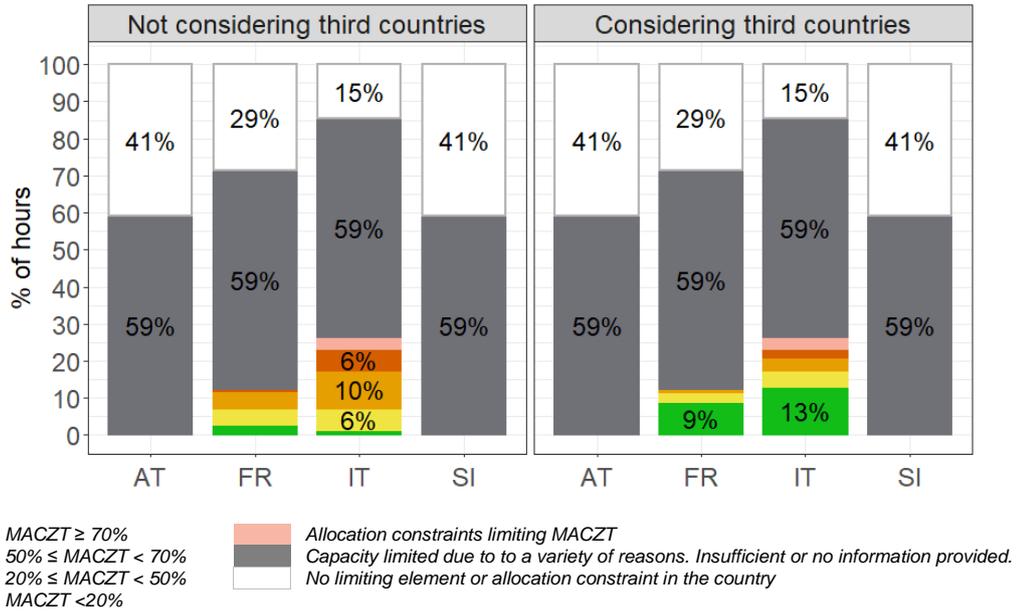
Note: For all the figures below, caveats can be found in the notes below the respective figures, or in the main text of the report.

Figure 2: Percentage of the time when the minimum 70% target was reached (green), the margin was below the target, or when the margin could not be estimated, per border, in the SWE region – second semester of 2020 (% of hours)



⁸ A coordination area describe sets of bidding-zone borders within which capacity calculation is fully coordinated. Until capacity calculation methodologies (CCMs), pursuant to the Capacity Allocation and Congestion Management (CACM) Regulation, are implemented, such coordination areas will normally remain smaller than the capacity calculation regions defined across the EU.

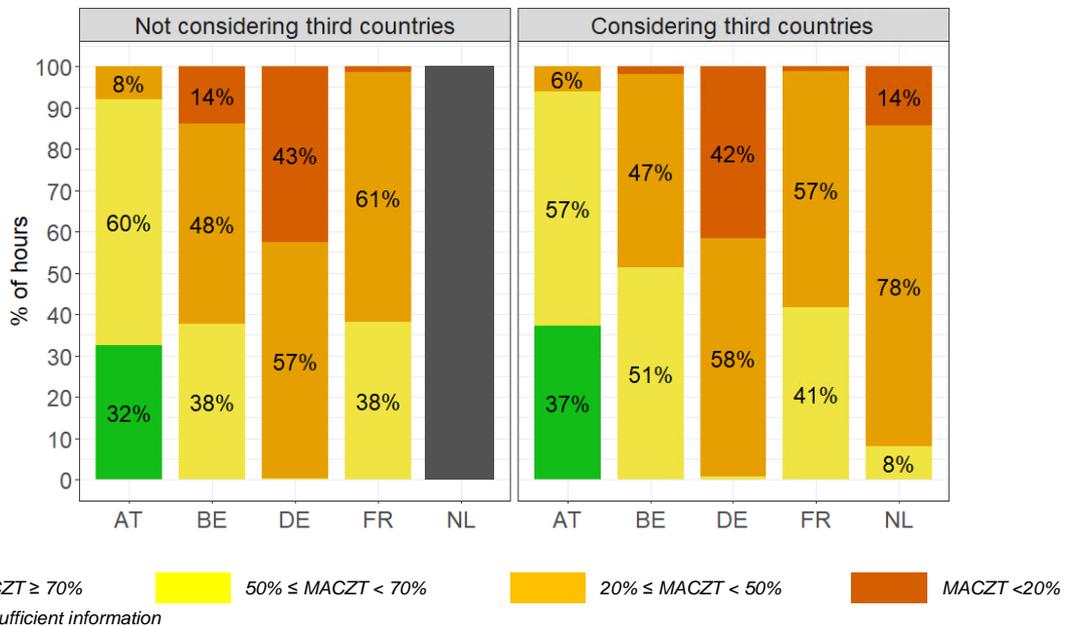
Figure 3: Percentage of the time when the minimum 70% target was reached (green), when the margin was below the target, or when the margin could not be estimated, per country, in Italy North region, not considering (left) and considering (right) exchanges with third countries – second semester of 2020 (% of hours)



MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Figure 4: Percentage of the time when the minimum 70% target was reached (green) or the margin was below the target, per country, in the CWE region, not considering (left) and considering (right) exchanges with third countries – second semester of 2020 (% of hours)



MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

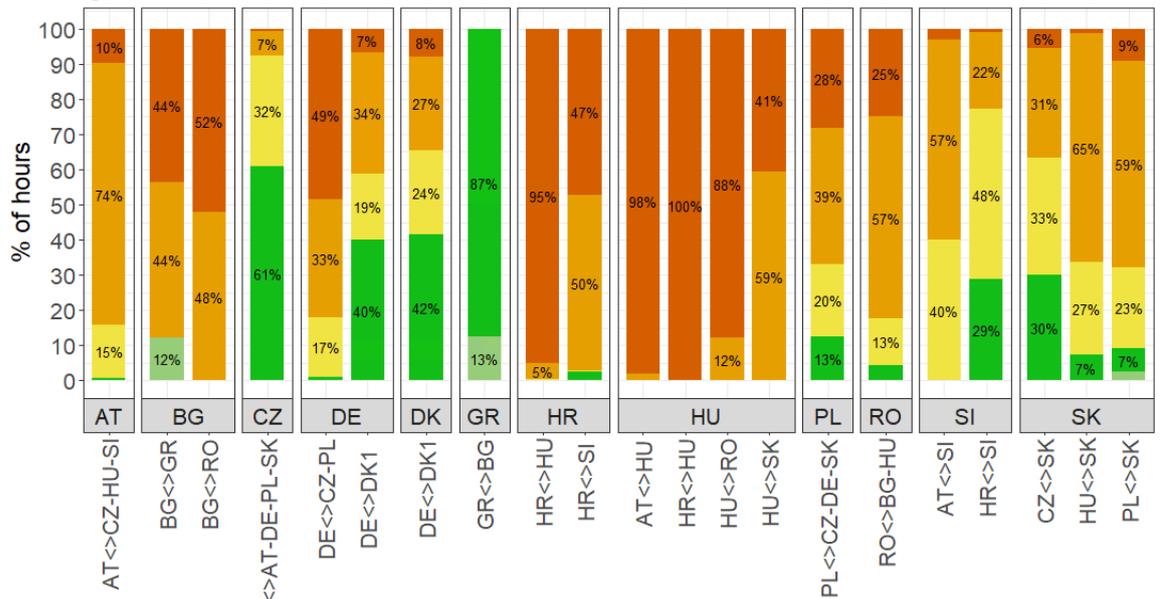
Note: The MACZT for Belgium includes the impacts of exchanges between the EU and Norway. For the Netherlands, the TSO did not provide the data necessary to calculate the MACZT not considering third countries in time for the report. The figure is presenting the level of the MACZT, which is different from the 'RAM' as described in the Core and CWE flow-based capacity calculation methodologies.

Figure 5: Percentage of the time when the minimum 70% target was reached (green) or the margin was below the target, per country and coordination area, for countries of Continental Europe where a coordinated capacity calculation is not yet implemented, not considering (top) and considering (bottom) exchanges with third countries – second semester of 2020 (% of hours)

Not considering third countries



Considering third countries



■ MACZT ≥ 70%
 ■ 50% ≤ MACZT < 70%
 ■ 20% ≤ MACZT < 50%
 ■ MACZT < 20%
■ All interconnectors of the coordination area are out of service
 MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Notes: The percentage of hours during which the minimum 70% target was reached refers to the hours when the target is met simultaneously on all limiting elements in both directions. The figure considers the impact of the technical profiles of Poland (Polish borders with Czech Republic, Germany and Slovakia), after considering allocation constraints, and the technical profile of Germany (German borders with Czech Republic and Poland).

- (10) The very diverse levels of the MACZT on AC borders across the EU for the second semester of 2020 are broadly similar to the levels observed in the first semester:
- Significant room for improvement to meet the minimum 70% target.
 - In the SWE region, the minimum 70% target was reached between 30 to 60% of the time, depending on the border, when calculating the MACZT was possible.
 - The scope for improvement is the largest for the following countries and regions:
 - In the CWE region, where significant efforts to meet the minimum 70% target are needed for all countries and especially in Germany, followed by the Netherlands, Belgium and France. However, the low MACZT in some of these countries may to a certain extent result from loop flows originating in other countries of the region. The presence of loop-flows has been one of the reasons for TSOs to request a derogation, e.g. Belgium and the Netherlands.
 - In a number of countries and borders without coordinated capacity calculation, where the levels of relative MACZT are the lowest in the EU; this includes Austria on non-CWE borders, Bulgaria, Croatia, Germany on the borders with Czech Republic and Poland, and Hungary.
 - In the Italy North region, where there are a low number of hours when the MACZT is above the 70% (9% of the hours when limiting elements have been declared). In this region, cross-zonal capacity is often limited by allocation constraints applied by the Italian TSO and by a number of other factors, on which insufficient information was provided. The level of MACZT would however increase significantly if the conditions to account for the exchanges with non-EU countries, namely with Switzerland were met (see paragraphs (12) and (34)).
 - Significant efforts to improve transparency, completeness and quality of the data provided to monitor the MACZT, are needed with priority in:
 - The Baltic and Nordic areas, where almost no information was provided. Efforts are currently being made by the Nordic TSOs to provide data.
 - The Italy North region, where no information on limiting elements was provided for 59% of the hours, thus preventing monitoring during these hours.
- (11) Further analysis included in the report confirm that, when the MACZT is below the 70% target, the average MACZT differs significantly per border or coordination area. Overall, considerable efforts are still to be made for most borders and/or capacity coordination areas.
- (12) When considering the conclusions presented above, the following considerations should be taken into account:
- Low MACZTs may originate from inside (e.g. from structural internal congestion or lack of redispatching potential) or outside a given country (e.g. from loop flows of neighbouring countries).
 - The European Commission recommended⁹ that the flows from a given third country are taken into account for the calculation of the MACZT if an agreement, in line with

⁹ See the presentation on the allocation of cross-zonal capacity and the bidding zone review made by the EC at the Florence Forum on 7 December 2020, available at: https://ec.europa.eu/info/events/european-electricity-regulatory-forum-florence-forum/meeting-european-electricity-regulatory-forum-2020-dec-07_en

EU capacity calculation principles and rules, with the third country has been concluded. As far as ACER is aware, such agreements were not yet in place in 2020. Reaching such agreements will contribute to align the capacity calculation requirements that apply to third countries' TSOs with those applying in the EU. Moreover, ACER acknowledges the importance of presenting the results in a transparent manner; hence, ACER presents the MACZT results separately including and excluding the impacts of third countries.

- Currently, the limited scope of coordination in capacity calculation is negatively affecting the ability of TSOs to maximise cross-zonal capacity. In particular, in the absence of coordination, TSOs need to reserve a share of the capacity of the critical network elements with contingencies (CNECs) to accommodate the flows coming from outside of their coordination area, based on their forecasts. TSOs cannot in general influence these flows, and their magnitude and direction is subject to uncertainty. TSOs reported to face difficulties to predict accurately these flows and, in particular, to ensure that flows from other coordination areas that relieve congestions lead to offer the relieved capacity to the market.
- While ACER acknowledges the difficulties to predict flows beyond the area of coordination, well-established regulatory principles should apply. In particular, the uncertainties related to these flows should be accounted for in the 'remaining 30% margin' as prescribed by the CEP; and TSOs should apply the principle of netting by increasing the amount of capacity offered in a given direction when those flows are in the opposite direction of the congestion. Overall, the issues related to flows from other coordination areas emphasise the need to speed up the implementation of the capacity calculation methodologies in each capacity calculation region; and, where problems of coordination in capacity calculation among regions persist, the need for reassessing the definition of the capacity calculation regions. Implementing all these measures will ensure that the cross-zonal capacity is used to the fullest where the value is the highest.

Based on the above findings, ACER advises the following:

- (13) In line with ACER Recommendation No 01/2019 on how to implement and monitor the MACZT:
- TSOs should continue improving the quality of the data provided for the monitoring of the MACZT. In particular, ACER expects the Nordic TSOs to deliver the data requested by ACER as soon as possible and the Italy North TSOs to deliver a complete set of data. ACER also expects the Baltic region TSOs to start working to overcome the difficulties they face to provide the required data.
 - TSOs should provide the complete set of limiting network elements for all hours. In addition, TSOs should also declare any additional allocation constraint that they apply. More specifically, for DC borders, TSOs should declare any relevant internal elements whose congestion led to reduce the capacity made available to the market.
 - TSOs should ensure that the level of transparency in capacity calculation with net transfer capacity (NTC)-based methods is similar to the level of transparency achieved where flow-based methods apply. In particular, TSOs should provide sufficient information to enable the monitoring of the MACZT on all network elements and not only on the limiting ones.

- TSOs and regulatory authorities should seek a joint delivery of data within each coordination area, to ensure consistent monitoring.
 - Regulatory authorities should consider the methodology and the results of ACER's analyses to assess the compliance of TSOs with the minimum 70% target, or, where applicable, with the transitional targets.
- (14) In line with the Electricity Regulation, the guidance provided by regulatory authorities and ACER to TSOs on the matter, and the findings of the first ACER's report on monitoring the MACZT:
- Regulatory authorities should grant derogations, as a last resort measure, and only where necessary for maintaining operational security.
 - TSOs and regulatory authorities should ensure that the subsequent derogations gradually increase the cross-zonal capacity offered to the market, with a view to meeting the 70% minimum target. In particular, the description of the derogations should allow for a proper monitoring of intermediate targets as proposed in the Recommendation.
 - To ensure that the adopted derogations are defined with a view to effectively increasing the capacity available for trade, regulatory authorities should seek for a higher degree of harmonisation on the content of the TSOs' requests for derogations, and a higher degree of consistency on the criteria to assess, approve and monitor them. In this respect, best practices should increasingly be developed and shared.
- (15) To meet the minimum 70% target, TSOs will increasingly rely on remedial actions. In this respect, the coordinated application of remedial actions is key to maximise efficiency while safeguarding operational security. Consequently, in line with the conclusions of the 35th Florence Forum¹⁰, the Network Code implementation process remains a key priority for the next years. In particular, TSOs should urgently implement the regional methodologies related to the optimisation of remedial actions (and related cost sharing), as an absolute prerequisite to meet the 70% minimum target.

¹⁰ The conclusions of the 35th Florence Forum, which took place the 7 and 8 December 2020, are available at: https://ec.europa.eu/info/sites/info/files/energy_climate_change_environment/events/documents/florenceforum2020_conclusions.pdf

1 Introduction

- (16) The development of rules for the calculation and allocation of cross-zonal capacities is an integral step, within the European legal and regulatory framework, for the completion of the internal electricity market. The primary objective of the above-mentioned rules is an efficient management of network congestions, i.e. situations when the capacity of a network is insufficient to accommodate all requests for transmission over this network. Efficient management of network congestions consists of several processes. From long run to short run, these consist of network development and investments, definition of bidding-zones, calculation and allocation of cross-zonal capacities in different timeframes, and, finally, identification of remaining congestions, which need to be addressed with remedial actions such as redispatching.
- (17) Over the last decade, significant progress has been achieved regarding capacity allocation. In particular the development and introduction of market coupling ensures that the available cross-zonal capacities, as calculated by transmission system operators (TSOs), are allocated in the most efficient manner. Regarding capacity calculation, progress has been much slower. In view of this, the ‘recast Electricity Regulation’¹¹ (hereafter, the Electricity Regulation) of the Clean Energy for all Europeans Package (CEP)¹² provides a new framework aiming to increase the capacity offered for cross-zonal trade.
- (18) More specifically, Article 16(8) of the Electricity Regulation requires TSOs to ensure that at least 70% of the transmission capacity is offered for cross-zonal trade, while respecting operational security limits. According to the Electricity Regulation, Member States may also adopt transitory measures, i.e. action plans or derogations, to reach gradually the minimum capacity margin available for cross-zonal trade (MACZT) by the end of 2025 at the latest.
- (19) Thus, the minimum 70% target, or the provisional targets derived from the transitory measures, has become a key element of market integration, which requires intensive monitoring. Following a request from the Electricity Cross-Border Committee, the European Union Agency for the Cooperation of Energy Regulators (ACER), in coordination with regulatory authorities, agreed to issue a recommendation¹³ (hereafter ‘the Recommendation’) aiming to ensure a harmonised approach on how to implement, and how to monitor the achievement of the MACZT, across the European Union (EU).
- (20) ACER’s analysis of the MACZT does not assess legal compliance of TSOs’ actions, which is a task assigned to national regulatory authorities, but estimates the margin for improvement with respect to the minimum 70% target. However, ACER advises that the regulatory authorities consider the results of ACER’s analyses to assess the compliance of TSOs with the minimum 70% target.

¹¹ Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast), available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943&from=EN>

¹² The Commission’s Clean Energy for All Europeans legislative proposal covered energy efficiency, generation from renewable energy sources, the design of the electricity market, security of electricity supply and governance rules for the Energy Union. Relevant material along with the adopted directives and legislation is available at: <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans>

¹³ ACER Recommendation No 01/2019 of 8 August 2019 on the implementation of the minimum margin available for cross-zonal trade pursuant to Article 16(8) of Regulation (EU) 2019/943, available at: https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf

- (21) The present report, produced in the context of ACER's tasks to monitor the internal electricity market¹⁴, makes use of the Recommendation with a view to identifying the scope for improvement to meet the minimum cross-zonal capacity target set in the CEP. This report - which has been produced biannually in 2020 and will be published annually from 2021 onwards - covers the second semester of 2020.
- (22) The report is structured as follows. Chapter 2 describes briefly the principles underlying the Recommendation, together with the methodology and the main data used to estimate the MACZT. Chapter 3 presents the results of estimating the MACZT on direct current (DC) and alternating current (AC) borders compared to: i) the minimum 70% target, and ii) to the transitional targets derived from either action plans or derogations approved by the regulatory authorities, if any, when information was available.

¹⁴ Article 15(1) of the ACER 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, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0942>

2 Methodology

- (23) As mentioned in Chapter 1, following numerous interactions with the European Commission (EC), the European Network of transmission system operators for Electricity (ENTSO-E), national regulatory authorities (NRAs) and TSOs, ACER issued a Recommendation to ensure a consistent approach to the implementation and monitoring of the MACZT, and to support legal compliance enforcement.
- (24) A methodological paper¹⁵ (hereafter ‘the methodological paper’) complements the Recommendation, describing how to estimate in practice the MACZT, and the main caveats underlying the estimation of the MACZT.
- (25) The present report monitors the MACZT across the EU in line with the Recommendation and the methodological paper. The main principles of calculation described in these two documents are:
1. The MACZT is monitored individually and separately for each critical network element with contingencies (CNEC);
 2. The MACZT is the sum of the margin made available within coordinated capacity calculation (MCCC), and the flow induced by cross-zonal exchanges beyond coordinated capacity calculation – the margin from non-coordinated capacity calculation (MNCC).
 3. The estimated MACZT focuses on the day-ahead timeframe (more details are provided in paragraph (27));
 4. The influence of flows on bidding-zone borders between EU and non-EU countries is monitored separately;
- (26) To calculate MACZT as the sum of MCCC and MNCC, the concept of coordination areas is introduced. It describes the sets of bidding-zone borders within which capacity calculation is fully coordinated. Until capacity calculation methodologies (CCMs) pursuant to the Capacity Allocation and Congestion Management (CACM) Regulation¹⁶ are implemented, such coordination areas will normally remain smaller than the capacity calculation regions (CCRs) defined across the EU. A comprehensive list of the coordination areas considered in this report is included in Table 3 of Annex 1.
- (27) As mentioned above, the calculation of the MACZT focuses mainly on the day-ahead timeframe, while other timeframes are considered when technically possible. The consideration of other timeframes is as follows:
- Long-term timeframe:
 - On borders where net transfer capacity (NTC) capacity calculation applies, the long-term capacity is indeed accounted for, by considering the NTC values estimated at the time of day-ahead capacity calculation.

