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

18 December 2020

PLEASE CONTACT THE MARKET MONITORING TEAM (MARGIN AVAILABLE FOR CROSS-ZONAL CAPACITY) (MACZT-MONITORING@ACER.EUROPA.EU) REGARDING THIS DOCUMENT FOR ANY QUESTIONS YOU MIGHT HAVE.

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Executive summary

Maximising the cross-zonal 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.

(2) The more interconnector capacity that is made available by transmission system operators (TSOs) for cross-zonal trade, the more trading that can occur. European legislation governs how interconnector capacity is calculated, allocated and how network congestion is managed. The ultimate aim is for consumers to benefit from the cheapest sources of electricity available in the market while not endangering security. Over the last decade, whilst significant progress has been made in improving capacity allocation (or how to allocate the capacity that is made available), progress has been much slower in the area of capacity calculation (or how much capacity is available for cross-zonal trading).

(3) Indeed, the Clean Energy for All Europeans[1] Package (CEP) identified the lack of sufficient cross-zonal capacity as one of the main barriers to the integration of electricity markets. It established a clear rule – namely a minimum capacity margin available for cross-zonal trade (MACZT), the 'minimum 70% target', to be met by all TSOs on all critical network elements. This means that a minimum legally binding 70% of each country's cross-border transmission capacity must be available for trade with neighbours with effect from 01 January 2020. But the Electricity Regulation[2], one of the key legislative acts of the CEP, also allows Member States (MSs) to adopt transitory measures, such as action plans or derogations, thus allowing TSOs to reach gradually the minimum 70% target, by the end of 2025 at the latest.

Key findings

(4) In summary, the monitoring by the European Union Agency for the Cooperation of Energy Regulators (ACER) of the 70% target in the first six months of 2020 finds that:

- On Direct Current (DC) borders, the 70% target was met most of the time but with a few notable exceptions.
- On Alternating Current (AC) borders, there is a very diverse picture with significant room for improvement to meet the 70% target for most regions and borders.
- On action plans and derogations, there is a diverse picture and significant room for further harmonising the setup of action plans and derogations across the EU.

[1] The Commission's Clean Energy for All Europeans legislative proposal covered 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

Regulatory authorities should grant derogations as a last resort measure, and only where necessary for maintaining operational security.

- ACER's monitoring of the MACZT depends critically on TSOs providing robust and extensive data. The quality of this data needs to be further improved.
- For consistency, regulatory authorities should consider the results of ACER's analysis to assess the compliance of TSOs with the minimum 70% target.

Shedding light on the margin available for cross-zonal trade and the efforts needed to meet the minimum 70% target.

(5) Just as market integration is a key way to deliver on Europe's energy goals, the minimum 70% target has become a key element of the market integration process. ACER, following numerous interactions with the European Commission (EC), ENTSO-E, regulatory authorities and TSOs, issued a recommendation[3] ('the Recommendation') to ensure a consistent monitoring of the MACZT, across the European Union, and to support the enforcement of legal compliance regulatory authorities.

(6) The present report will be produced biannually as part of ACER's tasks to monitor the internal electricity market[4]. It assesses the scope for improvement to meet the minimum cross-zonal capacity target set in the CEP. The report does not assess the legal compliance of TSOs' actions (which is the remit of regulatory authorities). What it does is estimate the margin for improvement with respect to the minimum 70% target, following the approach from the Recommendation. In line with this Recommendation, ACER advises that regulatory authorities consider the results of ACER's analysis to assess the compliance of TSOs with the minimum 70% target, or with the targets related to transitional measures, to ensure a coherent approach.

(7) The report relies on the principles clearly laid down in ACER's 2019 Recommendation, complemented by a methodological paper[5], describing how to estimate the MACZT on each critical network element with contingencies (CNECs).

(8) Additionally, the importance of monitoring MACZT for all hours, rather than for a selection of them, should be emphasised. In this respect, ACER was informed that in some Member States[6] the monitoring of the MACZT would focus only on the hours when the following two conditions are simultaneously met: i) there is price divergence, i.e. the cross-zonal capacity is fully used and ii) the limiting network element is located in the relevant Member State. The argument put forward is that offering 70% of the transmission capacity when the capacity is not fully used or when the limiting network element is not located in the said

[3] 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

[4] Article 15(1) of the Electricity Regulation.

[5] See the methodological paper at:

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

[6] See, e.g. the recent report on the implementation of the minimum threshold of 70% of interconnection capacity for cross-border trade at the French borders, available at:

https://www.cre.fr/en/News/cre-s-report-on-the-implementation-of-the-minimum-threshold-of-70-of-interconnection-capacity-for-cross-border-trade-at-the-french-borders

Member State would not create any value for consumers and would actually be 'welfare detrimental'. While acknowledging that assessing compliance is a national competence, ACER considers that there are solid arguments to keep monitoring the MACZT across all the hours. These arguments are described below:

- First, the minimum 70% target established in the Regulation is binding and it is not conditional to the use of the offered capacity by market participants.
- Second, except in very specific cases where TSOs would need to activate preventive redispatching actions, offering 70%, or more, of the transmission capacity when a TSO expects full price convergence, or when the limiting constraint is no located in its area does not imply any additional cost for the concerned TSO. In fact, such costs essentially arise when the market uses the offered 70% capacity fully and thus triggers the need for remedial actions. By contrast, when the offered 70% capacity is not fully used, TSOs do not need to activate costly remedial actions.
- Third, focusing the monitoring of the MACZT only on hours when prices diverge or when the limiting constraint is located elsewhere would incentivise TSOs to meet the minimum target, or not, based on their price and/or congestion forecasts. As a result, TSOs would transfer the risk of inaccurate forecasts to market participants. Whenever the TSO's forecast would be imperfect, social welfare losses would possibly arise.
- Fourth, questioning the 'convenience' of offering the 'minimum 70% target' capacity at all times would be equivalent to questioning the 'convenience' of offering infinite capacity within a bidding-zone at all times. However, the framework of 'infinite capacity' within bidding-zones has been in place for many years and, as far as ACER is aware, such a framework has to date hardly been questioned. Likewise, if the fulfilment of the 'minimum 70% target' was to be subject to efficiency considerations, such considerations should be part of a much broader analysis, rather than based on selected aspects.
- Finally, allowing national interpretations on the hours during which it 'makes sense' to meet the minimum 70% target may lead to a deadlock whereby no Member State would feel responsible for failing to meet the 70% target. Member States might put forward a variety of arguments to justify that the target is met despite the 70% capacity not being offered at all times. These arguments could include the exclusion of hours when a Member State considers that the capacity does not have a value, or the exclusion of hours when a Member State cannot meet the target due to loop flows originated within others' networks.

Overall, the quality of the data provided by TSOs to monitor the margin available for cross-zonal trade significantly improved. However, data quality issues remain in some regions, which TSOs need to tackle urgently.

(9) In order to perform the monitoring of the MACZT, the provision of robust and extensive data from TSOs is critical. In this respect, ACER gave several options to provide the data, including the possibility for TSOs to estimate the MACZT following the Recommendation or the possibility to provide data mainly for ACER to perform the calculations. For the purpose of this report, most TSOs provided input data or intermediate calculations, while few TSOs delivered final MACZT results. In the future, TSOs should be able to perform the estimations by themselves, and provide the results in a coordinated manner within each capacity calculation region.

(10) Due to the different characteristics of the interconnectors on a border, MACZT values are presented separately for DC and AC bidding-zone borders. All borders are compared to the minimum 70 % target, independently of the action plan or derogations that may apply. As further described below, the MACZT is also compared to transitional targets where sufficient information was made available

(11) Regarding the quality of the data provided by TSOs, ACER observed that the completeness and the quality significantly improved compared to previous monitoring of the MACZT[7]. However, important data quality issues remain, which require urgent improvement for the subsequent semester(s):

- On DC borders, when cross-zonal capacity is limited due to congestions within the TSOs' area, information on the intra-zonal network elements limiting cross-zonal capacity was often missing.
- On AC borders, significant efforts to improve transparency, completeness and quality of the data provided to monitor the MACZT are needed, in particular for the following areas and countries:
    - In the Baltic[8] and Nordic[9] areas, TSOs provided almost no information, impeding any monitoring in these two areas.
    - In the Italy North region, TSOs provided partial information on CNECs, particularly when capacity was limited by allocation constraints or other factors.
    - In France, the TSO did not provide all available information.

On DC borders, the margin available for cross-zonal trade reached the minimum 70% target most of the time in the first semester of 2020. However, few substantial exceptions apply.

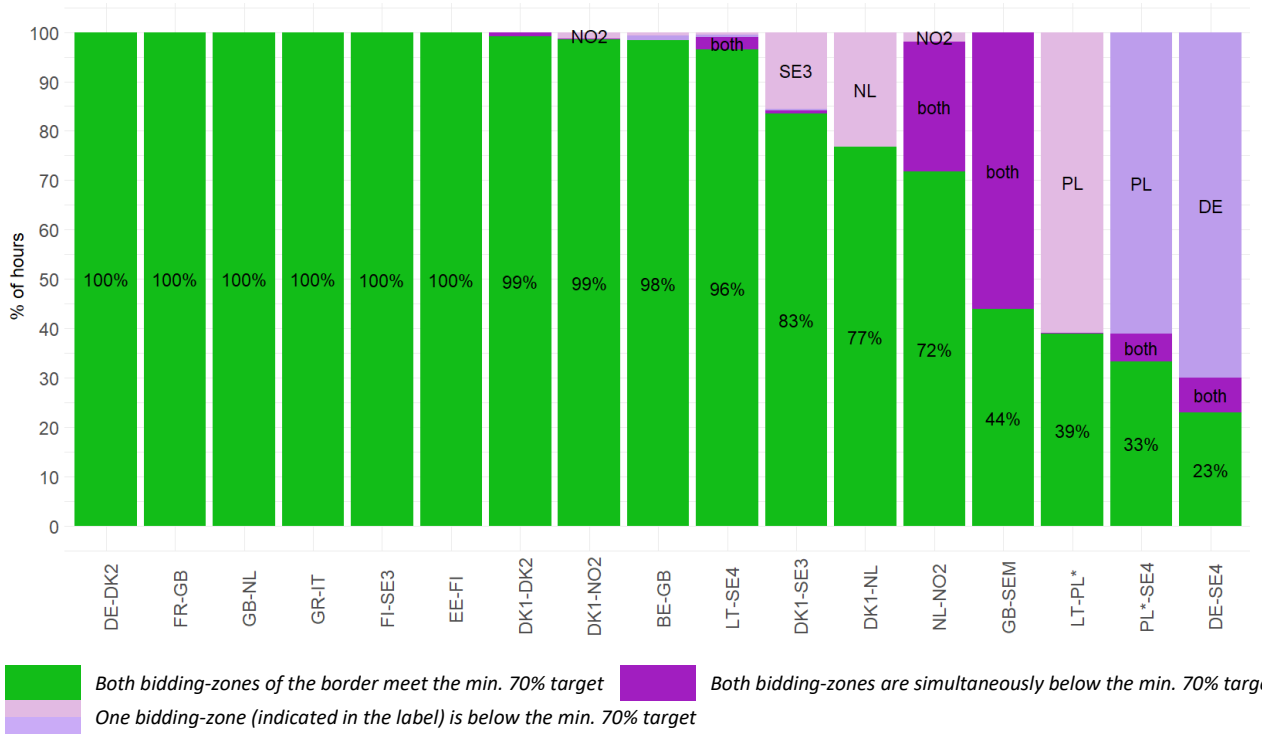
(12) Regarding the results of monitoring the MACZT on DC borders, Figure 1 displays the percentage of the hours when MACZT reached the minimum 70% target, for the first semester of 2020. Overall, the figure indicates the additional efforts needed to meet the minimum 70% target at all times on certain DC borders.

[7] 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 MMR 2018 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

[8] The Baltic regulatory authorities informed that common 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 common grid models, and the identification of the limiting network elements on hourly basis, to enable the monitoring of the MACZT as soon as possible.

[9] The Nordic TSOs explained that the data could not be provided to ACER due to national security legislation in Sweden. While ACER suggested different alternatives to meet the data request, including a certain degree of anonymization of CNECs, the necessary data was finally not provided. This issue should be urgently addressed to allow ACER's monitoring of the MACZT, for the second semester of 2020.

Figure 1: Percentage of the time when the relative MACZT is above 70% on DC borders – first semester of 2020 (% of hours)



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 both directions.

Note 2: The DC borders with Norway, where the minimum 70% target does not yet apply, are displayed only for information. Moreover, 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.

** 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. ACER performed estimates of this impact in line with the section 6.2.3 of the Recommendation: in particular, when allocation constraints apply, 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.*

(13) Overall, Figure 1 indicates that MACZT reached the minimum 70% target most of the time on DC borders in the first semester of 2020. However, few substantial exceptions apply:

- The border between Germany and Sweden 4, the so-called Baltic cable, where the capacity was below the minimum 70% target more than 75% of the time;
- The Polish borders with Lithuania, LitPol, and with Sweden, SwePol, where the capacity was often (respectively 61% and 67% of the time) below the minimum 70% target. The reductions mostly relate to the application of allocation constraints in Poland;
- The border between Great Britain and the Single Energy Market (SEM) of Ireland where the capacity, from Ireland to Great-Britain, was below the minimum target for

56% of the hours, mainly due to reductions of the capacity of the Moyle interconnector[10];

- The Dutch borders with Denmark (the so-called Cobra cable) and Norway (NorNed), due to disturbances in the Dutch grid, or outages in the Danish and/or Norwegian AC networks for the NorNed cable; and
- The border between Denmark 1 and Sweden 3, Konti-Skan HVDCs, where the capacity was below 70% for 17% of the hours, almost exclusively due to reductions on the Swedish side.

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

(14) Regarding the results of monitoring the MACZT on AC borders, the analysis is split as follows:

- First, the MACZT is analysed for those regions, or coordination areas[11], where coordinated capacity calculation already applied in the first semester of 2020 (i.e. the South West Europe (SWE), Italy North and Central West Europe (CWE) regions);
- Second, the MACZT is analysed for the remaining geographical areas where coordinated capacity calculation does not apply.

(15) As a result, Figure 2 to Figure 5 below display the results of monitoring MACZT on AC borders organised per region (SWE, Italy North, CWE) and, elsewhere, per country and coordination area.

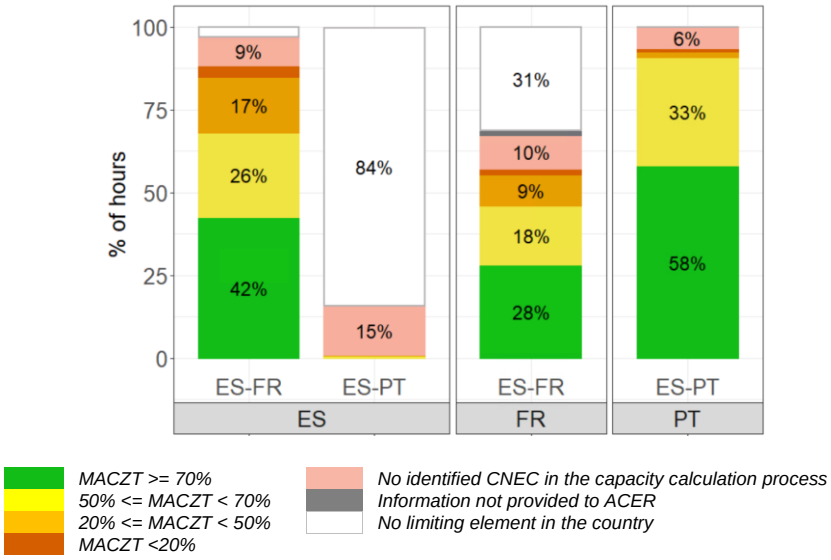
[10] The border between Great Britain and the Irish SEM encompasses two interconnectors, the Moyle and the East-West HVDCs. While finalising this report, ACER was informed that the reason for the cross-zonal capacity to be below the minimum 70% target on the border between Great Britain and the SEM of Ireland was related to constraints on the British side of the Moyle interconnector. ACER was also made aware of an existing connection agreement between the interconnector owner of Moyle and the connecting TSOs, setting a firm capacity value lower than Fmax in the direction of flows from the SEM bidding-zone to the Great-Britain bidding-zone, 80 MW for the first semester 2020, which was expected to be increased to 250 MW from 1 December 2020. Such value of 80 MW was not considered in this report, i.e. the Fmax 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.

[11] 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.

Note: The following caveats apply to all the figures below. Additional caveats can be found in the notes below the respective figures, or in the main text of the report.

- *Relative MACZT means the percentage of the MACZT relative to the maximum admissible flow (Fmax).*
- *The figures do not consider the influence of third countries, except partly for the CWE region as described in the note below the CWE figure.*
- *The information on CNECs for France was partially provided.*

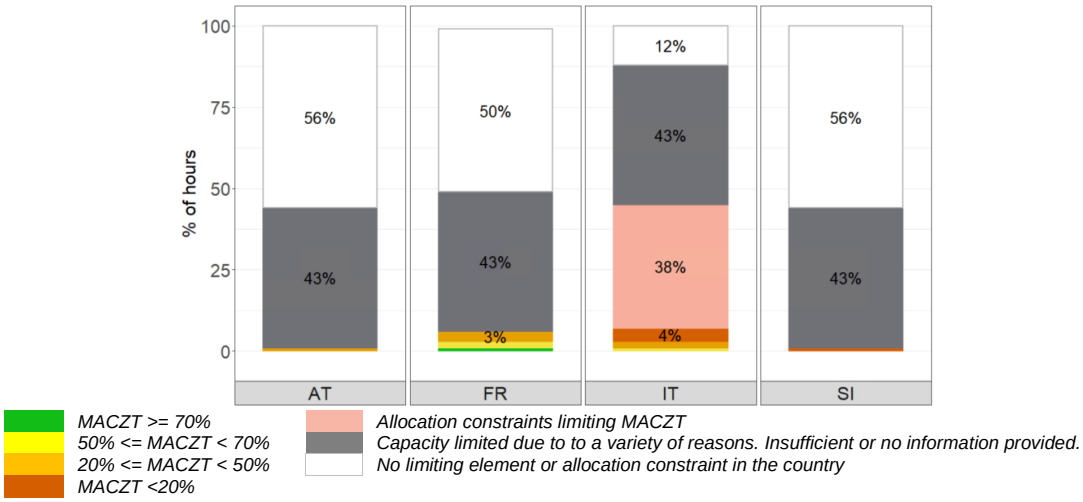
Figure 2: Percentage of the time when the relative MACZT is above the minimum 70% target (green) or within other ranges (yellow, orange, red), and when capacity is limited by other factors (light red and grey), per border, in SWE region – first semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

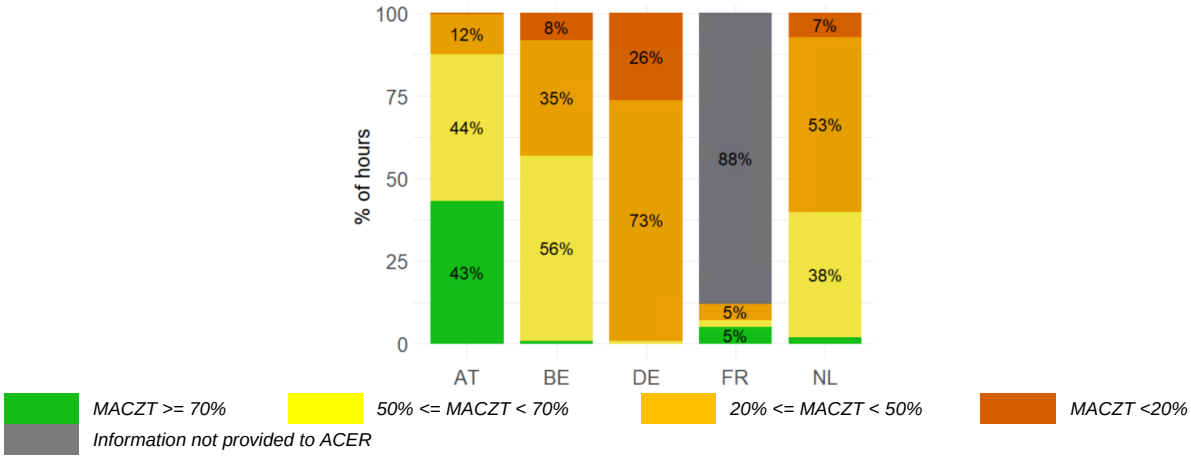
Note: The analysis corresponds to the period after 29 January 2020, when the SWE CCM went live.
The percentage of hours during which the relative MACZT reaches the minimum 70% target refers to the hours when the target is met simultaneously on all reported limiting CNECs in both directions.

Figure 3: Percentage of the time when the relative MACZT is above the minimum 70% target (green) or within other ranges (yellow, orange, red) and when capacity is limited by allocation constraints (light red), or by other factors (grey), in Italy North region, not considering exchanges with third countries – first semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

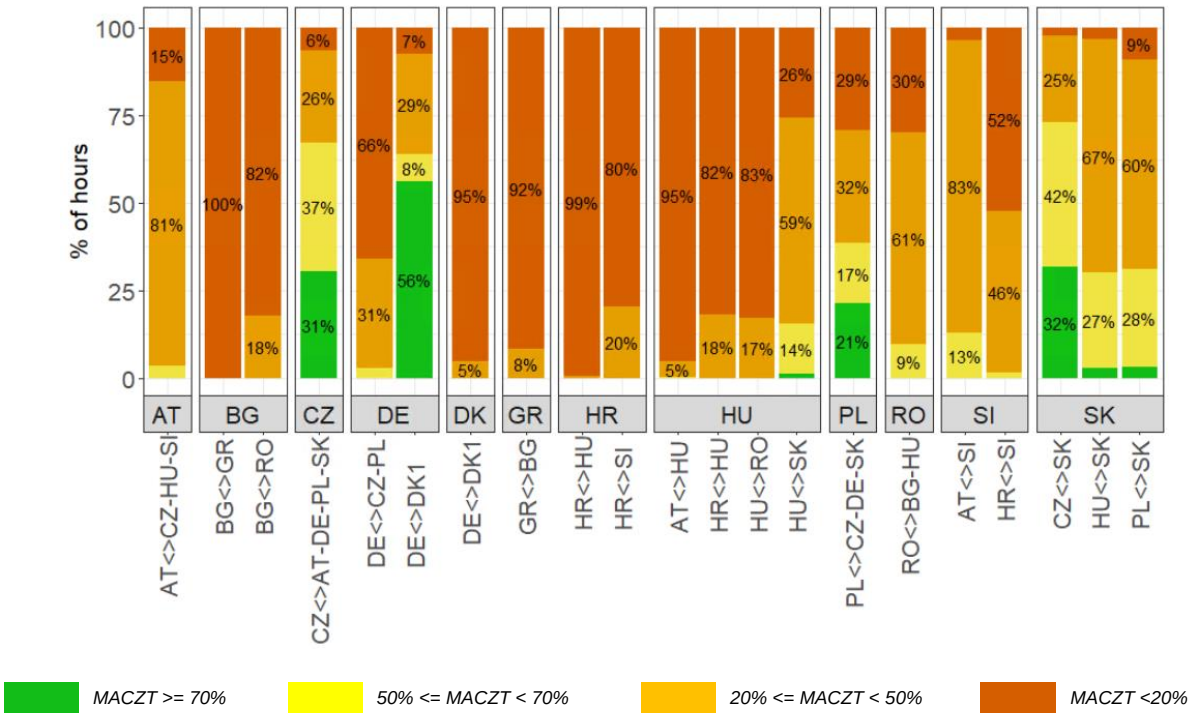
Figure 4: Percentage of the time when the relative MACZT is above the minimum 70% target on all CNECs, per country in the CWE region, not considering exchanges with third countries – second quarter of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note: The MACZT for the Netherlands includes the flow derived from exchanges with third countries, as the TSO could not disentangle such flows in time for the publication of this report. The MACZT for Belgium includes the impacts of exchanges between the EU and Norway. Figure 25 in the annex includes the influence of exchanges with third countries, for all CWE MSs.

Figure 5: Percentage of the time when the relative MACZT is above the minimum 70% target on all limiting CNECs in both directions, per country and coordination area, for countries of Continental Europe where a coordinated capacity calculation is not yet implemented, not considering exchanges with third countries – first semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Notes: 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 CNECs 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). The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation.

The Danish TSO (Energinet) provided a set of CNECs which were typically used in capacity calculation during the analysed period, without further specifying the hours or periods for which those CNECs where limiting. Thus, the MACZT is likely underestimated on the CNECs that are not limiting. Moreover, the impact of flows from DC borders on the Danish CNECs was only approximately taken into account. These two limitations affect the accuracy of the results for Denmark.

