



European Union Agency for the Cooperation
of Energy Regulators

ACER

Results of monitoring the margin available for cross-zonal electricity trade (MACZT) on the **Nordic Alternate Current borders in 2020**

Addendum to the reports on the results of monitoring
the MACZT in the EU in 2020

17 December 2021

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

- (1) The lack of sufficient cross-zonal capacity to trade across Member States is one of the main barriers to the integration of electricity markets. Larger amounts of cross-zonal capacity made available for trade increase cross-border competition enhance the integration of renewable energy sources and are therefore key to deliver on Europe's energy goals.
- (2) To ensure sufficient cross-zonal capacity and to avoid discrimination between internal and cross-zonal flows, the Europe's Clean Energy Package (CEP)¹ set a minimum level of capacity - also called margin available for cross-zonal trade (MACZT) - to be met by all Transmission System Operators (TSOs). This so-called 'minimum 70% target' is legally binding since the start of 2020, though Member States may adopt transitory measures, such as action plans or derogations, allowing TSOs to reach gradually the minimum 70% target by the end of 2025 at the latest.
- (3) This document was produced in the context of the European Union Agency for the Cooperation of Energy Regulators' (ACER) tasks to monitor the internal electricity market². It reports on the MACZT levels on the two Nordic Alternate Current (AC) borders (between the bidding zones Finland and Sweden¹, and Denmark² and Sweden⁴) in 2020, and the scope for improvement to meet the minimum 70% target.
- (4) In December 2020 and June 2021, ACER published two reports on the result of monitoring the MACZT in the EU in 2020³. However, an analysis of the MACZT on the Nordic AC borders was not included in these reports, due to no or insufficient data provided by the Nordic TSOs to ACER. ACER issued a decision⁴ asking the relevant TSOs to provide the data that ACER had previously requested; subsequently, the Nordic TSOs provided the data to ACER.
- (5) This publication is therefore an addendum to the above-mentioned reports.

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

² 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>

³ The two reports cover respectively the first and second semester of 2020. They were published respectively on 18 December 2020 and 2 June 2021 and are available at:

https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/MACZT%20report%20-%20S1%202020.pdf

https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20MACZT%20Report%20S2%202020.pdf

⁴ ACER Decision No 03/2021 of 30 April 2021 requesting information from Svenska Kraftnät, Energinet Elsystemansvar a/s and Fingrid Oyj for monitoring the margins available for cross-zonal trade on critical network elements, available at:

https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Individual%20decisions/ACER%20Decision%2003-2021%20on%20Nordic%20MACZT.pdf