¹⁵ See the methodological paper at: https://www.acer.europa.eu/en/Electricity/Market%20monitoring/Documents/20201209%20Methodological%20paper%20MACZT_final.pdf

¹⁶ Commission Regulation (EU) 2015/1222 of 24 July 2015, available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R1222&from=EN>

- On borders where flow-based applies, the current capacity calculation methodology does not offer a way to account for long-term capacities in the MACZT of physical CNECs¹⁷.
- Intraday timeframe: In ACER's view, the inclusion of intraday capacity in the MACZT is legitimate but needs to be carefully considered. In particular, ACER recommends to avoid as much as possible delaying offering the capacity to the market, i.e. TSOs should offer as much capacity as possible for day-ahead capacity calculation. However, in some cases, deemed justified by the regulatory authorities, the intraday timeframe may be taken into account in the calculation of the MACZT. A precondition to do so would be the implementation of intraday capacity calculation methodologies.
- For both the intraday and the long-term timeframes, ACER welcomes discussions among TSOs, regulatory authorities and ACER with a view to incorporating the components stemming from the long-term (for flow-based) and intraday timeframes, provided that such consideration is not detrimental to market integration.

(28) The methodological paper mainly describes:

- The calculation steps to estimate the MACZT;
- The data needed for the different calculation steps, including fallback data, i.e. data that ACER may use when the requested information is not available¹⁸. Using fallback data allows for a pan European monitoring of diverse capacity calculation processes;
- The options available to estimate the MACZT, which include:
 - the possibility for TSOs to directly provide the overall results of monitoring the MACZT values, when their estimations are in line with the Recommendation;
 - the possibility for TSOs to provide part of the data, together with some intermediate results or parameters (e.g. power transfer distribution factors, PTDFs¹⁹); and
 - the possibility for TSOs solely to provide all the necessary input data for ACER to perform the calculations.
- The general caveats underlying the estimation of the MACZT. The main caveat is that ACER computes PTDFs based on a limited number of merged grid models provided by TSOs, which may not be fully representative of the network topology for all the hours of the semester. This caveat is only relevant for TSOs that did not provide either i) MACZT, MCCC, and MNCC values in line with the Recommendation, or ii) a complete set of PTDFs. The TSOs for which this caveat applies can be inferred from Table 4 in Annex 3.

(29) Table 1 in Section 3.1 for DC borders, and Table 4 in Annex 3 for AC borders, provide a comprehensive overview of the data used to estimate the MACZT, and indicates whether TSOs or ACER estimated the different MACZT components.

¹⁷ Within the current CCM in CWE, the LTA inclusion is done by introducing so-called virtual branches. These virtual branches are used as constraints in the market coupling algorithm, but cannot be directly matched with physical network elements.

¹⁸ A detailed data request was sent to TSOs in December 2019, describing the necessary data needed from them to estimate the MACZT.

¹⁹ See paragraph (57) for the definition. In this case, consistency must be ensured in the data set, e.g. PTDFs have to be either fully provided by TSOs or fully calculated by ACER.

- (30) The terms used in this report follow the definitions included in Section 2 of the Recommendation. It should be noted that the MACZT term is different from the Remaining Available Margin (RAM) term used in flow-based calculation in the Central West Europe region. The flow-based RAM is equivalent to the MCCC component of the MACZT.
- (31) Finally, besides CNECs, TSOs may introduce additional so-called allocation constraints, which may further limit cross-zonal exchanges. These constraints are used by TSOs, when they are needed, to maintain the transmission system within operational security limits; most often these constraints cannot be transformed efficiently into a maximum flow allowed on individual CNECs. For example, such allocation constraints may restrict the overall capacity that it is possible to allocate on one or a set of bidding-zone borders, or the net position of a bidding-zone. To the extent possible, the impact of the allocation constraints on the MACZT of CNECs is monitored in this report, in line with the Recommendation.

3 Monitoring the margin available for cross-zonal trade for the second semester of 2020

- (32) This chapter presents the results of monitoring the MACZT across the EU in the second semester of 2020. Due to the different characteristics of the interconnectors, the results of the MACZT are presented separately for DC bidding-zone borders (Section 3.1) and for AC bidding-zone borders (Section 3.2).
- (33) Each of the two sections include the following aspects:
1. A description of the geographical scope of the analysis;
 2. The level of completeness and quality of the data provided by TSOs to ACER;
 3. The numerical results of calculating the MACZT; and
 4. The relevant conclusions.
- (34) Throughout this chapter:
- The MACZT is consistently compared to the minimum 70% target for all countries and coordination areas, also where a derogation or action plan applies. Where action plans or derogations apply, the minimum 70% target is not yet binding; instead, transitional targets apply. Where information about the transitional capacity target(s) is available, additional figures comparing the MACZT to such transitional target(s)²⁰ are included in the annexes. In addition, an updated list, with a brief description of the derogations and action plans in place for each coordination area is available on ACER's website²¹.
 - Fmax means the maximum admissible flow on critical network elements, respecting operational security limits²².
 - Relative MACZT means, unless stated otherwise, the MACZT as a percentage of Fmax.
 - According to the guidance provided by the services of Directorate-General for Energy of the European Commission in a letter of 16 July 2019, consideration of third (i.e. non EU member) country flows in capacity calculation and MACZT could be possible on the condition that an agreement has been concluded by all TSOs of a CCR with the TSO of the third country, approved by the respective regulatory authorities. The agreement should be fully in line with EU capacity calculation principles and rules, and should cover at least: (i) consideration of internal third country constraints for intra-EU capacity calculation, (ii) consideration of EU internal constraints for capacity calculation on the border with the third country, and (iii) cost-sharing of remedial actions. As far as ACER is aware, agreements with third countries in line with previous

²⁰ When the TSO was described unambiguously such transitional target for the relevant CNECs for the second semester of 2020.

²¹ The description of action plans and derogations for 2020 and 2021 is available at: https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publications%20Annexes/ACER%20Report%20on%20the%20result%20of%20monitoring%20the%20MACZT%20Generic/ACER%20Report%20on%20the%20result%20of%20monitoring%20the%20MACZT%20Derogations.pdf

²² See the complete definition in the Section 2 of the Recommendation.

EC's guidance were not yet in place for the second semester of 2020²³. As a result, the following considerations with regard to third countries apply throughout this chapter:

- In the absence of agreements in line with the above-mentioned conditions, non-EU countries are considered as third countries, i.e. exchanges with such countries are only taken into account for the estimation of the MACZT when explicitly mentioned in the title of the figures.
 - For the sake of transparency and to display the impact of exchanges with third countries, the figures are presented both with and without the consideration of exchanges with third countries;
 - For calculating MACZT in 2020, exchanges with the United Kingdom have still been considered in the same way as exchanges with any other country of the EU.
- (35) The annexes include other more detailed and country-specific analyses. The ones included in this chapter intend to present a comparable set of results of monitoring the MACZT with respect to the minimum 70% target, across the EU.

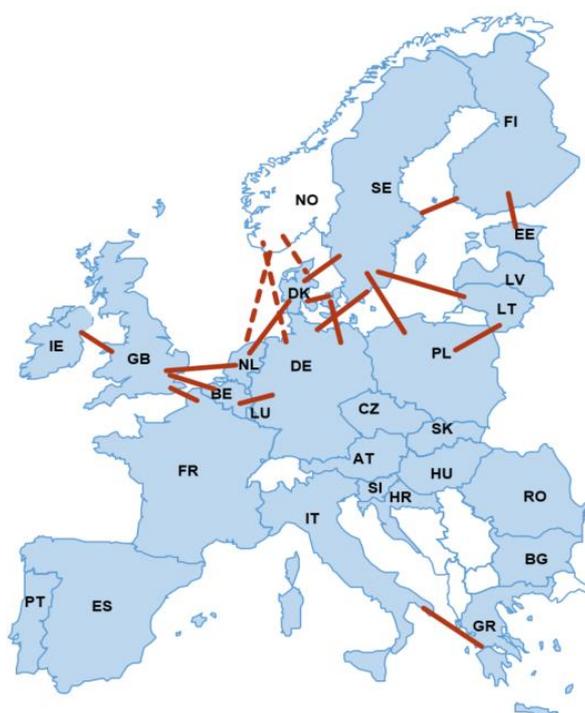
3.1 DC bidding-zone borders

3.1.1 Geographical scope of the monitoring of the MACZT

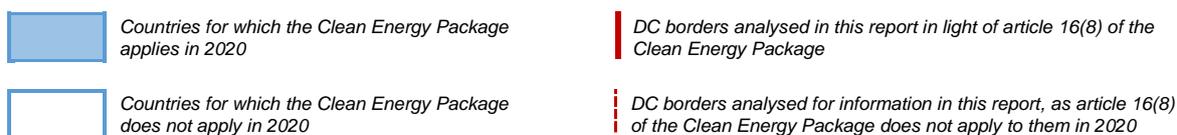
- (36) This section presents the results for the bidding-zone borders encompassing only high-voltage direct current (HVDC) interconnectors, hereafter called 'DC borders'. A total of 17 DC borders between EU bidding-zones have been reported: Belgium-Germany, Belgium-Great Britain, Germany-Denmark², Germany-Sweden⁴, Denmark1-Denmark², Denmark1-The Netherlands, Denmark1-Sweden³, Estonia-Finland, Finland-Sweden³, France-Great Britain, Great Britain-The Netherlands, Lithuania-Poland, Greece-Italy, Lithuania-Poland, Lithuania-Sweden⁴, Poland-Sweden⁴, Irish single energy market (SEM)-Great Britain. All these borders are subject to the minimum 70% target. In addition, while the DC borders Germany-Norway², the Netherlands-Norway² and Denmark-Norway² are not yet subject to the minimum 70% target²⁴, the results of monitoring the MACZT for these three borders are included for information.

²³ The case of Norway with regard to the consideration of exchanges between Norway and the EU for the monitoring of the MACZT is specific. On the one hand, Norway is a party to the European Economic Area (EEA) Agreement, which envisages the continuous implementation of relevant EU internal market legislation, including the energy-related one. On the other hand, the process to incorporate some cross-zonal capacity-related Regulation (e.g. the CACM Regulation) into the EEA-agreement and subsequent implementation in Norwegian law is not yet finished. In this context, to consider the exchanges between Norway and the EU as a part of the MACZT in the EU, some interim arrangements in line with the EC's guidance on the matter appear to be necessary. ACER was informed that an agreement was reached on the bidding-zone border between Norway and the Netherlands early 2021. This agreement did not yet apply in 2020. As a result, the influence of exchanges with Norway are, in general, not considered in the calculation of the MACZT. However, not all TSOs were able to report separately the exchanges with Norway in time for the publication of this report. Those exceptions are indicated in the note(s) below the relevant figures. Moreover, the amendment of the relevant CACM-related methodologies incorporating Norway to the relevant CCR(s) is planned soon.

²⁴ While the minimum 70% target does not yet apply for Norway, exchanges with Norway may be, in the near future, taken into account for the estimation of the MACZT in the EU. For more details, see footnote 23.

Figure 6: DC borders between bidding-zones in Europe – second semester of 2020

Source: ACER based on ENTSO-E public data.



Note: The map shows the approximate location of the interconnectors of the DC borders.

3.1.2 Data completeness and quality

(37) To enable the monitoring of the MACZT on DC borders, TSOs were requested to provide time series of:

- The Fmax available on the interconnectors, reduced by outages and operational security limits on the interconnectors themselves. TSOs were asked not to reduce the Fmax in case of an outage on other elements, e.g. in the AC network. In this case, those elements should be separately monitored, by reporting the limiting AC CNECs (see below);
- The offered capacity (NTC values) calculated by the TSO, before consolidation with the neighbouring country (i.e. before taking the minimum of the two TSOs' values when capacity is calculated unilaterally);
- If applicable, the allocation constraints applied by TSOs on these borders;
- If applicable, when TSOs are not able to offer the full capacity available on their interconnectors due to outages or congestions in their internal AC network, the corresponding AC CNECs that limit the capacity calculation on the DC border.

- (38) The table below includes an overview of the data provided, including the country of the TSO that provided the value. The cells in orange indicate that the relevant TSO did not provide the data, and that ACER had, instead, to rely on fallback data.

Table 1: Overview of the completeness of the data provided by TSOs for the monitoring of the MACZT on DC borders – second semester of 2020

DC Border	Maximum admissible flow (Fmax)	NTC values as calculated by each TSO		Allocation constraints	Limiting AC CNECs	
BE-DE	BE, DE	BE	DE		BE	DE
BE-GB	NemoLink	BE	GB via NemoLink		BE	GB
DE-DK2	DE, DK	DE	DK		DE	DK
DE-NO2	DE	DE	NO		DE	NO
DE-SE4	Baltic cable AB	DE	SE		DE	SE
DK1-DK2	DK	DK			DK	
DK1-NL	DK1, NL	DK	NL		DK	NL
DK1-NO2	DK	DK	NO		DK	NO
DK1-SE3	DK	DK	SE		DK	SE
EE-FI	FI	EE	FI	EE	EE	FI
FI-SE3	FI	FI	SE		FI	SE
FR-GB	FR	FR	GB		FR	GB
GB-NL	BritNed	GB	NL		GB	NL
GB-SEM		GB	SEM		GB	SEM
GR-IT	GR,IT	GR	IT		GR	IT
LT-PL	LT, PL	LT	PL	LT, PL	LT	PL
LT-SE4	LT	LT	SE	LT	LT	SE
NL-NO2	NL	NL	NO		NL	NO
PL-SE4	PL	PL	SE	PL	PL	SE

	The data was provided as requested.
	The data was not provided or not provided as requested, and ACER had to rely on fallback data
	The data item does not apply (not applicable) to the specific border (e.g. if allocation constraints are not applied), the relevant TSO did not have to provide the data (e.g. the Norwegian TSO) or the data was not provided and no fallback data can be used

Source: ACER analysis based on the data provided by TSOs.

Note 1: The country indicated in the columns refers to the entity (TSO or cable operator) or the country of the entity that provided the data item.

Note 2: Calculations of NTC values on DC borders are currently not coordinated. Each TSO usually calculates its own NTC value, considering only its own network constraints. The minimum of the two calculated NTC values is offered to the market. The NTC values used in MACZT monitoring are the capacity offered by the TSO, before alignment with the neighbouring TSO.

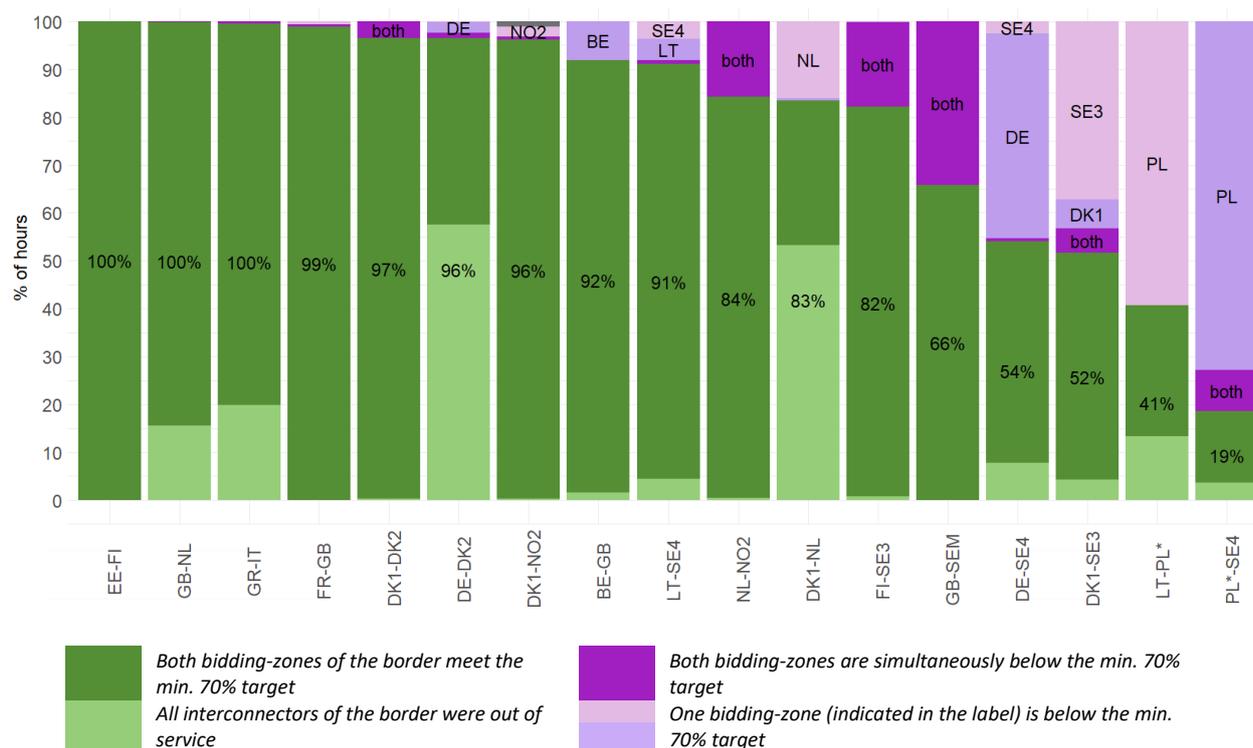
- (39) The information included in Table 1 allows to reach the following conclusions regarding the completeness and quality of the data provided by TSOs on DC borders:
- As for the first semester of 2020, the completeness was satisfactory for the Fmax values, NTC values, and allocation constraints: most TSOs provided all the requested data;

- The missing data did not impede totally the monitoring of the MACZT²⁵, as ACER was able to rely on alternative sources (ENTSO-E’s Transparency Platform);
- Very few TSOs (only the Belgian, German and Danish TSOs for their respective border with Great-Britain, Norway and Sweden) provided information on their internal elements limiting the capacity calculation on the DC borders. This is a slight improvement compared to the first semester, where only the Belgian TSO had provided this information. Still, for a significant number of borders and hours, TSOs did not always offer the full capacity corresponding to the maximum admissible flow on these borders, and did not provide the justification for it. Such justification should be either the allocation constraints, if any, responsible for it, and/or the element inside their internal network (typically AC CNECs) whose congestion prevented them to offer full capacity on the DC border. This subject is tackled in paragraphs (46) and (47).

3.1.3 Results

(40) Figure 7 below displays the percentage of hours for which the minimum 70% target was met, for both directions, per DC border, for the second semester of 2020. When the 70% was not met, the figure indicates the bidding-zone (or both bidding-zones) that did not meet the minimum 70% target.

Figure 7: Percentage of the time when the minimum 70% target was reached on DC borders – second semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note 1: The percentage of hours when the minimum 70% target is reached refers to the hours when the target is met simultaneously on both directions.

Note 2: The DC borders with Norway, where the minimum 70% target does not yet apply, are displayed for information. On these borders, the indication that ‘both’ countries are limiting is solely based on the

²⁵ See legend below Table 1.

information provided by the neighbouring TSO or information from the ENTSO-E Transparency Platform. As information from Norway was not requested, it could not be verified whether the limitation was simultaneously on both sides of the borders or only on the other side of the border.

Note 3: The DC borders Belgium-Germany and Germany-Norway² went live during the second half of the semester and are not included in the figure.

* On the Polish borders with Sweden and Lithuania, the calculations consider the impact of the allocation constraints limiting the total import (or export) capacity from (or to) Poland. When allocation constraints apply, the interconnectors with Poland can be used to accommodate exchanges between Sweden and Lithuania (via Poland); however, the application of the constraints effectively limits the trading possibilities with Poland.