(16) Overall, the above displayed figures show a very diverse level of the MACZT on AC borders across Europe, leading to the following main conclusions for the first semester of 2020:

- In the SWE region, the relative MACZT was above the minimum 70% target for around 50% of all the hours.
- Significant room for improvement to meet the minimum 70% target remains for most regions and borders. In particular, the scope for improvement is the largest for the following countries and regions:
    - TSOs in Bulgaria, Croatia, Greece Hungary, and Slovenia in some directions[12], have not yet implemented coordinated capacity calculation. Levels of relative MACZT in those countries are among the lowest in Europe.
    - In the CWE region, all countries must provide significant efforts to meet the minimum 70% target. This applies in particular to Germany, Belgium and the Netherlands. However, as further described below, the low MACZT (e.g. in Belgium and the Netherlands) may be partly due to loop flows crossing those countries and caused by intra-zonal exchanges in nearby countries.
    - In the Italy North region, the number of hours when the relative MACZT above 70% was low. It represented less than 8%[13] of the hours for which CNECs were provided. Moreover, around 38 % of the hours, cross-zonal capacity was limited by allocation constraints applied by the Italian TSO and, around 43% of the hours by a number of other factors, regarding which the Italian TSO provided insufficient or no information to ACER.
- In Finland, based on estimations made by the Finnish TSO (Fingrid), the relative MACZT was above 60% for most of the hours. However, the methodology underlying these estimations is not in line with the Recommendation and they are included in this report only for information and with the caveat that the Finnish TSO's estimations cannot be compared to the results of other countries.

(17) When considering the above presented conclusions, at least the following three main caveats apply:

- 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 figures included in the executive summary do not consider exchanges with third (non-EU) countries[14] because, as far as ACER is aware, agreements with third countries in line with previous EC's guidance were not yet in place for the first semester of 2020. These exchanges may affect the MACZT results on countries bordering non-EU countries. Such impacts appear to be most relevant for Italy North, Greece and Slovakia. Figures including the exchanges with third countries can be found in the annex of this report.

[12] Low levels of relative MACZT are also observed in Denmark (see Figure 15); however, issues with the quality of the data provided by the TSO and in the calculation may have led to underestimate the MACZT levels for this country.

[13] However, 55% of the hours, when considering exchanges with third countries, mostly with Switzerland.

[14] With the main exception of the Netherlands, where the TSO was unable to disentangle the influence of exchanges with third countries and Belgium, where the TSO included the influence of exchanges between the EU and Norway.

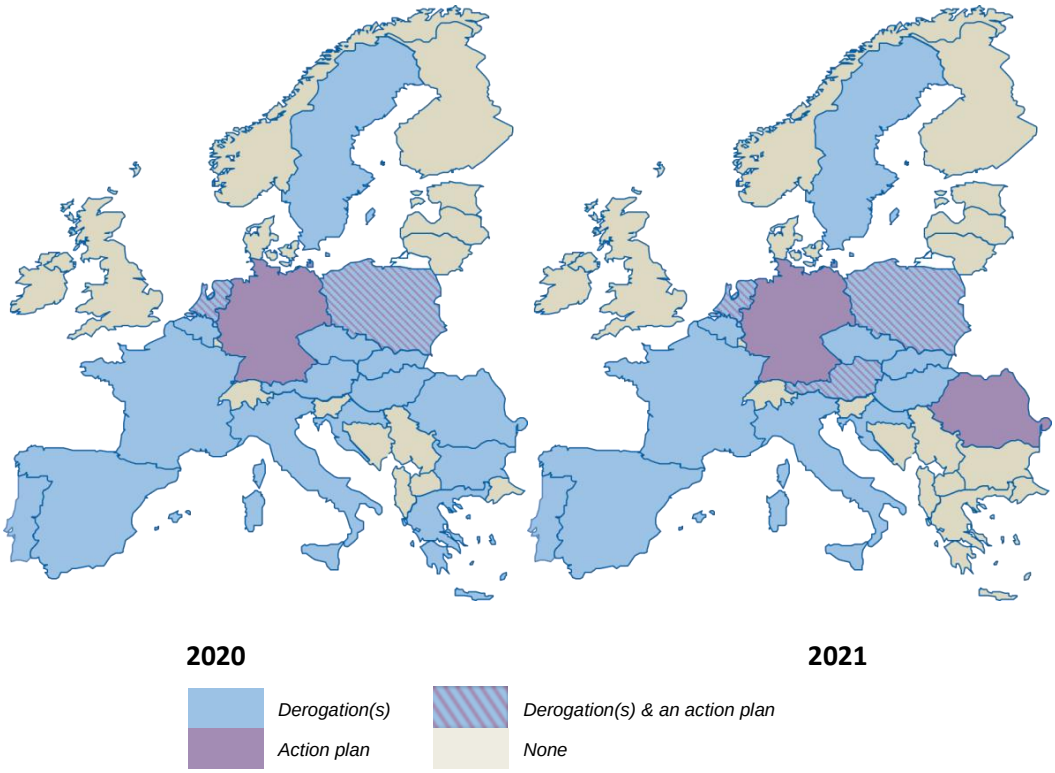
- Allocation constraints may significantly affect the MACZT effectively available. While ACER was able to estimate the impact of such constraints on some of the borders (example: for the Polish technical profile), a comprehensive monitoring of all allocation constraints was not yet possible.

On action plans and derogations, the report shows a diverse picture across Europe. Significant room for further harmonising the setup of action plans and derogations exists across the EU.

(18) Finally, the report includes an overview of action plans, established by MSs, and derogations, either already approved by the relevant authorities or for which a regulatory decision is pending, and an assessment on how the design of such transitional measures allows TSOs to gradually reach the 70% target by the end of 2025 at the latest.

(19) Figure 6 presents an overview of derogations and action plans for both 2020 and 2021. It shows that a majority of MSs have decided to adopt an action plan, a derogation, or both. Germany, the Netherlands and Poland implemented an action plan already in 2020, whereas more recently Austria and Romania have expressed their intention to apply action plans as of 2021. Regulatory authorities granted derogations in 16 MSs for the year 2020. So far, TSOs of 13 MSs submitted derogation requests for the year 2021. A detailed description of derogations and action plans in place for each coordination area is available on ACER's website[15].

Figure 6: Overview of derogations and action plans for 2020 (left) and 2021 (right)



Source: ACER elaboration based on information provided by regulatory authorities.

[15] 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%20-%202020/Overview%20of%20action%20plans%20and%20derogations%20for%202020%20and%202021%20(18.12.2020).pdf

Note: A country is considered to have a derogation and/or an action plan in place if they apply to at least one of its capacity calculation region or for one of its bidding-zone borders.

(20) While these measures should be aimed to gradually meet the 70% target, monitoring how they contribute to increase the MACZT its not straightforward, for the following main reasons:

- Regarding action plans, the linear trajectory is sometimes set or monitored by using different principles than the ones envisaged in ACER's Recommendation. For example, for the Dutch action plan within the CWE region, the starting value of the linear trajectory is based only on the exchanges within the coordination area, i.e. within the CWE region rather than on the MACZT, which also consider exchanges beyond the region. Moreover, in Germany, the linear trajectory is monitored by using a calculation methodology, e.g. for the estimation of the margin resulting from exchanges beyond the coordination area, that is not in line with the one envisaged in ACER's Recommendation. This should be taken into account when comparing the performance of different MSs with respect to their defined linear trajectories, or when comparing EU reports (e.g. this one) using the MACZT as reference to measure progress[16] with national reports used for compliance enforcement.
- Derogations do not always include a MACZT target, although ACER observed significant improvements in the derogation requests made for 2021, as further described below.

(21) As a result, this report only monitors the MACZT compared to the transitional targets where sufficient information was available. As above mentioned, priority was given to provide a consistent monitoring of the MACZT compared to the minimum 70% target across the EU.

(22) Regarding the need for further harmonisation of the content of derogations, ACER observed improvements within the scope of capacity calculation regions in the SWE and the Italy North regions, and partially in the CWE one. Most other derogations have shown hardly any harmonisation and minimal alignment with the guidance on the content of the derogations, jointly provided by ACER and regulatory authorities.

(23) Regarding the need for defining derogations with a view to gradually increasing the MACZT, a significant improvement in the content of the derogations was observed. While for 2020 most derogations did not define a minimum target of the MACZT, for 2021 all derogations included either:

- A minimum level of the MACZT specified that can be offered while respecting operational security; or
- A methodology and/or projects that shall provide a long-term solution to the issue(s) that the derogation seeks to address.

(24) Regarding the minimum level of the MACZT, the following is observed:

- On the one hand, Austria, Belgium, the Netherlands and Poland, proposed a methodology to identify the conditions that would create operational security concerns and to estimate by how much the capacity target needs to be reduced for each hour. This methodology is deemed necessary to address the impact of loop flows or flows from adjacent capacity calculation regions that TSOs are not able to adequately forecast. For Austria, the Netherlands and Poland, which apply an action plan, the

[16] In line with ACER's Recommendation and the binding target to be met at the end of the action plan, as envisaged in the Electricity Regulation.

methodological minimum level of the MACZT can lead in certain hours to capacities lower than the linear trajectory.

- On the other hand, most other derogations for 2021 only set a minimum average target for the whole year, thus compliance can only be assessed the year after. This approach hinders the individual assessment of the instances when cross-zonal capacity is reduced below the minimum target; in particular, it makes it harder to identify whether the reductions relate to the operational security issues for which the derogation was granted. In this respect, it is expected that the ongoing implementation of processes and tools by TSOs will enable a more granular definition of the minimum targets with a view to maximise cross-zonal capacity while respecting operational security.

Based on the above findings, ACER advises the following:

(25) 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, ensuring the provision of the required data is essential in the Nordic and Baltic regions, where, to date, virtually no monitoring was possible, and in Italy North and France, where information on limiting network elements was largely missing.
- TSOs should provide at least the complete set of limiting network elements for all hours. Specifically, for the hours when capacity is not limited by a network element, but by an allocation constraint or other limiting factor, TSOs should provide information on the network element that would have limited capacity calculation should such a constraint or limiting factor have not been applied.
- Regulatory authorities should consider the results of ACER's analysis to assess the compliance of TSOs with the minimum 70% target for the first semester of 2020.

(26) In line with the Electricity Regulation and the guidance provided by regulatory authorities and ACER to TSOs on the matter:

- 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 ACER’s Recommendation.
- Regulatory authorities should seek a higher degree of harmonisation on the minimum content that TSOs should include when requesting a derogation, and a higher degree of consistency on the criteria to assess and approve derogations. In this respect, best practices should increasingly be developed and shared.

(27) In line with the conclusions of the 35th Florence Forum[17], the Network Code implementation process remains a key priority for the next years and, in that respect, TSOs should urgently implement regional methodologies for coordination of redispatching and countertrading (and related cost-sharing), as an absolute prerequisite to meet the 70% minimum target.

[17] 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

(28) 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.

(29) 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'[18] (hereafter, the Electricity Regulation) of the Clean Energy for all Europeans Package (CEP)[19] provides a new framework aiming to increase the capacity offered for cross-zonal trade.

(30) 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 (MSs) may also adopt transitory measures, such as 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.

(31) 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. In the European Union Agency for the Cooperation of Energy Regulators (ACER), in coordination with regulatory authorities, agreed to issue a recommendation[20] (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).

(32) An important caveat underlying the ACER's analysis of the MACZT is that it does not assess legal compliance of TSOs' actions, which is a task assigned to national regulatory authorities, but rather estimates the margin for improvement with respect to the minimum 70% target. However, ACER advises that the regulatory authorities consider the results of

[18] 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

[19] 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

[20] 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

ACER's analysis to assess the compliance of TSOs with the minimum 70% target for the first semester of 2020.

(33) Overall, the present report, produced in the context of ACER's tasks to monitor the internal electricity market[21], 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 will be produced biannually, covers the first semester of 2020.

(34) 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 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, where relevant, and where information is available. Finally, chapter 4 includes an overview of the action plans and derogations approved by the relevant authorities, and an assessment on how the design of such transitional measures may contribute gradually to increase the MACZT.

[21] 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

(35) As mentioned above, ACER, following numerous interactions with the European Commission (EC), the European Network of transmission system operators for Electricity (ENTSO-E), regulatory authorities and TSOs, issued a Recommendation to ensure a consistent approach to the implementation and monitoring of the MACZT consistent, and to support legal compliance enforcement.

(36) A methodological paper[22] (hereafter 'the methodological paper') complements the Recommendation, describing how to estimate the MACZT, and the main caveats underlying the estimation of the MACZT. The present report monitors the MACZT across the EU in line with the Recommendation and the methodological paper. The main calculation principles included in these two documents are:

- The calculations focus on the day-ahead timeframe until coordinated intraday capacity calculation is implemented[23];
- The MACZT mostly stems from trade on EU bidding-zone borders. The influence of bidding-zone borders between EU and non-EU countries is separately monitored;
- The MACZT is monitored individually and separately for each critical network element with contingencies (CNEC);
- The MACZT is split between 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). Consequently, the concept of coordination areas is introduced to 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[24] 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 4 of Annex 1.

(37) As mentioned above, the methodological paper mainly describes:

- The calculation steps to estimate the MACZT;

[22] See the methodological paper at

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

[23] On borders where NTC capacity calculation applies, the long-term capacity is implicitly incorporated in the day-ahead capacity (NTC values evaluated on D-1). On borders where FB applies, incorporating the impact of long-term capacities on the MACZT on physical CNECs is not straight forward due to the relatively complex process followed to ensure the feasibility of long-term allocation (the so-called 'long-term allocated'- LTA - capacities inclusion process). Moreover, some CWE TSOs informed ACER that they did not take into account the process to ensure long term allocation, i.e. they did not remove the CNECs that were overwritten during the LTA-inclusion process. Consequently, the MACZT may be underestimated for those CNECs.

[24] 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

- The data needed for the different calculation steps, including fallback data, i.e. data that ACER may use when the requested information is not available[25]. 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, PTDFs[26]); 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. In this respect two of the main caveats are that:
    - when and where relevant, 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 5 in Annex 3;
    - some CNECs declared by TSOs for borders for which capacity calculation based on Net Transfer Capacity methodology (NTC borders) may not always be limiting, leading to an underestimated value of MCCC on these elements for some hours. This caveat is only relevant for TSOs that were unable to identify the actual limiting CNEC(s) per hour (e.g. for the Danish TSO Energinet as described in the notes below the relevant figures).

(38) In addition to the general caveats described in the Recommendation and the methodological paper, some caveats apply only to specific geographical areas. These caveats are described in the relevant sections and figures. An additional caveat that applies to this report refers to the influence of direct current (DC) borders on alternating current (AC) CNECs. Due to computational issues, we could not accurately consider this influence. The impact of this shortcoming is:

- not relevant for DC bidding-zone borders;
- not relevant for AC bidding-zone borders, when the MACZT estimations, or the PTDFs were provided by TSOs;
- limited for AC bidding-zone borders, when the analysed country did not provide PTDFs but is not in the proximity of a DC bidding-zone border;
- mostly relevant for AC CNECs in Denmark, due to the proximity of DC borders, in particular the border between the Netherlands and Denmark 1.

[25] With regard to the necessary data to estimate the MACZT, a detailed data request was sent to TSOs in December 2019.

[26] See paragraph (63) for the definition. In this case, consistency must nevertheless be ensured in the data set, e.g. PTDFs have to be either fully provided by TSOs or fully calculated by ACER.

(39) Regarding the data used for the calculations, Table 1 in section 3.1 for DC borders, and Table 5 in Annex 3, for AC borders, provide a comprehensive overview of the data used to estimate the MACZT, and whether TSOs or ACER estimated the different MACZT components.

(40) The terms used in this report follow the definitions included in Section 2 of the Recommendation. In particular, 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 however equivalent to the MCCC component of the MACZT.

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

(41) This chapter presents the results of monitoring the MACZT across the EU in the first semester of 2020. Due to the different characteristics of the interconnectors, the results are presented separately for DC and for AC bidding-zone borders. Section 3.1 presents the analysis of the MACZT on borders with only DC interconnectors, while section 3.2 includes the analysis of the MACZT on AC bidding-zone borders.

(42) For each of the two sections, the following aspects are included:

1. The geographical scope of the analysis is described;
2. The level of completeness and quality of the data provided by TSOs to ACER is analysed;
3. The numerical results of calculating the MACZT are displayed; and
4. The relevant conclusions are presented.

(43) The following caveats and definitions underlie the figures displayed 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 should apply. Where information about the transitional capacity target(s) is available, additional figures, comparing the MACZT to such transitional target(s)[27] are included in the annexes.
- Fmax means the maximum flow on critical network elements, respecting operational security limits[28].
- 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 EC's guidance were not yet in place for the first semester of 2020[29]. As a result, the following considerations with regard to third countries apply throughout this chapter:

[27] When such transitional target was unambiguously described by the TSO for the relevant CNECs for the first semester of 2020.

[28] See the complete definition in the section 2 of the Recommendation.

[29] 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.

- 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[30].
- Figures are firstly presented without consideration of exchanges with third countries; for most figures, an equivalent figure considering exchanges with third countries is included in the annexes;
- For the purpose of calculating MACZT in 2020, exchanges with the United Kingdom have been considered in the same way as exchanges with any other country of the EU.

(44) More generally, 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

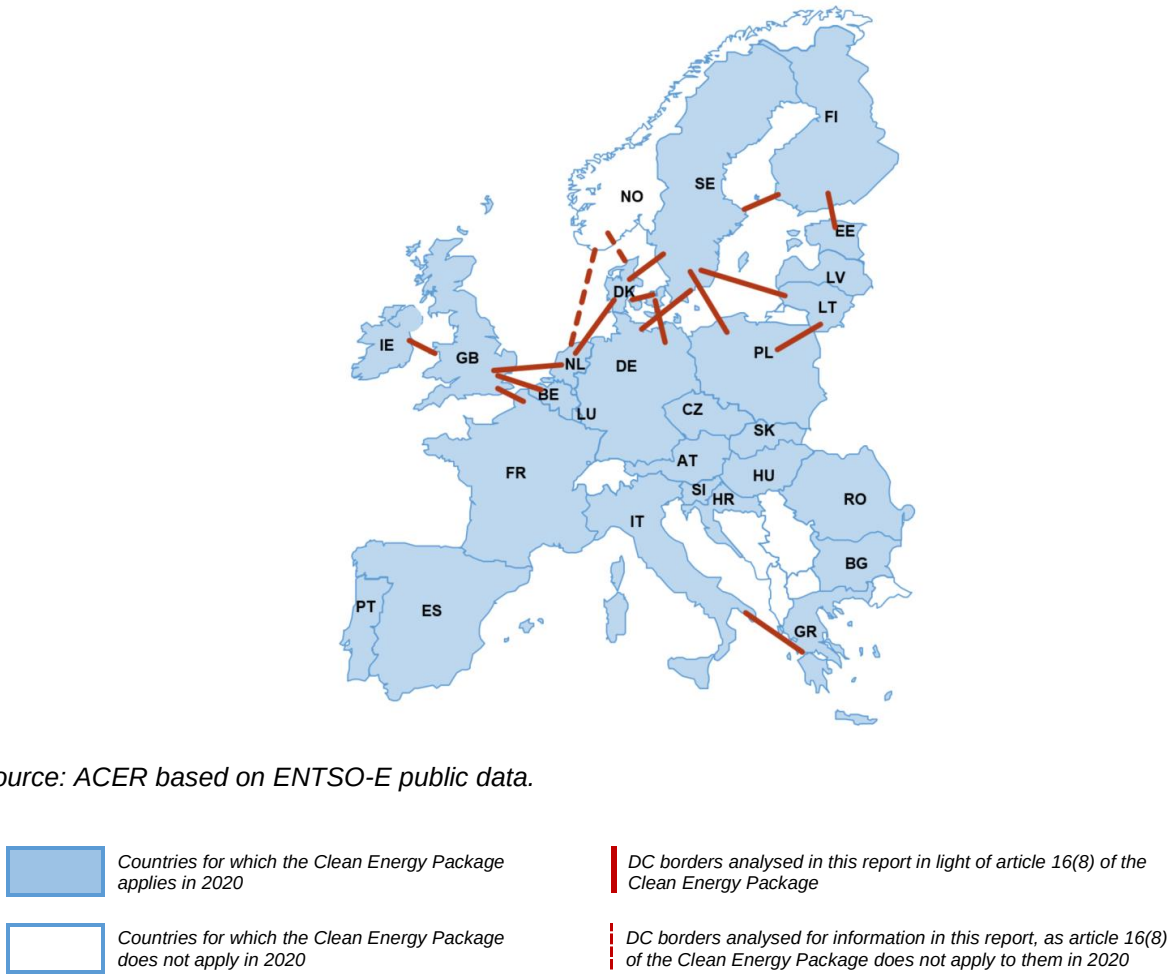
(45) This section presents the results for the bidding-zone borders encompassing only high-voltage direct current (HVDC) interconnectors, hereafter called 'DC borders'. A total of 16 DC borders between EU bidding-zones have been reported: Belgium-Great Britain, Germany-Demmark2, Germany-Sweden4, Denmark1-Denmark2, 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. While the DC borders between the Netherlands and Norway and between Denmark and Norway are not yet subject to the minimum 70% target[31], the results of monitoring the MACZT for these two borders are included for information.

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. In fact, ACER was informed that the relevant TSOs and regulatory authorities were taking the necessary steps to materialise such an interim arrangement, although this process was not yet concluded at the time of finalising this report. Additionally, not all TSOs were able to report separately the exchanges with Norway in time for the publication of this report. As a result, the influence of exchanges with Norway are not, in general, considered for the calculation of the MACZT; however, due to data-related issues, a limited number of exceptions apply; such exceptions are indicated in the note(s) underlying the relevant figures. In addition, the amendment of the relevant CACM-related methodologies incorporating Norway to the relevant CCR(s) is planned soon, so the figures that incorporated exchanges with Norway represent the most probable scenario in the short-term."

[30] In a very limited number of cases, the TSO was not able to disentangle exchanges with third countries, and such cases were caveated in the notes below the relevant figures.

[31] 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 29.

Figure 7: DC borders between bidding-zones in Europe – first semester of 2020



Source: ACER based on ENTSO-E public data.

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

3.1.2 Data completeness and quality

(46) 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;
- 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).

(47) 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 data was not provided by the relevant TSO, and that, instead, ACER had 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 – first semester of 2020

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

Yes, 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) or that the relevant TSO did not have to provide the data (e.g. the Norwegian TSO)

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. When the entities at both sides of the border provided different information on Fmax, the average value was used for the calculations.

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 then offered to the market. The NTC value represents the capacity offered by the TSO, before alignment with the neighbouring TSO.

(48) 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:

- In general, the completeness was satisfactory, as most TSOs provided all the requested data.
- The missing data did not impede the monitoring of the MACZT[32], as ACER was able to rely on alternative sources (ENTSO-E's Transparency Platform).

(49) Additionally, ACER investigated the reasons explaining some of the reductions of cross-zonal capacities below thermal limits. As a result, ACER found out that, sometimes, cross-zonal capacities on DC borders were reduced not only when outages occurred on the

[32] See note below Table 1.

interconnectors themselves, but also when congestions or outages occurred on network elements inside the TSOs' AC networks.

(50) Specifically, ACER was informed that, in the first semester of 2020, cross-zonal capacity was at times limited by internal congestions on at least the following borders:

- On the Baltic cable between Germany and Sweden4 due to congestions, at the distribution network level, within the German TSO's (TenneT) network in Germany;
- On the borders between the Netherlands and Norway, and between the Netherlands and Denmark1 due to congestions and outages within the Dutch TSO's (TenneT) network in the Netherlands;
- On the border between Great Britain and the Irish SEM, although precise information on the location (i.e. the side of the border) of the congestions was not provided [33].