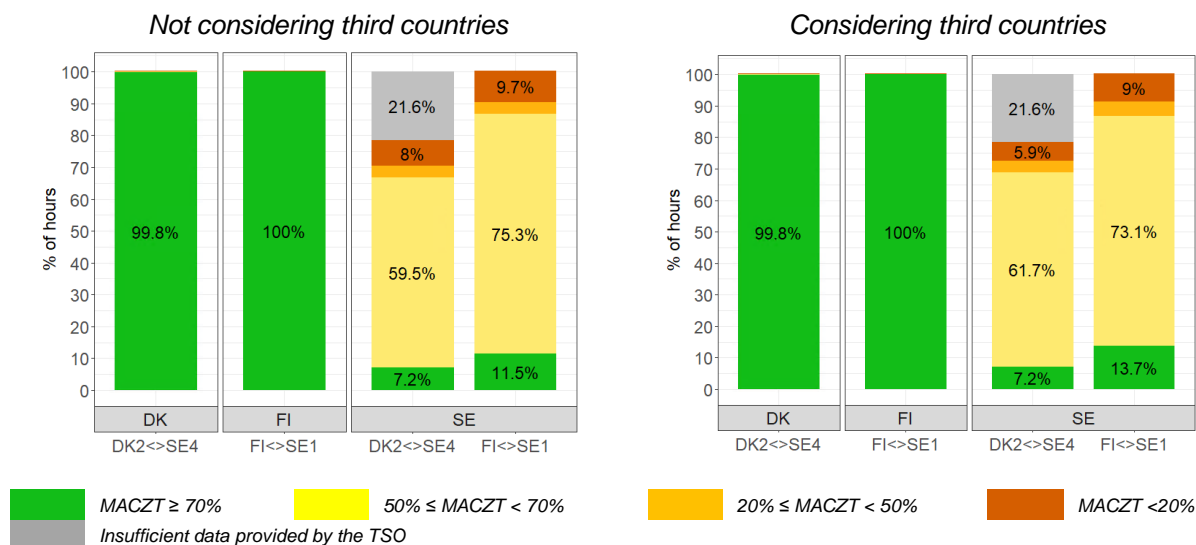
Key findings

- (6) In summary, ACER's monitoring of the minimum 70% target on the AC Nordic borders in 2020 led to the following findings:
- The performance of the Nordic TSOs with regard to the MACZT, and the quality of the data they provided for monitoring, is diverse, depending on the border and TSO.
 - As shown in Figure 1, on the border between Finland and Sweden¹, the Finnish TSO met the target for both directions and for all hours of 2020. On the same border, the Swedish TSO met the target for 90% of the hours in the direction from Sweden¹ to Finland and for only 15% of the hours in the opposite direction.
 - On the border between Denmark² and Sweden⁴, the Danish TSO met the target for almost all hours of 2020⁵; on the same border, the Swedish TSO reached the target for 67% of the hours in the direction from Denmark² to Sweden⁴, and for only 10% of the hours in the opposite direction.
 - In Figure 2, the analysis of the MACZT during the hours when the target is not met confirms that significant efforts to meet the minimum 70% target at all times are needed for Sweden. For Denmark, for the few hours when they do not reach the target, significant efforts are also needed.
 - All Nordic TSOs reported that allocation or dynamic constraints (including rotor angle oscillations in Finland, and voltage issues in Sweden) were often the reason limiting the cross-zonal capacity on the analysed borders.
 - Denmark and Sweden need to improve the quality of the data they will provide for 2021.
- (7) As for the data quality, the analysis would benefit from a higher level of detail for the network-related parameters⁶ provided by the Nordic TSOs, from a more accurate identification of the limiting network elements, including when TSOs apply so-called dynamic constraints, and from the provision of meaningful identifiers of the network elements in Sweden, as opposed to anonymised ones. The impact of insufficient data quality is difficult to estimate, but it could be relevant. ACER expects TSOs to make their utmost best to improve the quality of the data provided to ACER for subsequent reports.

⁵ These results are for the border between Denmark² and Sweden⁴. The results for the border between Denmark¹ and Germany are included in the report previously published by ACER (see footnote 3). As a comparative illustration, on the border between Denmark¹ and Germany Denmark reached the minimum 70% target 42% of the hours of the second semester of 2020.

⁶ The analysis of the MACZT is based on parameters (power transfer distribution factors – PTDFs) calculated from network models. For this report, the TSOs calculated these parameters based on a limited number of different grid models, which may not be fully representative of the network topology for all the hours of the semester. Moreover, when calculating these parameters, the Swedish TSO considered Norway as one single bidding zone, while it would have been more accurate to consider the different bidding zones comprised within Norway. Finally, the Danish TSO may not have modelled the Swedish network with sufficient accuracy in its calculation.