- (41) The values shown in Figure 7 for the borders between Lithuania and Poland and between Poland and Sweden take account of the allocation constraints applied on the Polish side²⁶. When allocation constraints limit the exchanges with Poland, the interconnectors with Poland can still be used to accommodate exchanges between Sweden and Lithuania (via Poland); however, the application of the constraints effectively limits the trading possibilities with Poland. Therefore, the possibility to trade between Sweden and Lithuania is not included in the MACZT for Poland. Figure 17 in Annex 2 shows the impact of the allocation constraints introduced by Poland on the relative MACZT.
- (42) The border Belgium-Germany (the so-called “ALEGrO cable”) and Germany-Norway² (the so-called “NordLink”) went live during the second half of the studied semester. They are thus not part of the previous figure. For the border Belgium-Germany, the Belgian and German TSOs declared to have offered 100% of the available thermal capacity since the cable is fully operational, following the agreed ramp-up approach in the first two weeks after the commercial go-live. For the border Germany-Norway², the TSOs offered a MACZT on the interconnector between 0% and 50% since it went live, beginning of December 2020.
- (43) Complementing the analysis above, Figure 16 in Annex 2 shows the percentage of hours for which the minimum 70% target was met for each of the directions on the given DC border, for the second semester of 2020. This breakdown allows identifying that on some borders, the deviation from the minimum 70% target mostly occurs in one of the two directions. For example, the 70% target is reached considerably more frequently in the direction from Sweden to Germany (91% of the hours) than in the opposite direction (58%), or in the direction from Great Britain to the Irish Isle (97%) than in the opposite one (66%). In other cases (e.g. on the Polish-Swedish and Polish-Lithuanian borders), the frequency of deviation from the minimum 70% target is comparable in both directions.
- (44) For the second semester of 2020, derogations or action plans applied for a few DC borders: for Poland on its border with Sweden⁴, for Germany on its border with Sweden⁴, and for Germany and Denmark on the border Germany-Denmark² (the so-called Kriegers Flak Combined Grid Solution).
- (45) Finally, Figure 8 below shows the percentage of hours for which at least one of the two TSOs made available less than 95% of Fmax available on the border. For all hours, TSOs should provide the complete set of limiting network elements. In addition, TSOs should also declare any additional allocation constraint that they apply. More specifically, for DC borders, TSOs should declare any relevant internal elements whose congestion led to reduce the capacity made available to the market.
- (46) However, as presented in Table 1, only few TSOs provided such justification. The Polish TSO justified the reductions on the borders Poland-Sweden⁴ and Lithuania-Poland by the

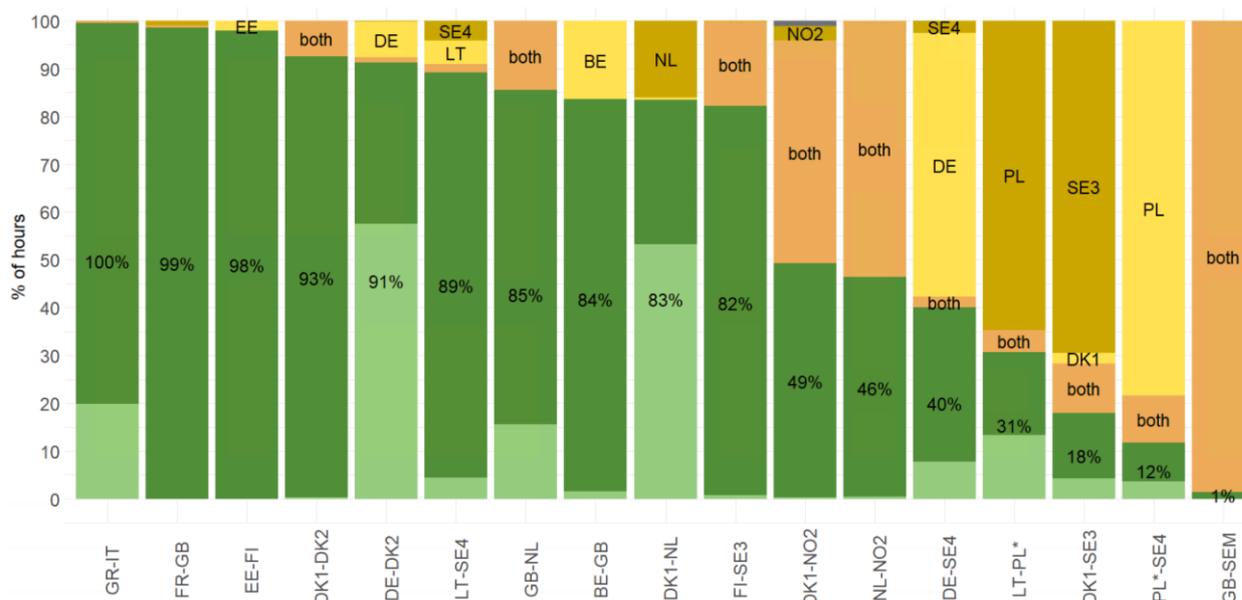
²⁶ The allocation constraint has been considered according to the Section 6.2.3 of the Recommendation.

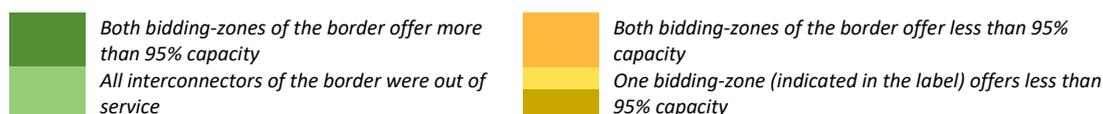
use of allocation constraints. The Belgian, German and Danish TSOs, justified the reductions on their respective borders with Great Britain, Norway and Sweden by the presence of congestions on internal AC CNECs. From the information provided by TSOs, the following can be derived:

- For the border Belgium-Great Britain, the Belgian TSO provided information on the limiting AC CNECs for 337 hours. On these CNECs, the MACZT was above the minimum 70% target for 51% of the time. In particular, over the 375 hours where the capacity provided by the Belgian TSO on the DC border was below 70% of Fmax, the TSO provided limiting CNECs for 165 hours. For one third of these 165 hours, the MACZT was above 70%.
- For the border Denmark1-Sweden3, out of the 740 hours where the capacity provided by the was below 70%, the Danish TSO provided information on the limiting AC CNECs for 74 hours. For these hours, the MACZT on these elements was always below the 70% minimum target.
- For the border Germany-Norway2, the German TSO provided information on the limiting AC CNECs for all hours since the go-live of the cable. On these AC CNECs, the 70% minimum target was only met for 16% of the hours since the go-live of the cable in the direction Norway to Germany, while in the other direction it was never met.

(47) In light of the frequent reductions of capacity below the maximum admissible flow shown in Figure 8 and the limited number of TSOs that provided justifications for the reductions, it can be concluded that there is a need for further transparency on a majority of DC borders. Particular attention is needed on borders where the capacity was often below the 70% minimum target, and no sufficient justification (e.g. by means of an AC CNECs) has yet been provided, for instance on the borders Germany-Sweden4 and Denmark1-Sweden3, for the Swedish side and on the borders, Great Britain-Irish SEM, or Netherlands-Denmark1, at both sides of the border.

Figure 8: Percentage of the time when the margin made available is below 95% of the maximum admissible flow on the border – second semester of 2020





Source: ACER calculation based on TSOs data.

Note 1: The percentage of the time when the margin made available is below 95% of the maximum admissible flow on the border refers to the hours when it below in at least one direction.

Note 2: The DC borders with Norway, where the minimum 70% target does not yet apply, are displayed for information. On these borders, the indication that 'both' countries offered less than 95% capacity is solely based on the information provided by the neighbouring TSO or information from the ENTSO-E Transparency Platform. As information from Norway was not requested, it could not be verified whether the limitation was simultaneously on both sides of the borders or only on the other side of the border.

Note 3: The DC borders Belgium-Germany and Germany-Norway² went live during the second half of the semester and are not included in the figure.

* On the Polish borders with Sweden and Lithuania, the calculations consider the impact of the allocation constraints limiting the total import (or export) capacity from (or to) Poland. When allocation constraints apply, the interconnectors with Poland can be used to accommodate exchanges between Sweden and Lithuania (via Poland); however, the application of the constraints effectively limits the trading possibilities with Poland.

3.1.4 Conclusions

- (48) Overall, the conclusion drawn in the report for the first semester are still largely valid. In general, the minimum 70% target was fulfilled most of the time on DC borders in the second semester of 2020. However, a few substantial exceptions apply, and the transparency on the causes of the reduction of capacity should be improved on most borders.
- (49) The lowest MACZT were observed on the following borders:
- The Polish borders with Lithuania and with Sweden, where the capacity was above the minimum 70% target for respectively 41% and 19% of the time. The reductions mostly relate to the application of allocation constraints on the Polish side. An action plan applies however on the border between Poland and Sweden, setting the target in the direction Poland to Sweden at 40% of Fmax for 2020. Based on ACER's estimations, the MACZT was above this target 37% of the time for the second semester.
 - The border between Denmark 1 and Sweden 3 (Konti-Skan HVDCs), where the capacity was above the minimum target for 52% of the hours, mainly due to reductions on the Swedish side.
 - The border between Germany and Sweden⁴ (the so-called Baltic cable) where the minimum 70% target was reached for 54% of hours (+31% percentage points compared to the first semester), almost exclusively due to constraints on the German side. The relevant German TSO (TenneT) attributes the reductions to the presence of congestions at the distribution network level. Currently, an action plan applies in Germany, whereby the target capacity for this border is established at 41% of Fmax in 2020. Based on the data provided by TSOs²⁷ and the estimations made by ACER, the MACZT was above such target for both directions 93% of the hours in the second semester of 2020.

²⁷ Which includes the consideration that the HVDC interconnector was the only CNEC monitored. See further considerations on this issue in paragraphs (45) to (47).

- The border between Great Britain and the Irish SEM where the capacity, from the Irish SEM to Great Britain, was above the minimum target for 66% of the hours. The location of the constraints leading to reduced capacities could not be precisely identified with supporting hourly data from the TSOs²⁸.
- (50) On these borders, and more generally, on borders where the capacity was often reduced below the maximum admissible flow (e.g. Denmark1-Netherlands and Netherlands-Norway2), TSOs should declare any relevant internal elements whose congestion led to reduce the capacity made available to the market.
- (51) Overall, while the quality of the data provided by TSOs on DC borders improved compared to the first semester, the need to better report the reasons leading to reduction below the maximum admissible flow remains. In particular, TSOs should inform on the AC CNECs limiting capacity calculation on DC borders, and the need for identifying these CNECs should be reflected in the relevant CCMs.

3.2 AC bidding-zone borders

3.2.1 Geographical scope of the monitoring of the MACZT

- (52) This section presents the results for the bidding-zone borders encompassing only AC interconnectors or a combination of AC and DC interconnectors on the same border. The results of monitoring the MACZT on AC borders are organised according to the existing capacity coordination areas²⁹.
- (53) For the coordination areas comprising several countries, the results are presented per coordination area; then, the performance of each country regarding the MACZT, within the coordination area, is analysed. This is the case for the South West Europe (SWE) region, Subsection 3.2.3.1, the Italy North region, Subsection 3.2.3.2, and the Central West Europe (CWE) region, Subsection 3.2.3.3.
- (54) Elsewhere, the results are displayed per country, and per coordination area within the country, when a country encompasses different coordination areas. The results for the countries that fall under this category are presented in Subsection 3.2.3.4.
- (55) Finally, the Subsection 3.2.3.5 present additional figures for all the countries and coordination areas
- (56) While ACER aimed to monitor the MACZT on all EU borders, insufficient or no data was provided for most of the Nordic and Baltic region. It impeded ACER to monitor the MACZT on the AC borders of these two regions³⁰. ACER however expects the Nordic TSOs to provide the data necessary to monitor the MACZT in the near future. The set of data provided to ACER was also limited for the Italy North region, thus the monitoring of the MACZT was only partial in this area. Elsewhere, the analysis of the MACZT was possible. More details on the completeness and quality of the data provided is included in the Subsection 3.2.2.

²⁸ For more details, please refer to footnote 7.

²⁹ See the definition of coordination areas in paragraph (26).

³⁰ With the main exception of Finland, where the Finnish TSO provided MACZT values, although the methodology followed to calculate those values was not in line with the Recommendation. See paragraph (61) for more details on the data collection from the Nordic TSOs.

3.2.2 Data completeness and quality

- (57) To enable the monitoring of the MACZT on AC borders, ACER requested TSOs to provide:
- Necessarily:
 - The description of their coordination areas (i.e. the bidding-zone borders on which a coordinated capacity calculation applies);
 - The list of all CNECs (for flow-based coordination areas) or at least limiting CNECs per direction and coordination area (for NTC-based countries), for all hours, and the Fmax of each CNEC;
 - Either:
 - The PTDFs on all relevant borders; or
 - At least one representative merged grid model and the grid model identifiers of the CNECs in the merged grid model, to allow ACER to calculate the PTDFs. The PTDFs describe the impact of a commercial exchange between two bidding-zones on a CNEC.
 - When and where relevant:
 - The allocation constraints applied by TSOs, if any;
 - The offered capacity (NTC values) calculated by the TSO, before consolidation with the neighbouring country (i.e. before taking the minimum of the two TSOs' values);
 - The TSO's forecasts of cross-zonal exchanges between countries at the time of capacity calculation.
- (58) TSOs were offered the possibility to perform themselves, partly or fully, the calculations of the MACZT and to provide the intermediate and/or final results to ACER. In this case, ACER required that the underlying calculations be performed in line with the Recommendation. ACER evaluated both the quality of the data and the alignment of TSOs' calculation with the Recommendation.
- (59) Table 2 provides a summary of the completeness and quality of the data provided to ACER. This summary should be considered together with Table 4 in Annex 3, which presents the actual data used by ACER in the report to estimate the MACZT on AC borders, and related justifications when ACER was unable to directly use TSOs' estimations.

Table 2: Overview of the completeness and quality of the data provided by TSOs for the monitoring of the MACZT on AC borders – second semester of 2020

CCAs	Country	TSO	Overall ACER's assessment of data completeness and quality	Observations
CWE	AT	APG		
	BE	Elia		The MNCC values provided without third countries did not exclude Norway.
	DE	TenneT		The MNCC values provided were not calculated in line with the Recommendation. ACER recalculated them.
		Transnet		
	FR	RTE		
NL	TenneT		The data necessary to calculate the MNCC values without third countries were not provided in time for the report.	
Italy North	AT	APG		Despite improvements compared to the first semester 2020, no information on CNECs was provided for 59% of the hours of the semester. ACER could not monitor the MACZT in line with the Recommendation for these hours
	FR	RTE		
	IT	TERNNA		
	SI	ELES		
SWE	ES	REE		
	FR	RTE		
	PT	REN		
AT-CZ, AT-HU, AT-SI	AT	APG		
BG-GR	BG	ESO		
BG-RO				
AT-CZ, CZ-DE, CZ-PL, CZ-SK	CZ	CEPS		
DE-CZ and DE-PL	DE	TenneT		The MNCC values provided were not calculated in line with the Recommendation. The MCCC values provided did not take into account the technical profile in line with the Recommendation. ACER recalculated them.
		50Hz		
DE-DK1		TenneT		The MNCC values provided were not calculated in line with the Recommendation. ACER recalculated them.
DE-DK1	DK	Energinet		No grid model and no CNECs were provided; no monitoring was possible.
DK-SE				
FI-SE1	FI	Fingrid		The MCCC and MNCC values provided were not calculated in line with the Recommendation. The absence of merged grid model did not allow ACER to recalculate the values in line with the Recommendation.
BG-GR	GR	IPTO		
HR-HU	HR	HOPS		
HR-SI				
	LU	CREOS	Not applicable	Luxembourg is part of the DE/LU bidding-zone.
AT-HU	HU	MAVIR		
HR-HU				
HU-RO				
HU-SK				
EE-LV	EE	Elering		No grid model and no CNECs were provided; no monitoring was possible.
LT-LV	LT	Litgrid		No grid model and no CNECs were provided; no monitoring was possible.
EE-LV, LT-LV	LV	AST		No grid model and no CNECs were provided; no monitoring was possible.
CZ-PL, CZ-DE, CZ-SK	PL	PSE		The MCCC and MNCC values provided were not calculated in line with the Recommendation. ACER recalculated them.
BG-RO, BG-HU	RO	Transelectrica		
DK-SE	SE	SVK		No grid model and no CNECs were provided; no monitoring was possible.
FI-SE1				
AT-SI	SI	ELES		
HR-SI				
CZ-SK	SK	SEPS		
HU-SK				
PL-SK				

 All data was provided as requested.

 Most or all data was provided. Some non-critical elements were missing or the provision of data was not fully in line with the Recommendation. The impact on the MACZT results was limited and/or fallback data could be used.

 Most or all data was provided. Some essential elements were missing or the provision of data deviated significantly from the Recommendation. The impact on the MACZT results was relevant and/or using fallback data was not always possible.

 No or insufficient data provided. Monitoring MACZT was not possible at all, or only very limitedly.

- (60) The information included in Table 2 allows to reach the following conclusions regarding the level of completeness and quality of the data provided by TSOs on AC borders:
- In general, quality improved compared to the previous semester and to the previous preliminary ACER's analysis of the MACZT³¹;
 - However, certain aspects still hamper the correct monitoring of the MACZT, and may put at risk the comparability of the results between countries.
- (61) The most outstanding data quality issue relates to the countries of Baltic and the Nordic regions, where TSOs provided close to no data. In both regions, the lack of data was mainly attributed by TSOs to the absence or difficulties to provide merged grid models. While these grid models are not yet developed in the Baltic region³², they are relatively advanced in the Nordic countries. ACER expects the Nordic TSOs to provide the data necessary to monitor the MACZT in the near future³³.
- (62) TSOs should provide the complete set of limiting network elements for all hours. In addition, TSOs should also declare any additional allocation constraint that they apply. In some occasions, in particular in Italy North, TSOs were not able to report on the limiting CNECs for more than half of the hours of the semester, preventing the monitoring during these hours.
- (63) Moreover, when TSOs made calculations by themselves, they did not always follow the Recommendation. To ensure a consistent monitoring of the MACZT, ACER needs to ensure that a harmonised approach is followed. When necessary, ACER recalculated any values that were not estimated by TSOs in line with the Recommendation (see more details in Table 4 in Annex 3).
- (64) Finally, TSOs provided the data to ACER individually, with little or no coordination even when TSOs belong to the same capacity coordination area. This resulted in inconsistencies inside coordination areas, sometimes hampering the identification of the country and TSO's area where the limiting CNEC was located for each hour, e.g. in the Italy North region³⁴. TSOs belonging to the same coordination area should, at least ensure consistent data; and preferably, they should submit the data jointly, rather than individually.

³¹ While the legal requirement stemming from Article 16(8) of the recast Electricity Regulation did not yet apply, the 2018 market monitoring report (MMR) included a preliminary analysis of the MACZT, and the scope for improvement with regard to the minimum 70% target, where sufficient information was available, for the period between 2016 and 2018. The 2018 MMR is available at:

https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Market%20Monitoring%20Report%202018%20-%20Electricity%20Wholesale%20Markets%20Volume.pdf

³² The Baltic regulatory authorities informed that merged grid models would not be available before the synchronisation of the electricity systems of the Baltic States with the ones in Continental Europe, expected for 2025. ACER encourages the Baltic TSOs to accelerate the development of merged grid models, and the identification of the limiting network elements on hourly basis, to enable the monitoring of the MACZT as soon as possible.

³³ On 30 April 2021, following numerous interactions with the Nordic NRAs and TSOs, ACER issued a decision to formally request from the Nordic TSOs the data needed to ACER to perform the monitoring. It is expected that Nordic TSOs will provide the missing data for the whole year 2020 by 25 June 2021.

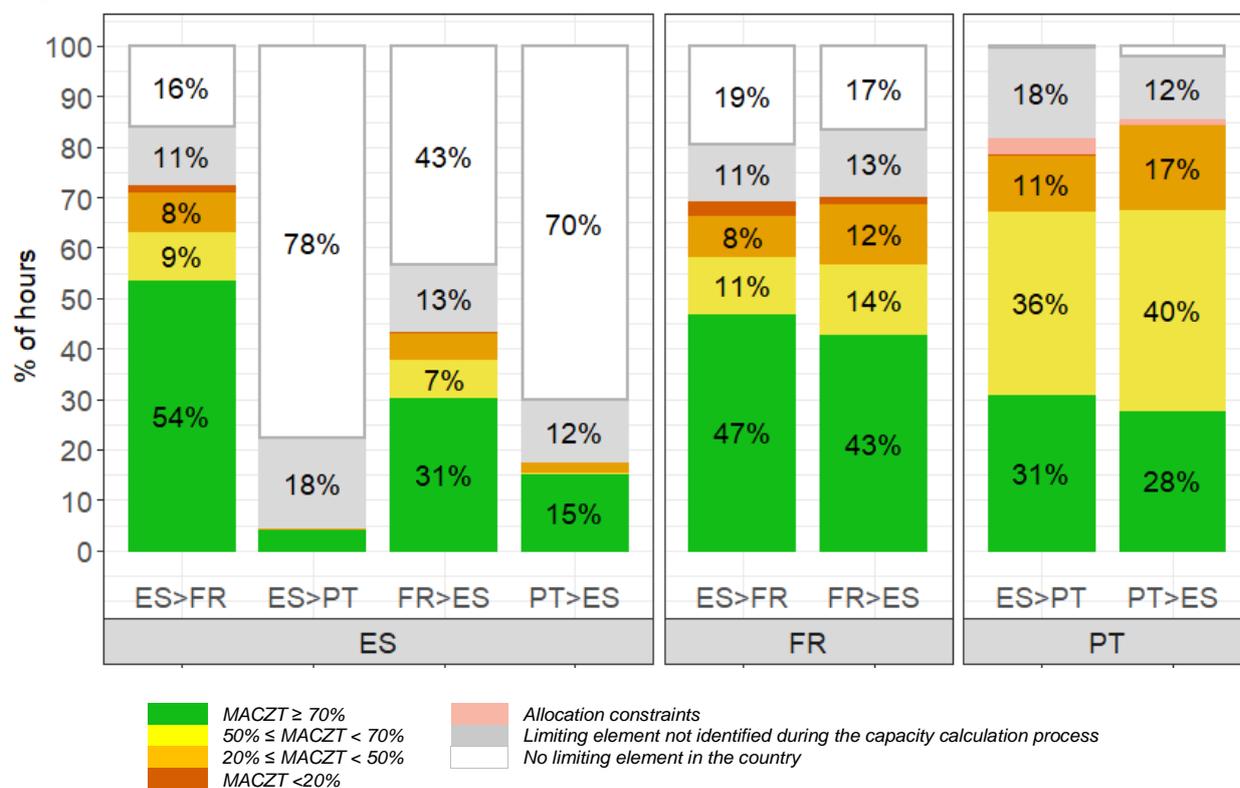
³⁴ In this region, while the Italian TSO provided information on limiting CNECs for the whole region, the other TSOs only provided CNECs referring to its own network. TSOs did not organise any coordinated submission of the data to ACER. ACER only used the information provided by each TSO for its own network.