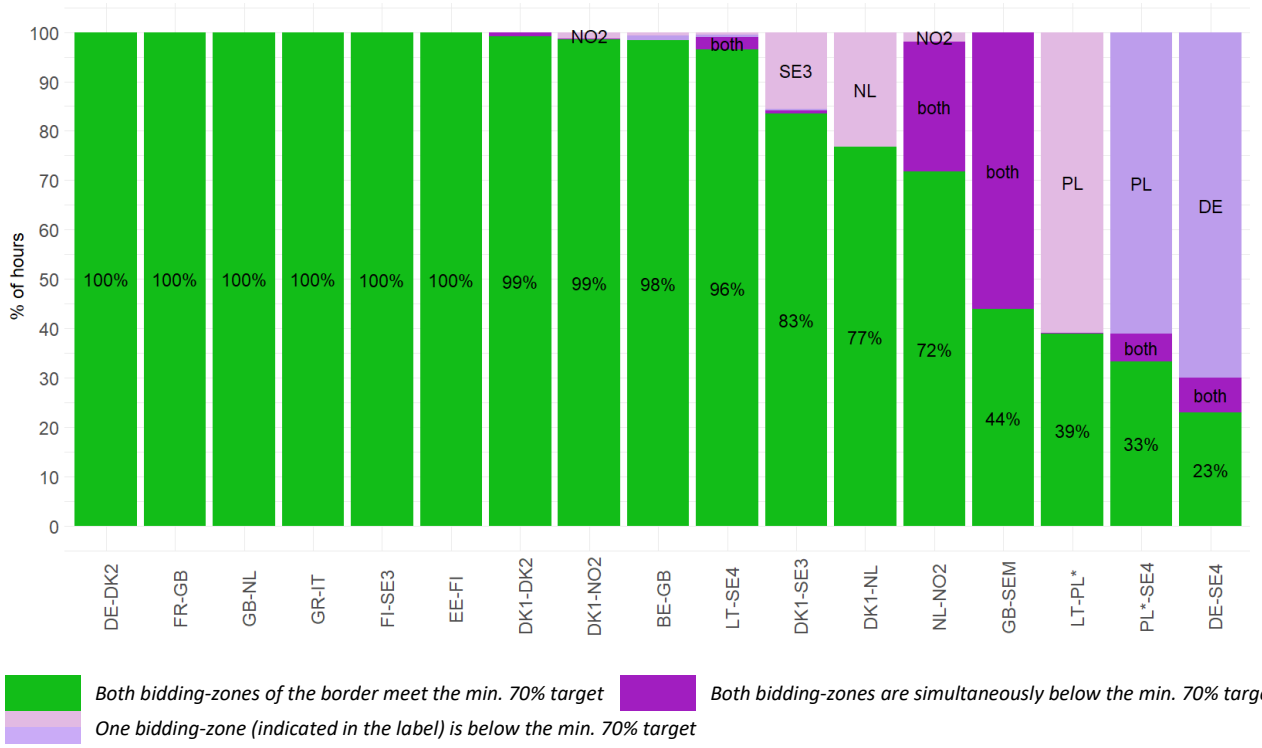
(51) Intra-zonal congestions may apply on several other borders for which the offered capacity is, with some frequency, below Fmax. As described in the Recommendation, reductions on DC borders due to congestions in the TSO's AC network should be reported. Such CNECs should be monitored separately, in addition to the HVDC. The reported Fmax of the interconnectors should not be reduced by these congestions.

3.1.3 Results

(52) Figure 8 below displays the percentage of hours for which the minimum 70% target was met, for both directions, per DC border, for the first semester of 2020. When the 70% was not met, the figure indicates the bidding-zone (or both bidding-zones when applicable) that did not meet the minimum 70% target.

[33] See footnote 36.

Figure 8: Percentage of the time when the relative MACZT is above 70% on DC borders – first semester of 2020 (% of hours)



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 both directions.

Note 2: The DC borders with Norway, where the minimum 70% target does not yet apply, are displayed only for information. Moreover, 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.

** 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. The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation: in particular, when allocation constraints apply, 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.*

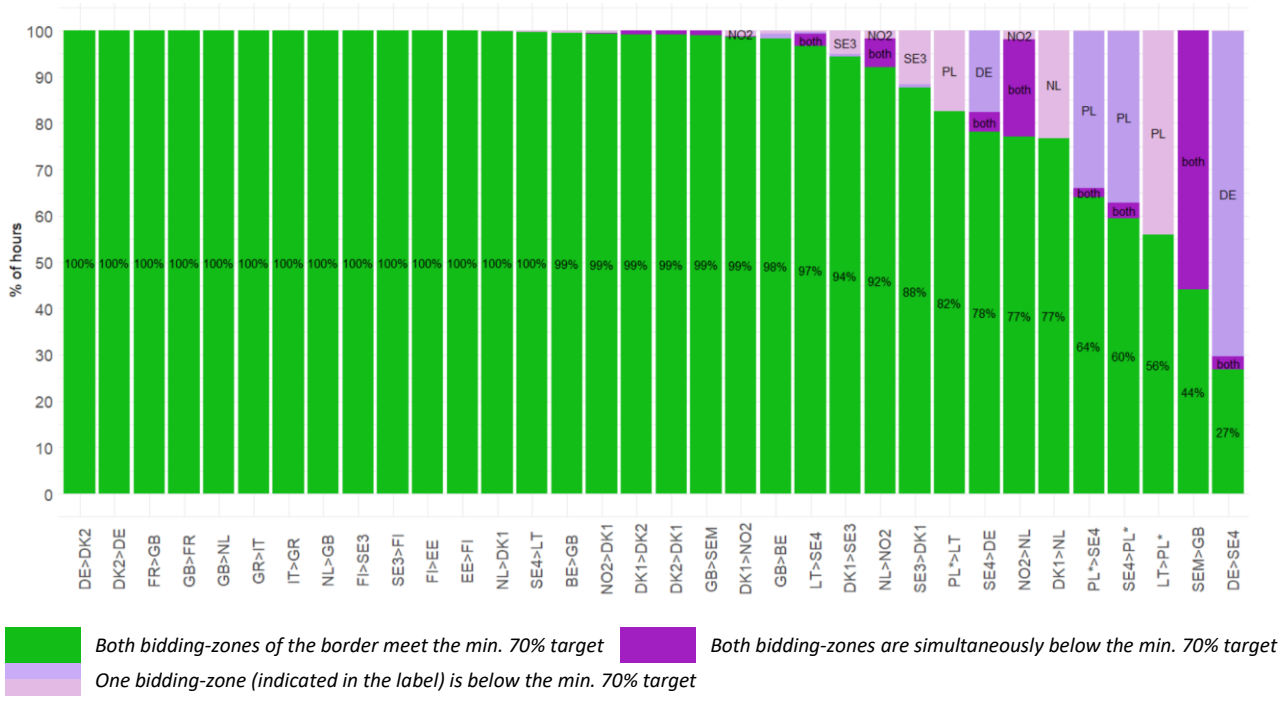
(53) The values shown in Figure 8 for the borders between Lithuania and Poland and between Poland and Sweden take account of the Polish allocation constraints[34]. When allocation constraints limit the exchanges with Poland, the interconnectors with Poland can still be used to accommodate exchanges between Sweden and Lithuania (via Poland); however, the application of the constraints effectively limits the trading possibilities with Poland. Figure 20 in Annex 2 shows the impact of the Polish allocation constraints on the relative MACZT.

(54) Complementing the analysis above, Figure 9 below shows the percentage of hours for which the minimum 70% target was met for each of the directions on a given DC border, for the first 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

[34] The allocation constraint has been considered according to the section 6.2.3 of the Recommendation.

example, such deviation is considerably more frequently observed in the direction from Germany to Sweden (73% of the hours) than in the opposite direction (22%), or in the direction from the Irish Isle to Great Britain (56%) than in the opposite one (1%). In other cases (e.g. on the Polish-Swedish borders), the frequency of deviation from the minimum 70% target is comparable in both directions.

Figure 9: Percentage of the time when the relative MACZT is above 70% on oriented DC borders – first semester of 2020



Source: ACER calculation based on TSOs data.

Note 2: The DC borders with Norway, where the minimum 70% target does not yet apply, are displayed only for information. Moreover, 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.

** 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. The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation: in particular, when allocation constraints apply, 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.*

(55) Moreover, Annex 2 includes the following figures on the MACZT on DC borders.

- Figure 19 shows the percentage of hours for which the relative MACZT is above 95% of Fmax and the identification of the TSO(s)' area effectively limiting the cross-zonal capacity, when the relative MACZT is below 95%.
- Figure 20 shows the percentage of the time for which the relative MACZT is above 70% on the Polish DC borders when allocation constraints are not considered.
- Figure 21 shows the density function of the relative MACZT values, on limiting AC CNECs in Belgium for the border between Belgium and Great Britain.

3.1.4 Conclusions

(56) Overall, the minimum 70% target was fulfilled most of the time on DC borders in the first semester of 2020. However, few substantial exceptions apply:

- The border between Germany and Sweden4 (the so-called Baltic cable) where the capacity was below the minimum 70% target more than 75% of the time, mostly due to constraints on the German side (70% of the time). The relevant German TSO (TenneT) attributes the reductions to the presence of congestions at the distribution network level. It should be noted that 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 TSOs[35] and the estimations made by ACER, the MACZT was above such target for both directions 38% of the hours in the first semester of 2020.
- The Polish borders with Lithuania and with Sweden, where the capacity was often (respectively 61% and 67% of the time) below the minimum 70% target. The reductions mostly relate to the application of allocation constraints on the Polish side, which explain 100% and 55% of the hours when the capacity is below the minimum 70% target on, respectively, the Lithuanian and Swedish border. 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 78% of the time for the first semester. A derogation also applies on this border for the first semester of 2020 (see chapter 4).
- The border between Denmark 1 and Sweden 3 (Konti-Skan HVDCs), where the capacity was below 70% for 17% of the hours, almost exclusively due to reductions on the Swedish side.
- The Dutch borders with Denmark (the so-called Cobra cable) and Norway (NorNed), due to disturbances in the Dutch grid, or outages in the Danish and/or Norwegian AC networks for the NorNed cable.
- The border between Great Britain and the Irish SEM where the capacity, from the Irish SEM to Great Britain, was below the minimum target for 66% of the hours. The location of the constraints leading to reduced capacities not be precisely identified with supporting hourly data from the TSOs[36].

(57) Finally, when analysing the results, the following main caveat needs to be considered. When the actual cross-zonal capacity was limited due to congestions within the TSOs' area, information on the limiting AC CNECs was rarely provided[37]. As mentioned above,

[35] Which includes the consideration that the HVDC interconnector was the only CNEC that needs to be monitored. See further considerations on this issue in paragraphs (50), (51) and (57).

[36] The border between Great Britain and the Irish SEM encompasses two interconnectors, the Moyle and the East-West HVDCs. While finalising this report, ACER was informed that the reason for the cross-zonal capacity to be below the minimum 70% target on the border between Great Britain and the SEM of Ireland was related to constraints on the British side of the Moyle interconnector. ACER was also made aware of an existing connection agreement between the interconnector owner of Moyle and the connecting TSOs, setting a firm capacity value lower than Fmax in the direction of flows from the SEM bidding-zone to the Great-Britain bidding-zone, 80 MW for the first semester 2020, which was expected to be increased to 250 MW from 1 December 2020. Such value of 80 MW was not considered in this report. 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.

[37] For the first semester, only the Belgian TSO (Elia) provided partial information on internal network elements limiting cross-zonal capacity on the border between Belgium and Great Britain (see Figure 21 in the annex), even though reduction of cross-zonal capacity below the transmission capacity of the interconnector are less frequent than on other

reductions on DC borders due to congestions in the TSO's network should be reported. Such CNECs should be monitored separately, in addition to the HVDC. The reported Fmax of the interconnectors should not be reduced by these congestions.

(58) Overall, while the quality of the data provided by TSOs improved compared to previous preliminary ACER's analysis of the MACZT[38], the above-described data quality issues may affect the accuracy of the results. The necessary corrections and data quality improvements should be made for subsequent editions of this report.

3.2 AC bidding-zone borders

3.2.1 Geographical scope of the monitoring of the MACZT

(59) 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 areas[39].

(60) 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, section 3.2.3.1, the Italy North region, section 3.2.3.2, and the Central West Europe (CWE) region, section 3.2.3.3 .

(61) 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 section 3.2.3.4.

(62) 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 regions[40]. For different reasons, the set of data provided to ACER was limited, for the Italy North region and, in general, for France, thus the monitoring of the MACZT was only partial in these areas. Elsewhere, the analysis of the MACZT was possible. More details on the completeness and quality of the data provided is included in the next subsection.

3.2.2 Data completeness and quality

(63) To enable the monitoring of the MACZT on AC borders, TSOs were requested to provide :

borders (see Figure 19 in the annex, showing the frequency of MACZT being below 95% of Fmax on the respective interconnectors).

[38] 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.

[39] See the definition of coordination areas in paragraph (36).

[40] 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 ACER's recommendation. Therefore, the MACZT results for Finland, included, only for information, in Figure 40 in Annex 3, are hardly comparable with the MACZT values calculated by ACER throughout this report.

- Necessarily:
    - The description of their coordination areas (i.e. the bidding-zone borders on which a coordinated capacity calculation applies);
    - At least one representative common grid model;
    - 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;
    - The PTDFs on all relevant borders, or the grid model identifiers of the CNECs in the common 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 TSO's values);
    - The TSO's forecasts of cross-zonal exchanges between countries at the time of capacity calculation.

(64) Moreover, TSOs were offered the possibility to perform, partly or fully, the calculations of the MACZT by themselves and provide the intermediate and/or final results to ACER, provided that the underlying calculations are performed in line with the Recommendation. ACER evaluated both the quality of the data and the alignment of TSO's calculation with the Recommendation.

(65) Table 2 provides a summary of the completeness and quality of the data provided to ACER. This summary should be considered together with Table 5 in Annex 3, which present 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 – first semester of 2020

CCAs	Country	TSO	Overall ACER's assessment of data completeness and quality	Observations
CWE	AT	APG		
	BE	Elia		The MNCC values, when provided without third countries, did not exclude all non-EU countries.
	DE	TenneT		The MNCC values provided were not calculated in line with the Recommendation (see table 3 in the annex for details). ACER recalculated them.
		Transnet		
		Amprion		
	FR	RTE		Part of the CNECs were discretionally not provided
	NL	TenneT		The MNCC values provided included exchanges with all third countries. The TSO did not provide PTDFs or grid model identifiers that would have allowed ACER to recalculate MNCC values with and without third countries.
Italy North	AT	APG		For most of the time, particularly when capacity was reduced due to allocation constraints or other issues, no information on CNECs was provided. Monitoring of the MACZT in line with the Recommendation could only be performed for the market time units for which CNECs were provided. For France, part of the CNECs were discretionally not provided
	FR	RTE		
	IT	TERNA		
	SI	ELES		
SWE	ES	REE		
	FR	RTE		01 Jan. to 28 Jan.: Neither PTDFs, nor the data necessary for ACER to compute PTDFs were provided. From 29 Jan.: Part of the CNECs were discretionally not provided
	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 (see annex for details). 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		The TSOs provided a set of CNECs which were typically used in capacity calculation during the analysed period, without further specifying the hours or periods for which those CNECs were relevants. EIC codes were missing
DK-SE				No grid model and no CNECs were provided; no monitoring was possible.
FI-SE1	FI	Fingrid		The MCCC and MNCC values provided are not calculated in line with the recommendation. The absence of common grid model dit 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 (see annex for details). 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 insufficent data provided. Monitoring MACZT was not possible at all, or only very limitedly.

(66) 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 considerably compared to the previous preliminary ACER's analysis of the MACZT[41].
- However, certain aspects still hamper the correct monitoring of the MACZT, and may put at risk the comparability of the results between countries.

(67) 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 partly relates to the absence of common grid models. While these grid models are not yet developed in the Baltic region[42], they are relatively advanced in the Nordic countries. However, the Nordic TSOs explained that the data could not be provided to ACER due to national security legislation in Sweden. While ACER suggested different alternatives to meet the data request, including a certain degree of anonymization of CNECs, the necessary data was finally not provided. This issue should be urgently addressed to allow ACER's monitoring of the MACZT, for the second semester of 2020.

(68) In few occasions, TSOs only provided a subset of the data requested, despite the full data set being available to them. For example, the French TSO (RTE) provided partial information on CNECs.

(69) In other occasions, TSOs only provided information on limiting CNECs for a reduced number of hours. For example, when cross-zonal capacity was limited due to allocation constraints or due to other reasons, TSOs often did not provide information on CNECs. This was particularly the case for the Italy North region. To enable ACER's monitoring of the MACZT, TSOs should provide information on the limiting CNEC for all hours. Specifically, for the hours when capacity is not limited by a CNEC, but by an allocation constraint or other limiting factor, TSOs should provide information on the CNEC that would have limited capacity calculation should such a constraint or limiting factor have not been applied.

(70) 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. ACER recalculated any provided values that diverted from the Recommendation.

(71) 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

[41] See footnote 38.

[42] The Baltic regulatory authorities informed that common 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 common grid models, and the identification of the limiting network elements on hourly basis, to enable the monitoring of the MACZT as soon as possible.

area where the limiting CNEC was located for each hour, e.g. in the Italy North region[43]. TSOs belonging to the same coordination area should, at least ensure consistent data; and preferably, they should submit the data jointly, rather than individually.

3.2.3 Results

3.2.3.1 South West Europe region

(72) In the SWE region, the adopted CCM went live on 29 January 2020. While the TSOs of the region provided data for the whole semester[44], the data set provided for the period after this date was deemed more relevant and therefore the analysis included below corresponds only to such period.

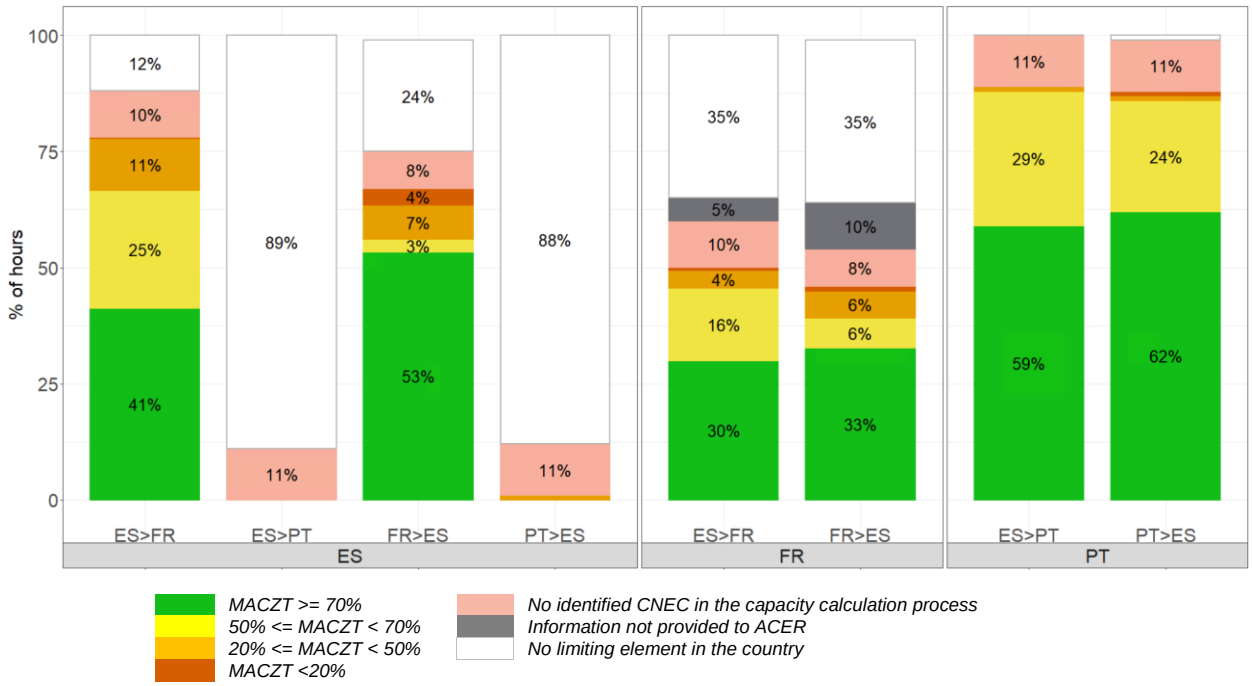
(73) Figure 10 shows the percentage of hours for which the MACZT was within a set of predefined ranges (>70%, 50-70%, 20-50%, <20%).The information for the SWE region is displayed per border-direction[45] and from the perspective of the two countries at both sides of the border, i.e. based on the geographical location of the limiting CNEC(s). The figure also indicates the percentage of hours for which: i) the capacity calculation in SWE was not successful in identifying the limiting CNEC; ii) no information was provided to ACER due to reasons explained in the note below the figure. In any of these two cases, TSOs 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 have been successful. Finally, the figure describes the percentage of hours for which there is no limiting CNEC from the perspective of a country, as the limiting element is located in the neighbouring one.

[43] 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.

[44] Except the French TSO that did not provide a full dataset for the French-Spanish border for the period before 29 January 2020.

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

Figure 10: Percentage of the time when the relative MACZT is above the minimum 70% target (green) or within other ranges (yellow, orange, red), and when capacity is limited by other factors (light red and grey), per oriented border, in SWE region – first semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note 1: The analysis corresponds to the period from 29 January 2020, when the SWE CCM went live.

Note 2: The French TSO filtered out information on limiting CNECs for a number of hours. The analysis is based on the data made available to ACER.

Note 3: 'No limiting element in the country' means that the limiting element was located in the network of the neighbouring TSO.

Note 4: When the limiting CNEC is the interconnector, the limiting CNEC was declared by the two TSOs on each side of a given border. This is why the overall percentage of the time when limiting CNECs are reported on a given border-direction, considering the two TSOs taken together, is above 100%.

Note 5: 'No identified CNEC in 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 CNEC.

Note 6: When no information on CNECs was provided to ACER on the French-Spanish border, TSOs have informed ACER that it is due to either i) CNECs applied by the French TSO, and not reported (see above), or ii) Differences between TSOs in the approach to spreading the results of capacity calculation, which only takes place few times within the day, across all hours.

Note 7: 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.

(74) Overall, Figure 10 shows that 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, and otherwise an element more often located in Spain than in France. However, the accuracy of the analysis on the Spanish-French border is hindered by the filters applied by the French TSO when providing information on limiting CNECs.

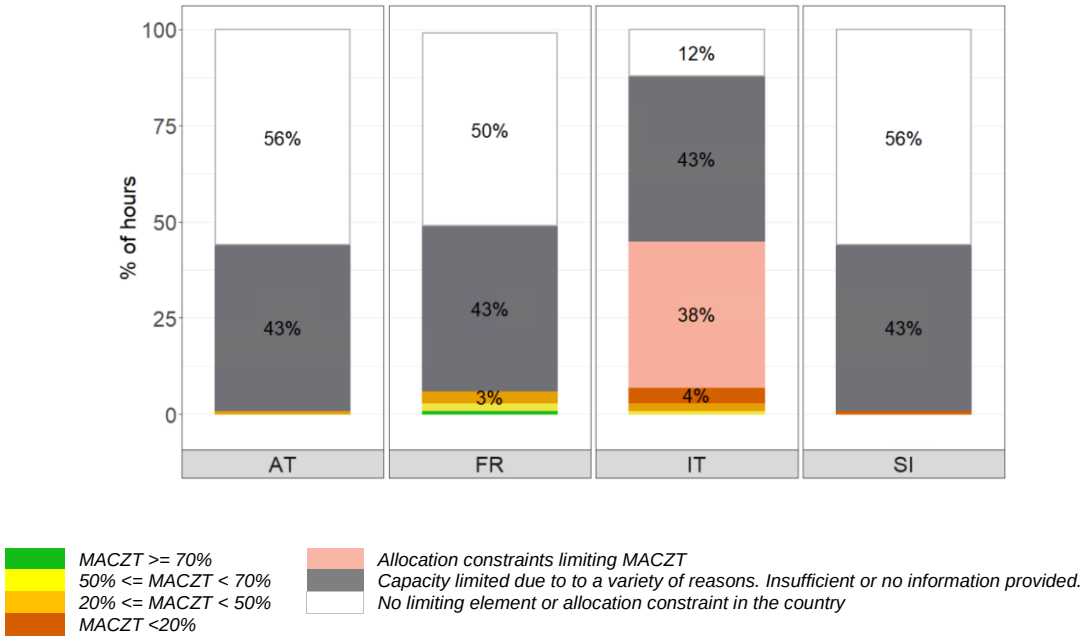
(75) Moreover, for Portugal, a MACZT of at least 70% was available during more than 60% of the hours when a Portuguese CNEC was limiting cross-zonal trade between Spain and Portugal in the first semester of 2020. For both Spain and France, the minimum 70% target was met for around 50% of the time when a limiting CNEC has been reported by the respective country. Finally, during around 11% of the hours, technical issues of various kinds[46] impeded the identification of the elements limiting the capacity calculation. For some cases, the capacity calculation itself was not successful, and the TSOs applied default, previously agreed, cross-zonal capacity values.

(76) Further details on the levels of the MACZT in the SWE region are included in Figure 22 in the Annex 2, which shows the density function of the lowest hourly relative MACZT of the limiting CNECs per country, in the SWE region, in the first semester of 2020.

3.2.3.2 Italy North region

(77) 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 other allocation constraints introduced by TSOs.

Figure 11: Percentage of the time when the relative MACZT is above the minimum 70% target (green) or within other ranges (yellow, orange, red) and when capacity is limited by allocation constraints (light red), or by other factors (grey), in Italy North region, not considering exchanges with third countries – first semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note 1: '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.

Note 2: The figure does not consider the influence of exchanges with third countries. Figure 23 in the Annex 3 includes the influence of third countries.

Note 3: The French TSO filtered out information on limiting CNECs for a number of hours. The analysis is based on the data made available to ACER.

[46] These issues were reported by TSOs as follows: "Information Technology (IT) issues", "insufficient GLSK", or "load-flow divergence".