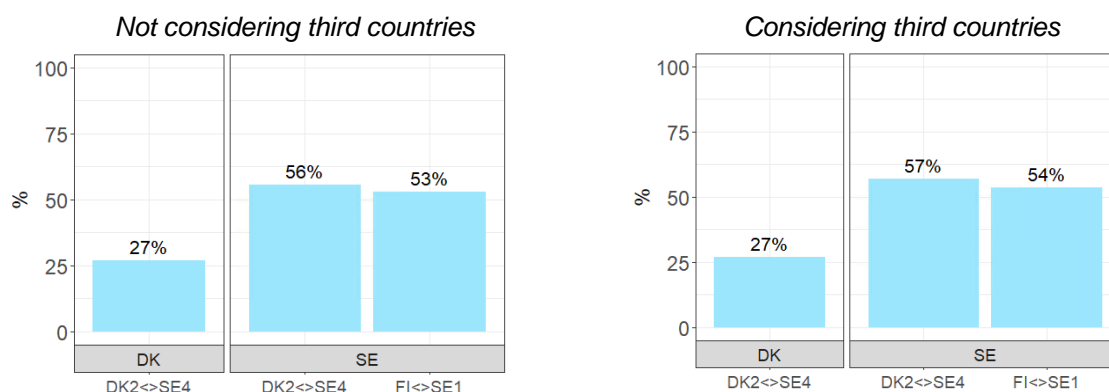
Figure 1: Percentage of the time when the minimum 70% target was reached, per country and coordination area, in the Nordic region – 2020 (% of hours)



MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Figure 2: Average margin available on elements where the minimum 70% target is not reached, in the Nordic region – 2020



Source: ACER calculation based on TSOs data.

Note: Finland is not part of the figure because it reached the minimum 70% target on all reported network elements in 2020.

For 22% of the hours, Sweden did not provide sufficient data to calculate the level of MACZT. The figure encompasses only the hours for which sufficient data was provided.

- (8) While meeting the minimum 70% target is a legal obligation that does not depend on the capacity calculation method applied by TSOs (i.e. either the net transmission capacity, NTC-based method, or the flow-based method), ACER expects that the implementation of the flow-based method in the Nordic region will increase the coordination in capacity calculation, leading to a greater transparency in the provision of data for monitoring, and overall to a larger amount of cross-zonal capacity made available to the market.

Need for enhanced coordination in the implementation and monitoring of the minimum 70% target across the European Union

- (9) To ensure a timely and efficient implementation of the minimum 70% target, the CEP differentiates different monitoring roles:
- Every three years the European Network of transmission system operators for Electricity (ENTSO-E) is required to include in its technical report on structural congestions⁷ an assessment of whether the cross-zonal trade capacity reached the minimum 70% target⁸.
 - Regulatory authorities⁹, and the European Commission (EC) where relevant, are required to formally assess the legal compliance of TSOs with regard to the fulfilment of the target.
 - ACER is required to monitor, among other issues, electricity wholesale markets¹⁰, in particular the progress made with regard to interconnectors and barriers to cross-border trade. This inherently includes the monitoring of the progress towards meeting the minimum 70% target.
- (10) To ensure a harmonised fulfilment of the above mentioned tasks, and following a request of the Electricity Cross-Border Committee, ACER, in coordination with regulatory authorities, agreed to issue a recommendation¹¹ (hereafter ‘the Recommendation’) on how to implement, and how to monitor the achievement of the MACZT, across the European Union (EU).
- (11) In 2020 and 2021, ACER, a number of regulatory authorities and ENTSO-E published various reports on the level of fulfilment of the MACZT. While ACER’s report on the MACZT consistently applied the monitoring methodology described in the Recommendation, the same degree of harmonisation was not observed across all other reports.
- (12) With regard to NRAs’ reports¹², it is observed that the Recommendation was generally used as a basis for the assessment of the MACZT. However, a number of reports divert from the Recommendation to varying degrees. While some divergences complement the analysis, some others seem to contradict the Recommendation and the Regulation itself. For example, in some reports, the analysis was limited to a subset of the hours, with the argument that meeting the 70% across all hours would not be efficient. Besides the fact that the Regulation requires the 70% minimum target to be met at all times, ACER notes

⁷ Article 14(2) of the Electricity Regulation of the CEP.

⁸ Or the transitional targets related to action plans or derogations, where these measures apply.

⁹ Article 59(1)(h) of the Directive (EU) 2019/944.

¹⁰ See footnote 2.