3.2.3 Results

3.2.3.1 South West Europe region

(65) Figure 9 shows the percentage of hours for which the relative MACZT is above the 70% minimum target, or within a set of predefined ranges (50-70%, 20-50%, <20%). The information for the SWE region is displayed per country, and per border-direction³⁵. The figure also indicates the percentage of hours for which: i) the capacity calculation was limited by allocation constraints; ii) the capacity calculation in SWE was not successful in identifying the limiting CNEC and no allocation constraint was applied. In these two cases, TSOs reported that they were unable to provide information on the CNEC(s) that is limiting the capacity calculation, or would have limited it, should the capacity calculation process had been successful. Finally, the figure describes the percentage of hours for which the limiting CNEC is, from the perspective of the country, located in the neighbouring country, and therefore the TSO had no limiting CNEC to report.

Figure 9: Percentage of the time when the minimum 70% target was reached (green), the margin was below the target, or when the margin could not be estimated, per oriented border, in the SWE region – second semester of 2020 (% of hours)



MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Note 1: 'No limiting element in the country' means that the limiting element was located in the network of the neighbouring TSO.

Note 2: When the limiting element was an interconnector, it was declared by the two TSOs on each side of the border. This is why the overall percentage of the time when limiting elements are reported on a given border-direction, considering the two TSOs taken together, is above 100%.

³⁵ Despite the fact that the SWE region encompasses two borders, one limiting CNEC is determined for each border separately for each hour.

Note 3: ‘Limiting element not identified during the capacity calculation process’ refers to hours for which the capacity calculation process was not successful in calculating a NTC value (in this case, TSOs used default capacity parameters to define the level of capacity made available to the market) or identifying the limiting element. The reasons reported by TSOs were information system failure or load-flow divergence.

Note 4: The figure does not consider the influence of exchanges with third (non-EU) countries. For Portugal, this impact could be estimated but was limited. For France and Spain, the necessary information to estimate this impact was not available. For these reasons, no additional figure considering exchanges with third countries was produced.

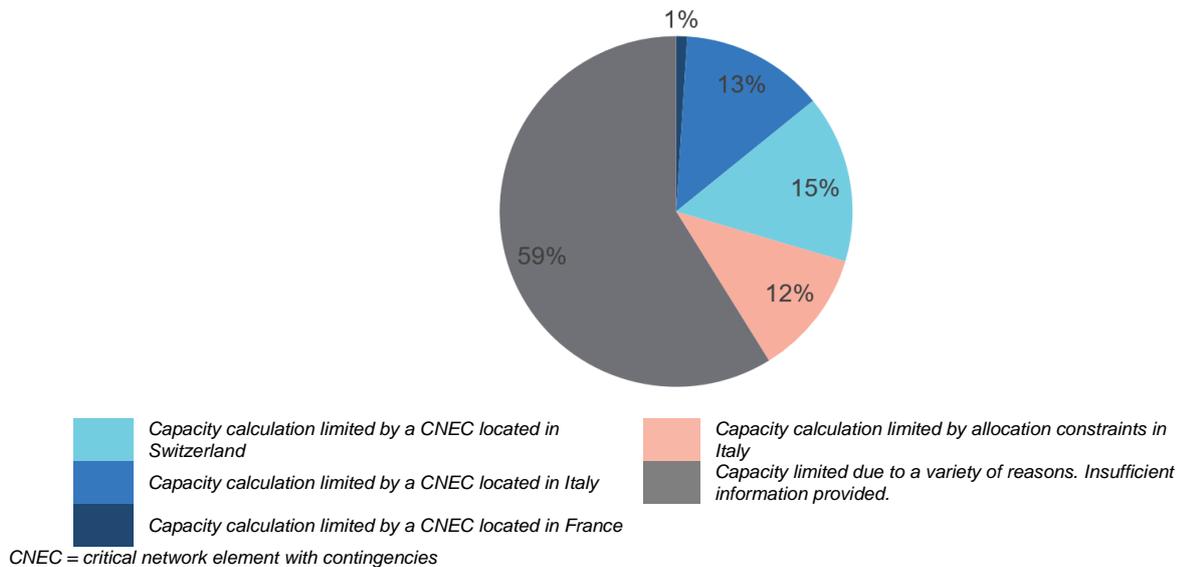
- (66) Overall, there are no significant changes in Figure 9 compared to the first semester of 2020. On the border between Portugal and Spain, the limiting CNEC was almost always located on the Portuguese side of the border. On the border between France and Spain, the limiting CNEC was most often an interconnector.
- (67) For Portugal, the minimum 70% target was met during more than 35% of the hours when a Portuguese CNEC was limiting capacity between Spain, in the second semester of 2020. This is less than for the first semester, when the target was reached for more than 60% of these hours. For both Spain and France, the minimum 70% target was met for around 60% of the time when a limiting CNEC was reported. These results are slightly better for Spain compared to the first semester of 2020.
- (68) In addition, for around 15% of the hours, the use of allocation constraints or technical issues of various kinds³⁶ impeded the identification of the CNECs limiting cross-zonal capacity and thus the monitoring of the MACZT. Compared to the first semester, this means an increase in the number of hours when monitoring the MACZT was not possible.
- (69) Further details on the levels of the MACZT in the SWE region are included in Figure 18 in the Annex 3, which shows the density function of the lowest hourly relative MACZT of the limiting CNECs per country, in the SWE region, in the second semester of 2020.

3.2.3.2 Italy North region

- (70) Figure 10 presents the causes limiting capacity calculation, and their frequency in the Italy North region during the second semester of 2020. Figure 11 shows the percentage of hours for which the MACZT was above, or below, the minimum 70% target, and when cross-zonal capacity was limited by allocation constraints introduced by TSOs, or other reasons, further described in paragraph (71).

³⁶ The allocation constraints were reported by TSOs as being caused by ‘insufficient generation and load shift keys (GLSKs)’, and the other issues were reported as follows: “Information Technology (IT) issues” or “load-flow divergence”.

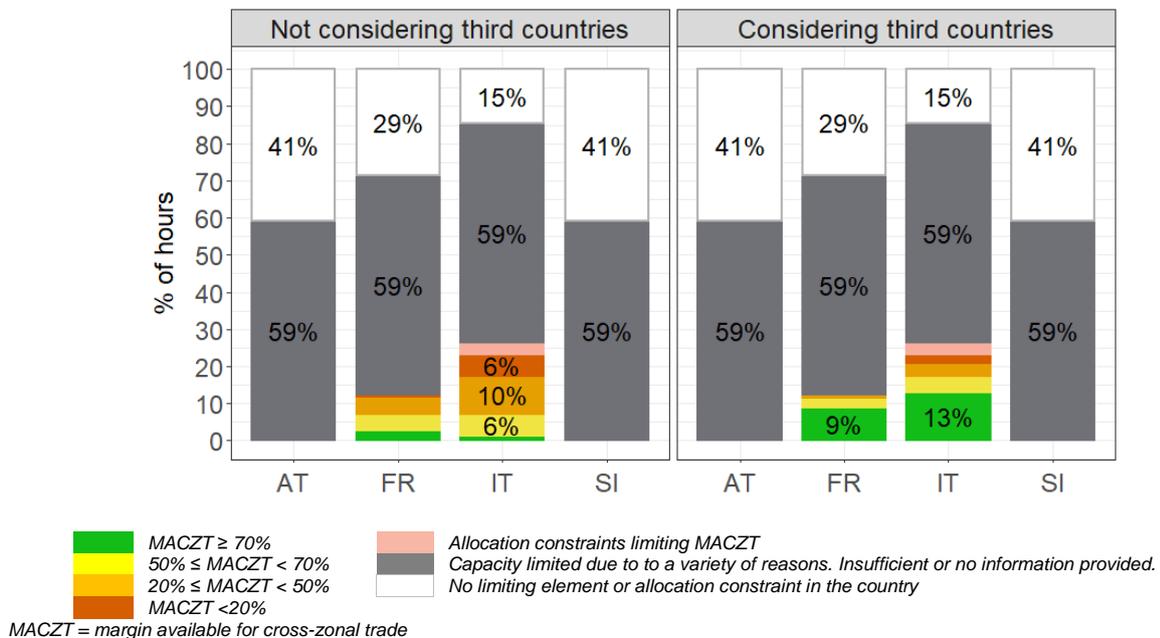
Figure 10: Causes of limitation of the capacity calculation, in Italy North region – second semester of 2020 (% of hours)



Source: ACER based on TSOs data.

Note: The percentages describing the location of the limiting CNEC are approximate because multiple CNECs belonging to different bidding-zones may have been declared by TSOs for the same hour.

Figure 11: Percentage of the time when the minimum 70% target was reached (green), when the margin was below the target, or when the margin could not be estimated, per country, in Italy North region, not considering (left) and considering (right) exchanges with third countries – second semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note: 'No limiting element or allocation constraint in the country' means that the limiting element or allocation constraint was located in the network of another TSO in the region.

- (71) Overall, the Figure 11 shows that, for monitoring the MACZT, the level of transparency in the Italy North region is still poor, though better than for the first semester of 2020. The effective monitoring of the MACZT on CNECs was only possible for around 40% of the hours. The remaining time (59% of the hours), ACER was not provided with information on the limiting CNEC. TSOs declared that the allocation of cross-zonal capacity in the region was limited due to a variety of reasons³⁷, mainly reported as 'capacity reduced by a TSO in the validation phase' or 'failure to report the limiting CNEC'. TSOs reported that the reduction in validation phase have been requested by Switzerland (92% of the cases) and Italy (8% of the cases).
- (72) For the 40% of the hours when a limiting CNEC was declared, it was located mainly in Switzerland³⁸ and Italy, and in France. No limiting CNECs were declared in Austria and Slovenia, thus no level of MACZT were calculated for these two countries for the second semester of 2020. Figure 19 in Annex 3 shows the density function of relative MACZT on Italian and French CNECs, for the hours for which detailed data was available.
- (73) An important remark underlying the analysis for the Italy North region is that the influence of the exchanges with Switzerland on the potential fulfilment of the MACZT target is significant, as shown in Figure 11. To date, ACER has not been made aware that an agreement between the region and Switzerland, in line with EC's guidance (see paragraph (34)) has already been concluded. The figure shows that when the exchanges with Switzerland are included in the MACZT analysis, France and Italy would be above the minimum 70% target for respectively 72% and 56% of hours for which CNECs have been declared. These conclusions are restricted to the reduced number of hours for which ACER received information.

3.2.3.3 Central West Europe region

- (74) In the CWE region, flow-based capacity calculation applies since 2015. The MACZT can be accurately calculated on all CNECs relevant in the capacity calculation, and not only on the limiting ones. The higher data granularity provided for this region allows presenting the results in a more detailed manner. For example, Figure 21 to Figure 26 in Annex 3 display the density functions of the MACZT for all CNECs declared, per TSO, in the CWE region in the second semester of 2020.
- (75) ACER, as it described in the Recommendation, deems it necessary that the MACZT is monitored on all CNECs individually, on every hour, and not as an average performance of all CNECs taken together³⁹. To consider that the minimum 70% target must be met by all CNECs individually is equivalent to consider that the target should be met on the CNEC with the lowest relative MACZT among all CNECs, for each hour. Figure 12 and Figure 13 thus focus on the performance of the CNEC with the lowest relative MACZT, per hour, per Member State in the CWE region.

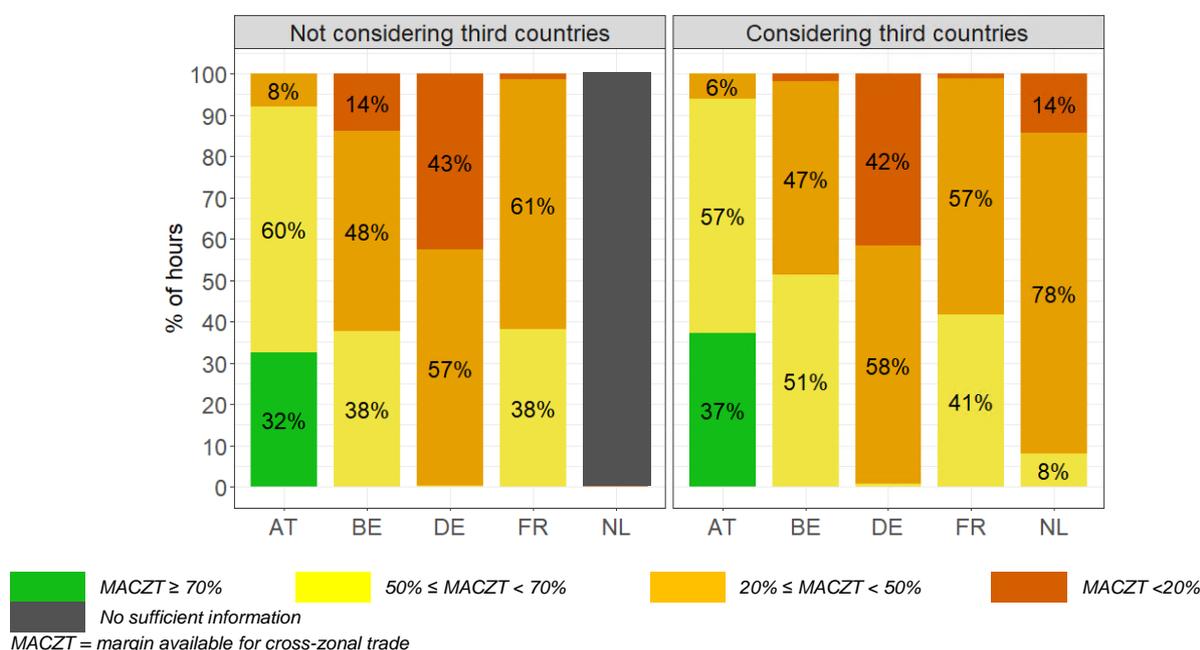
³⁷ Based on interactions with the TSOs, such reasons are very diverse and include operational security issues and difficulties for the TSO to successfully complete the capacity calculation process.

³⁸ The article 16(8) does not yet apply in Switzerland, so the level of MACZT on the Swiss CNECs is not presented in the present report.

³⁹ If average values across all CNEC were considered for the assessment of the MACZT, the results of the monitoring could be misleading. For example, a TSO may offer more than 70% margin on 90% of its CNECs, and low margin on the remaining 10%, systematically for each hour. In this situation, looking at all CNEC taken together would lead to conclude good performance, while in practice the offered capacity could be strongly limited by the 10% of CNECs with low margin, and the target would never be met.

(76) Figure 12 shows the percentage of hours for which the relative MACZT was above the minimum 70% target for all CNECs, per country. Figure 13 describes the density of the hourly minimum relative MACZT on CNECs, per country, in the CWE region. Both figures indicate the effort required to ensure that at least 70% capacity is offered on all CNECs at all times. They show that the greatest effort will be required in Germany. Significant effort is also needed in the Netherlands, in Belgium and in France. Some effort would also be necessary in Austria. Overall, the deviation from the minimum 70% target was, for all CWE countries, slightly higher than in the first semester of 2020

Figure 12: Percentage of the time when the minimum 70% target was reached (green) or the margin was below the target, per country, in the CWE region, not considering (left) and considering (right) exchanges with third countries – second semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

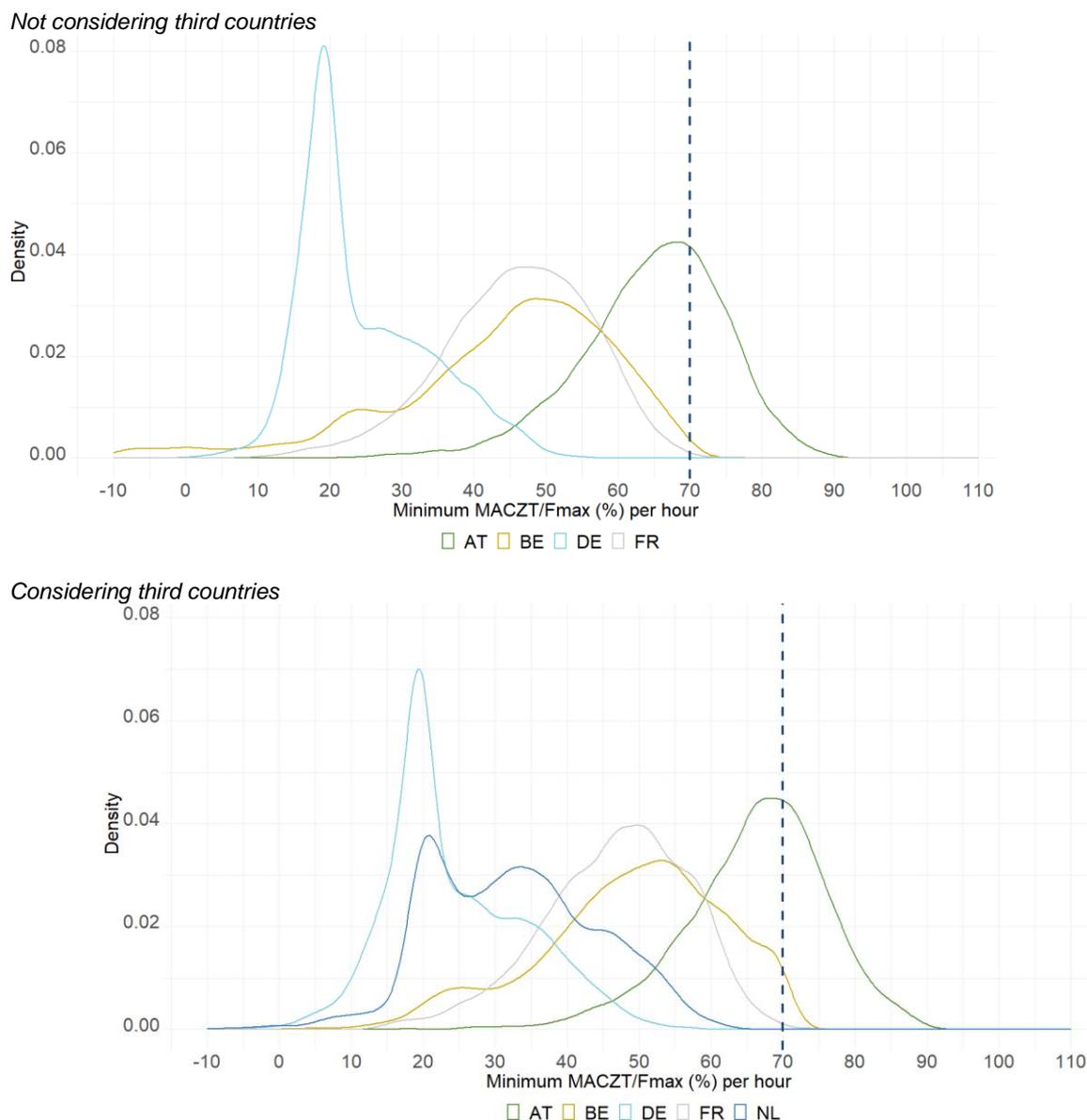
Note 1: The MACZT for Belgium includes the impacts of exchanges between the EU and Norway. For the Netherlands, the TSO did not provide the data necessary to calculate the MACZT not considering third countries in time for the report.

Note 2: Belgium and the Netherlands declared allocation constraints limiting the total exchanges from and/or to these two countries. Allocation constraints are separately monitored and thus not considered in this figure.

Note 3: The figure is presenting the level of the MACZT, which is different from the ‘RAM’ as described in the Core and CWE flow-based capacity calculation methodologies.

(77) An important caveat underlying the performance of Member States is that low MACZTs may originate from inside (e.g. from structural internal congestion or lack of redispatching potential) or outside a given bidding-zone (e.g. from loop flows of neighbouring bidding-zones). Increasing the MACZT of one bidding-zone may depend on the efforts made in the neighbouring bidding-zones.

Figure 13: Density function of the lowest hourly relative MACZT per country, in the CWE region, not considering (top) and considering (bottom) exchanges with third countries – second semester of 2020



MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Note 1: The MACZT for Belgium includes the impacts of exchanges between the EU and Norway. For the Netherlands, the TSO did not provide the data necessary to calculate the MACZT not considering third countries in time for the report.

Note 2: Belgium and the Netherlands declared allocation constraints limiting the total exchanges from and/or to these two countries. Allocation constraints are separately monitored and thus not considered in this figure.

(78) In addition to defining CNECs, the TSOs may define other type of constraints to be considered in capacity calculation, that are not directly associated with CNECs. In CWE region, the Belgian and Dutch TSOs apply constraints that limit the maximum total import

and/or export values over their own bidding-zone. These constraints can reduce the flow-based domain offered to the capacity allocation⁴⁰.