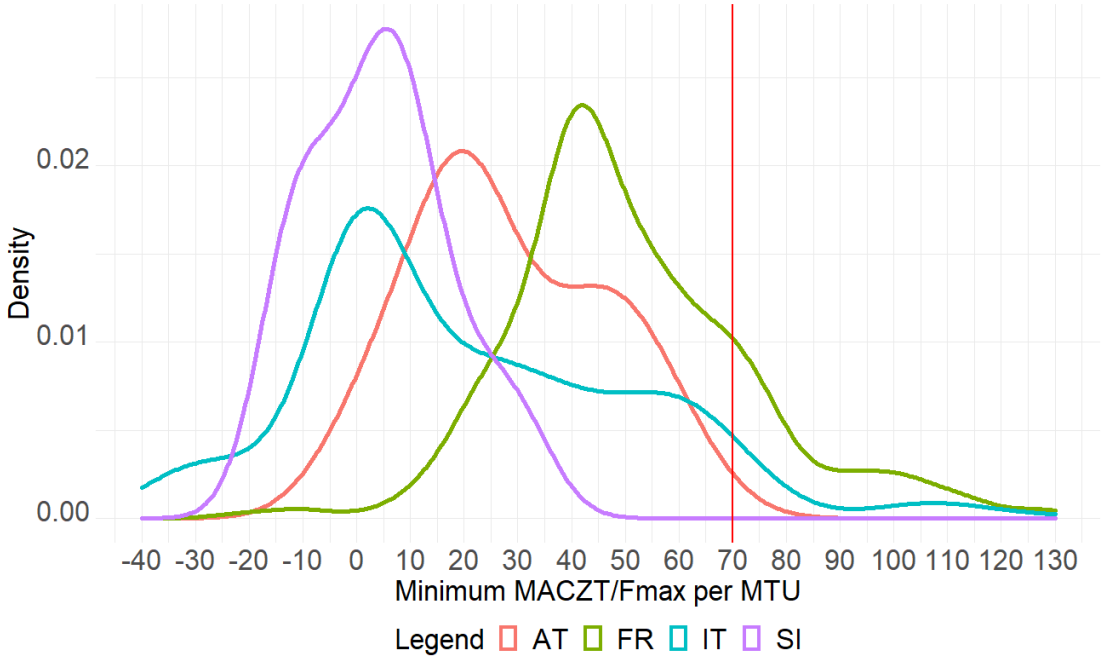
(78) Overall, the figure shows that, for monitoring the MACZT, the level of transparency in the Italy North region is poor. In particular, the effective monitoring of the MACZT on CNECs was only possible for around 20% of the hours. The remaining time, the allocation of cross-zonal capacity in the region was limited due to either allocation constraints applied by the Italian TSO (TERNA) for around 38% of the hours, or to a variety of other reasons[47] for 43% of the hours. For these 43% of hours, no additional information was provided to ACER. In particular, during the hours when allocation constraints or other factors limited the allocation of cross-zonal capacity, ACER was not provided with information on the limiting CNEC, which impeded to monitor the impact of such constraints on the level of the MACZT on CNECs.

(79) To shed light on the level of the MACZT on CNECs, Figure 12 indicates the effort required to ensure that at least 70% of the capacity is offered on the limiting CNEC(s), for the hours for which detailed data was available. The figure shows that the greatest effort will be required in Italy and Slovenia, while some effort would also be necessary in Austria and France.

(80) 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 may be significant. ACER has not been made aware of an agreement between the region and Switzerland, in line with EC's guidance (see paragraph (43)), Figure 23 in the Annex 3 was produced with a view to monitoring the level of MACZT regarding the minimum 70% target, should exchanges with Switzerland, and other third countries, be considered. It shows that when the exchanges with Switzerland are included in the MACZT analysis, France would be above the minimum 70% target for a relevant number of hours, while significant efforts would still be needed in Italy, and to a lesser extent in Austria and Slovenia, to meet the minimum 70% target at all times. These conclusions are restricted to the reduced number of hours for which ACER received information.

[47] Based on interactions with the TSOs, such reasons are very diverse and include not only operational security issues, but also issues related to the availability of the information systems and/or difficulties for the TSO to successfully complete the capacity calculation process.

Figure 12: Density function of the lowest hourly relative MACZT of limiting CNECs per country in the Italy North region, not considering exchanges with third countries – first semester of 2020



Source: ACER calculation based on TSOs data.

Note 1: The figure takes into account only the hours for which the countries have declared a limiting CNEC. This results in a low number of hours in the first semester of 2020, as follows:

Country	*Number of hours*
AT	*14*
FR	*299*
IT	*276*
SI	*16*

Note 2: In addition, the French TSO provided ACER with only a subset of the limiting CNECs for France.

Note 3: The figure does not consider the influence of exchanges with third countries. Figure 24 in the annex includes the influence of third countries.

3.2.3.3 Central West Europe region

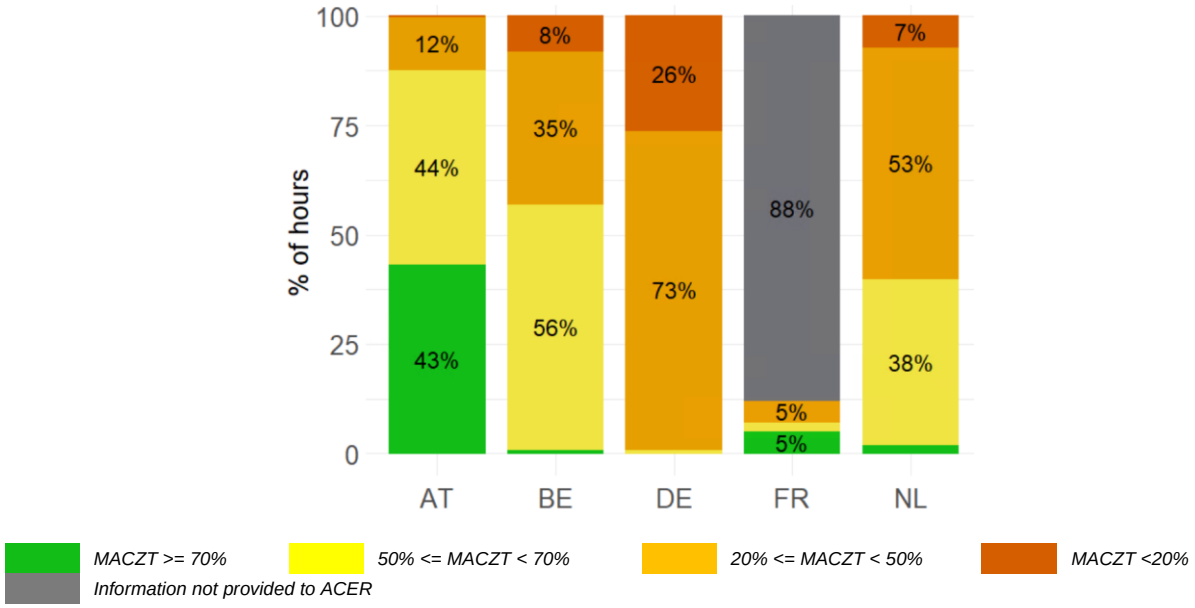
(81) In the CWE region, flow-based capacity calculation applies since 2015. The higher data granularity provided for this region allows presenting the results in a more detailed manner. For example, Figure 27 to Figure 33 in Annex 3 display the density functions of the MACZT for all CNECs declared, per TSO, in the CWE region in the first semester of 2020.

(82) Furthermore, ACER's Recommendation requires monitoring all CNECs individually, rather than the average performance of all CNECs taken together. This implies that the minimum 70% target is considered to be met for a given hour when the lowest MACZT (relative to Fmax) among all CNECs is above 70%. Figure 13 and Figure 14 thus focus on the performance of the CNEC with the lowest hourly MACZT (relative to Fmax) per MS in the CWE region.

(83) In particular, Figure 13 shows the percentage of hours for which the relative MACZT was above the minimum 70% target for all CNECs, per country, while Figure 14 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. Figure 14 shows that the greatest effort will be required in Germany.

Significant effort is also needed in the Netherlands and in Belgium. Some effort would also be necessary in France[48] and Austria.

Figure 13: Percentage of the time when the relative MACZT is above the minimum 70% target on all CNECs, per country in the CWE region, not considering exchanges with third countries – second quarter of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note 1: The data for the first quarter 2020 not being available in Belgium and the Netherlands, the analysis is made only on the second quarter of 2020, to ensure comparability between countries.

Note 2: The MACZT for the Netherlands includes the flow derived from exchanges with third countries, as the TSO could not disentangle such flows in time for the publication of this report. The MACZT for Belgium includes the impacts of exchanges between the EU and Norway. Figure 25 *in the annex includes the influence of exchanges with third countries, for all CWE MSs.*

Note 3: Belgium and the Netherlands declared allocation constraints limiting the total exchanges from and/or to these two countries. The impact of these allocation constraints on the MACZT on CNECs should be analysed in line with the Recommendation. ACER could not yet perform this analysis, and allocation constraints are thus not considered in this figure.

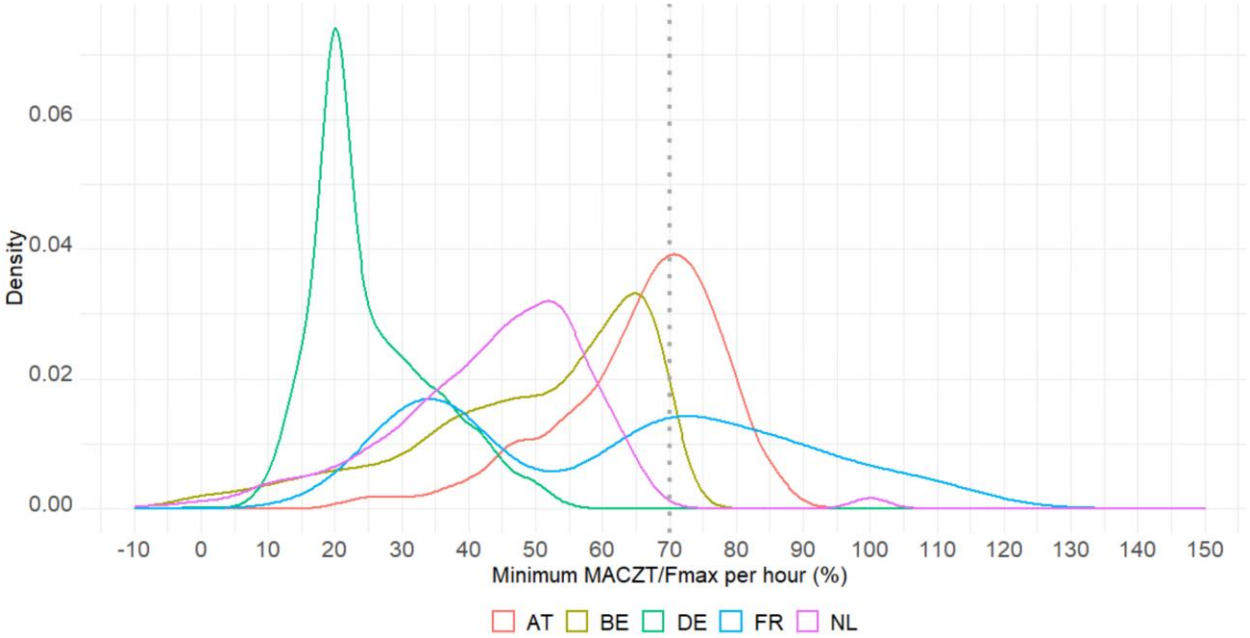
Note 4: The figure is presenting the level of the MACZT, which is different from the RAM as described in the Core flow-based capacity calculation methodology.

Note 5: The French TSO filtered out information on CNECs for a number of hours. The analysis is based on the data made available to ACER.

(84) An important caveat 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.

[48] The conclusions for France are affected by the fact that only a limited number of CNECs were provided by the French TSO.

Figure 14: Density function of the lowest hourly relative MACZT per country, in the CWE region, not considering exchanges with third countries – second quarter of 2020



Source: ACER calculation based on TSOs data.

Note 1: The data for the first quarter 2020 not being available in Belgium and the Netherlands, the analysis is made only on the second quarter of 2020, to ensure comparability between countries.

Note 2: The MACZT for the Netherlands includes the flow derived from exchanges with third countries, as the TSO could not disentangle such flows in time for the publication of this report. The MACZT for Belgium includes the impacts of exchanges between the EU and Norway. Figure 26 in the annex includes the influence of exchanges with third countries, for all CWE MSs.

Note 3: Belgium and the Netherlands declared allocation constraints limiting the total exchanges from and/or to these two countries. The impact of these allocation constraints on the MACZT on CNECs should be analysed in line with the Recommendation. ACER could not yet perform this analysis, and allocation constraints are thus not considered in this figure.

Note 4: The figure is presenting the level of the MACZT, which is different from the RAM as described in the Core flow-based capacity calculation methodology.

Note 5: The French TSO filtered out information on limiting CNECs for a number of hours. The analysis is based on the data made available to ACER. Consequently, the MACZT may be overestimated for France compared to the other countries.

(85) Moreover, Annex 3 includes additional figures related to the MACZT in the CWE region. This comprises the following:

- Figure showing the percentage of hours for which the lowest relative MACZT among all CNECs is above the minimum 70% target (Figure 25), when considering the exchanges with third countries;
- Density function of the lowest hourly relative MACZT of limiting CNECs per country in the CWE region, when considering the exchanges with third countries (Figure 26);
- Density function, per TSO, of relative MACZT for all CNECs, with and without exchanges with third countries (Figure 27 to Figure 33); and

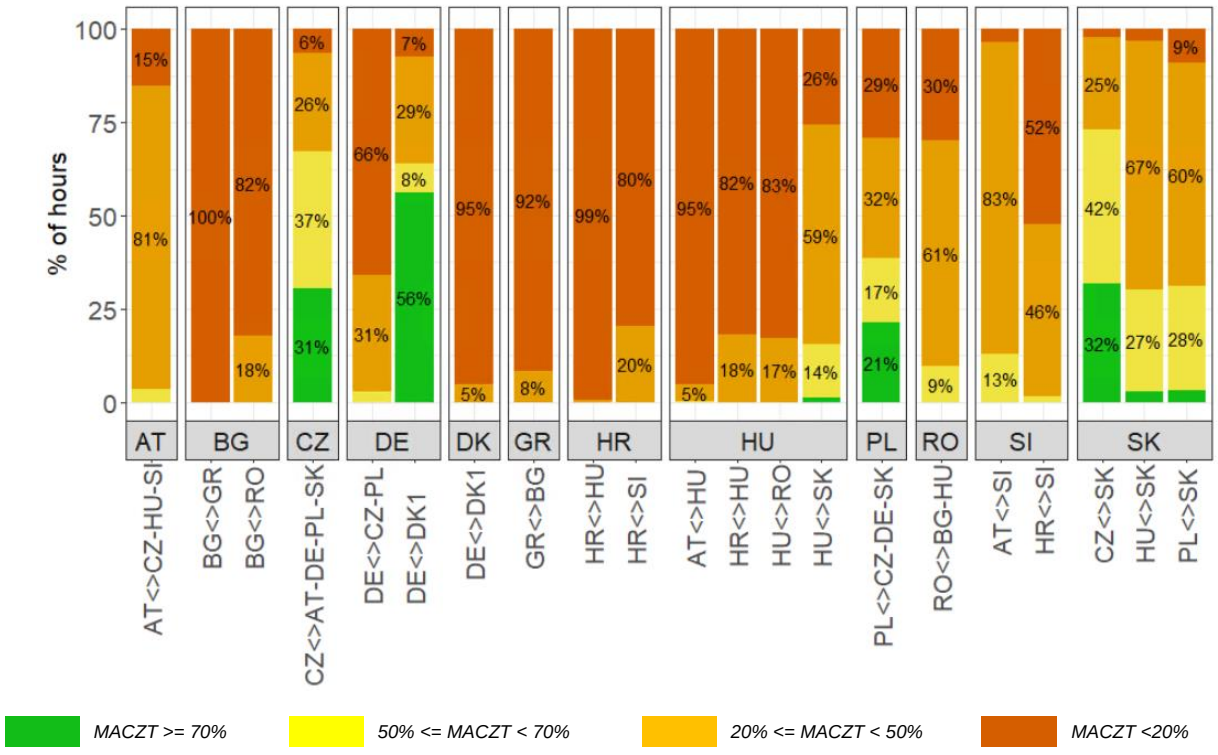
- When relevant, the distribution of the lowest hourly MACZT compared to the target set by the derogation(s) and/or action plan (Figure 34 to Figure 36).

3.2.3.4 Other countries and coordination areas of Continental Europe

(86) Besides the regions included the previous sections, coordinated capacity calculation is not yet implemented for the rest of Continental Europe. 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 paper. In view of this, this section monitors the MACZT for the existing coordination areas and countries where a larger scope of coordination in capacity calculation is not yet in place. For example, the Austrian TSO (APG) performs simultaneous capacity calculation for the Czech, Hungarian and Slovenian borders within Austria; therefore, those borders are analysed from two perspectives: first, from the perspective of Austria taken all borders together, and second, from the perspective of, respectively, the Czech Republic, Hungary and Slovenia.

(87) In view of this, Figure 15 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.

Figure 15: Percentage of the time when the relative MACZT is above the minimum 70% target on all limiting CNECs in both directions, per country and coordination area, for countries of Continental Europe where a coordinated capacity calculation is not yet implemented, not considering exchanges with third countries – first semester of 2020 (% of hours)



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 CNECs in both directions.

Note 2: The figure does not consider the influence of exchanges with third countries. Figure 37 in the annex includes the influence of third countries.

Note 3: 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). The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation.

Note 4: The Danish TSO (Energinet) provided a set of CNECs which were typically used in capacity calculation during the analysed period, without further specifying the hours or periods for which those CNECs where limiting. Thus, the MACZT is likely underestimated on the CNECs that are not limiting. Moreover, the impact of flows from DC borders on the Danish CNECs was only approximately taken into account. These two limitations affect the accuracy of the results for Denmark.

Note 5: The only tie-line between Bulgaria and Greece was out of operation from 14 to 23 of April, and 4 to 31 of May, with NTC equal to zero. These hours are not included in the analysis for Bulgaria and Greece.

(88) Overall, Figure 15 shows that the margin for improvement with respect to the minimum 70% target is substantial across the analysed countries and coordination areas. Moreover, the MACZT is rarely above the minimum 70% target, with the main exceptions of Germany on its border with Denmark 1[49] (more than half of the hours), Czech Republic (more than 30 % of the hours) Slovakia (more than 30% of the hours for the border with the Czech Republic) and Poland (more than 20% of the hours).

(89) An important remark underlying the analysis is that, in the absence of agreements with third countries[50], the influence of exchanges with third countries was not considered for the analysis of the MACZT presented above. However, the impact of exchanges with third countries on the MACZT may be significant, in particular for countries bordering non-EU countries. Figure 37 and Figure 39 give a view on how the MACZT is affected by the third countries. The influence of exchanges with third countries on the MACZT analysis, are particularly noticeable for Greece (which borders Albania and North Macedonia) and Slovakia (which borders Ukraine).

(90) Finally, Annex 3 includes additional and country-specific figures related to the results of monitoring the MACZT. This includes the following:

- The analysis presented in Figure 15, when considering the exchanges with third countries (Figure 37);
- 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 (with and without exchanges with third countries, Figure 38 and Figure 39);
- The density function of the lowest hourly relative MACZT for Finland (Figure 40); and
- When relevant, the distribution of the lowest hourly MACZT compared to the target set by the derogation(s) and/or action plan (Figure 41 and Figure 42).

3.2.4 Conclusions

(91) Overall, the results of monitoring the MACZT on AC borders present a diverse picture across EU regions, countries and borders. The following main conclusions can be derived from the analysis:

[49] 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.

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

- In the SWE region, the MACZT was above the minimum 70% target for around 50% of all the hours.
- Significant room for improvement to meet the minimum 70% target remains for most regions and borders. In particular, the scope for improvement is the largest:
  - In a number of countries where coordinated capacity calculation is not yet implemented and the levels of relative MACZT appear to be among the lowest in Europe (this includes Bulgaria, Croatia, Greece, Hungary – in particular on the border with Austria –, and Slovenia in some directions)[51].
  - In the CWE region, where significant efforts to meet the minimum 70% target are needed for all countries, and more noticeably in Germany, Belgium and the Netherlands. However, as further described below, 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 the Italy North region, where the number of hours when the MACZT is above the 70% is low (8% of all the hours[52]), and 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.
- Based on estimations made by the Finnish TSO, the MACZT on Finland's CNECs is above 60% for 97% of the hours. However, the methodology underlying these estimations are not in line with the Recommendation; they are included in this report only for information and with the caveat that the Finnish TSO's estimations cannot be compared to the results of other countries.
- Significant efforts to improve transparency, completeness and quality of the data provided to monitor the MACZT, are needed:
  - In the Baltic and Nordic area, where almost no information was provided
  - In the Italy North region, where partial information on CNECs was provided, particularly when capacity was limited by allocation constraints or other elements.
  - In France, where the TSO did not provide all the information it had available.

(92) The following main caveats underlie the above described conclusions:

- In a majority of countries, a derogation and/or an action plan applies for this first semester (see Figure 16). 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).
- As far as ACER is aware, agreements with third countries in line with previous EC's guidance were not yet in place in the first semester of 2020[53]. Exchanges with third countries may relevantly affect the MACZT results on countries bordering non-EU

[51] Low levels of relative MACZT are also observed in Denmark (see Figure 15); however, issues with the quality of the data provided by the TSO and in the calculation may have led to underestimate the MACZT levels for this country.

[52] However, 55% of the hours, when considering exchanges with third countries, mostly with Switzerland.

[53] See paragraph (43).

countries. These impacts appear to be most relevant for Italy North, Greece and Slovakia.

- Allocation constraints may significantly affect the level of the MACZT. While ACER was able to evaluate the impact of such constraints on some of the borders (example: for the Polish technical profile), a comprehensive monitoring of all allocation constraints was not possible due to insufficient ACER's computational capacity or lack of TSOs' data. For future editions of this report, ACER expects:
  - To be able to estimate the impact of all allocation constraints for which a method is defined in the Recommendation; and
  - TSOs to propose methods to monitor other types of allocation constraints[54].

[54] See section 6.2.2 of the Recommendation.

4 Action plans and derogations

(93) Article 14(7) of the Electricity regulation requires that a MS with identified structural congestion shall either establish (multi)national action plans pursuant to Article 15 or review and amend its bidding-zone configuration. When a MS decides to develop an action plan, pursuant to Article 15(2), this plan shall set a linear trajectory for reaching the target of a 70% MACZT by the end of 2025 at the latest. In the last quarter of 2019, three countries have established an action plan (Germany, the Netherlands and Poland). At the end of 2020, Austria and Romania have announced their intention to establish action plans. A confirmation of the adoption of these action plans was not provided to date.

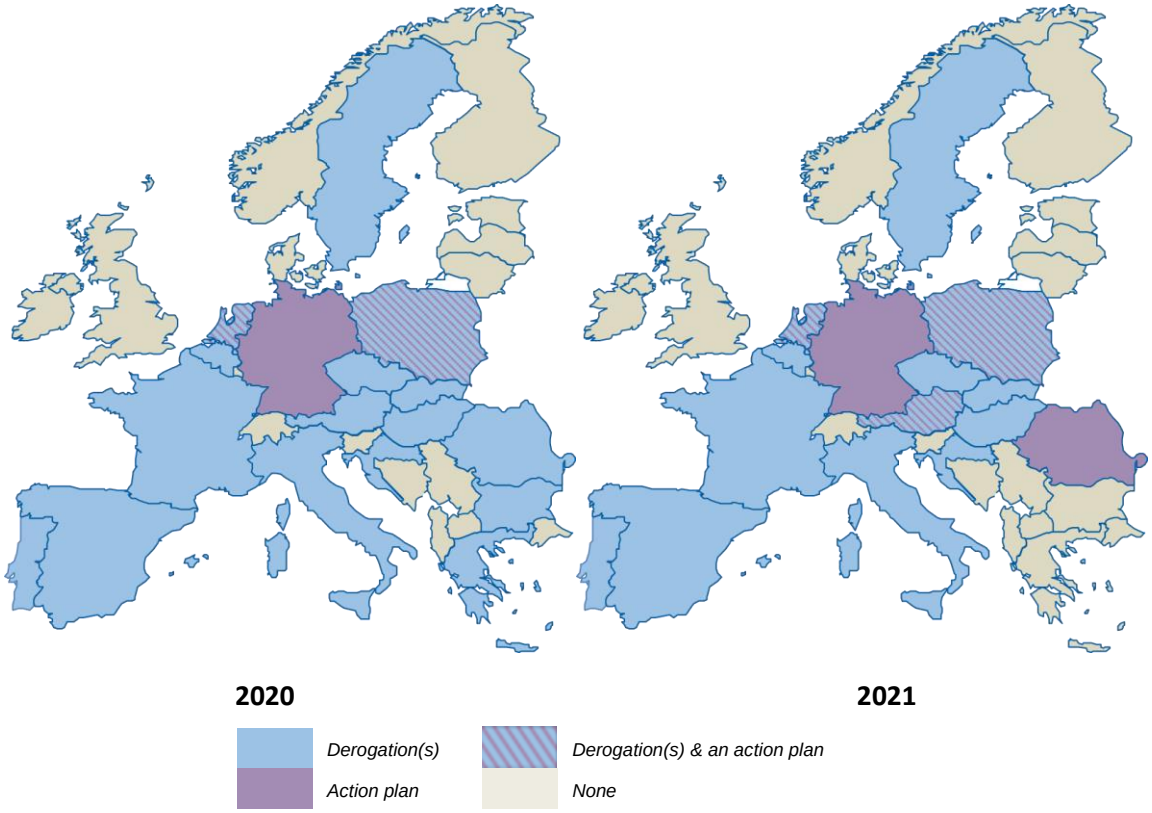
(94) The Electricity Regulation foresees the possibility for regulatory authorities to grant a derogation pursuant to Article 16(9) or a deviation pursuant to Article 16(3) to allow TSOs temporarily to deviate from the MACZT target set either by Article 16(8) of the Electricity Regulation or by the action plan. For the year 2020, relevant regulatory authorities granted derogations in 16 countries, for a total of 23 bidding-zone borders or CNECs, in almost all CCRs across the EU. For the year 2021, until the publication of this report, relevant TSOs requested 13 derogations. Unlike in 2020, based on the information available to date, TSOs of Romania, Bulgaria and Greece did not yet request any derogation for 2021. The possibility of deviations pursuant to Article 16(3) was neither requested nor granted for both years 2020 and 2021.