¹¹ 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

¹² The overview of the NRAs’ approaches to compliance is available at:

https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publications%20Annexes/ACER%20Report%2001-2020%20the%20result%20of%20monitoring%20the%20MACZT%20S2%202020/ACER%20MACZT%20Report%20S2%202020_Annex%20NRAs%20assessment.pdf

that using the efficiency argument for the 70% target can be a two-edged sword as it can also lead to question the efficiency of zonal pricing under which TSOs are required to offer 'infinite' capacity within bidding zones at all times.

- (13) With regard to ENTSO-E's report¹³, it does not include the essential elements that could be expected from an EU-wide assessment on the MACZT levels. Firstly, it lacks transparency as the multiple methodologies underlying the analysis are often not described or not referenced. Secondly, it lacks harmonisation as the report appears to be a compilation of uncoordinated national assessments, performed individually by each TSO, using different methodologies and standards. Thirdly, it lacks proper justification as regard the reasons for deviating from the minimum target: indeed, the report seems to refer to operational security as a reason explaining the deviations from the target without further justification. Fourthly, the assessment goes beyond the legal mandate, as it refers to 'compliance', while the Regulation clearly assigns compliance as a duty for NRAs and the EC.¹⁴ Fifthly, the report does not take advantage of the coordination efforts undertaken by the relevant NRAs, ACER and the EC. Finally, the report does not give a clear overview of the levels of MACZT in the EU. In fact, the main conclusion of the report is that virtually all TSOs are fully compliant with their MACZT obligations; this is largely the result of stating that in the presence of a derogation with no associated MACZT target, the MACZT obligations are supposedly fulfilled.
- (14) In view of the various and divergent reports, stakeholders raised concerns about the "blurry picture" on the progress towards meeting the 70% target that was provided to the market¹⁵. This illustrates that uncoordinated monitoring may hinder stakeholders' understanding of the progress towards meeting the MACZT target, and ultimately put the achievement of the target at risk.
- (15) By contrast, a regular, harmonised and coordinated compliance assessment performed by NRAs is paramount to ensure that the minimum 70% target is implemented with equally high standards across the EU, thus leading to actual increases in the cross-zonal capacity made available to market participants.
- (16) Moreover, ACER reiterates its commitment to enhance its monitoring reports continuously, considering best practices, in coordination with the EC, NRAs, ENTSO-E and TSOs, and stakeholders. Finally, to facilitate NRAs' compliance assessment, ACER is also available to share detailed results of its assessments, while ensuring the protection of confidential data.

¹³ ENTSO-E market report 2021, available at:

https://ee-public-nc-downloads.azureedge.net/strapi-test-assets/strapi-assets/ENTSO_E_Market_report_2021_2e499deda8.pdf

¹⁴ A few TSOs referred to the respective NRA's compliance assessment in the ENTSO-E's report.

¹⁵ For example, such concerns were raised during the market European stakeholders committee meeting held on 1 December 2021. See further information at https://www.entsoe.eu/network_codes/esc/#market-stakeholder-committee

1 Introduction

- (1) The development of European rules for the calculation and allocation of cross-zonal capacities on electricity interconnectors is an integral step, within the European legal and regulatory framework, for the completion of Europe's internal electricity market, and, more broadly, for the achievement of the European Union's (EU) ambitious energy and climate policy targets. A larger amount of cross-zonal capacity made available for trade increases cross-border competition and enhances the integration of renewable energy sources.
- (2) Over the last decade, significant progress has been made to improve the allocation of the capacity that is made available to the market, namely by implementing of the so-called single day-ahead and intraday market coupling across the entire EU. However, progress in maximising the capacity that is available for cross-zonal trading has been much slower. To address this, the Electricity regulation¹⁶ of the Clean Energy for All Europeans Package (CEP)¹⁷ set a minimum level of capacity - also called margin available for cross-zonal trade (MACZT) - to be reached by transmission system operators (TSOs). This so-called 'minimum 70% target' took effect on 1 January 2020. The Electricity Regulation also allows Member States to adopt transitory measures, i.e. action plans or derogations, to reach gradually the minimum 70% target by the end of 2025 at the latest.
- (3) This document was produced in the context of the European Union Agency for the Cooperation of Energy Regulators' (ACER) tasks to monitor the internal electricity market¹⁸. More specifically, the document assesses the MACZT levels on the two Nordic Alternate Current (AC) borders (between the bidding zones Finland and Sweden¹, and Denmark² and Sweden⁴) in 2020, and the scope for improvement to meet the minimum 70% target.
- (4) In December 2020 and June 2021, ACER published two reports on the result of monitoring the MACZT in the EU in 2020¹⁹. However, an analysis of the MACZT on the Nordic AC borders was not included in these reports, due to no or insufficient data provided by the Nordic TSOs to ACER. ACER issued a decision²⁰ asking the relevant TSOs to provide the