- (79) As foreseen by the Recommendation, ACER assessed whether the allocation constraints would become relevant should the 70% minimum target be reached on all CNECs. The analysis showed that during the second semester of 2020, would the minimum 70% target had been reached on all CNECs in the country in question for all hours:
- The allocation constraints applied by the Belgian TSO would not have restricted the flow-based domain; and
 - The allocations constraints applied by the Dutch TSO would have restricted the flow-based domain for 24% of the time.
- (80) Moreover, Annex 3 includes additional figures related to the MACZT in the CWE region. This comprises the following:
- Density function, per TSO, of relative MACZT for all CNECs, with and without exchanges with third countries (Figure 21 to Figure 26); and
 - When relevant, the distribution of the lowest hourly MACZT compared to the target set by the derogation(s) and/or action plan (
 - Figure 27 to Figure 29).

3.2.3.4 Other countries and coordination areas of Continental Europe

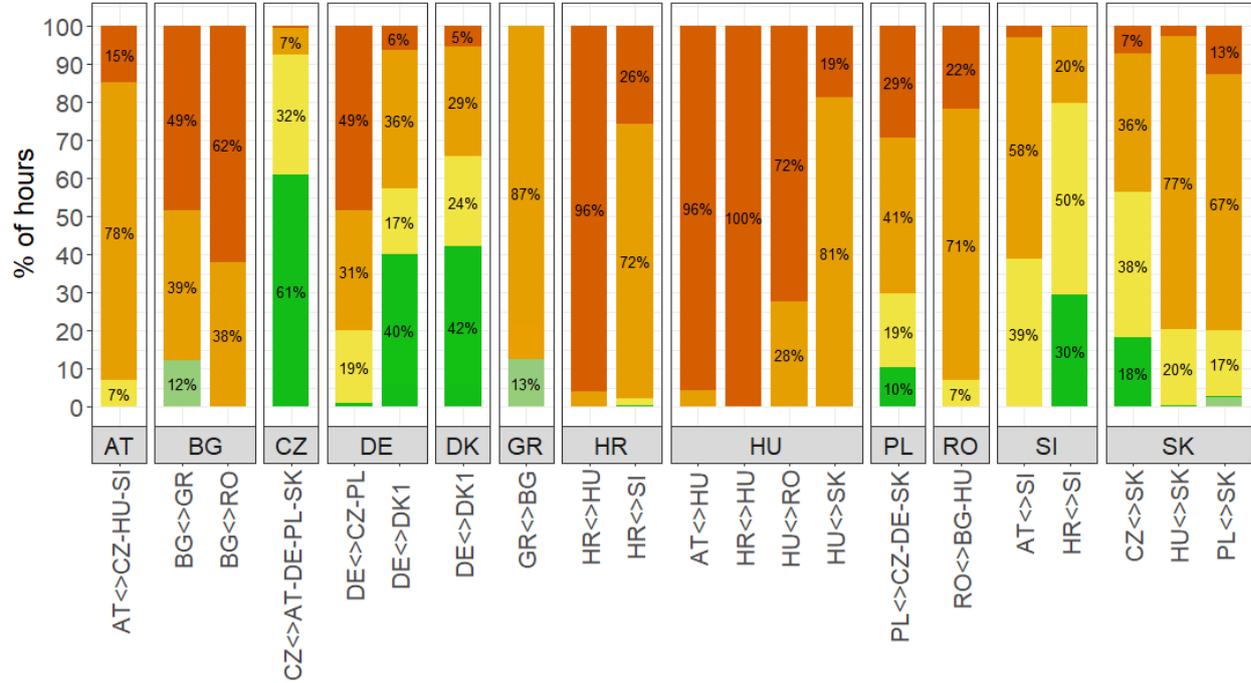
- (81) Besides the regions included in the previous subsections, coordinated capacity calculation is not yet implemented for the rest of Continental Europe. This subsection monitors the MACZT for those coordination areas and countries where a larger scope of coordination in capacity calculation is not yet in place.
- (82) More precisely, capacity calculation is not coordinated across countries, but it may be coordinated for several borders within a country, forming a national coordination area, as described in the methodological paper⁴¹. For example, the Austrian TSO performs simultaneous capacity calculation for the Czech, Hungarian and Slovenian borders within Austria; therefore, those borders are analysed from two perspectives: firstly, from the perspective of Austria taken all borders together, and secondly, from the perspective of, respectively, the Czech Republic, Hungary and Slovenia.
- (83) In view of this, Figure 14 shows the percentage of hours for which the MACZT was above, or below, the minimum 70% target, organised per country and coordination area within a country.

⁴⁰ If a constraint is effectively limiting at the time of capacity allocation, i.e. at the time of market clearing, then the said constraint is considered to be 'active'. The Dutch and Belgian TSOs both declared that those constraints were never active during the second semester of 2020. However, even if a constraint is not active, it may restrict the flow-based domain, and should thus be monitored.

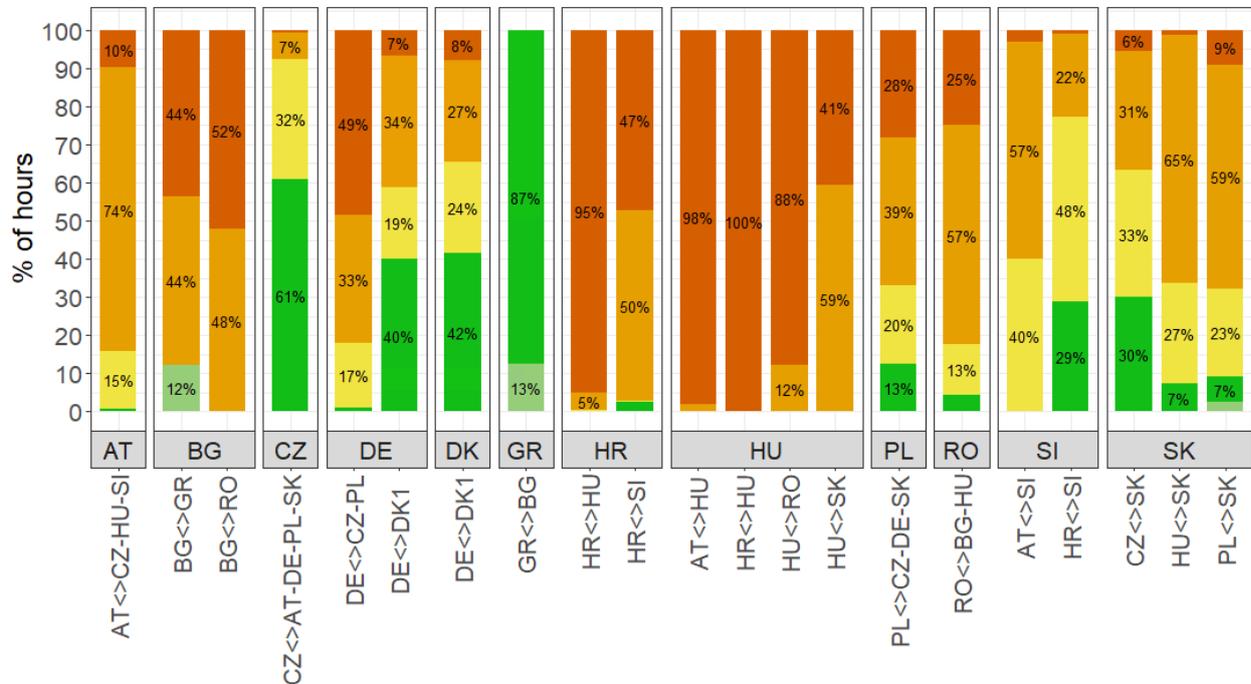
⁴¹ See Section 3.1 of the methodological paper.

Figure 14: Percentage of the time when the minimum 70% target was reached (green) or the margin was below the target, per country and coordination area, for countries of Continental Europe where a coordinated capacity calculation is not yet implemented, not considering (top) and considering (bottom) exchanges with third countries – second semester of 2020 (% of hours)

Not considering third countries



Considering third countries



■ MACZT ≥ 70%
 ■ 50% ≤ MACZT < 70%
 ■ 20% ≤ MACZT < 50%
 ■ MACZT < 20%
■ All interconnectors of the coordination area are out of service
 MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Note 1: The percentage of hours during which the relative MACZT reaches the minimum 70% target refers to the hours when the target is met simultaneously on all limiting elements in both directions.

Note 2: The figure considers the impact of the technical profiles of Poland (Polish borders with Czech Republic, Germany and Slovakia), after considering allocation constraints, and the technical profile of Germany (German borders with Czech Republic and Poland).

- (84) Overall, Figure 14 shows that the margin for improvement with respect to the minimum 70% target is substantial across the analysed countries and coordination areas. The MACZT is rarely above the minimum 70% target. The main exceptions are the AC borders between Germany and Denmark⁴² (where the target is met for more than 40% of the hours), Czech Republic (more than 60% of the hours), Slovenia (30% of the hours on the border with Hungary) and Slovakia (18% of the hours for the border with Czech Republic) and Poland (10% of the hours).
- (85) Compared to the first semester, Figure 14 shows notable improvement in the performance of Denmark, Slovenia, and Bulgaria. It can largely be attributed to a more precise identification of the limiting CNECs and/or calculation of the MACZT. Other countries/coordination areas, such as Czech Republic, Germany (on the border with Czech Republic and Poland), Greece, and Hungary, on the border with Slovenia, also performed better than during the first semester. On the contrary, Germany (on the border with Denmark), Poland and Slovakia show a worse performance than in the first semester.
- (86) An important remark underlying the analysis is that in the absence of agreements with third countries⁴³ the exchanges with third countries are not, by default considered for the estimation of the MACZT. The impact of considering or not these exchanges may be significant, in particular for countries bordering non-EU countries. Figure 14 shows that this impact is particularly noticeable for Greece, which borders Albania and North Macedonia, Slovakia, which borders Ukraine, and Romania, which borders Ukraine and Serbia.
- (87) Finally, Annex 3 includes additional and country-specific figures related to the results of monitoring the MACZT. This includes the following:
- The percentage of hours for which the MACZT on the limiting CNEC(s) is above the minimum 70% target, per country and coordination area for oriented borders (Figure 30); and
 - When relevant, the distribution of the lowest hourly MACZT compared to the target set by the derogation(s) and/or action plan (Figure 31 and Figure 32).

3.2.3.5 Other relevant results for all countries and coordination areas in the EU

- (88) As seen in Subsections 3.2.3.1, 3.2.3.2, 3.2.3.3 and 3.2.3.4, the levels of MACZT on AC borders are very diverse across EU regions, ranging from countries and coordination areas reaching the 70% minimum target for a significant share of the time, to countries and coordination never reaching the 70% minimum target during the second semester of 2020.
- (89) Figure 15 below displays the average relative MACZT over all the CNECs, in all directions, that do not meet the 70% minimum target, across EU Member States and coordination areas. It shows that the scope for improvement on the CNECs that do not reach the target

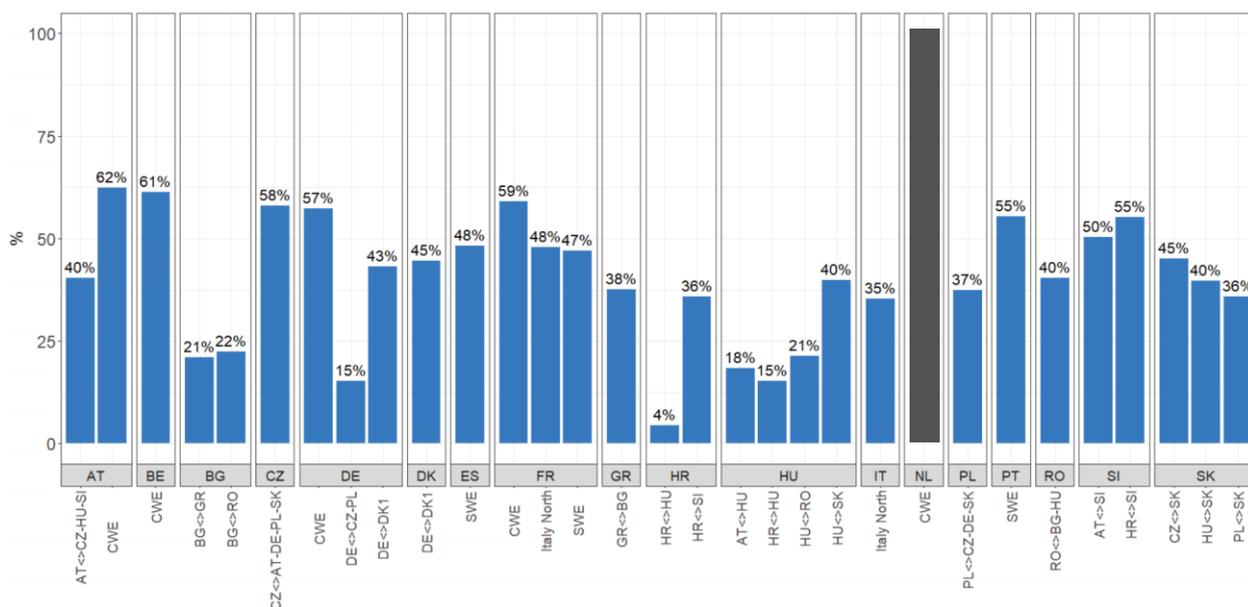
⁴² In 2017, Germany and Denmark reached a bilateral agreement to guarantee minimum available hourly capacities. The observance of the terms of the agreement is not monitored in this report.

⁴³ In line with the EC's guidance on the matter, see paragraph (34).

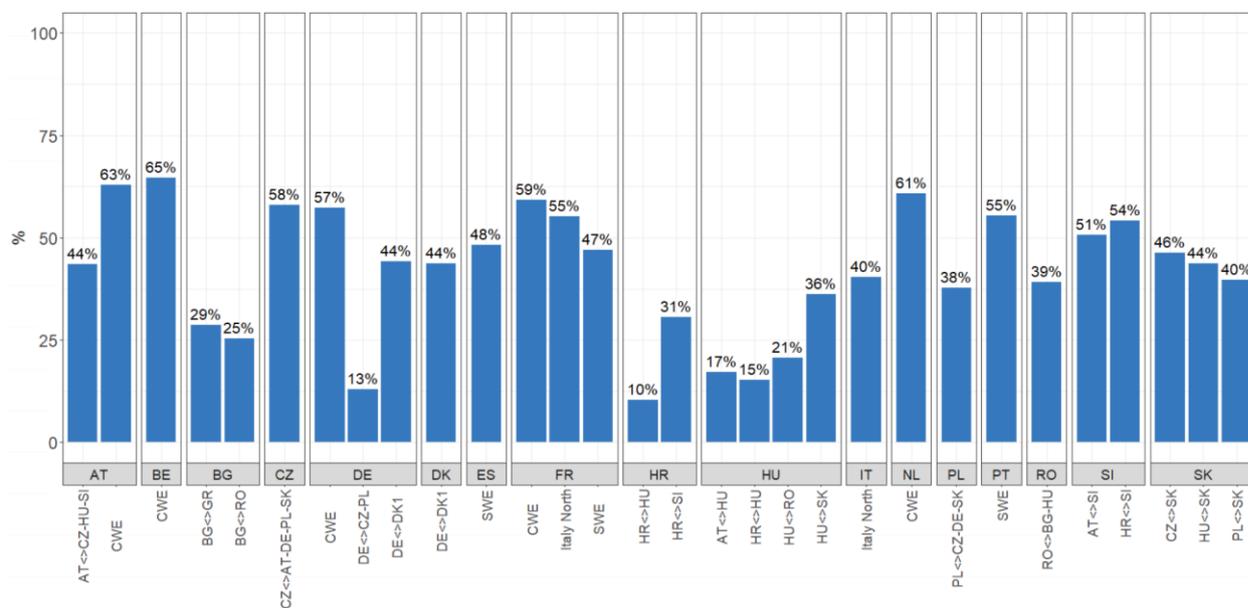
is very diverse across the EU. While some countries and regions (e.g. SWE, CWE, Italy North, Slovenia, Czech Republic) appear to be, on average, close to the 70% minimum target, the gap is ample in many other cases (e.g. Bulgaria, Germany on the borders with Poland and Czech Republic, Croatia, Hungary).

Figure 15: Average margin available on elements where the minimum 70% target is not reached, not considering (top) and considering (bottom) exchanges with third countries – second semester of 2020

Not considering third countries



Considering third countries



Average relative MACZT (margin available for cross-zonal trade) on elements where the minimum 70% target is not reached
 No sufficient information

MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Note: The MACZT for Belgium includes the impacts of exchanges between the EU and Norway. For the Netherlands, the TSO did not provide the data necessary to calculate the MACZT not considering third countries in time for the report.

- (90) Figure 33 in Annex 3 completes the pictures given in previous subsections, by presenting, for each country and coordination area, among all CNECs declared by the TSOs, the share of CNECs with a positive MNCC, and the share of CNECs with negative MNCC. As explained in paragraph (25), MNCC represent the flow induced by cross-zonal exchanges beyond coordinated capacity calculation. Such a contribution may be negative, i.e. may free capacity on the CNEC. This additional capacity should then become available for trade on bidding-zone borders within the coordination area⁴⁴.
- (91) Figure 33 also shows the average levels, in percentage of Fmax, of the MNCC values when MNCC is positive, and when MNCC is negative. Overall, the figure gives insight of how and to what extent the flows from other coordination areas influence the capacity TSOs can offer on their CNECs. While the netting of flows opposite to congestion is legally required, it has to be noted that such flows are computed based on forecasts, which have inherent uncertainties. MNCC values are expected to decrease in the future, e.g. following the implementation of the common grid model methodology and of the CCMs pursuant CACM Regulation.

3.2.4 Conclusions

- (92) The very diverse levels of the MACZT on AC borders across the EU for the second semester of 2020 are broadly similar to the levels observed in the first semester.
- In the SWE region, the minimum 70% target was reached between 30 to 60% of the time, depending on the border, when calculating the MACZT was possible.
 - The scope for improvement is the largest for the following countries and regions:
 - In the CWE region, where significant efforts to meet the minimum 70% target are needed for all countries and especially in Germany, followed by the Netherlands, Belgium and France. However, the low MACZT in some of these countries, e.g. Belgium and the Netherlands, may be, to a certain extent, the result of loop flows originating in other countries of the region.
 - In a number of countries and borders without coordinated capacity calculation, where the levels of relative MACZT are the lowest in the EU; this includes Austria on non-CWE borders, Bulgaria, Croatia, Germany on the borders with Czech Republic and Poland, and Hungary.
 - In the Italy North region, where there are a low number of hours when the MACZT is above the 70% (9% of the hours when limiting elements have been declared). In this region, cross-zonal capacity is often limited by allocation constraints applied by the Italian TSO and by a number of other factors, on which insufficient information was provided. The level of MACZT would however increase significantly if the conditions to account for the exchanges with non-EU countries, namely with Switzerland, were met.
 - Significant efforts to improve transparency, completeness and quality of the data provided to monitor the MACZT, are needed with priority in:
 - The Baltic and Nordic areas, where almost no information was provided. Efforts are currently being made by the Nordic TSOs to provide data.

⁴⁴ This assumption is in line with Article 16(11) of the Electricity Regulation.

- The Italy North region, where no information on limiting elements was provided for 59% of the hours, thus not allowing for monitoring during these hours.
- (93) When considering the conclusions presented above, the following considerations should be taken into account:
- In a majority of countries, a derogation and/or an action plan applies for this semester (a detailed description of derogations and action plans in place for each coordination area is available on ACER's website, see footnote 21). Thus, the minimum 70% target is not yet (or not fully) binding for these countries.
 - Low MACZTs may originate from inside (e.g. from structural internal congestion or lack of redispatching potential) or outside a given country (e.g. from loop flows of neighbouring countries).
 - The European Commission recommended⁴⁵ that the flows from a given third country are taken into account for the calculation of the MACZT if an agreement, in line with EU capacity calculation principles and rules, with the third country has been concluded. As far as ACER is aware, such agreements were not yet in place in 2020. However, exchanges with third countries may still relevantly affect the MACZT results on countries bordering non-EU countries
 - Currently, the limited scope of coordination in capacity calculation is negatively affecting the ability of TSOs to maximise cross-zonal capacity. In particular, in the absence of coordination, TSOs need to reserve a share of the capacity of the critical network elements with contingencies CNECs to accommodate the flows coming from outside of their coordination area, based on their forecasts. TSOs cannot in general influence these flows, and their magnitude and direction is subject to uncertainty. TSOs reported to face difficulties to predict accurately these flows and, in particular, to ensure that flows from other coordination areas that relieve congestions lead to offer the relieved capacity to the market. While ACER acknowledges the difficulties to predict flows beyond the area of coordination, well-established regulatory principles should apply. In particular, the uncertainties related to these flows should be accounted for in the 'remaining 30% margin' as envisaged in the CEP; and TSOs should apply the principle of netting by increasing the amount of capacity offered in a given direction when those flows are in the opposite direction of the congestion. Overall, the issues related to flows from other coordination areas emphasise the need to speed up the implementation of the capacity calculation methodologies in each capacity calculation region; and, where problems of coordination in capacity calculation among regions persist, the need for reassessing the definition of the capacity calculation regions.