(95) This chapter provides an analysis of the action plans and derogations related to 2020 and 2021, either already approved by the relevant authorities or for which a regulatory decision is pending. Further, it assesses derogations against their expected minimum content according to the guidance that regulatory authorities provided to TSOs. The assessment indicates the extent to which the content of the adopted transitional measures is defined with a view to gradually increasing the MACZT.

(96) Figure 16 provides an overview of derogations and action plans across the EU for both 2020 and 2021. A detailed description of derogations and action plans in place for each coordination area is available on ACER's website[55].

[55] 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%20-%202020/Overview%20of%20action%20plans%20and%20derogations%20for%202020%20and%202021%20(18.12.2020).pdf

Figure 16: Overview of derogations and action plans for 2020 (left) and 2021 (right)



Source: ACER elaboration based on information provided by regulatory authorities.

Note: A country is considered to have a derogation and/or an action plan in place if they apply to at least one of its capacity calculation region or for one of its bidding-zone borders.

4.1 Action plans

(97) A precondition to the establishment of an action plan is the identification of structural congestion in the control areas of one or more TSOs in a report approved by the relevant regulatory authorities. After such approval, the MS shall decide, in cooperation with these TSOs and within six months, either to establish national or multinational action plans pursuant to Article 15 of the Electricity Regulation, or to review and amend its bidding-zone configuration. Pursuant to Article 15(2) of the Electricity Regulation, the action plan shall contain a concrete timetable for adopting measures to reduce the structural congestions identified within four years after the approval of the structural congestion report.

(98) In Germany, the Netherlands and Poland and more recently Austria and Romania, the respective regulatory authority approved a national structural congestion report. The approval of such report led to the adoption of the respective action plans for Germany, the Netherlands and Poland already at the end of 2019, whereas the Austrian and Romanian regulatory authorities were still assessing the content of the action plans at the time of writing this report.

(99) In their action plans, MSs shall ensure annual increases of the capacity available for cross-zonal trade until the minimum 70% target is reached by 31 December 2025. Those annual increases shall be achieved by means of a linear trajectory. The starting point of that trajectory shall be the highest of the following values: (i) the capacity allocated at the border or on a critical network element in the year before adoption of the action plan, or (ii) the

average of the capacity allocated at the border or on a critical network during the three years before adoption of the action plan.

(100) The action plan of Germany defines the starting points and the linear trajectory for the CNECs within the CWE region, the German borders with Czech Republic and Poland, and for the Hansa borders (DE-DK1 and DE-SE4) separately. With regard to the assessment of the action plan, Germany intends to apply its own methodology for the estimation of the MNCC. Unlike the Recommendation, the estimation of the MNCC will take into account the maximum possible exchanges, also beyond the coordination area, rather than the actual forecasted exchanges. In ACER's view, this may lead to overestimating the reliability margin, and incorporating a part of it into the MACZT, rather than into the remaining 30% share of the transmission capacity, as envisaged in the Electricity Regulation.

(101) The action plan of the Netherlands defines the starting points and the linear trajectory for the CWE CNECs. For Hansa (NL-NO2) and Channel (GB-NL) borders, no linear trajectory was set. The starting values set for the CWE CCR reflect only the contribution of MCCC to MACZT, thus disregarding the contribution of MNCC. Nevertheless, for assessing compliance, in all cases the minimum target to be achieved every year will need to be considered as met if the sum of both MCCC and MNCC exceeds the yearly target set by the action plan. Even if in CWE the action plan of the Netherlands considers a different linear trajectory per Critical network element (CNE), Table 3 below presents the minimum target value per year across all CNEs to ensure comparability across MSs.

(102) The action plan of Poland defines the starting points and the linear trajectory for the Core CCR borders (PL-DE, PL-CZ and PL-SK), the Hansa border (PL-SE4) and Baltic border (PL-LT). For the Hansa border (PL-SE4), a linear trajectory was only set in the export direction. For the Baltic border, no linear trajectory was set. Differently from Germany and the Netherlands for CWE (where the starting value is, respectively, the same for all CNECs and defined at CNE level), the Polish action plan defines a different starting point per CNEC and per direction on the PL-CZ, PL-DE and PL-SK borders. In Table 3 below, the minimum target value per year across all CNECs and directions is reported to ensure comparability across MSs.

(103) Table 3 shows the minimum target per capacity calculation area as specified in the respective action plans.

Table 3: Minimum relative MACZT targets, per country and coordination area or border, as specified in the national action plans (%)

Country	Capacity calculation area	Bidding-zone border[3] or CNECs	2020 (%)	2021 (%)	2022 (%)	2023 (%)	2024 (%)	2025 (%)	2026 (%)
DE	CWE	DE CWE CNECs	12[1]	21	31	41	51	60	70
	DE-CZ_PL	DE-CZ, DE-PL	12	21	31	41	51	60	70
	DE-DK1	DE-DK1[2]	24	32	39	47	55	62	70
	DE-SE4	DE-SE4	41	46	51	56	61	65	70
NL	CWE	NL CWE CNECs[4]	20	28	37	45	53	62	70
PL	LT-PL	LT->PL	70	70	70	70	70	70	70
		PL->LT	70	70	70	70	70	70	70
	PL-SE4	PL->SE4	40	45	50	55	60	65	70
		SE4->PL	70	70	70	70	70	70	70
	PL-CZ_DE_SK	PL-CZ, PL-DE and PL-SK[5]	0	12	23	35	47	58	70

Note 1: This trajectory is irrespective of the agreement to provide 20% minimum MCCC introduced in the CWE region in April 2018.

Note 2: This trajectory is irrespective of the bilateral agreement between Germany and Denmark reached in 2017 to guarantee minimum available hourly capacities

Note 3: For Poland-Sweden and Poland-Lithuania, the arrows indicate the relevant direction of the border.

Note 4: In the action plan of the Netherlands, a different linear trajectory per CNE is considered. However, to ensure comparability across MSs, only the minimum value per year across all CNEs is reported.

Note 5: In the action plan of Poland, a different linear trajectory per CNEC and direction is considered. However, to ensure comparability across MSs, only the minimum value per year across all CNECs and directions is reported

Source: ACER calculation based on information provided by regulatory authorities.

(104) The structural congestion report received from the Austrian TSO, was approved by the Austrian regulatory authority (E-Control) on 24 September 2020. Subsequently, the Austrian ministry informed ACER that an action plan would be established before the end of the year. At the time of writing this report, the action plan was not yet available.

(105) The structural congestion report received from the Romanian TSO (Transelectrica) was approved by the Romanian regulatory authority (ANRE), on 11 November 2020. The subsequent decision of an action plan by the Romanian ministry has not been made available to date.

(106) A detailed overview of all structural congestion reports and action plans that have been approved before the end of 2020 is available on ACER website[56].

4.2 Derogations

4.2.1 Requirements pursuant to the Electricity Regulation and further guidance from ACER and regulatory authorities

(107) As stated in paragraph (94), Article 16(9) of the Electricity Regulation allows TSOs to request a derogation from the MACZT target. In June 2020, ACER and regulatory authorities agreed upon a number of minimum requirements regarding the content of the derogation requests and the duration of the derogation for TSOs to consider from 2021 onwards[57]. The following paragraphs further describe these minimum requirements.

(108) First, the extent of such derogations shall be strictly limited to what is necessary to maintain operational security and they shall avoid discrimination between internal and cross-zonal exchanges, as prescribed by Article 16(9) of the Electricity Regulation. Operational security can be guaranteed by applying remedial actions and, as a measure of last resort in case of insufficient remedial actions, by reduction of cross-zonal capacities below the minimum 70% target in accordance with Article 16(3) of the Electricity Regulation and with CACM Regulation (i.e. capacity validation). Operational security problem could therefore be handled without derogations. However, in case the foreseeable operational security

[56] See link in footnote 55.

[57] The guidance was provided in a position paper approved by all regulatory authorities at the 33rd Energy Regulatory Forum in June 2020. An overview of these principles was presented at the Market European Stakeholders Committee and it is available at https://eepublicdownloads.azureedge.net/clean-documents/Network codes documents/Implementation/stakeholder committees/MESC/2020-06-17/200617_6.2_MESC_70%25 derogation-Main views by NRAs.pdf

problems are not under the control of the TSO(s), relevant regulatory authorities may grant a derogation temporarily to reduce the legally required target capacity.

(109) Second, in each derogation request, TSOs must demonstrate how the issues motivating the request would endanger operational security, should the derogation not be granted. If TSOs choose to request a derogation according to Article 16(9) of the Electricity Regulation, they should consider in particular that a derogation:

- May be granted on foreseeable grounds where necessary for maintaining operational security, but it shall not cope with situations originating from structural congestions;
- Can be applied to reduce the capacity only to the extent that is required to maintain operational security;
- Can be issued to cope with loop flows that exceed the 30% level as allowed by Article 16(8) of the Electricity Regulation, but only if the TSOs are not able to address these loop flows with an increased use of coordinated remedial actions (redispatching and countertrading) as meant in the CACM Regulation;
- Can be issued to cope with the high uncertainty of external market flows[58], but only if the TSOs are not able to address these external market flows with measures such as better forecasting, merger of regions or advanced hybrid coupling.

(110) Third, ACER and regulatory authorities acknowledge that this list of reasons may not be exhaustive. TSOs may propose different reasons in their request, but they always need to demonstrate the underlying reasons and how much control they have on them. Moreover, the extent of possible reductions of capacity should be limited to the amount reflecting the underlying reasons lying outside the control of a TSO.

(111) Fourth, the requests for derogation shall comply at least with the following content requirements:

- Demonstrating that the request is legitimate as regards the principles outlined above;
- Mentioning CNE(s) or CNEC(s) or at least EU bidding-zone border(s) for which the derogation applies;
- Allowing the approving regulatory authorities and ACER to be in a position to perform a proper monitoring of the compliance of TSO with the minimum 70% target and the derogations themselves[59].
- Including a methodology and/or projects or require the TSO(s) to publish a methodology and projects that shall provide a long-term solution to the issue that the derogation seeks to address and thus shall clearly address these issues or at least include a timeline for the adoption of such methodology and projects.[60]

[58] Uncertainty of exchanges outside the CCR which cannot be captured with allowed flow reliability margin.

[59] A simple request to be exempted from the 70% requirement is not acceptable, but at least a minimum level of capacities and a proper monitoring of the level of capacity made available during the derogation period shall be offered. For example, indications of what level of capacity will be given to the market, which reductions below 70% relate to which underlying reason for the derogation request and how a derogation on a specific CNE or CNEC is reflected in the capacity calculation are valid alternatives. Also, a parallel run phase aimed to test the specific tools developed to cope with the 70% requirement should be envisaged.

[60] When TSOs cannot comply with this requirement, they shall clearly explain in the derogation requests why they cannot publish the above-mentioned methodology.

- Describing how to compute the minimum capacity value the TSO can offer while respecting operational security[61] and if the TSO(s) cannot commit to a proper minimum level of capacity, they shall explain the reasons in the derogation request. In any case, the minimum level of capacity shall not be lower than the minimum level granted in previous derogations related to the same reasons.
- To the extent possible, TSOs in the same CCR shall try to further align and harmonise approaches and calculations.[62]

(112) In terms of duration of the derogations, the Electricity Regulation prescribes that derogations should be granted for no more than one-year at a time, or, provided that the extent of the derogation (namely reduction of capacities) decreases significantly after the first year, up to a maximum of two years. The TSOs willing to ask for a derogation for more than one year shall, thus, demonstrate such decrease, providing a proper analysis attached to the derogation request.

4.2.2 Assessment of existing derogations in light of the guidance ACER and regulatory authorities

4.2.2.1 Procedural aspects of derogations in 2020 and 2021

(113) For the year 2020, regulatory authorities approved derogations in 16 MSs, whereas for the year 2021, TSOs have requested 13 derogations to date. Unlike in 2020, TSOs of Romania, Bulgaria and Greece did not yet request any derogation for 2021. As mentioned in paragraph 44(93), Romania announced its intention to establish an action plan.

(114) For both 2020 and 2021, no derogation adopted by a MS was formally challenged by another MS from the same CCR. For 2020 and 2021, some of the derogations were approved for a period shorter than a year. This mainly related to setting deadlines for the development of new processes and tools by the TSO. All other derogations were provided for a period of one year.

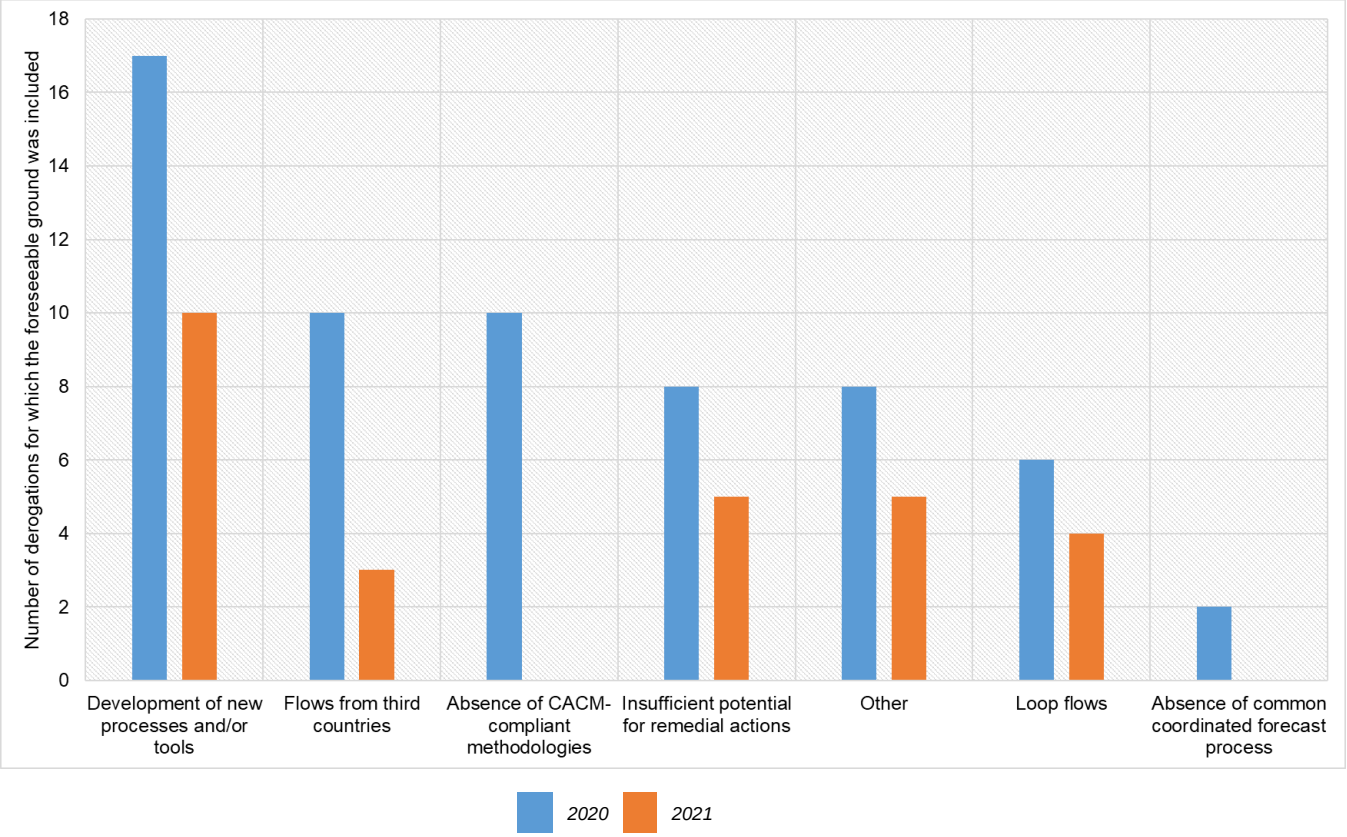
(115) The foreseeable grounds brought forward for requesting a derogation, for both 2020 and 2021, are reported in Figure 17. Regulatory authorities mainly mentioned the development of new processes and/or tools, insufficient potential for remedial actions, flows from third countries and loop flows.

(116) In 2020, the absence of CACM-compliant methodologies and the absence of a common coordinated forecasting process were mentioned in a number of derogations, but these were removed in 2021 following the guidance from ACER and regulatory authorities referred to in paragraph (107).

[61] For example using a predefined value or a varying one based on a predefined formula attached to the request. Where a flow-based approach is in force, a minimum value for CNEC shall be proposed, while a minimum value for border may be sufficient if a coordinated NTC (cNTC) approach is in force.

[62] For example, they could investigate common approaches to monitor the parallel run phase.

Figure 17: Foreseeable grounds included in the derogations requests for 2020 and 2021



Source: ACER based on information provided by regulatory authorities.

4.2.2.2 Content of the derogations in 2020 and 2021

(117) This subsection analyses the content of the derogations in light of the guidance referred to in paragraph (107), including the following aspects: i) the specification of the minimum level of the MACZT or a methodology to estimate it, ii) the inclusion of projects providing a solution to the foreseeable grounds included in the derogations and iii) the degree of alignment and harmonisation within a CCR.

(118) With regard to alignment and harmonization of derogations within a CCR, ACER observed substantial alignment and harmonisation of the content and structure of the derogations requests in SWE and Italy North and partial alignment of a number of derogations granted in CWE MSs. In CWE, derogations mainly differed in the approach of the methodology to calculate the amount of allowed reduction of the MACZT in the operational process.

(119) An important aspect of the derogation is to include a level and a way of computation for the minimum capacity value the TSO can offer while respecting operational security. This can be done either by means of a methodology or by setting a minimum value.

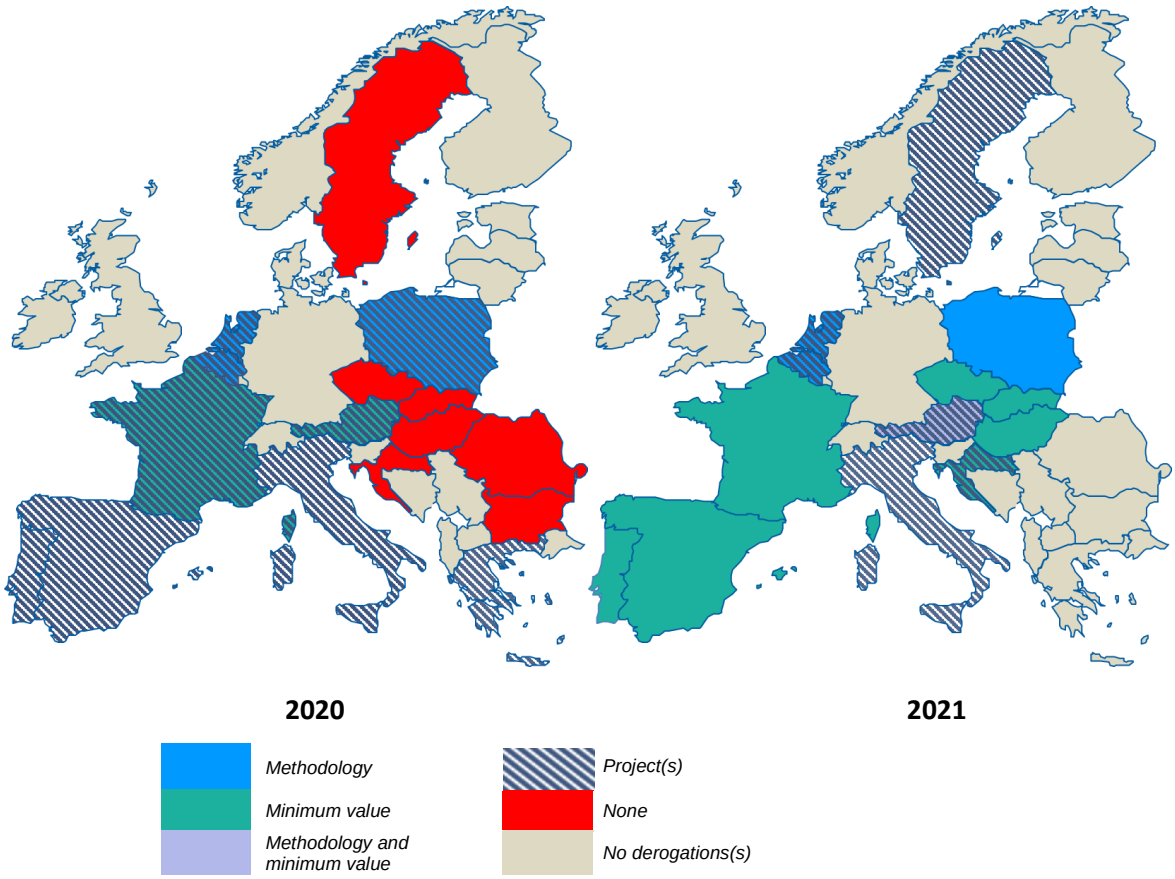
(120) A methodology describes the precise way in which a TSO calculates the amount of additional reduction needed to ensure operational security. This methodology generally describes the amount of megawatts by which a TSO is allowed to reduce the MACZT, based on a number of specific input criteria and calculations.

(121) Another possibility is to include a minimum value to be provided by the TSOs, per border, direction and percentage of time per year. The compliance of such a target can only be assessed ex-post based on the monitoring of the offered MACZT.

(122) Finally, one additional aspect to be covered in the derogation requests is the inclusion of projects that shall provide a long-term solution to the issue that the derogation seeks to address, alongside a timeline for their implementation.

(123) Figure 18 provides an overview on the different options pursued by each MS, for both 2020 and 2021.

Figure 18: Categorization of derogation requests based on the inclusion of minimum capacity values and/or methodologies to estimate them, and projects providing long-term solutions for 2020 (left) and 2021 (right)



Source: ACER elaboration based on information provided by regulatory authorities.

(124) Between 2020 and 2021, three MSs (Belgium, the Netherlands and Poland) further improved their already existing methodology, and, for 2021, Austria proposed a methodology for the first time. Between derogations approved for 2020 and 2021, five MSs (Croatia, the Czech Republic, Hungary, Portugal and Spain) introduced minimum values to be achieved on average over the year. However, for both 2020 and 2021, hardly any derogation, apart from the ones proposing a methodology, justified why a methodology could not be published.

(125) For 2020 and 2021, respectively, 13 and 9 derogations included requirements to execute specific projects and a timeline for their implementation. The main projects included were development of new processes and tools, implementation of the CCM, reports detailing

methodologies and projects (Belgium and the Netherlands) and a study on allocation constraints (Italy).

(126) A detailed overview of the elements included in the derogations approved until the end of 2020 can be found on ACER's website[63].

4.3 Conclusions

(127) In view of the possibility for MSs to adopt transitory measures, in order to gradually reach the minimum 70% target, a majority of MSs have decided to adopt either an action plan (Germany, the Netherlands, Poland, and more recently Austria and Romania), a derogation (derogations granted in 16 MSs in 2020 and 13 derogations requests made, so far, in 2021) or both.

(128) While these measures should aim at gradually meeting the 70% target, the monitoring of their contribution to increasing the MACZT is not straightforward, for the following main reasons:

- Regarding action plans, the starting values of the linear trajectory are sometimes set based on MCCC only (in the case of the Netherlands) or the linear trajectory is monitored by using a different calculation methodology for the estimation of MNCC than the one included in the Recommendation (in the case of Germany). This should be taken into account when comparing the performance of different MSs with respect to their defined linear trajectories, or when comparing EU reports (e.g. the present one) using the MACZT as reference to measure progress with national reports used for compliance enforcement;
- Derogations do not always include a MACZT target, although a significant improvement was observed in this area, and all the derogation requests, except the Swedish and Italian ones, made for 2021, include such a target.

(129) Regarding the justifications underlying the derogations, three main reasons for a derogation were put forward:

- Development of new processes and/or tools;
- Insufficient potential for remedial actions; and
- Commercial flows from third countries.

(130) Regarding the need for further harmonising the content of the derogations within a CCR, improvements were noticed in the SWE and Italy North regions, and to a lesser extent in the CWE region. Most other derogations have shown hardly any harmonisation and minimal alignment with the guidance on the content of the derogations, jointly provided by ACER and the regulatory authorities.