¹⁶ 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>

¹⁷ The Commission's Clean Energy for All Europeans legislative proposal covers energy efficiency, renewable energy sources generation, the design of the electricity market, security of electricity supply and governance rules for the Energy Union. Relevant material along with the adopted directives and legislation is available at: <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans>

¹⁸ 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>

¹⁹ The two reports issued by ACER on the results of monitoring the margin available for cross-zonal electricity trade in the EU, for the first and second semester of 2020, published respectively on 18 December 2020 and 2 June 2021 are available at:

https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/MACZT%20report%20-%20S1%202020.pdf

https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20MACZT%20Report%20S2%202020.pdf

²⁰ ACER Decision No 03/2021 of 30 April 2021 requesting information from Svenska Kraftnät, Energinet Elsystemansvar a/s and Fingrid Oyj for monitoring the margins available for cross-zonal trade on critical network elements, available at:

data that ACER had previously requested; subsequently, the Nordic TSOs provided the data.

- (5) This publication is therefore an addendum to the above-mentioned ACER's reports. From 2021 onwards, ACER expects that the Nordic TSOs deliver the data with the same frequency and by the same deadlines as all other TSOs, to ensure the publication of a single ACER report on the results of monitoring the MACZT, for the benefit of all stakeholders.

2 Detailed results of monitoring the MACZT

2.1 Geographical scope

- (6) This document includes the results of monitoring the MACZT on the AC borders among the Nordic countries where the CEP applied in 2020, namely:
- The border between the bidding zones of Finland and Sweden¹;
 - The border between the bidding zones of Denmark² and Sweden⁴.
- (7) The following Nordic borders are not included in the analysis:
- All Nordic direct Current (DC) borders, as they were included in previous MACZT reports;
 - Bidding zone borders internal to a country (e.g. Sweden¹ – Sweden²)²¹;
 - Borders with Norway²², where the 'minimum 70% target does not yet apply.
- (8) As in previous MACZT reports, the performance of each Member State with regard to the MACZT is separately analysed. The performance of the two Nordic AC borders are also analysed separately, because each border belongs to a different coordination area²³. With the upcoming implementation of flow-based capacity calculation in the Nordic area, all Nordic borders will be jointly analysed, as they will be part of the same coordination area.

https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Individual%20decisions/ACER%20Decision%202003-2021%20on%20Nordic%20MACZT.pdf

²¹ However, exchanges between bidding-zones internal to a country should be accounted for to estimate the MACZT on CNECs, when this information is available.

²² The case of Norway with regard to the consideration of exchanges between Norway and the EU for the monitoring of the MACZT is specific. Firstly, 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. As the CEP has not yet been incorporated to Norwegian law, the minimum 70% target does not yet apply on Norwegian borders. Secondly, exchanges with Norway are taken into account for the estimation of the MACZT on the other Nordic borders; however they will be displayed separately as a 'third country' until the CACM Regulation is incorporated into the EEA-agreement and implemented in Norwegian law. This approach is in line with the guidance provided by the services of Directorate-General for Energy of the European Commission (see paragraph (34) of the ACER MACZT report for the second semester of 2020).