⁴⁵ See the presentation on the allocation of cross-zonal capacity and the bidding zone review made by the EC at the Florence Forum on 7 December 2020, available at https://ec.europa.eu/info/events/european-electricity-regulatory-forum-florence-forum/meeting-european-electricity-regulatory-forum-2020-dec-07_en

Annex 1: List of coordination areas

Table 3: List of coordination areas – second semester of 2020

Bidding - zone border	Side(s)	Coordination area	Calculation type
AT-CZ	AT	AT-CZ_HU_SI (AT side)	UNILATc
AT-CZ	CZ	CZ borders	UNILATc
AT-DE	Both	CWE	FB
AT-HU	AT	AT-CZ_HU_SI (AT side)	UNILATc
AT-HU	HU	AT-HU (HU side)	UNILAT
AT-IT	Both	North Italy	NTC
AT-SI	AT	AT-CZ_HU_SI (AT side)	UNILATc
AT-SI	SI	AT-SI (SI side)	UNILAT
BE-FR	Both	CWE	FB
BE-GB	BE	BE-GB (BE side)	UNILAT
BE-GB	GB	GB-BE_FR_NL (GB side)	UNILATc
BE-NL	Both	CWE	FB
BG-GR	BG	BG-GR_MK (BG side)	UNILATc
BG-GR	GR	North GR borders (GR side)	UNILATc
BG-RO	BG	BG-RO_RS (BG side)	UNILATc
BG-RO	RO	RO borders	UNILATc
CZ-DE	CZ	CZ borders	UNILATc
CZ-DE	DE	DE-CZ_PL	UNILATc
CZ-PL	CZ	CZ borders	UNILATc
CZ-PL	PL	PL-CZ_DE_SK	UNILATc
CZ-SK	CZ	CZ borders	UNILATc
CZ-SK	SK	CZ-SK (SK side)	UNILATc
DE-DK1	DE	DE-DK1 (DE side)	UNILAT
DE-DK1	DK	Hansa	UNILATc
DE-DK2	DE	DE-DK2 (DE side)	UNILAT
DE-DK2	DK	Hansa	UNILATc
DE-FR	Both	CWE	FB
DE-NL	Both	CWE	FB
DE-PL	DE	DE-CZ_PL	UNILATc
DE-PL	PL	PL-CZ_DE_SK	UNILATc
DE-SE4	DE	DE-SE4 (DE side)	UNILAT
DE-SE4	SE	DE-SE4 (SE side)	UNILAT
DK1-DK2	Both	Nordic	UNILATc
DK1-NL	NL	DK1-NL (NL side)	UNILAT
DK1-NL	DK	Hansa	UNILATc
DK1-SE3	SE	DK1-SE3 (SE side)	UNILAT
DK1-SE3	DK	Nordic	UNILATc
DK2-SE4	SE	DK2-SE4 (SE side)	UNILAT
DK2-SE4	DK	Nordic	UNILATc
EE-FI	EE	EE-FI (EE side)	UNILAT
EE-FI	FI	EE-FI (FI side)	UNILAT
EE-LV	Both	EE-LV	NTC

Bidding - zone border	Side(s)	Coordination area	Calculation type
ES-FR	Both	SWE	NTC
ES-PT	Both	SWE	NTC
FI-SE1	FI	FI-SE1 (FI side)	UNILAT
FI-SE1	SE	FI-SE1 (SE side)	UNILAT
FI-SE3	FI	FI-SE3 (FI side)	UNILAT
FI-SE3	SE	FI-SE3 (SE side)	UNILAT
FR-GB	FR	FR-GB (FR side)	UNILAT
FR-GB	GB	GB-FR_NL_BE (GB side)	UNILATc
FR-IT	Both	North Italy	NTC
GB-NL	GB	GB-FR_NL_BE (GB side)	UNILATc
GB-NL	NL	GB-NL (NL side)	UNILAT
GB-SEM	GB	GB-SEM	UNILAT
GB-SEM	SEM	GB-SEM	UNILAT
GR-IT	GR	GR-IT (GR side)	UNILAT
GR-IT	IT	GR-IT (IT side)	UNILAT
HR-HU	HR	HR-HU (HR side)	UNILAT
HR-HU	HU	HR-HU (HU side)	UNILAT
HR-SI	HR	HR-SI (HR side)	UNILAT
HR-SI	SI	HR-SI (SI side)	UNILAT
HU-RO	HU	HU-RO (HU side)	UNILAT
HU-RO	RO	RO borders	UNILATc
HU-SK	HU	HU-SK (HU side)	UNILAT
HU-SK	SK	HU-SK (SK side)	UNILATc
IT1-IT2	Both	IT internal borders	UNILATc
IT2-IT3	Both	IT internal borders	UNILATc
IT3-IT4	Both	IT internal borders	UNILATc
IT3-IT5	Both	IT internal borders	UNILATc
IT4-IT6	Both	IT internal borders	UNILATc
IT-SI	Both	North Italy	NTC
LT-LV	Both	LT-LV	NTC
LT-PL	LT	LT-PL (LT side)	UNILAT
LT-PL	PL	LT-PL (PL side)	UNILAT
LT-SE4	LT	LT-SE4 (LT side)	UNILAT
LT-SE4	SE	LT-SE4 (SE side)	UNILAT
PL-SE4	PL	PL-SE4 (PL side)	UNILAT
PL-SE4	SE	PL-SE4 (SE side)	UNILAT
PL-SK	PL	PL-CZ_DE_SK	UNILATc
PL-SK	SK	PL-SK (SK side)	UNILATc
SE1-SE2	Both	SE1-SE2	UNILAT
SE2-SE3	Both	SE2-SE3	UNILAT
SE3-SE4	Both	SE3-SE4	UNILAT

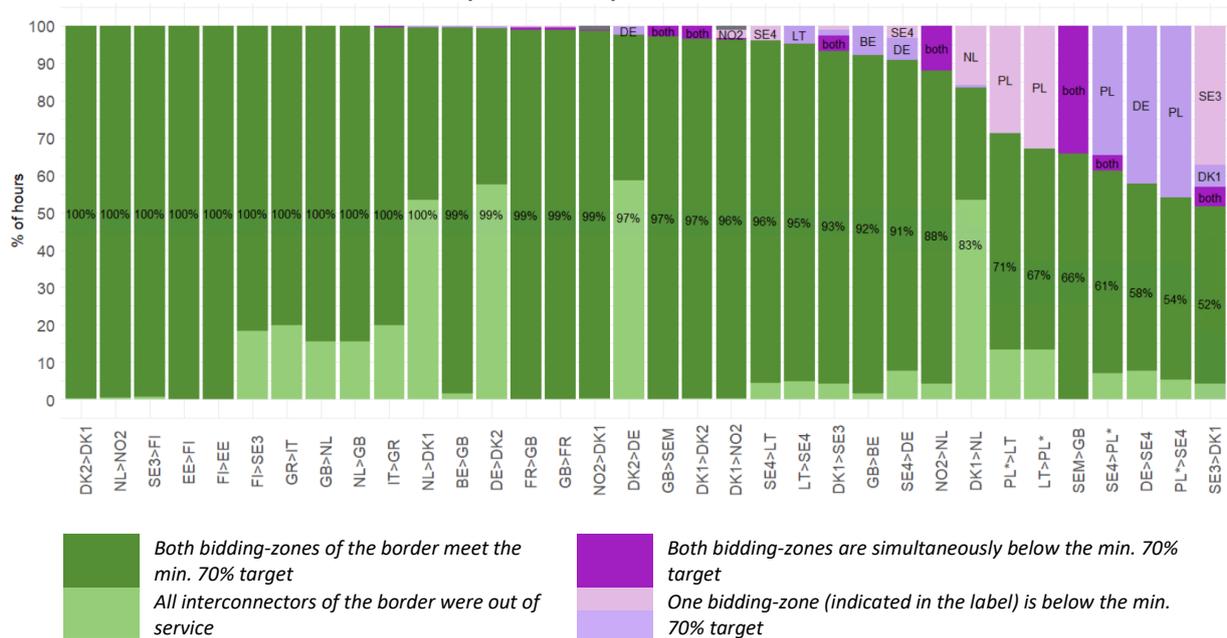
Note 1: The coordination level of DA capacity calculation is defined as follows:

- FB: flow-based capacity calculation.
- NTC: fully coordinated NTC calculation.
- UNILAT: unilateral capacity calculation, i.e. not coordinated on the two sides of a border (half bidding-zone border coordination).
- UNILATc: coordinated unilateral capacity calculation on several half bidding-zone borders.

Note 2: Cyprus is not interconnected. Luxembourg is interconnected but is part of the German bidding-zone; therefore, it does not have any bidding-zone border. Therefore, no bidding-zone borders were reported for these two Member States.

Annex 2: Additional figures on DC borders

Figure 16: Percentage of the time when the minimum 70% target was reached on oriented DC borders – second semester of 2020 (% of hours)



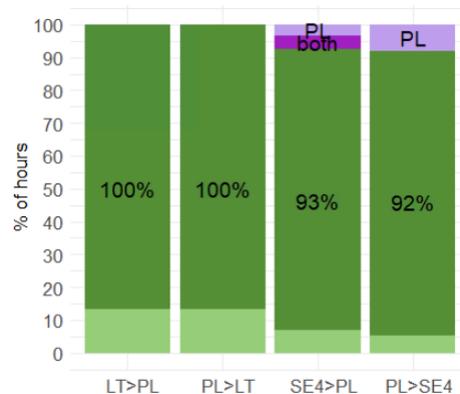
Source: ACER calculation based on TSOs data.

Note 1: The DC borders with Norway, where the minimum 70% target does not yet apply, are displayed for information. On these borders, the indication that ‘both’ countries are limiting is solely based on the information provided by the neighbouring TSO or information from the ENTSO-E Transparency Platform. As information from Norway was not requested, it could not be verified whether the limitation was simultaneously on both sides of the borders or only on the other side of the border.

Note 2: The DC borders Belgium-Germany and Germany-Norway2 went live during the second half of the semester and are not included in the figure.

* On the Polish borders with Sweden and Lithuania, the calculations consider the impact of the allocation constraints limiting the total import (or export) capacity from (or to) Poland. When allocation constraints apply, the interconnectors with Poland can be used to accommodate exchanges between Sweden and Lithuania (via Poland); however, the application of the constraints effectively limits the trading possibilities with Poland.

Figure 17: Percentage of the time when the minimum 70% target was reached on oriented DC Polish borders, without considering allocation constraints – second semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note: The results considering the impact of the allocation constraints applied on the Polish side are displayed in Figure 7.

Annex 3: Additional figures on AC borders

Table 4: Overview of the data used by ACER in the report and for the calculation when performed by ACER – second semester of 2020

CCAs	Country	TSO	Results			Data used by ACER for calculation					Comments	
			MCCC	MNCC	MNCC with third countries	CNECs	PTDFs	NTC	Forecast sched.	Alloc. const.		
CWE	AT	APG	TSO	TSO	TSO							
	BE	Elia	TSO	TSO	TSO					TSO		
	DE	TenneT	TSO	ACER	ACER	TSO	TSO			EE-TP		See Note 1.
		Transnet	TSO	ACER	ACER	TSO	TSO			EE-TP		
		Amprion	TSO	ACER	ACER	TSO	TSO			EE-TP		
	FR	RTE	TSO	TSO	TSO							
NL	TenneT	TSO		TSO						TSO		
Italy North	AT	APG										
	FR	RTE	TSO	TSO	TSO							
	IT	TERNNA	ACER	ACER	ACER	TSO	ACER	EE-TP	EE-TP			
	SI	ELES										
SWE	ES	REE	TSO									
	FR	RTE	TSO									
	PT	REN	ACER	ACER	ACER	TSO	ACER	EE-TP	EE-TP			
AT-CZ, AT-HU, AT-SI	AT	APG	TSO	TSO	TSO							
BG-GR	BG	ESO	ACER	ACER	ACER	TSO	ACER	TSO/EE-TP	EE-TP			
BG-RO			ACER	ACER	ACER	TSO	ACER	EE-TP	EE-TP			
AT-CZ, CZ-DE, CZ-PL, CZ-SK	CZ	CEPS	TSO	TSO	TSO							
DE-CZ and DE-PL	DE	TenneT	ACER	ACER	ACER	TSO	TSO	TSO	EE-TP	TSO	See Notes 1 and 2.	
			50Hz	ACER	ACER	ACER	TSO	TSO	TSO	EE-TP		TSO
DE-DK1		TenneT	TSO	ACER	ACER	TSO	TSO		EE-TP		See Note 1.	
DE-DK1	DK	Energinet	ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
DK-SE												
FI-SE1	FI	Fingrid										
BG-GR	GR	IPTO	ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
HR-HU	HR	HOPS	ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
HR-SI			ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
	LU	CREOS										
AT-HU	HU	MAVIR	ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
HR-HU			ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
HU-RO			ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
HU-SK			ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
EE-LV	EE	Elering										
LT-LV	LT	Litgrid										
EE-LV, LT-LV	LV	AST										
CZ-PL, CZ-DE, CZ-SK	PL	PSE	ACER	ACER	ACER	TSO	TSO	TSO	TSO	TSO	See Notes 2 and 3.	
BG-RO, BG-HU	RO	Transelectrica	ACER	ACER	ACER	TSO	ACER	EE-TP	EE-TP			
DK-SE	SE	SVK										
FI-SE1												
AT-SI	SI	ELES	ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
HR-SI			ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
CZ-SK	SK	SEPS	ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
HU-SK			ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			
PL-SK			ACER	ACER	ACER	TSO	ACER	TSO	EE-TP			

ACER	ACER calculation		Data not provided and/or calculations not possible
TSO	Data provided by the TSO		Data not applicable, or not used for the calculations
EE-TP	Data from the ENTSO-E Transparency Platform		

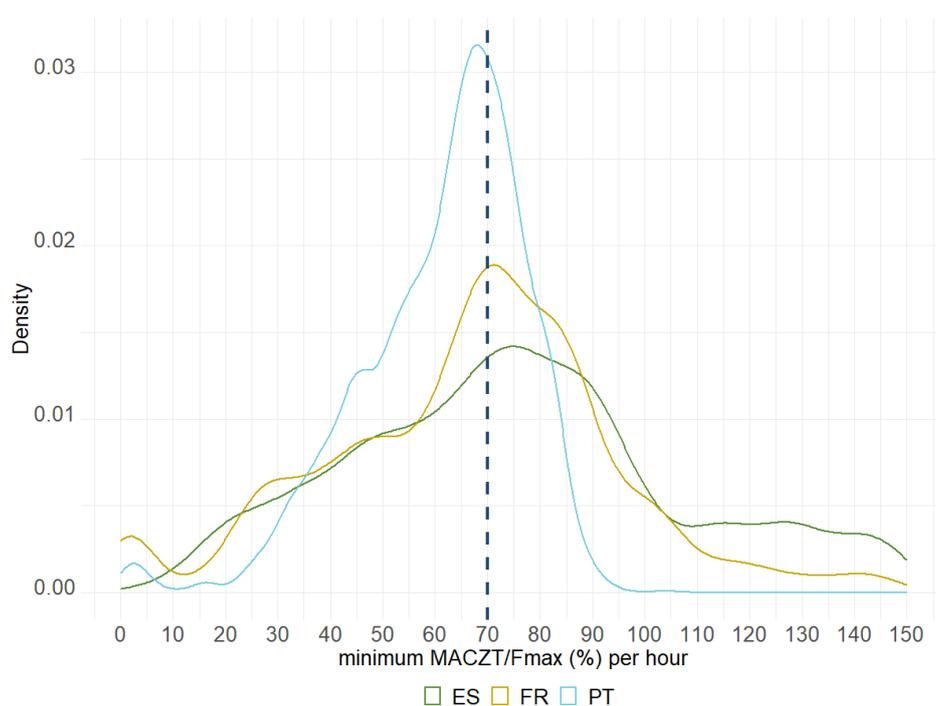
Source: ACER elaboration

Notes referred to in the table:

- Note 1: ACER estimated the MNCC values because the MNCC estimations provided by TSOs considered full simultaneous NTC on borders beyond the coordination area, which is not in line with the Recommendation.
- Note 2: ACER estimated the MCCC values because the estimations provided by the TSO did not consider the technical profile in line with the Recommendation and/or the allocation constraints that further limit cross-zonal capacity.
- Note 3: ACER estimated the MNCC values because the estimations provided by the TSO did not consider the case when MNCC is negative, and did not exclude the influence of all third countries.

SWE region

Figure 18: Density function of the lowest hourly relative MACZT of limiting CNECs per country in SWE region – second semester of 2020



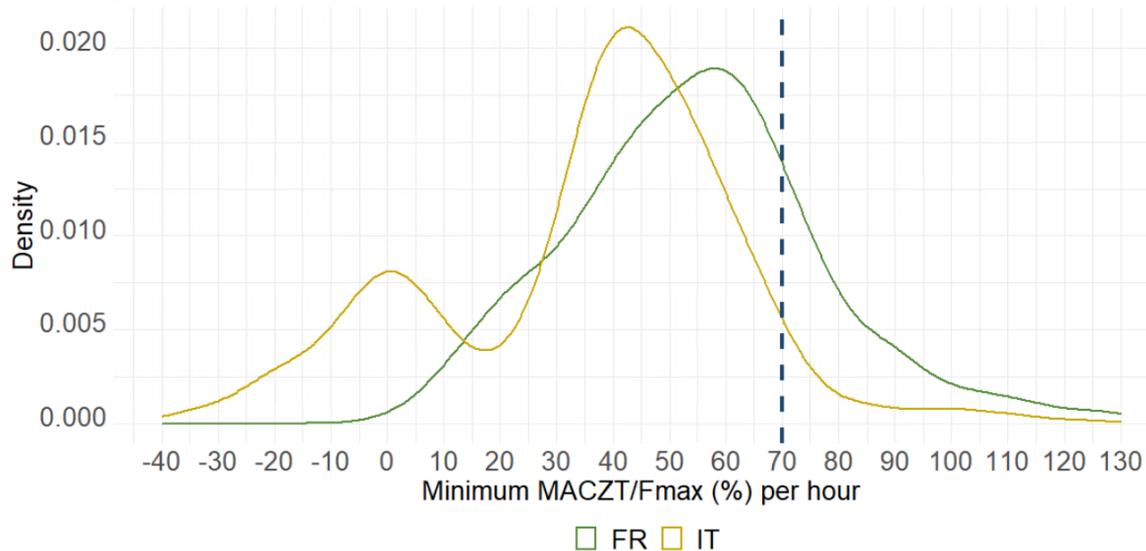
Source: ACER calculation based on TSOs data.

Note 1: The difference between the results with and without the influence of third countries are very limited in the SWE region; only the results without the influence of third countries are thus presented.