(131) Regarding the need to define derogations with a view to gradually increasing the MACZT, a relevant improvement in the content of the derogations was observed. While for 2020 most derogations did not define a minimum target of the MACZT, for 2021 all derogations included either:

[63] See link in footnote 55.

- A minimum level of the MACZT specified that can be offered while respecting operational security; or
- A methodology and/or projects that shall provide a long-term solution to the issue(s) that the derogation seeks to address.

(132) Regarding the minimum level of the MACZT, the following is observed:

- On the one hand, Austria, Belgium, the Netherlands and Poland, proposed a methodology to identify the conditions that would create operational security concerns and to estimate by how much the capacity target needs to be reduced for each hour. This methodology is deemed necessary to address the impact of loop flows or flows from adjacent CCRs that TSOs are not able to adequately forecast. For Austria, the Netherlands and Poland, who also apply an action plan, the methodological minimum level of the MACZT can lead in certain hours to capacities lower than the linear trajectory.
- On the other hand, most other derogations for 2021 only set a minimum average target for the whole year, thus compliance can only be assessed the year after. This approach hinders the individual assessment of the instances when cross-zonal capacity is reduced below the minimum target; in particular, it makes it harder to identify whether the reductions relate to the operational security issues for which the derogation was granted. In this respect, it is expected that the ongoing implementation of processes and tools by TSOs will enable a more granular definition of the minimum targets with a view to maximise cross-zonal capacity while respecting operational security.

Annex 1: List of coordination areas

Table 4: List of coordination areas – first semester of 2020

Bidding - zone border	Side(s)	Coordination area	Calculation type	Period
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 (BG side)	UNILATc	
BG-GR	GR	North GR borders (GR side)	UNILATc	
BG-RO	BG	BG-RO (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	
ES-FR	Both	SWE	NTC	29/01/2020 onwards
ES-FR	ES	ES-FR (ES side)	UNILAT	01-28/01/2020
ES-FR	FR	ES-FR (PT side)	UNILAT	01-28/01/2020
ES-PT	Both	SWE	NTC	29/01/2020 onwards
ES-PT	ES	ES-PT (ES side)	UNILATc	01-28/01/2020
ES-PT	PT	ES-PT (PT side)	UNILATc	01-28/01/2020
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.*

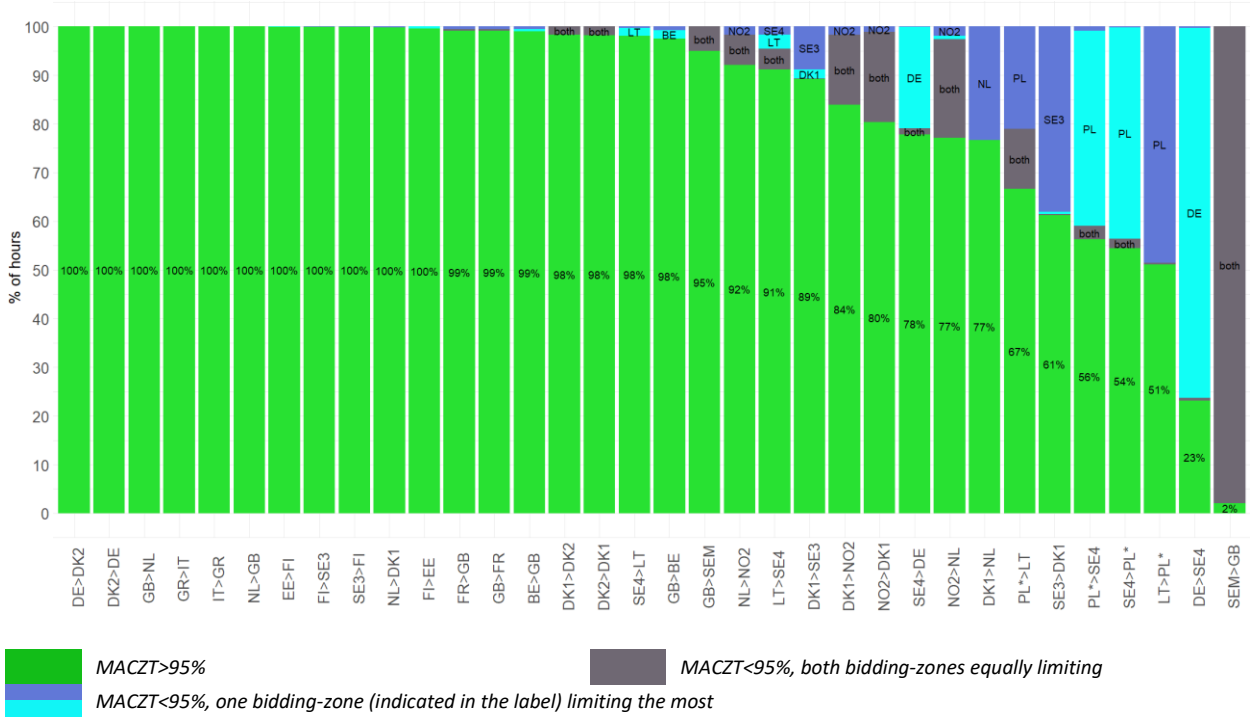
- *NTC: fully coordinated NTC calculation.*
- *UNILAT: unilateral capacity calculation, i.e. not coordinated on the two sides of a border (half bidding-zone border coordination).*
- *UNILATc: coordinated unilateral capacity calculation on several half bidding-zone borders.*

As of 2020, Cyprus is not interconnected and Luxembourg is interconnected but is part of the German bidding-zone, therefore, it does not have any bidding-zone border; as a result, no bidding-zone borders were reported for these two MSs. "Period" refers to the period for which the level of coordination applies; when "period" is left empty, it means that the coordination area is unchanged for the whole first semester of 2020.

Note 2: Greece declared a coordination area (UNILATc) encompassing its borders with Albania, Bulgaria, North Macedonia and Turkey. Bulgaria's coordination area with Greece also encompasses the Bulgaria-North Macedonia border, and its coordination area with Romania encompasses the Bulgaria-Serbia border. Romania's coordination area encompasses all Romania's borders, including with Serbia and Ukraine.

Annex 2: Additional figures on DC borders

Figure 19: Percentage of the time when the MACZT is above 95% of Fmax on oriented DC borders– first semester of 2020 (% of hours)

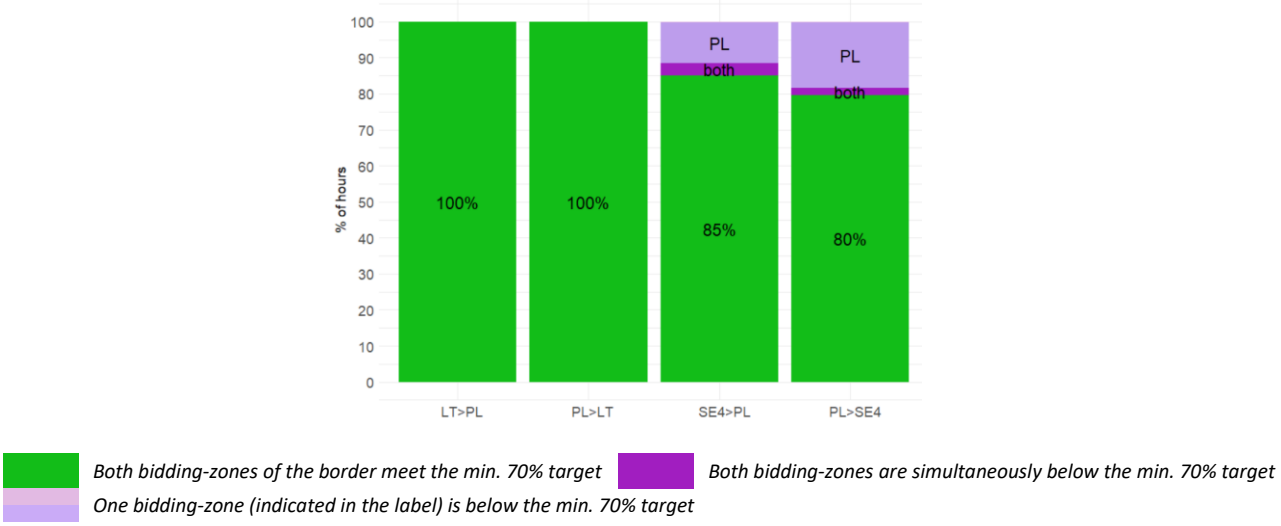


Source: ACER calculation based on TSOs data.

Note: On the borders with Norway, 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.

** 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. The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation: in particular, when allocation constraints apply, 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.*

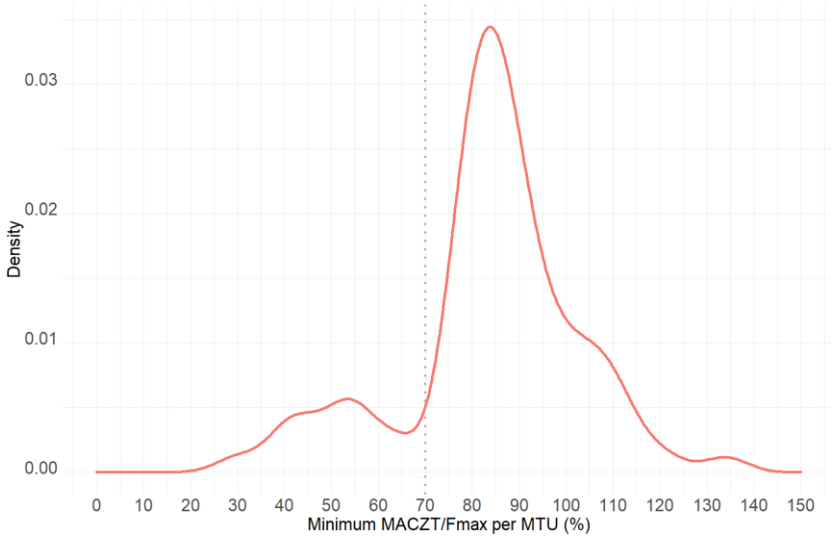
Figure 20: Percentage of the time when the relative MACZT is above the minimum 70% target for oriented DC Polish borders, without considering allocation constraints – first semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note: The results considering the impact of the Polish allocation constraints are displayed in Figure 9.

Figure 21: Density function of the relative MACZT of Belgian CNECs limiting the calculation on the border between Belgium and Great Britain – first semester of 2020



Source: ACER calculation of the density function based on TSO's calculation of the MACZT

Note 1: This figure is based on the 76 hours for which the Belgian TSO provided information on the limiting CNECs.

Note 2: The MACZT for Belgium includes the impacts of exchanges between the EU and Norway.

Annex 3: Additional figures on AC borders

Table 5: Overview of the data used by ACER in the report and for the calculation when performed by ACER – first 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						
	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						See Note 4.
Italy North	AT	APG	ACER	ACER	ACER	TSO	ACER	EE-TP	EE-TP		
	FR	RTE	TSO	TSO	TSO						
	IT	TERNA	ACER	ACER	ACER	TSO	ACER	EE-TP	EE-TP		
	SI	ELES	ACER	ACER	ACER	TSO	ACER	TSO	EE-TP		
SWE	ES	REE	ACER	ACER		TSO	TSO	EE-TP	EE-TP		
	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	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	ACER	EE-TP	TSO	See Notes 1 and 3.
		50Hz	ACER	ACER	ACER	TSO	TSO	ACER	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	TSO	TSO							
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	EE-TP	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*
TSO	*Data provided by the TSO*
EE-TP	*Data from the ENTSO-E Transparency Platform*
	Data not provided and/or calculations not possible
	Data provided but not monitored
	Data not applicable, or not used for the calculations

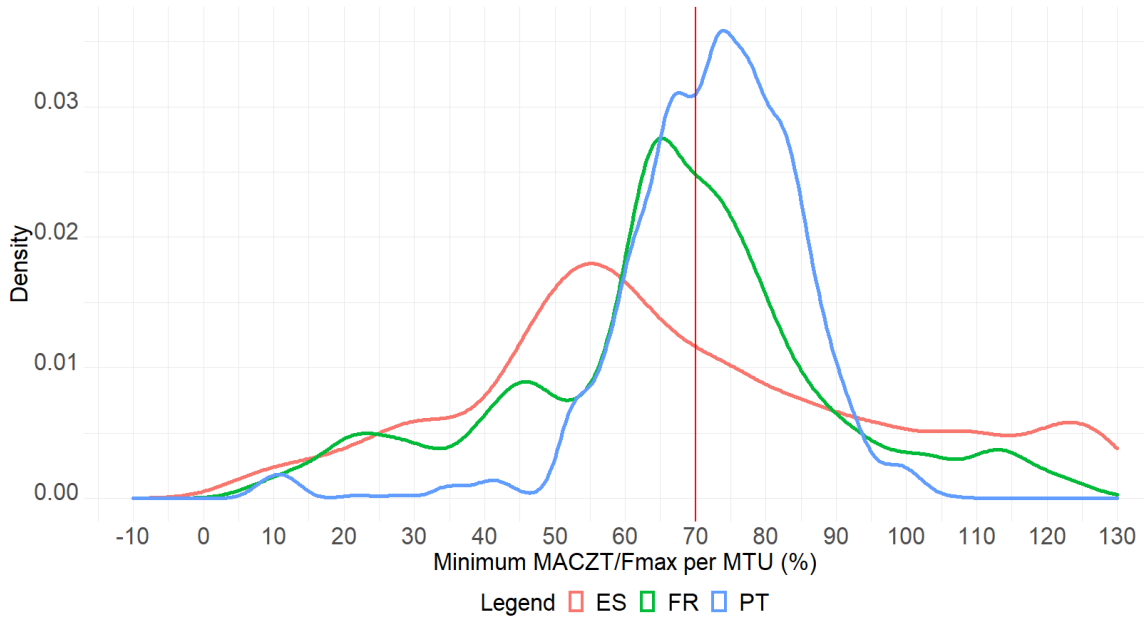
Source: ACER elaboration

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 MNCC values because the estimations provided by the TSO did not disentangle exchanges from third countries. ACER used however the PTDFs provided by the TSO.*
- *Note 3: ACER estimated the MCCC values because the estimations provided by the TSO considered the technical profile without considering the allocation constraints that further limit cross-zonal capacity.*
- *Note 4: The MNCC values provided by the TSO do not disentangle the influence of third countries from the influence of EU countries. In addition, the TSO did not provide the PTDFs or grid model identifiers of the CNECs to allow ACER to recalculate the values.*

SWE region

Figure 22: Density function of the lowest hourly relative MACZT of limiting CNECs per country in the SWE region – first semester of 2020 (from 29 January)



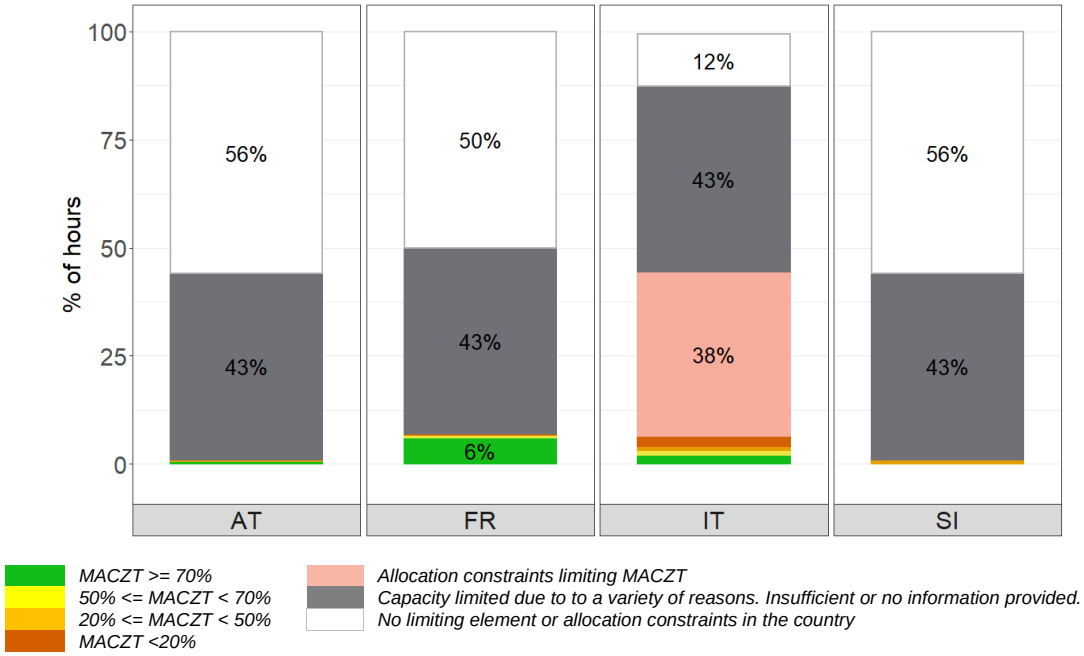
Source: ACER calculation based on TSOs data.

Note 1: The figure takes into account only the hours for which the countries have declared a limiting CNEC. In particular, the French TSO did not provide all CNECs to ACER. The analysis is based on the data made available to ACER.

Note 3: The difference between the results with and without the influence of third countries are very limited for the SWE region; only the results without the influence of third countries are thus presented.

Italy North region

Figure 23: Percentage of the time when the MACZT is above the minimum 70% target (green) or within other ranges (yellow, orange, red) and when capacity is limited due to allocation constraints (light red), or by other factors (grey), in Italy North region, considering exchanges with third countries – first semester of 2020 (% of hours)



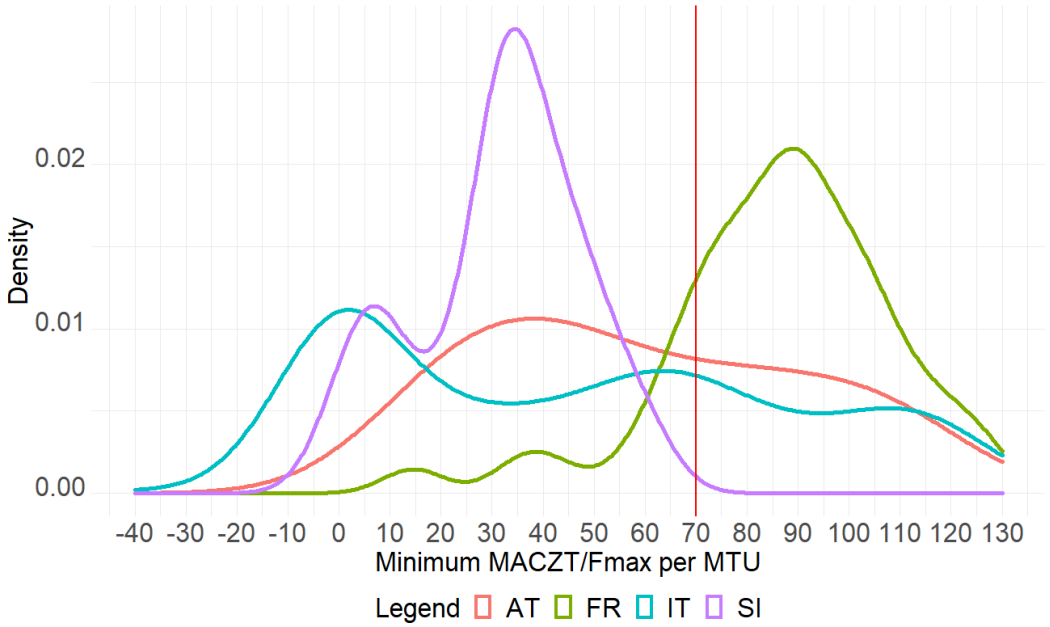
Source: ACER calculation based on TSOs data.

Note 1: '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.

Note 2: The figure considers the influence of exchanges with third countries. Figure 11 in the body text excludes the influence of third countries.

Note 3: The French TSO filtered out information on limiting CNECs for a number of hours. The analysis is based on the data made available to ACER.

Figure 24: Density function of the lowest hourly relative MACZT of limiting CNECs per country in Italy North region, considering exchanges with third countries – first semester of 2020



Source: ACER calculation based on TSOs data.

Note 1: The figure takes into account only the hours for which the countries have declared a limiting CNEC. This result in a very low number of hours in the first semester of 2020, as follows:

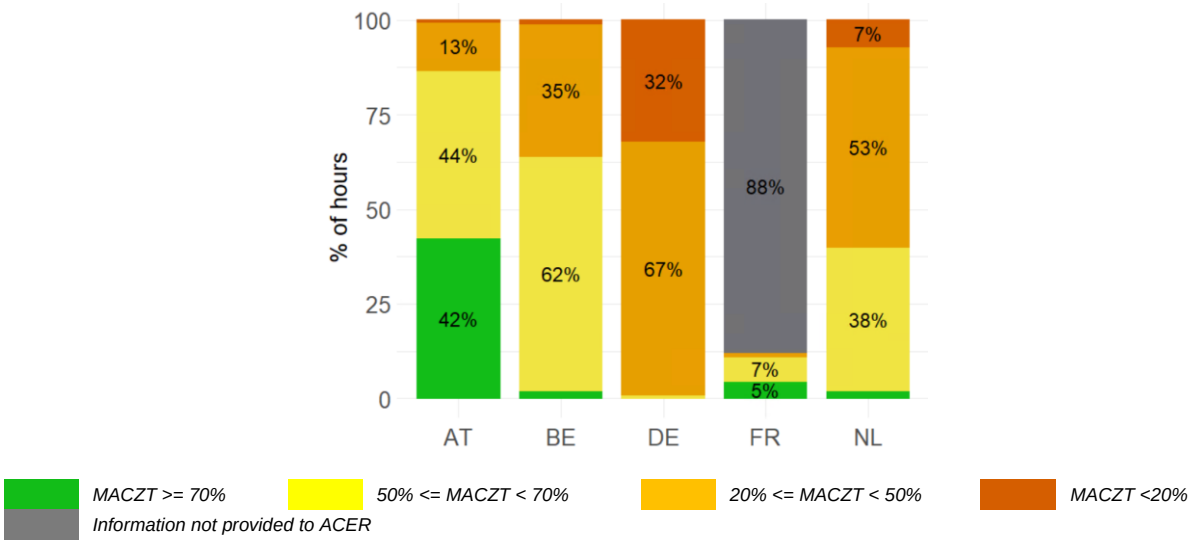
Country	*Number of hours*
AT	*14*
FR	*299*
IT	*276*
SI	*16*

Note 2: In addition, the French TSO provided ACER with only a subset of the limiting CNECs in France.

Note 3: The figure considers the influence of exchanges with third countries. Figure 12 in the body text excludes the influence of third countries.

CWE region[64]

Figure 25: Percentage of the time when the relative MACZT is above the minimum 70% target on all CNECs, per country in the CWE region, considering exchanges with third countries – second quarter of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note 1: The data for the first quarter 2020 not being available in Belgium and the Netherlands, the analysis is made only on the second quarter of 2020, to ensure comparability between countries.

Note 2: The figure considers the influence of exchanges with third countries. Figure 13 in the body text excludes, when it was possible, the influence of third countries.

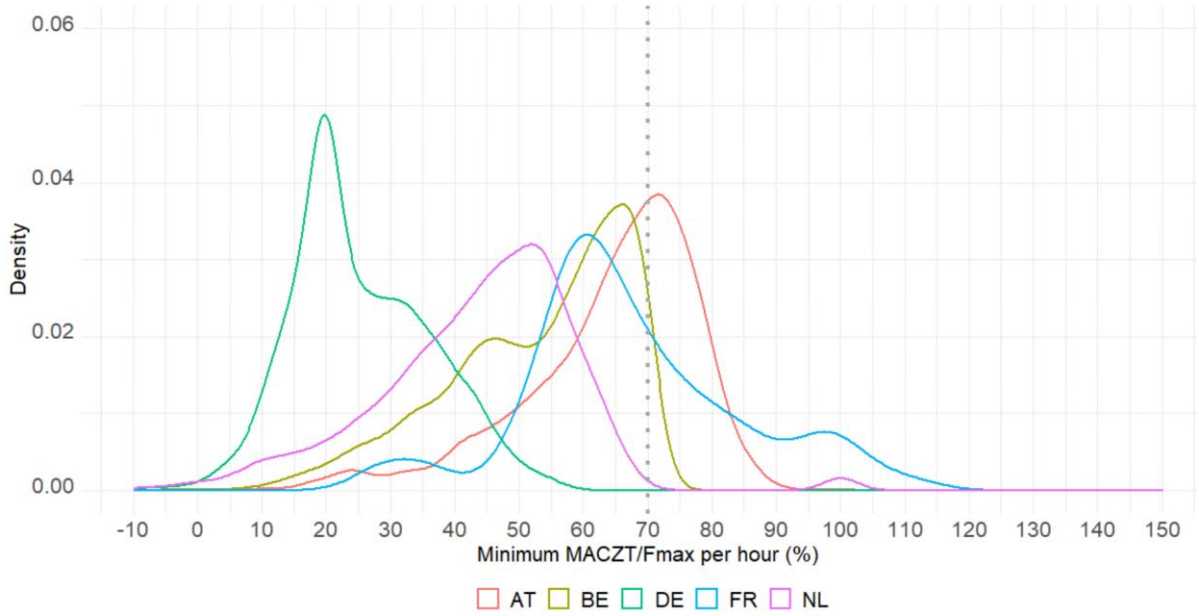
Note 3: Belgium and the Netherlands declared allocation constraints limiting the total exchanges from and/or to these two countries. The impact of these allocation constraints on the MACZT on CNECs should be analysed in line with the Recommendation. ACER could not yet perform this analysis, and allocation constraints are thus not considered in this figure.