²³ A coordination area describes the sets of bidding-zone borders within which capacity calculation is fully coordinated. For the Nordic AC borders, the coordination areas were, in 2020, each of the two borders. For more information on coordination areas, please refer to paragraph (26) of the ACER report on monitoring the MACZT for the second semester of 2020.

2.2 Data completeness and quality

- (9) To enable the monitoring of the MACZT on AC borders, ACER requested TSOs to provide a set of data that is described in section 3.2.2 of ACER MACZT report for the second semester of 2020.
- (10) Table 1 provides a summary of the completeness and quality of the data provided by the Nordic TSOs to ACER. This summary should be considered together with
- (11) Table 2 that describes how the data was actually used by ACER in the report to estimate the MACZT. Overall, the tables reveal that the data provided by TSOs was sufficient for ACER’s monitoring for a majority of hours, although there is room for improvement.
- (12) It should be noted that both the Danish and the Finnish TSOs considered that the impact of other countries, in particular of Norway, were negligible for the calculation of the MACZT. Only the Swedish TSOs provided the zone-to-zone power transfer distribution factors (PTDFs²⁴) between the Swedish bidding-zones and Norway, which allows to estimate the impact of the exchanges with Norway. Consequently, throughout this section, the results with and without third countries are different only for Sweden. Finally, it should be noted that the Nordic TSOs reported PTDFs only on a limited numbers of borders (at most, on the Nordic borders between two countries), and considered that all other PTDFs (all borders beyond the Nordic region, but also borders internal to a country, e.g. internal Swedish borders) were not relevant in the calculation.

Table 1: Overview of the completeness and quality of the data provided by TSOs for the monitoring of the MACZT on AC borders in the Nordic region – 2020

CCAs	Country	TSO	Overall ACER's assessment of data completeness and quality	Observations
DK2-SE4	DK	Energinet		<ul style="list-style-type: none"> - Identification of limiting elements is approximate - SE4 is not modelled as a meshed network
FI-SE1	FI	Fingrid		
DK2-SE4	SE	SVK		<ul style="list-style-type: none"> - Irrelevant PTDFs (set to 0) for 23% of the time on the border DK2-SE4. - Possible lack of accuracy due to only two sets of PTDFs provided. More PTDFs would also resolve the issue above. - The list of critical network elements (CNECs) have been anonymised by the TSO. It prevents ACER from performing a certain number of consistency checks. - The PTDFs have been provided between Sweden’s bidding-zones and Norway as a whole, instead of being provided on each bidding-zone border. Consequently, the impact of exchanges on Norwegian borders is an approximation.
FI-SE1				

 All data was provided as requested.

²⁴ The PTDFs describe the impact of a commercial exchange between two bidding-zones on a network element. The Swedish TSO only provided PTDFs considering Norway as a whole rather than providing PTDFs referring to each of the Norwegian bidding zones. The former allowed performing the calculations, but the latter would have been more accurate.

	Most or all data was provided. Some non-critical elements were missing or the provision of data was not fully in line with the Recommendation. The impact on the MACZT results was limited and/or fallback data could be used.
	Most or all data was provided. Some essential elements were missing or the provision of data deviated significantly from the Recommendation. The impact on the MACZT results was relevant and/or using fallback data was not always possible.
	No or insufficient data provided. Monitoring MACZT was not possible at all, or only very limitedly.