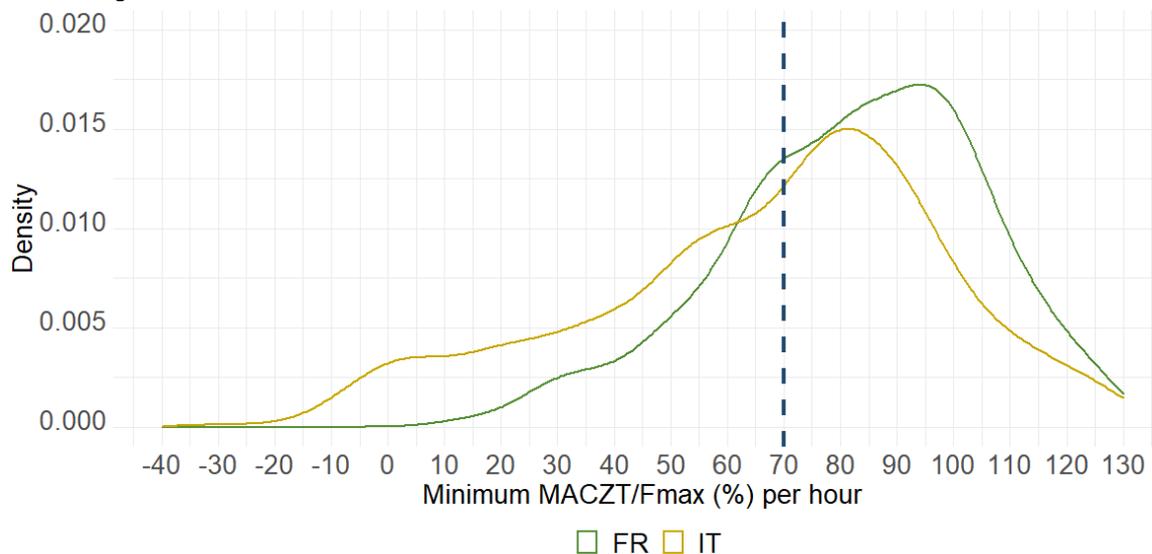
Italy North region

Figure 19: Density function of the lowest hourly relative MACZT of limiting CNECs per country in Italy North region, not considering (top) and considering (bottom) exchanges with third countries – second semester of 2020

Not considering third countries



Not considering third countries



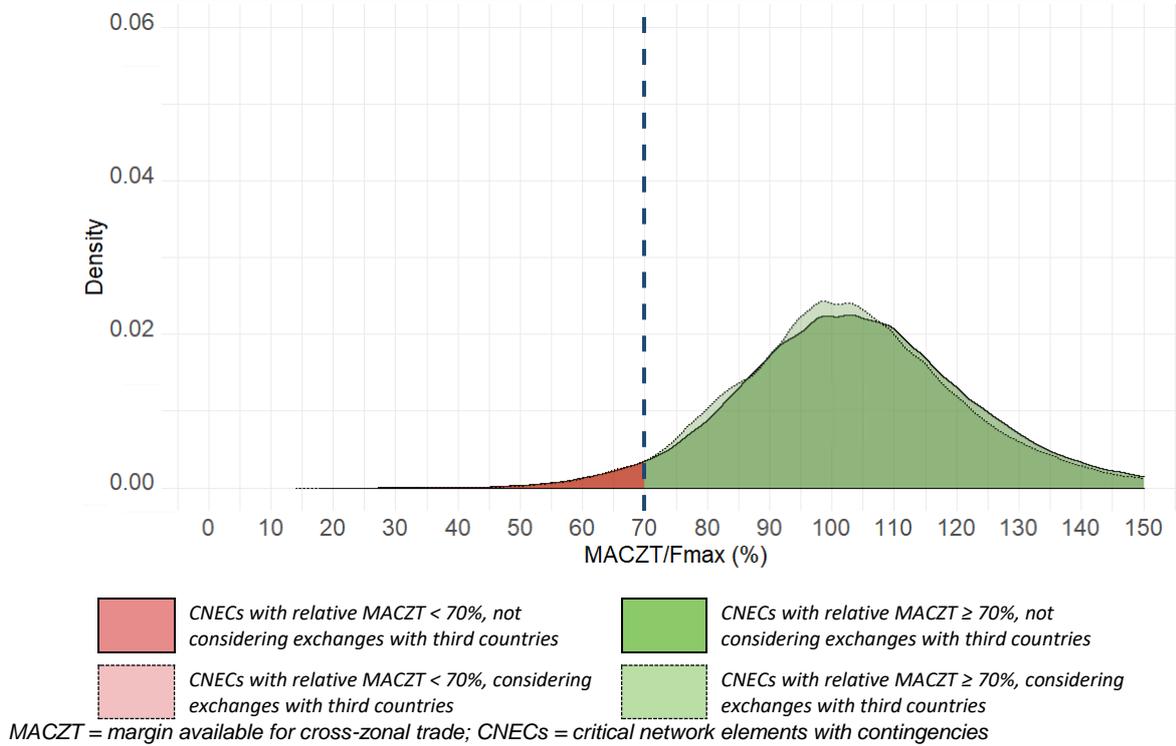
MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Note: The figure takes into account only the hours for which the countries have declared a limiting CNEC. This result in 1025 hours for Italy, and 552 hours for France. TSOs did not report any limiting CNEC in Austria and Slovenia.

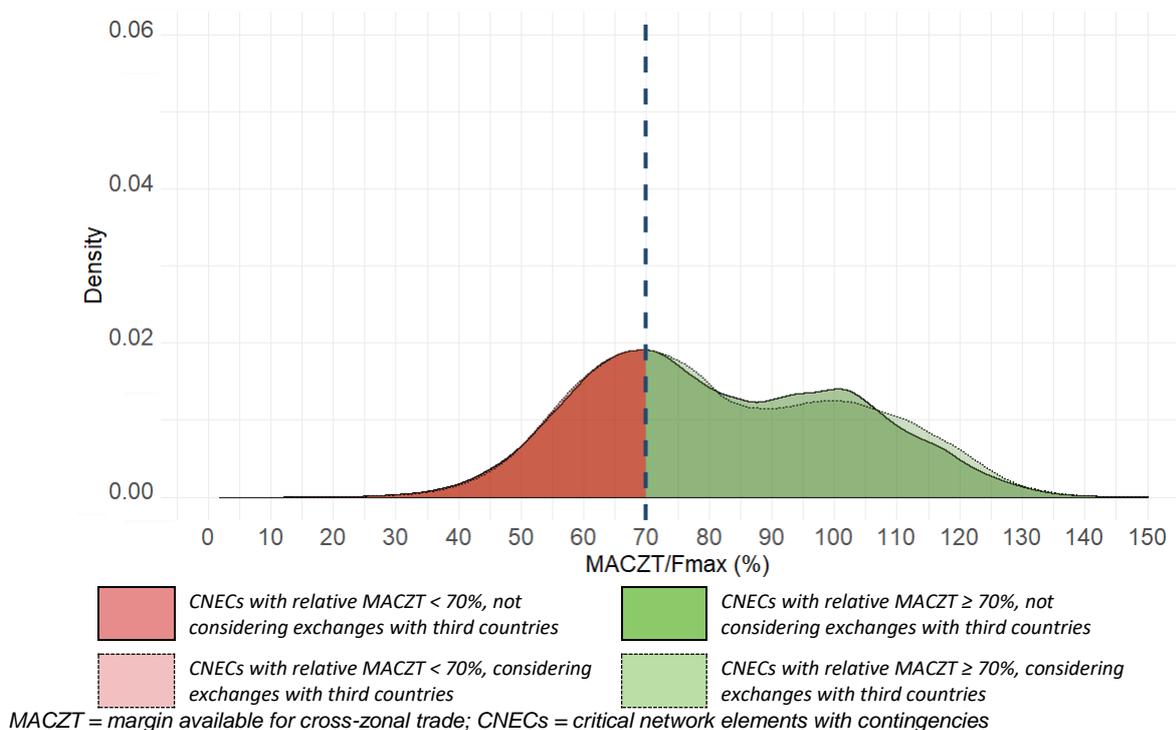
CWE region

Figure 20: Density function of the relative MACZT for all CNECs declared by Austria for CWE region – second semester of 2020



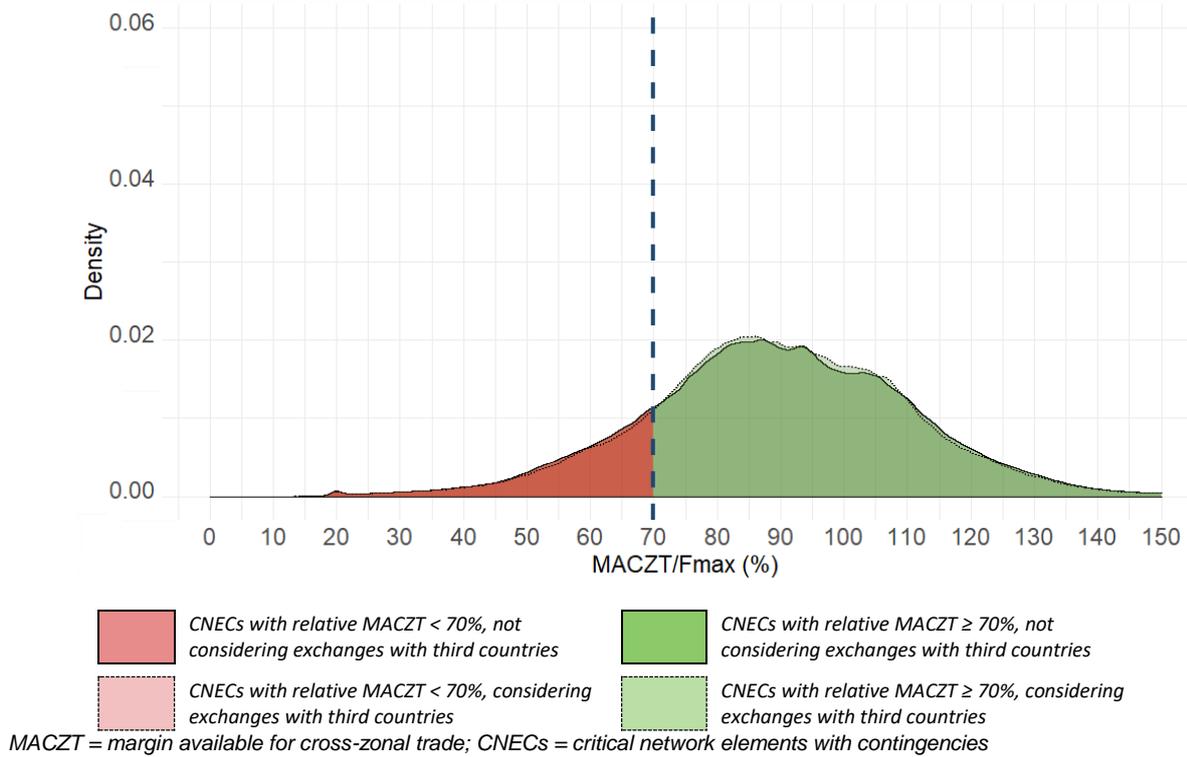
Source: ACER calculation based on TSOs data.

Figure 21: Density function of the relative MACZT for all CNECs in France for the CWE region – second semester of 2020



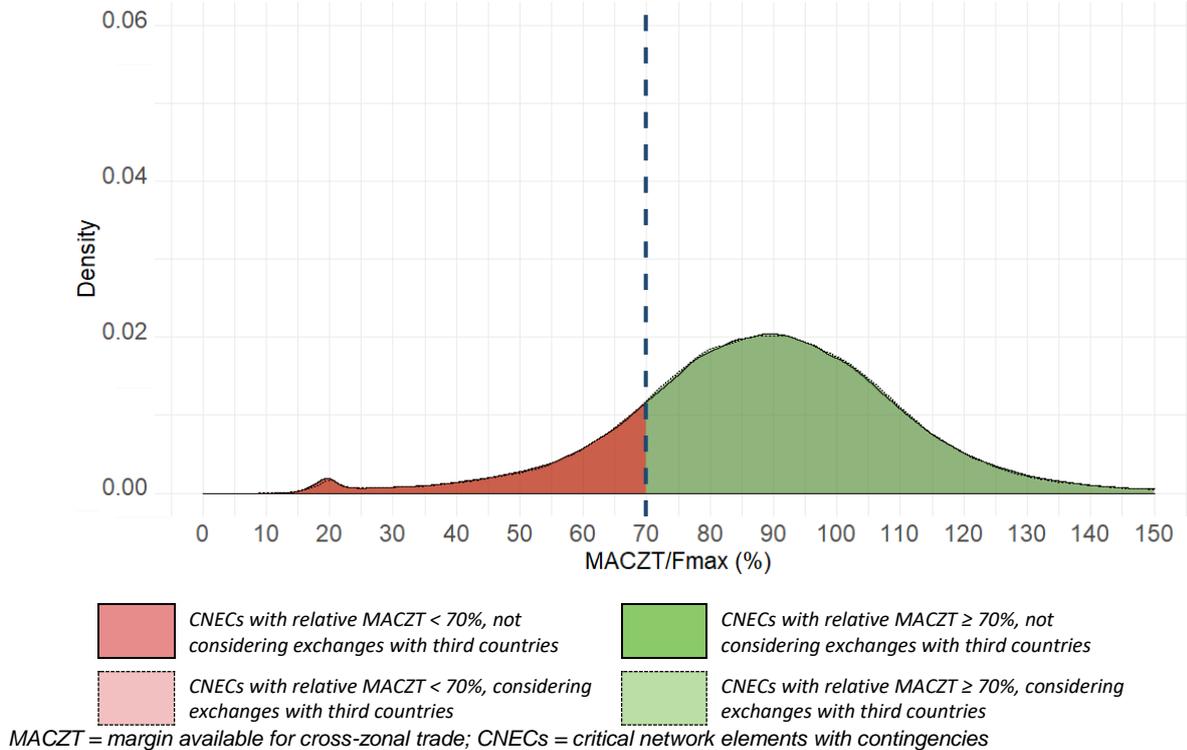
Source: ACER calculation based on TSOs data.

Figure 22: Density function of the relative MACZT for all CNECs of Amprion Germany for the CWE region – second semester of 2020



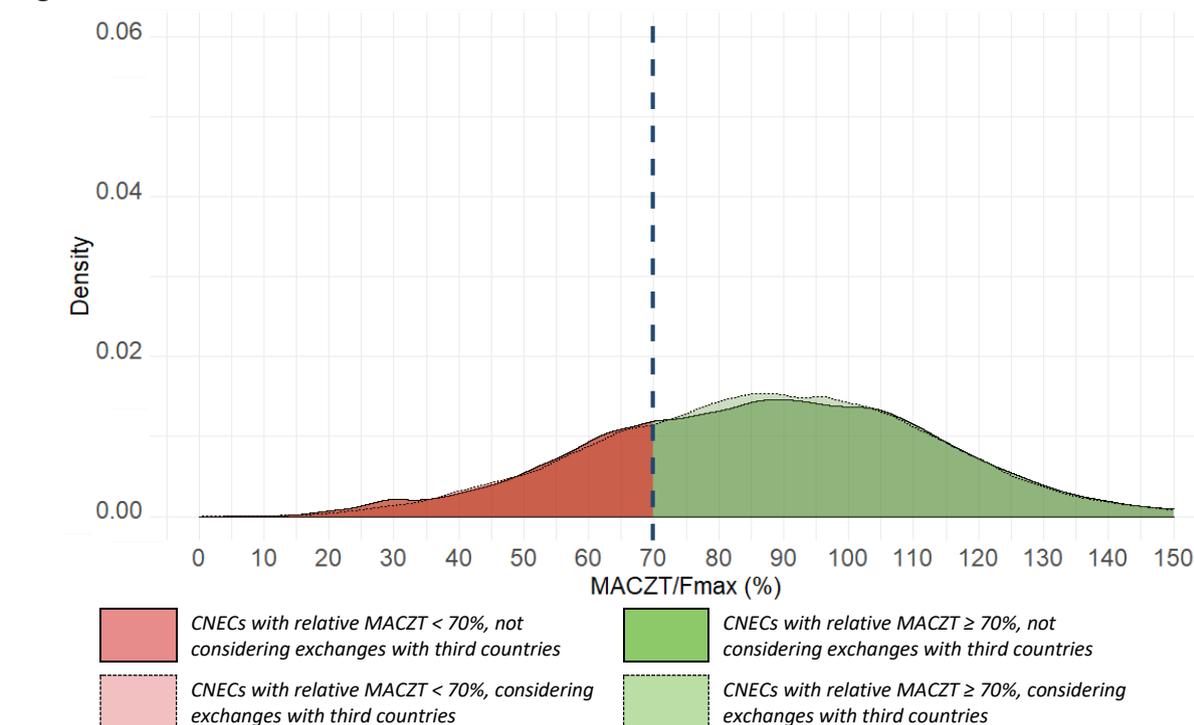
Source: ACER calculation based on TSOs data.

Figure 23: Density function of the relative MACZT for all CNECs of TenneT Germany for the CWE region – second semester of 2020



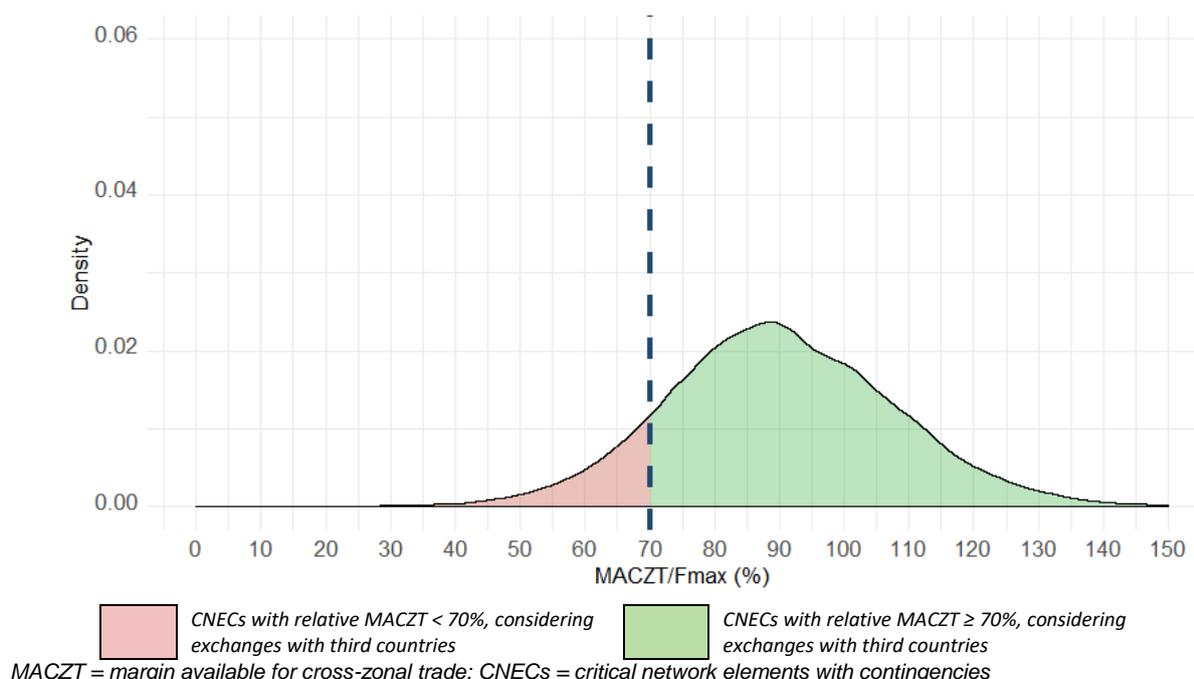
Source: ACER calculation based on TSOs data.

Figure 24: Density function of the relative MACZT for all CNECs of Transnet Germany for the CWE region – second semester of 2020



Source: ACER calculation based on TSOs data.

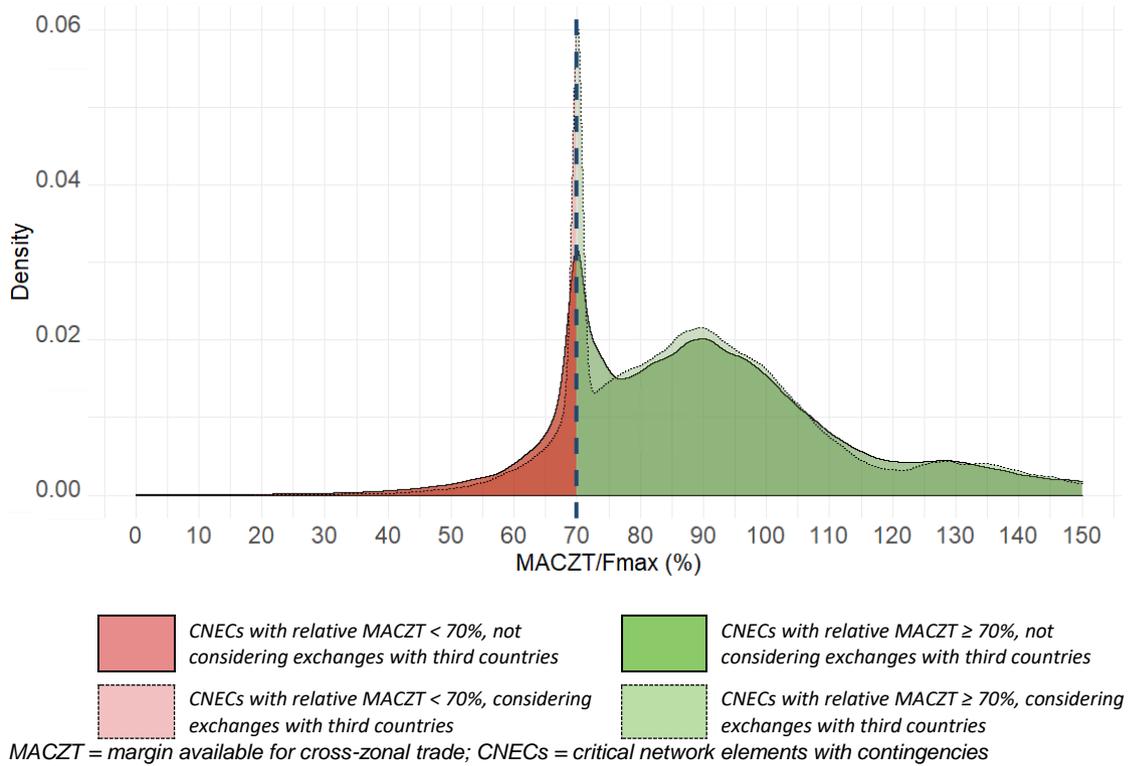
Figure 25: Density function of the MACZT for all CNECs of the Netherlands for the CWE region with – second semester of 2020



Source: ACER calculation based on TSOs data.

Note: The TSO did not provide the data necessary to calculate the MACZT not considering third countries in time for the report.