Note 4: The figure is presenting the level of the MACZT, which is different from the RAM as described in the Core flow-based capacity calculation methodology.

Note 5: The French TSO filtered out information on CNECs for a number of hours. The analysis is based on the data made available to ACER.

[64] The capacity values corresponding to 4 June 2020 are not part of the analysis because no data on CNECs was available. On that day, the flow-based process in the CWE region failed, triggering the application of default fallback values. The figures are presenting the level of MACZT, which is different from the RAM as described in the Core flow-based capacity calculation methodology.

Figure 26: Density function of the lowest hourly relative MACZT of limiting CNECs per country, in the CWE region, considering exchanges with third countries – second quarter of 2020



Source: ACER calculation based on TSOs data.

Note 1: The data for the first quarter 2020 not being available in Belgium and the Netherlands, the analysis is made only on the second quarter of 2020, to ensure comparability between countries.

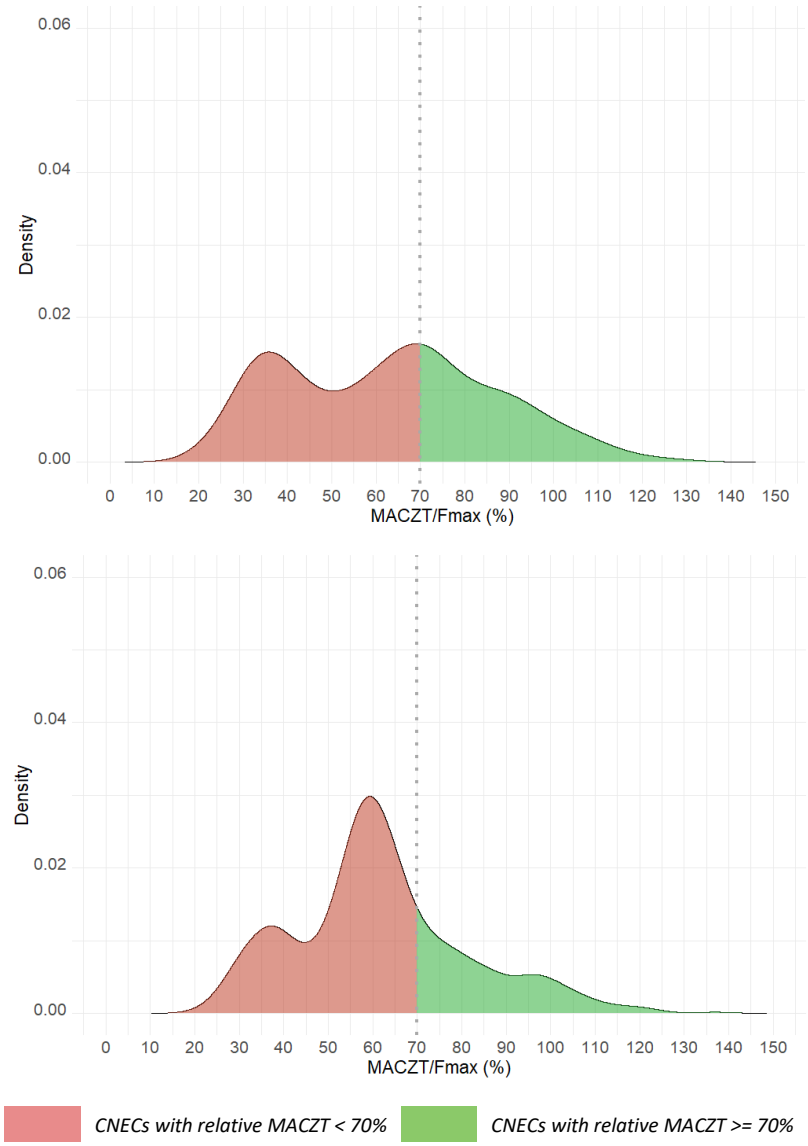
Note 2: The figure considers the influence of exchanges with third countries. Figure 14 in the body text excludes, when it was possible, the influence of third countries.

Note 3: Belgium and the Netherlands declared allocation constraints limiting the total exchanges from and/or to these two countries. The impact of these allocation constraints on the MACZT on CNECs should be analysed in line with the Recommendation. ACER could not yet perform this analysis, and allocation constraints are thus not considered in this figure.

Note 4: The figure is presenting the level of the MACZT, which is different from the RAM as described in the Core flow-based capacity calculation methodology.

Note 5: The French TSO filtered out information on limiting CNECs for a number of hours. The analysis is based on the data made available to ACER. Consequently, the MACZT may be overestimated for France compared to the other countries.

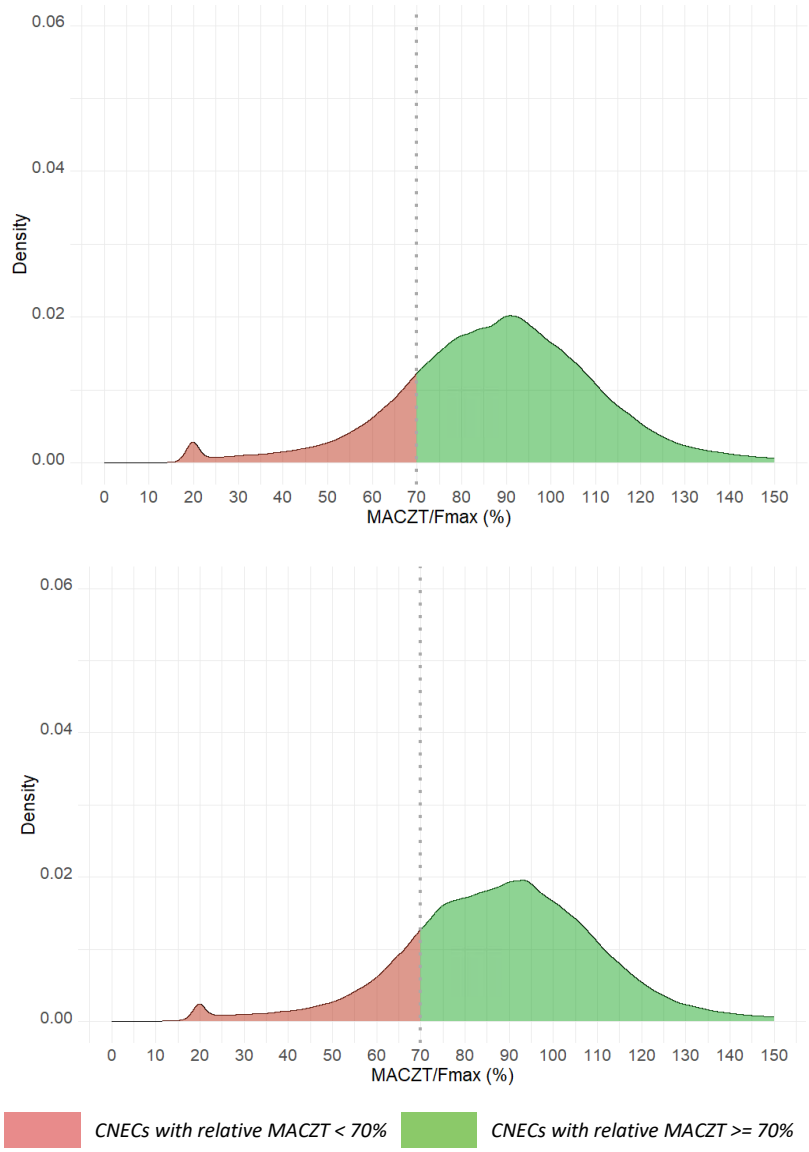
Figure 27: Density function of the relative MACZT for all CNECs in France for the CWE region, with (above) and without (below) considering exchanges with third countries – first semester of 2020



Source: ACER calculation based on TSOs data.

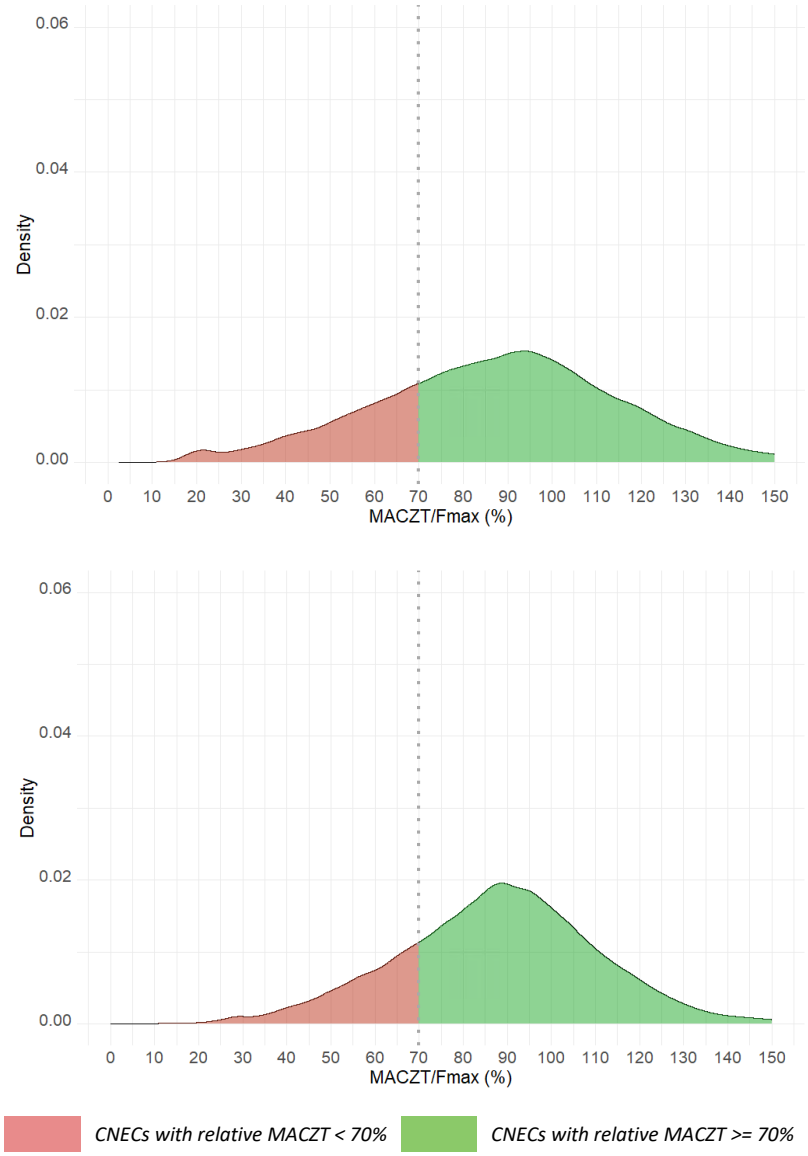
Note: The French TSO filtered out information on CNECs for a number of hours. The analysis is based on the data made available to ACER.

Figure 28: Density function of the relative MACZT for all CNECs of TenneT Germany for the CWE region, with (above) and without (below) considering exchanges with third countries – first semester of 2020



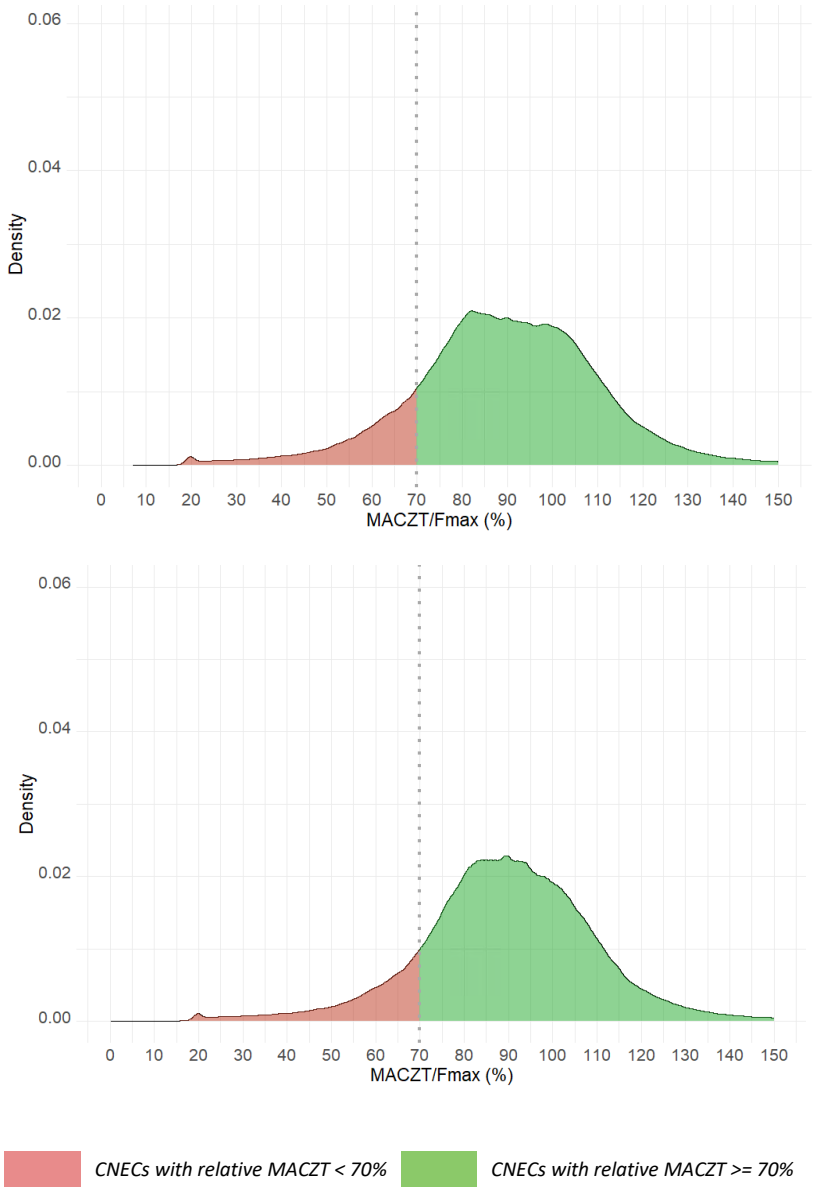
Source: ACER calculation based on TSOs data.

Figure 29: Density function of the relative MACZT for all CNECs of Transnet Germany for the CWE region, with (above) and without (below) considering exchanges with third countries – first semester of 2020



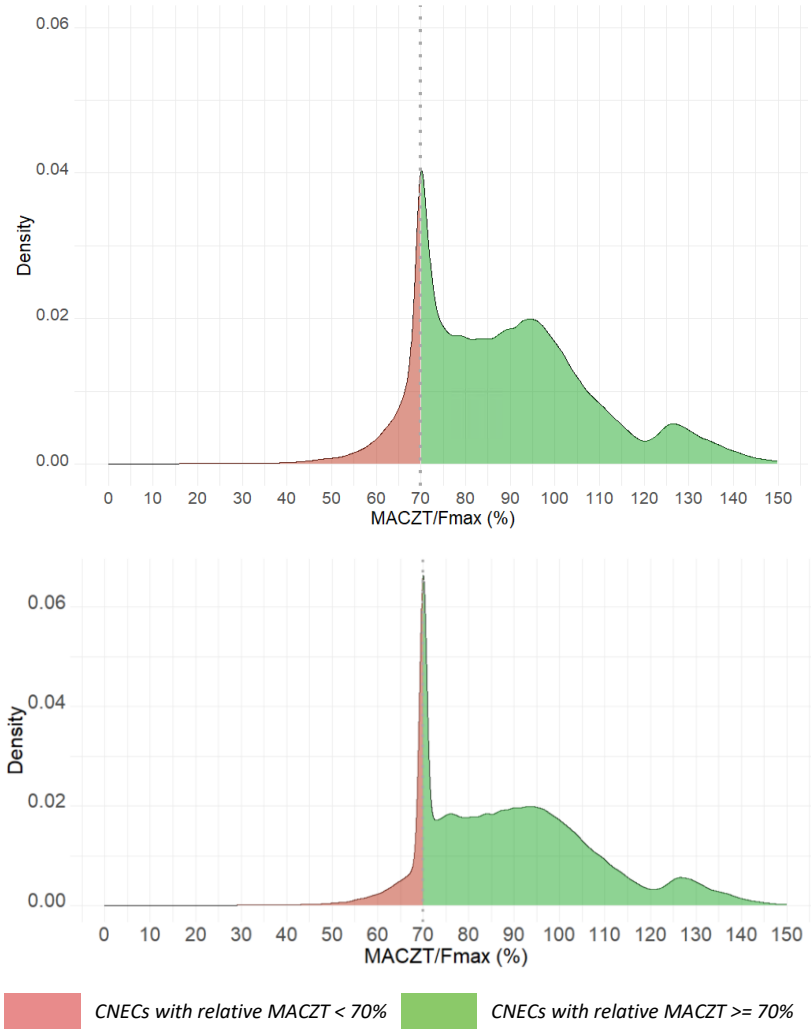
Source: ACER calculation based on TSOs data.

Figure 30: Density function of the relative MACZT for all CNECs of Amprion Germany for the CWE region, with (above) and without (below) considering exchanges with third countries – first semester of 2020



Source: ACER calculation based on TSOs data.

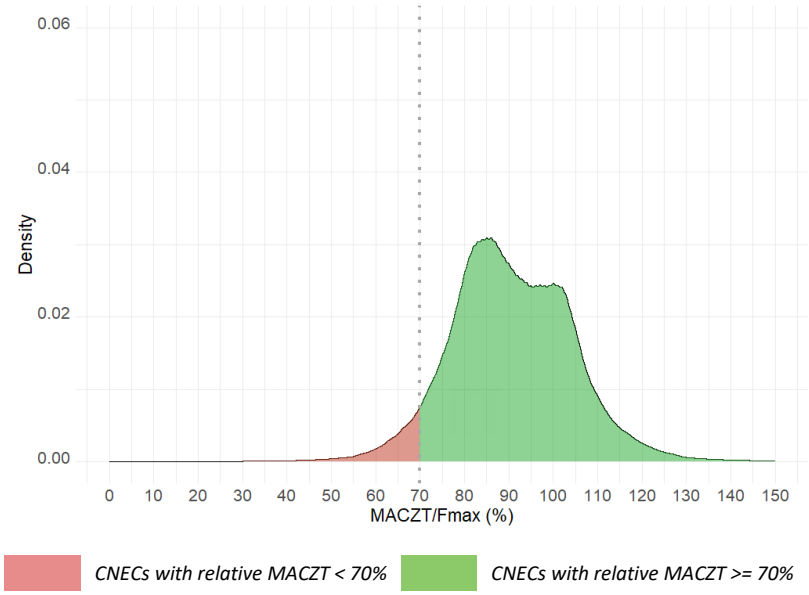
Figure 31: Density function of the MACZT for all CNECs of Belgium for the CWE region, with (above) and without (below) considering exchanges with third countries – second quarter of 2020



Source: ACER calculation based on TSOs data.

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

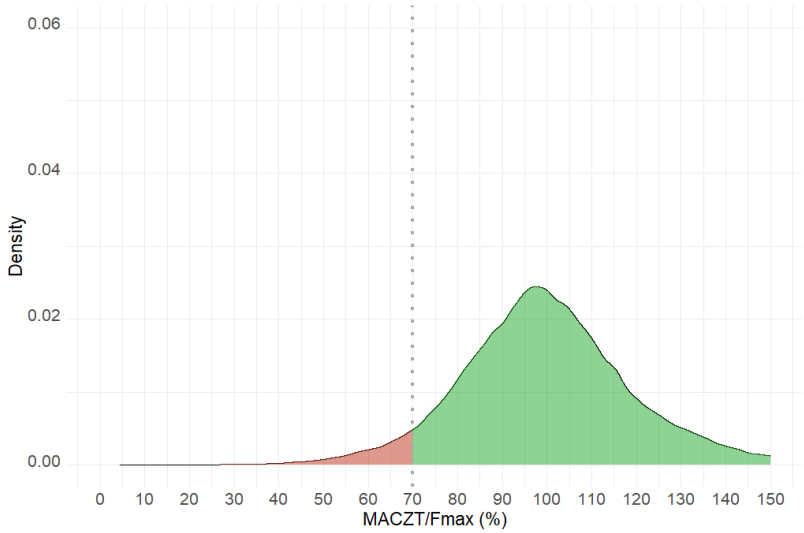
Figure 32: Density function of the MACZT for all CNECs of the Netherlands for the CWE region with considering exchanges with third countries – second quarter of 2020

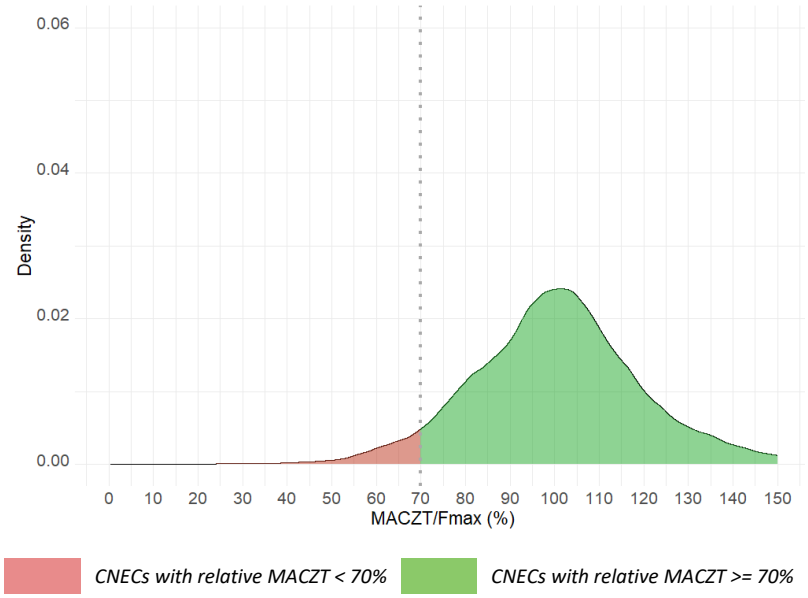


Source: ACER calculation based on TSOs data.

Note: The Dutch TSO did not provide values of the MACZT without considering third countries, or sufficient information to estimate them. Therefore, a figure without considering the exchanges with third countries could not be produced for the Netherlands.

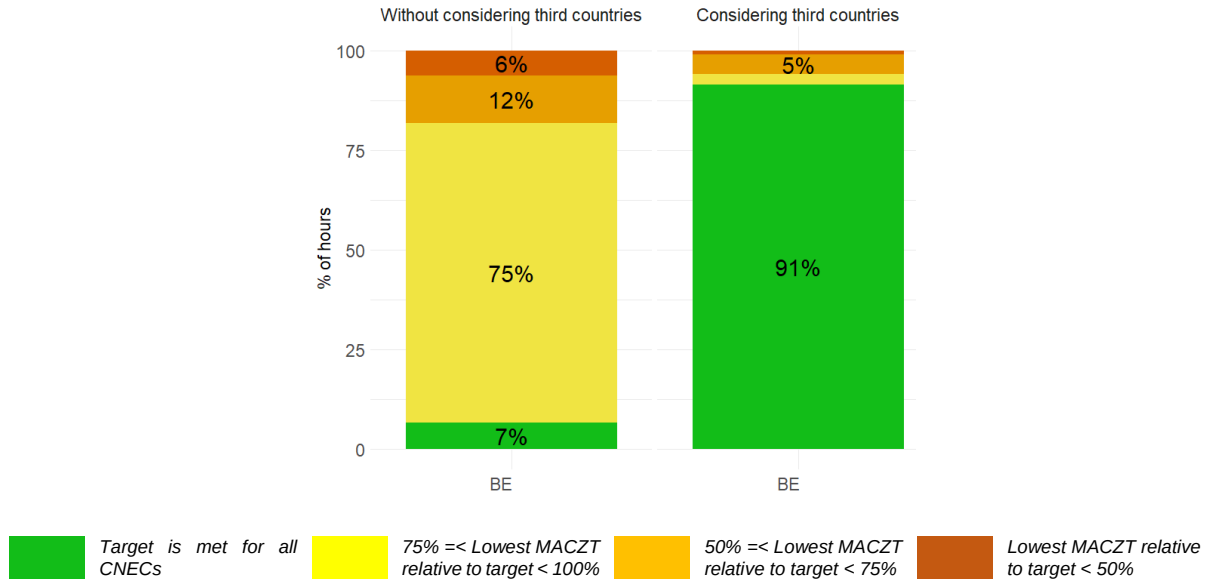
Figure 33: Density function of the relative MACZT for all CNECs declared by Austria for CWE region, without third countries (above) and with third countries (below) – first semester of 2020





Source: ACER calculation based on TSOs data.