Table 2: Overview of the data used by ACER in the report and for the calculation when performed by ACER for the Nordic region – 2020

CCAs	Country	TSO	Results			Data used by ACER for calculation					Comments
			MCCC	MNCC	MINCC with third countries	CNECs	PTDFs	NTC	Forecast sched.	Alloc. const.	
DK2-SE4	DK	Energinet	ACER			TSO	TSO	TSO			
FI-SE1	FI	Fingrid	TSO	TSO	TSO						
DK2-SE4	SE	SVK	ACER	ACER	ACER	TSO	TSO	TSO	EE-TP		
FI-SE1			ACER	ACER	ACER	TSO	TSO	TSO	EE-TP		

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

Source: ACER elaboration

2.3 Results

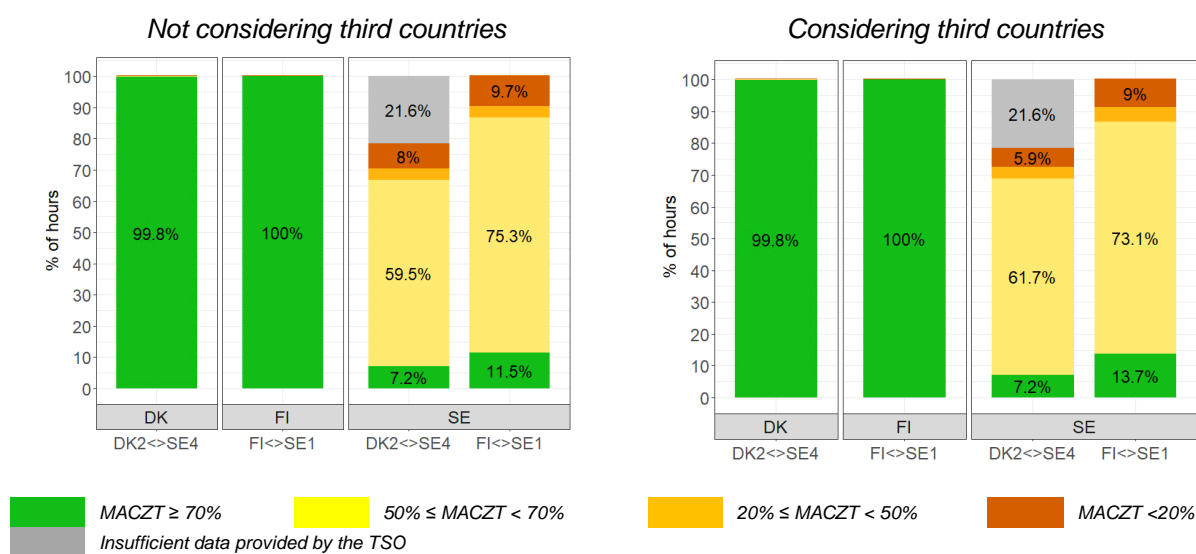
- (13) As explained in previous MACZT reports, following numerous interactions with the European Commission (EC), the European Network of transmission system operators for Electricity (ENTSO-E), national regulatory authorities (NRAs) and TSOs, ACER issued a recommendation²⁵ ('the Recommendation') to ensure a consistent approach to the implementation and monitoring of the MACZT, and to support legal compliance enforcement. A methodological paper²⁶ ('the methodological paper') complements the Recommendation, describing how to estimate in practice the MACZT, and the main caveats underlying the estimation of the MACZT.
- (14) The present report monitors the MACZT across the EU in line with the Recommendation and the methodological paper. The main principles of calculation described in these two documents are:
1. The MACZT is monitored individually and separately for each critical network element with contingencies (CNEC);
 2. The MACZT is the sum of the margin made available within coordinated capacity calculation (MCCC), and the flow induced by cross-zonal exchanges beyond coordinated capacity calculation – the margin from non-coordinated capacity calculation (MNCC).

²⁵ See footnote 11.

²⁶ See the methodological paper at: https://www.acer.europa.eu/en/Electricity/Market%20monitoring/Documents/20201209%20Methodological%20paper%20MACZT_final.pdf

3. The estimated MACZT focuses on the physical capacity offered for the long-term timeframes (which is not relevant for the Nordic area²⁷) and the day-ahead timeframe. In the future, intraday capacity²⁸ - when this capacity is additional capacity made available and not just leftovers from the previous timeframes - will also be considered.
 4. The influence of flows on bidding-zone borders between EU and non-EU countries is monitored separately.
- (15) A relevant caveat underlying is that the TSOs calculated their PTDFs, on which the calculation of the MACZT is based, on a limited number of grid models, which may not be fully representative of the network topology for all the hours of the semester. To address this issue, Nordic TSOs are invited to increase the number of grid models that allow them to calculate the PTDFs.
- (16) Figure 3 displays the percentage of hours for which the relative MACZT was, for both directions (import and export) above the minimum 70% target for the limiting CNECs, per country and coordination area (i.e. a border). Figure 4 complements this figure by showing this analysis per bidding-zone borders and direction (oriented bidding-zone border).