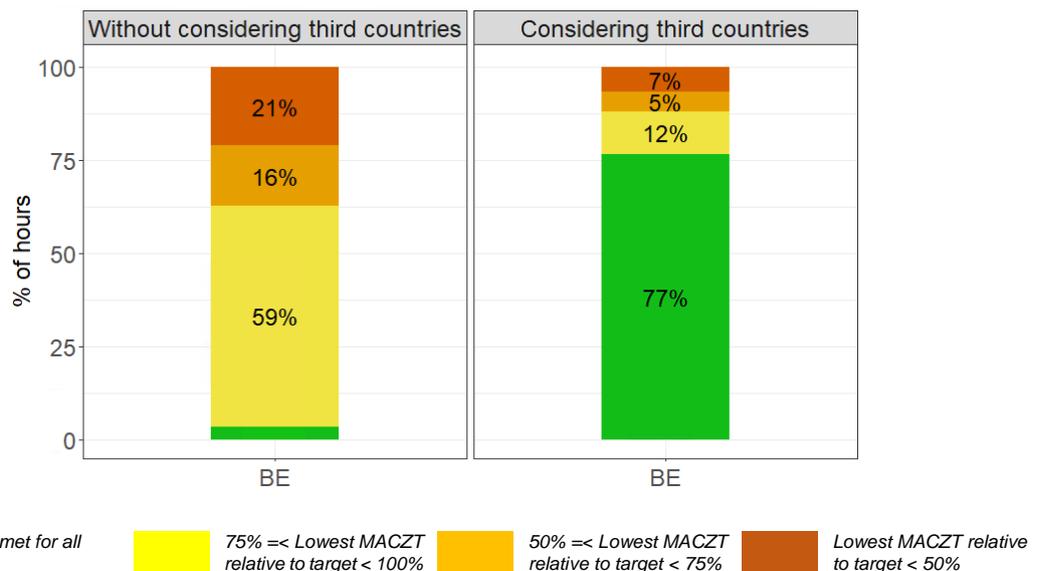
Figure 26: Density function of the MACZT for all CNECs of Belgium for the CWE region with – second semester of 2020



Source: ACER calculation based on TSOs data.

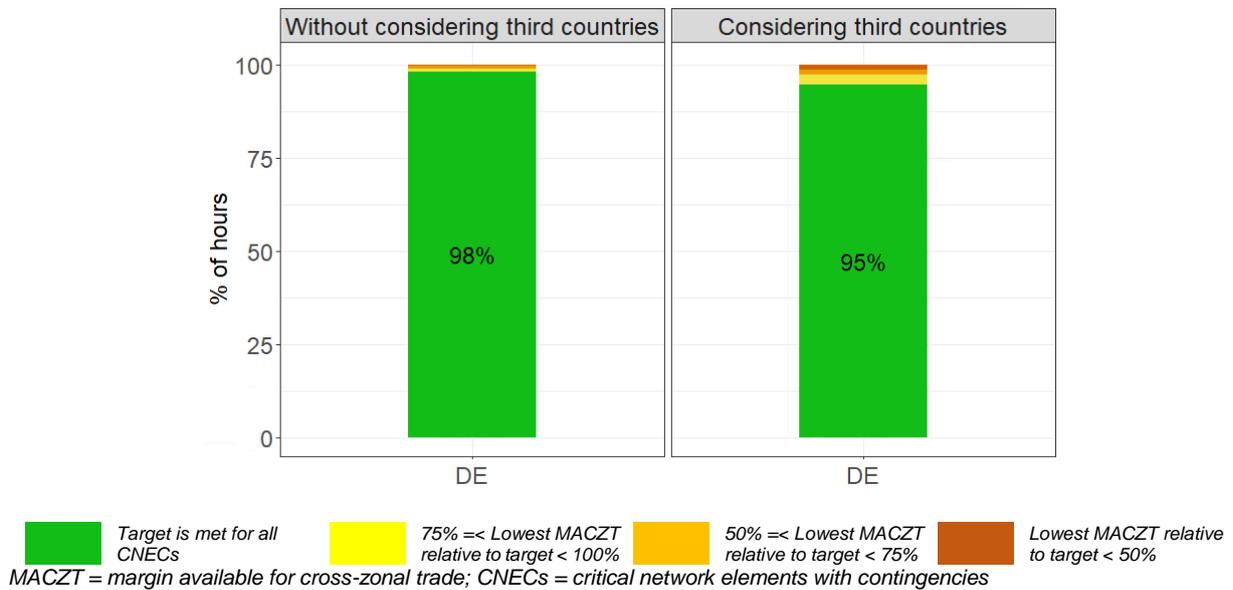
Note: The MACZT includes the impacts of exchanges between the EU and Norway.

Figure 27: Percentage of the time when the target set by the derogation for excessive loop flows (derogation for outages not covered) is met on all CNECs for Belgium for the CWE region – second semester of 2020 (% of hours)



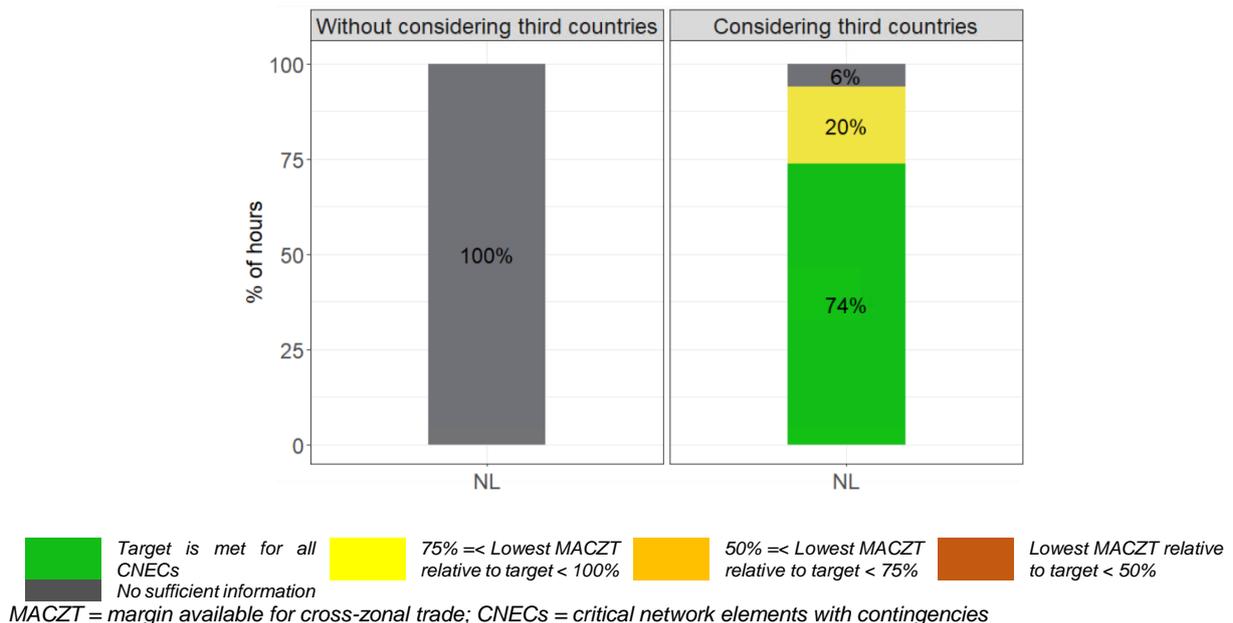
Source: ACER calculation based on TSOs data.

Figure 28: Percentage of the time when the target set by action plan is met on all CNECs for Germany for the CWE region – second semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Figure 29: Percentage of the time when the target set by the action plan and derogation on loop flows is met on all CNECs for the Netherlands for the CWE region – second semester of 2020 (% of hours)



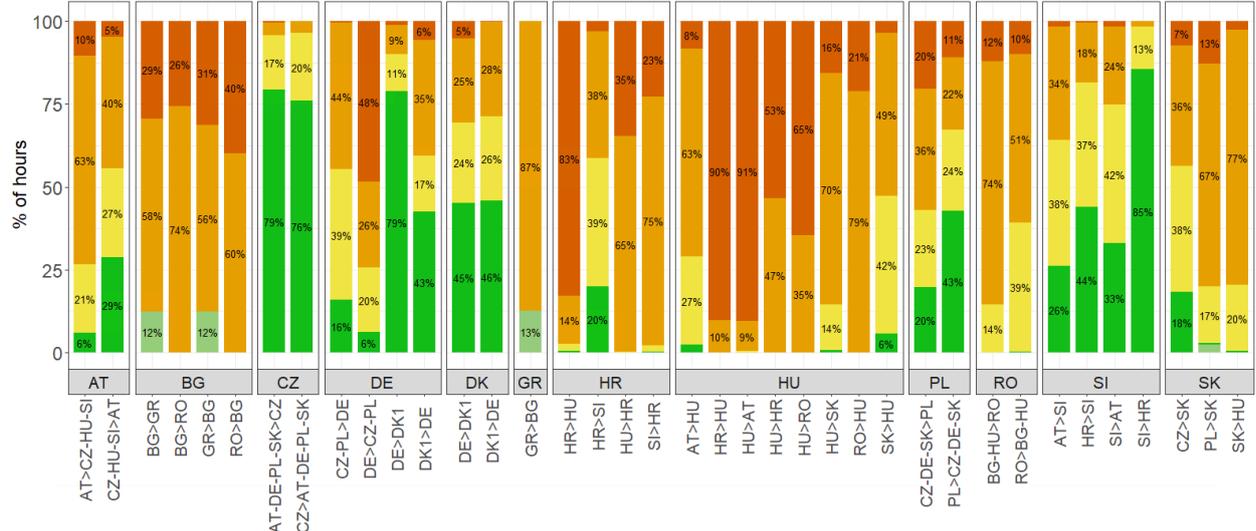
Source: ACER calculation based on TSOs data.

Note: The TSO did not provide the data necessary to calculate the MACZT not considering third countries in time for the report. In addition, the TSOs reported for a few hours a failure of internal tools, leading to no target or MACZT being calculated.

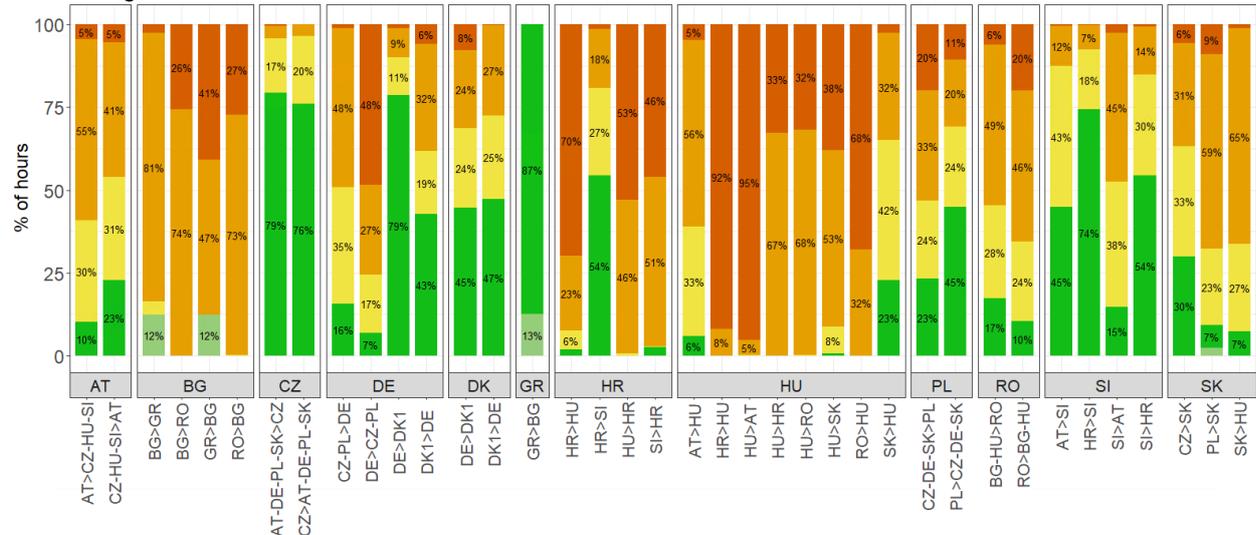
Other countries and coordination areas of Continental Europe

Figure 30: Percentage of the time when the minimum 70% target was reached (green) or the margin was below the target, per country, coordination area and direction, for countries of Continental Europe where a coordinated capacity calculation is not yet implemented, not considering (top) and considering (bottom) exchanges with third countries – second semester of 2020 (% of hours)

Not considering third countries



Considering third countries



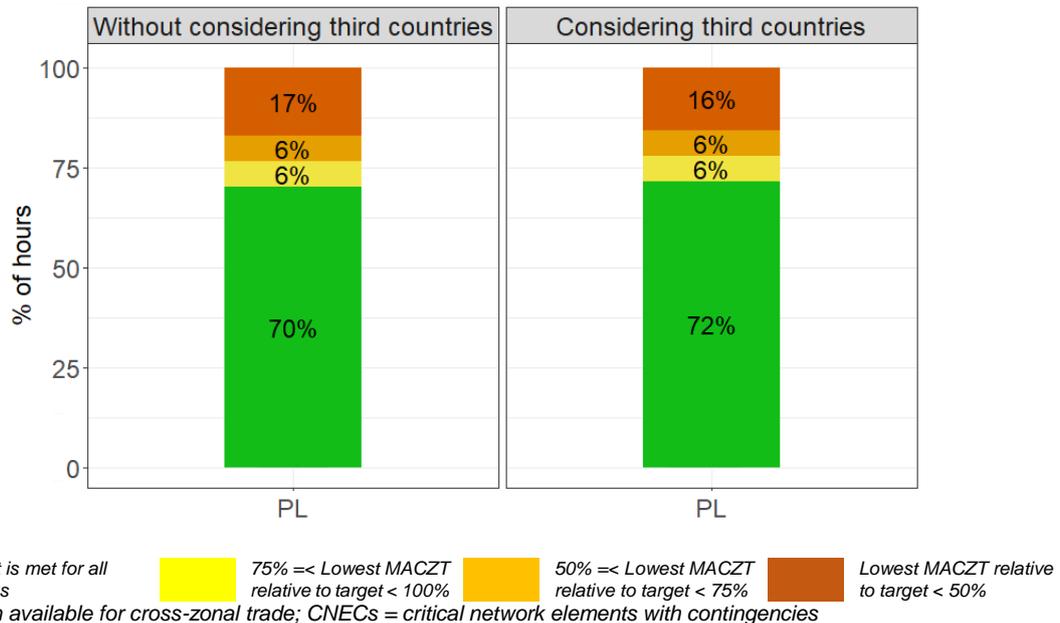
MACZT ≥ 70% 50% ≤ MACZT < 70% 20% ≤ MACZT < 50% MACZT < 20%

MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Note: The figure considers the impact of the technical profiles of Poland (Polish borders with Czech Republic, Germany and Slovakia), after considering allocation constraints, and the technical profile of Germany (German borders with Czech Republic and Poland).

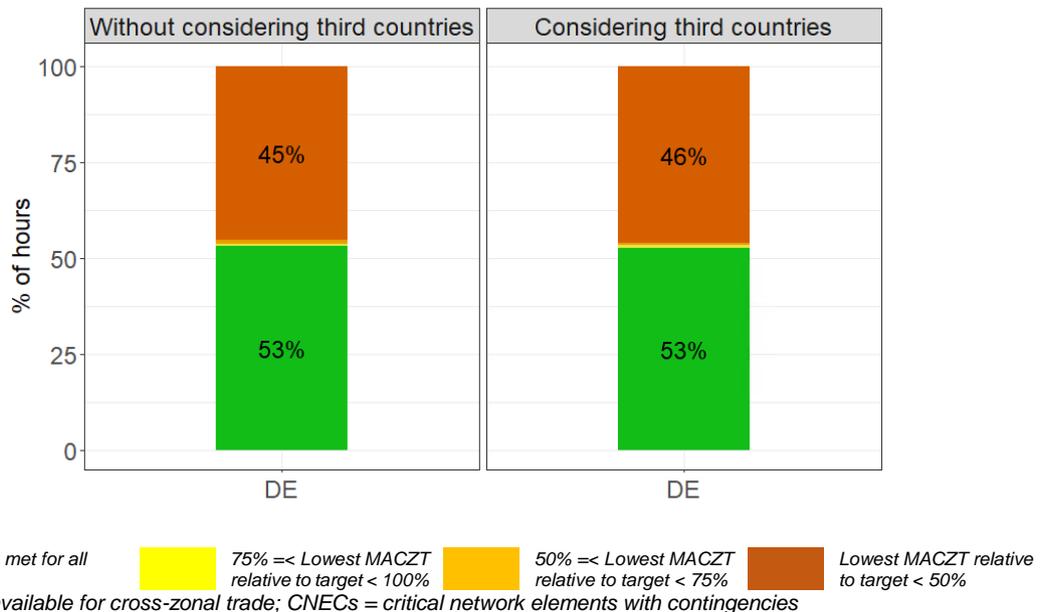
Figure 31: Percentage of the time when the target set by action plan (derogation not covered) is met on all CNECs for Poland – second semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note: The figure considers the impact of the technical profile of Poland (Polish borders with Czech Republic, Germany and Slovakia), after considering allocation constraints.

Figure 32: Percentage of the time when the target set by action plan is met on all CNECs for Germany for the coordination area between Germany and Czech Republic and Poland – second semester of 2020 (% of hours)



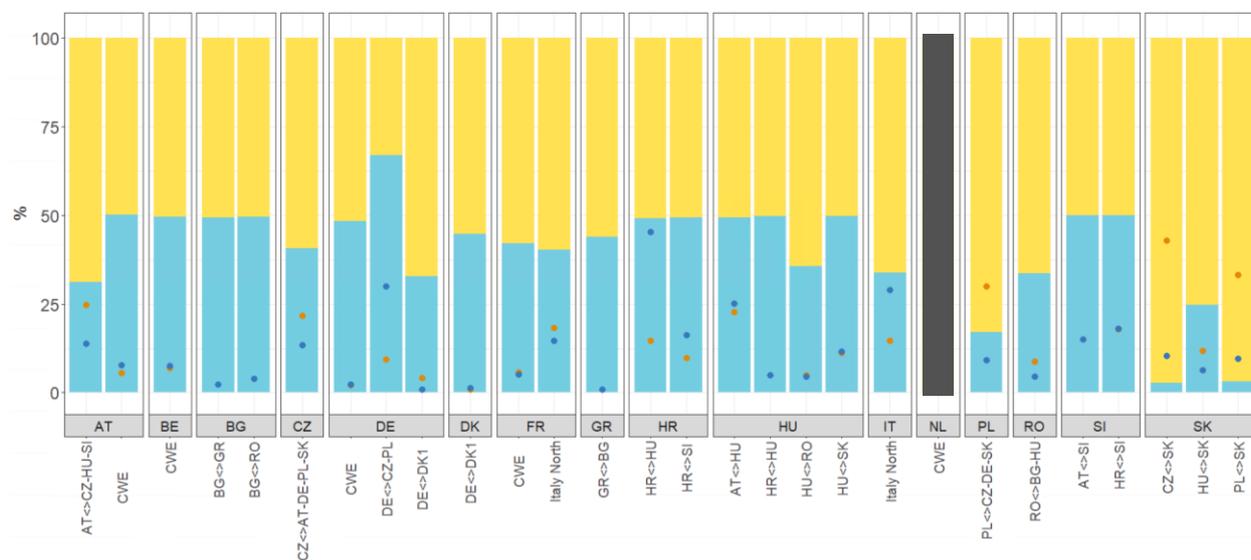
Source: ACER calculation based on TSOs data.

Note: The figure considers the impact of the technical profile of Germany (German borders with Czech Republic and Poland).

All EU countries and coordination areas

Figure 33: Share of CNECs with positive and negative MNCC as a % of all CNECs, and respective average levels of MNCC as a % of Fmax, not considering (top) and considering (bottom) exchanges with third countries – second semester of 2020 (% of CNECs)

Not considering third countries



Considering third countries



MACZT = margin available for cross-zonal trade; CNECs = critical network elements with contingencies

Source: ACER calculation based on TSOs data.

Note 1: The SWE region is not part of this figure, because the French and Spanish TSOs did not calculate the MNCC. In general, the MNCC is considered low in this region.

Note 2: The MACZT for Belgium includes the impacts of exchanges between the EU and Norway. For the Netherlands, the TSO did not provide the data necessary to calculate the MACZT not considering third countries in time for the report.

Annex 4: List of acronyms

Acronym	Meaning
AC	Alternating current
ACER	Agency for the Cooperation of Energy Regulators
CACM	Capacity Allocation and Congestion Management (electricity)
CCM	Capacity calculation methodology
CCR	Capacity calculation region
CEP	Clean Energy (for all Europeans) Package
CNEC	Critical network element with contingencies
CWE	Central West Europe (electricity region)
DC	Direct current
EC	European Commission
EEA	European Economic Area
ENTSO-E	European Network of Transmission System Operators for Electricity
EU	European Union
Fmax	Maximum flow on critical network elements, respecting operational security limits
HVDC	High-voltage direct current
IT	Information Technology
IU	Ireland and United Kingdom (electricity region)
MACZT	Margin available for cross-zonal trade
MCCC	Margin from coordinated capacity calculation
MNCC	Margin from non-coordinated capacity calculation
NTC	Net Transfer Capacity
PTDF	Power transfer distribution factor
RAM	Remaining Available Margin
SEM	Irish Single Energy Market (comprising Northern Ireland and the Republic of Ireland)
SWE	South West Europe (electricity region)
TSO	Transmission system operator