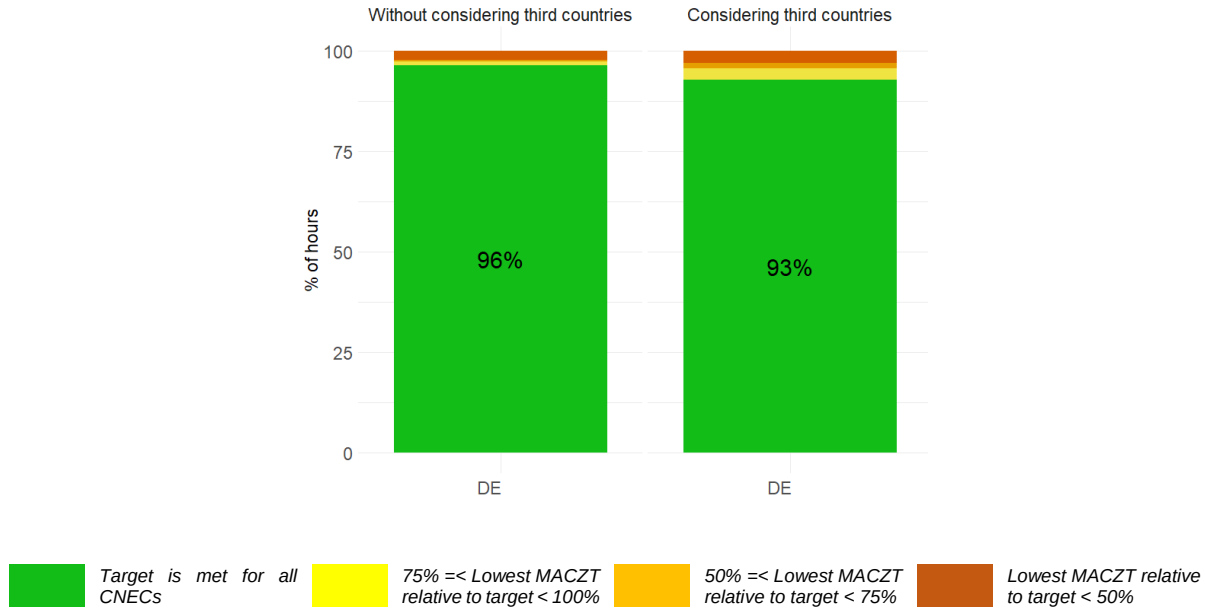
Figure 34: Percentage of the time when the relative MACZT is, for all CWE CNECs, above the target set by the derogation for excessive loop flows (derogation for outages not covered) for Belgium – second quarter of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note: The 4 May 2020 is not included in the analysis due to a failure in the in the Belgian TSO internal tool. The MACZT for Belgium includes the impacts of exchanges between the EU and Norway for both figures.

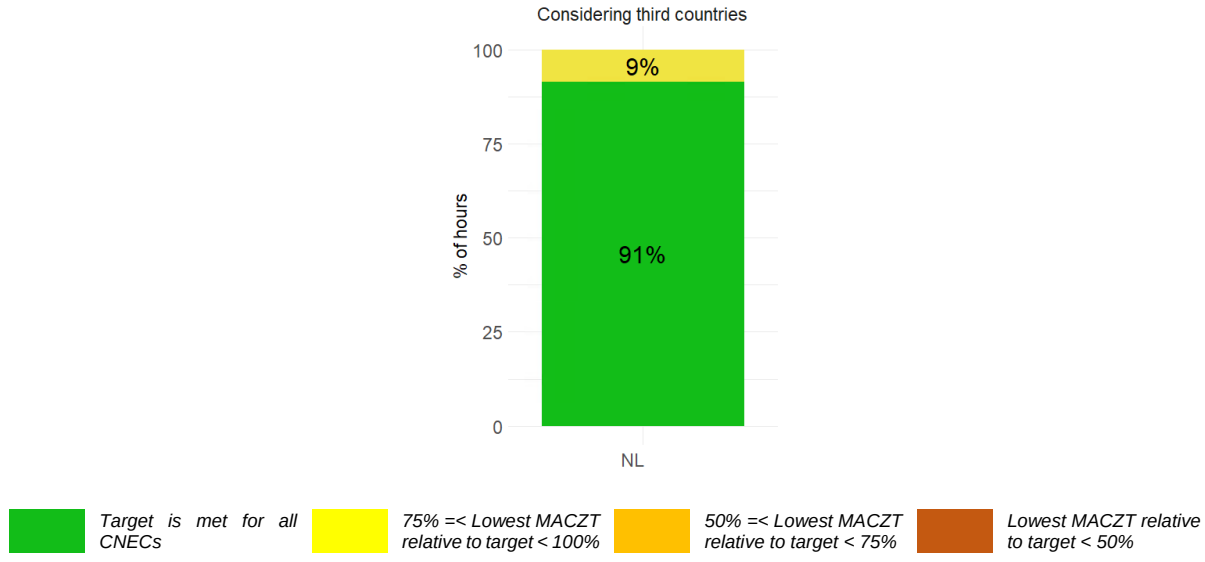
Figure 35: Percentage of the time when the relative MACZT is, for all CWE CNECs, above the target set by the action plan of Germany – first semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note: ACER's estimations are based on the minimum MACZT targets reported by TSOs for each CNEC and hour. ACER was informed that for Germany the calculation principles envisaged for compliance enforcement of the minimum MACZT targets would not be in line with the Recommendation (see paragraph (100) for more information on the discrepancies).

Figure 36: Percentage of the time when the relative MACZT is, for all CWE CNECs, above the target set by the action plan and derogation on loop-flows for the Netherlands, considering the exchanges with third countries – second quarter of 2020 (% of hours)



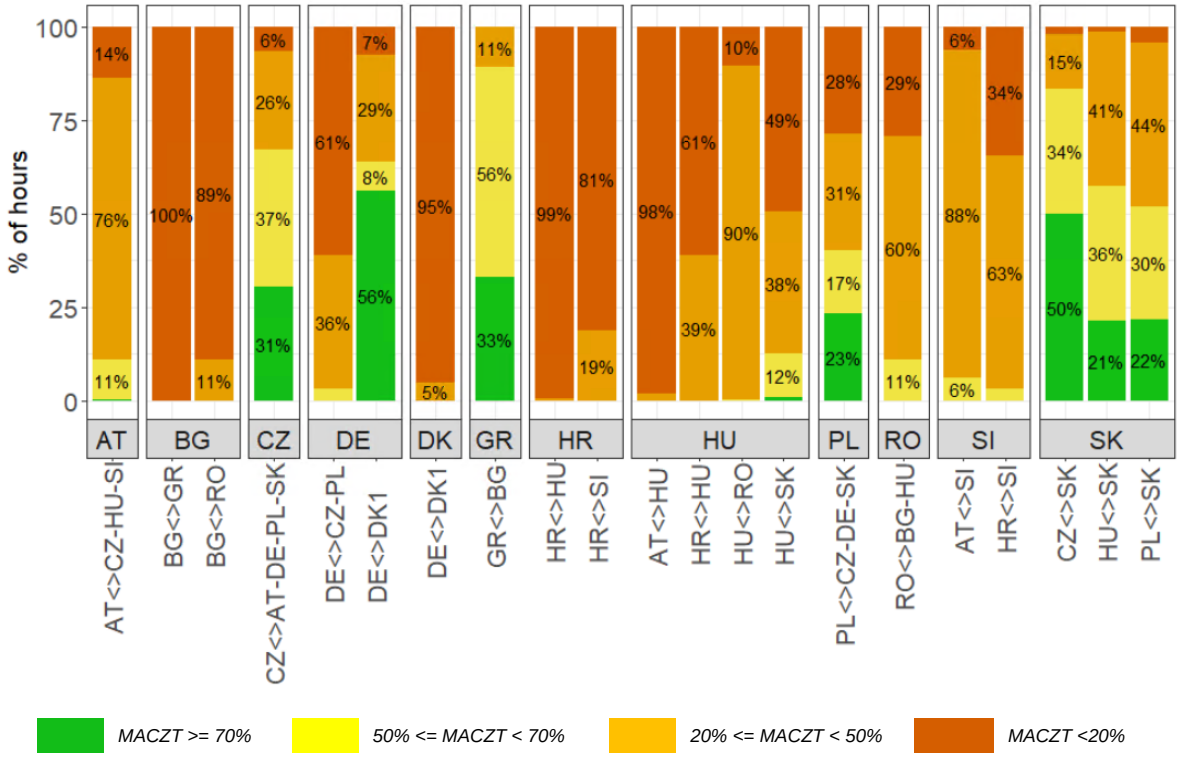
Source: ACER calculation based on TSOs data.

Note 1: ACER's estimations are based on the targets reported by TSOs as MACZT for each CNEC and hour. ACER was informed that for the Netherlands the starting point of the linear trajectory was not formulated as a MACZT value calculated in line with the Recommendation (see paragraph (101) for more information on the discrepancies).

Note 2: The Dutch TSO did not provide values of the MACZT without considering third countries, or sufficient information to estimate them. Therefore, a figure without considering the exchanges with third countries could not be produced for the Netherlands.

Other countries and coordination areas of Continental Europe

Figure 37: Percentage of the time when the relative MACZT is above the minimum 70% target on all limiting CNECs in both directions, per country and coordination area, for countries of Continental Europe where a coordinated capacity calculation is not yet implemented, considering exchanges with third countries – first semester of 2020 (% of hours)



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 CNECs in both directions.

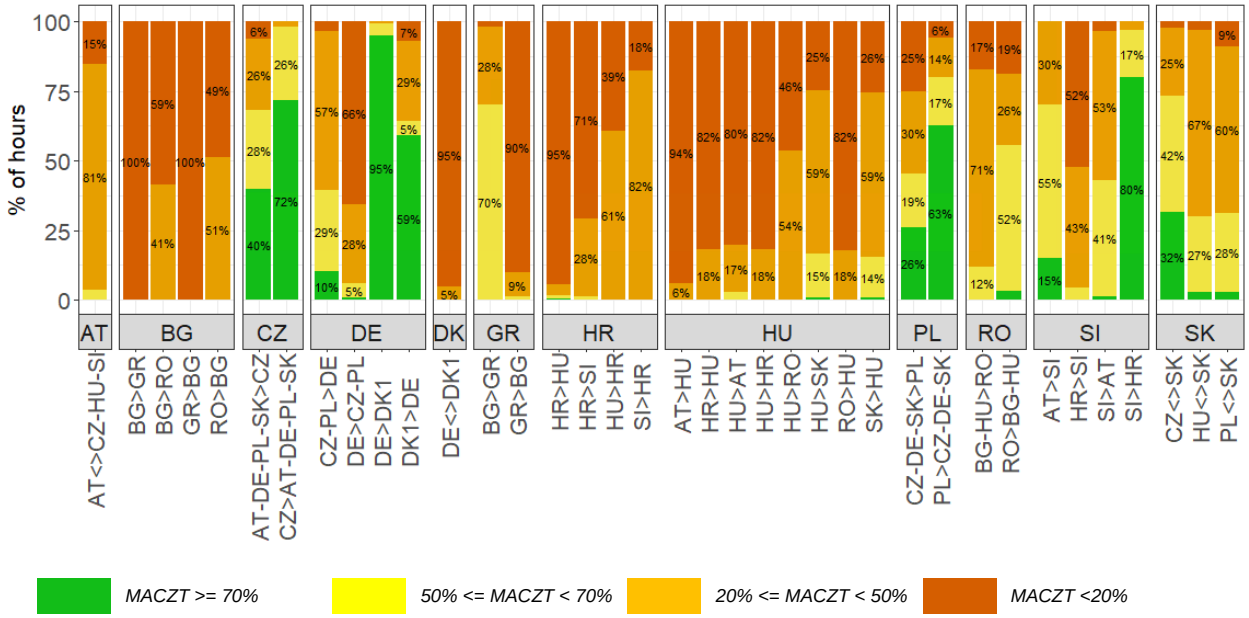
Note 2: The figure considers the influence of exchanges with third countries. Figure 15 in the body text excludes the influence of third countries.

Note 3: 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). The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation.

Note 4: The Danish TSO (Energinet) provided a set of CNECs which were typically used in capacity calculation during the analysed period, without further specifying the hours or periods for which those CNECs where limiting. Thus, the MACZT is likely underestimated on the CNECs that are not limiting. Moreover, the impact of flows from DC borders on the Danish CNECs was only approximately taken into account. These two limitations affect the accuracy of the results for Denmark.

Note 5: The only tie-line between Bulgaria and Greece was out of operation from 14 to 23 of April, and 4 to 31 of May, with NTC equal to zero. These hours are not included in the analysis for Bulgaria and Greece.

Figure 38: Percentage of the time when the relative MACZT is above the minimum 70% target on all limiting CNECs, per country, coordination area and direction, for countries of Continental Europe where a coordinated capacity calculation is not yet implemented – first semester of 2020 (% of hours)



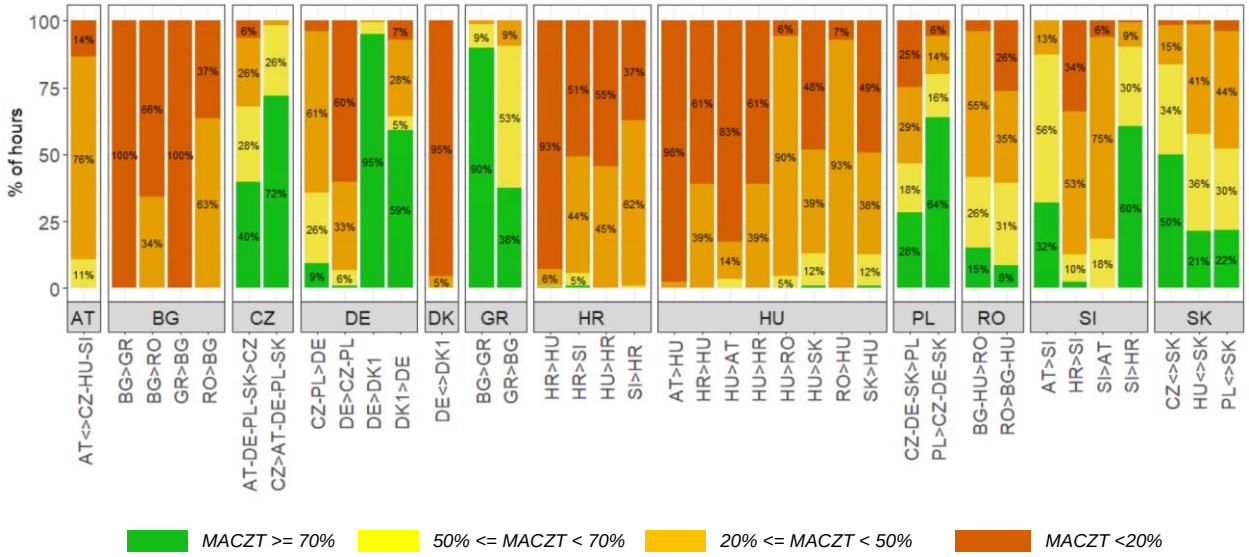
Source: ACER calculation based on TSOs data.

Note 1: 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). The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation.

Note 2: The Danish TSO (Energinet) provided a set of CNECs which were typically used in capacity calculation during the analysed period, without further specifying the hours or periods for which those CNECs where limiting. Thus, the MACZT is likely underestimated on the CNECs that are not limiting. Moreover, the impact of flows from DC borders on the Danish CNECs was only approximately taken into account. These two limitations affect the accuracy of the results for Denmark.

Note 3: The only tie-line between Bulgaria and Greece was out of operation from 14 to 23 of April, and 4 to 31 of May, with NTC equal to zero. These hours are not included in the analysis.

Figure 39: Percentage of the time when the relative MACZT is above the minimum 70% target on all limiting CNECs, per country, coordination area and direction, for countries of Continental Europe where a coordinated capacity calculation is not yet implemented, considering exchanges with third countries – first semester of 2020 (% of hours)



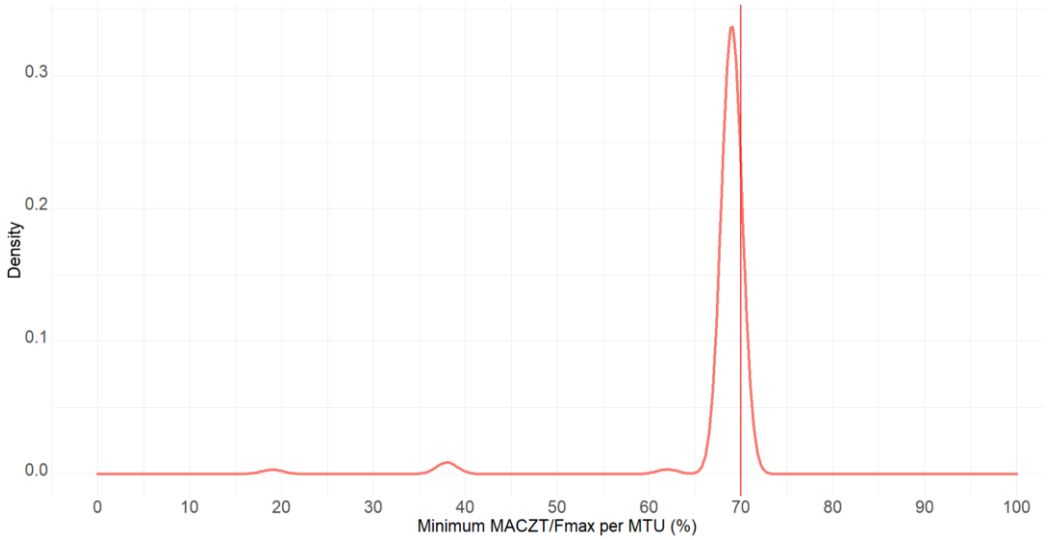
Source: ACER calculation based on TSOs data.

Note 1: 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). The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation.

Note 2: The Danish TSO (Energinet) provided a set of CNECs which were typically used in capacity calculation during the analysed period, without further specifying the hours or periods for which those CNECs where limiting. Thus, the MACZT is likely underestimated on the CNECs that are not limiting. Moreover, the impact of flows from DC borders on the Danish CNECs was only approximately taken into account. These two limitations affect the accuracy of the results for Denmark.

Note 3: The only tie-line between Bulgaria and Greece was out of operation from 14 to 23 of April, and 4 to 31 of May, with NTC equal to zero. These hours are not included in the analysis.

Figure 40: Density function of the lowest hourly relative MACZT of limiting CNECs for Finland – first semester of 2020

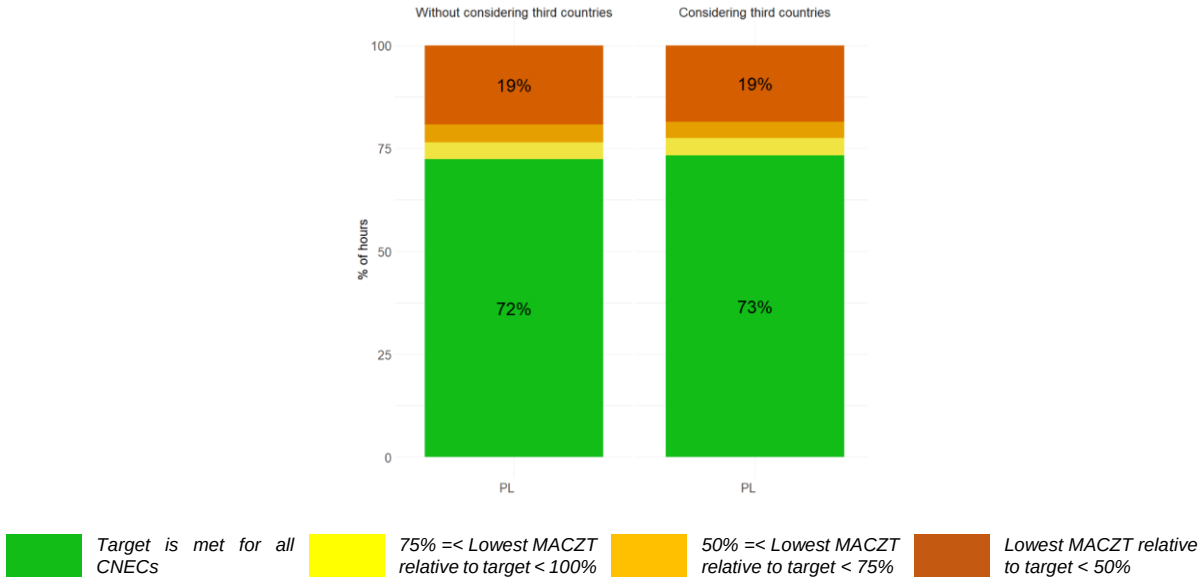


Source: ACER calculation of the density function based on TSO's data on MACZT

Note 1: The MACZT values used in this figure were calculated by the Finnish TSO. The calculations are not in line with ACER's Recommendation, thus the results are displayed for information only and they are not comparable to the results of other countries.

Note 2: The MACZT values underlying this figure consider the impact of exchanges from/to all other Nordic countries.

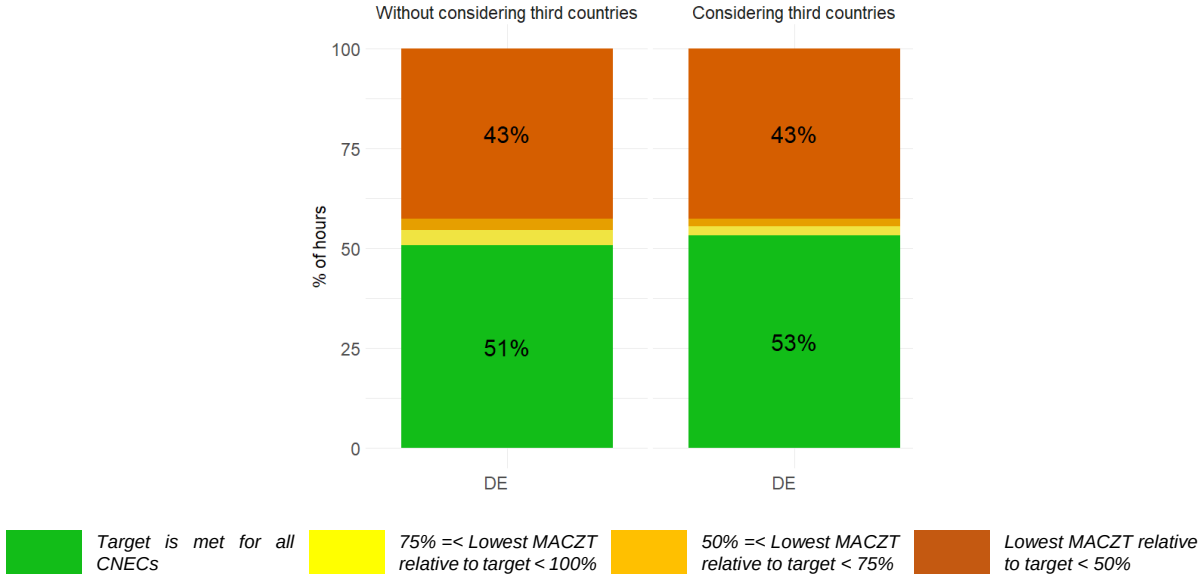
Figure 41: Percentage of the time when the relative MACZT is, for limiting CNECs in both directions, above the target set by the action plan for Poland – first semester of 2020 (% of hours)



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. The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation.

Figure 42: Percentage of the time when the relative MACZT is, for limiting CNECs in both directions, above the target set by the action plan for Germany, for the coordination area between Germany and Czech Republic and Poland – first semester of 2020 (% of hours)



Source: ACER calculation based on TSOs data.

Note 1: ACER's estimations are based on the minimum MACZT targets reported by TSOs for each CNEC and hour. ACER was informed that for Germany the calculation principles envisaged for compliance enforcement of the minimum MACZT targets would not be in line with the Recommendation (see paragraph (100) for more information on the discrepancies).

Note 2: The figure considers the impact of the technical profile of Germany (German borders with Czech Republic and Poland), after considering allocation constraints. The estimations of this impact are performed in line with the section 6.2.3 of the Recommendation.

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)
CCA	Capacity calculation area
CCM	Capacity calculation methodology
CCR	Capacity calculation region
CEP	Clean Energy (for all Europeans) Package
CNE	Critical network element
CNEC	Critical network element with contingencies
cNTC	Coordinated Net Transfer Capacity
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
FB	Flow-based
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
MS	Member State
NTC	Net Transfer Capacity
PST	Phase shifting transformer
PTDF	Power transfer distribution factor
RAM	Remaining Available Margin
RSC	Regional Security Coordinator
SEE	South East Europe (electricity region)
SEM	Irish Single Energy Market (comprising Northern Ireland and the Republic of Ireland)
SWE	South West Europe (electricity region)
TP	(ENTSO-E) Transparency Platform
TSO	Transmission system operator

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