Figure 3: Percentage of the time when the minimum 70% target was reached, per country and coordination area, in the Nordic region – 2020 (% of hours)



MACZT = margin available for cross-zonal trade

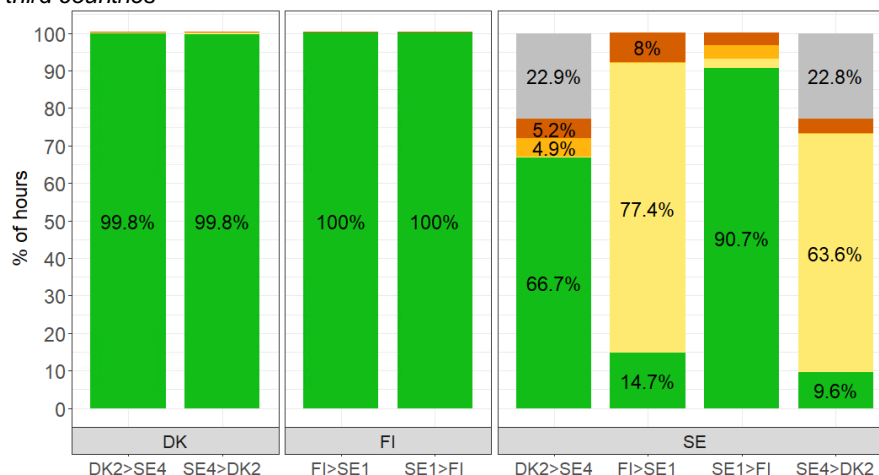
Source: ACER calculation based on TSOs data.

²⁷ In the Nordic area, cross-border access to forward markets is based on financial products, so-called Electricity Price Area Differentials, which do not require TSOs to offer cross-zonal capacity for the long-term.

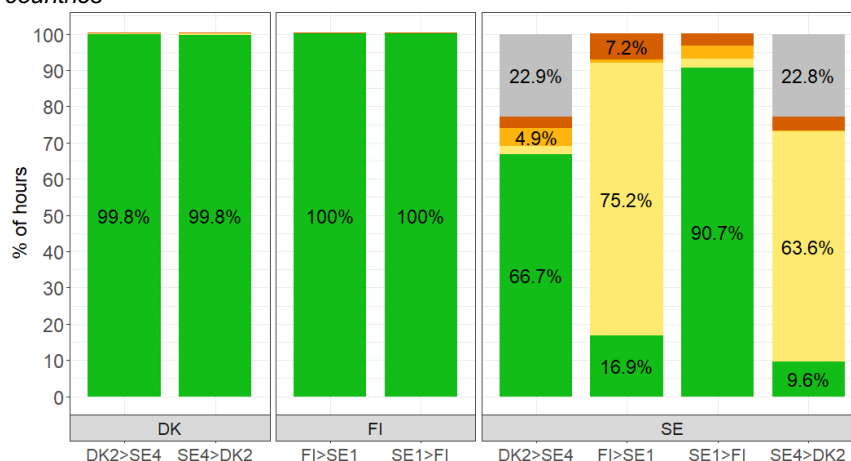
²⁸ Subject to improvements in the methodology and to the implementation of the intraday capacity calculation methodologies.

Figure 4: Percentage of the time when the minimum 70% target was reached, per country and oriented border, in the Nordic region – 2020 (% of hours)

Not considering third countries



Considering third countries



MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

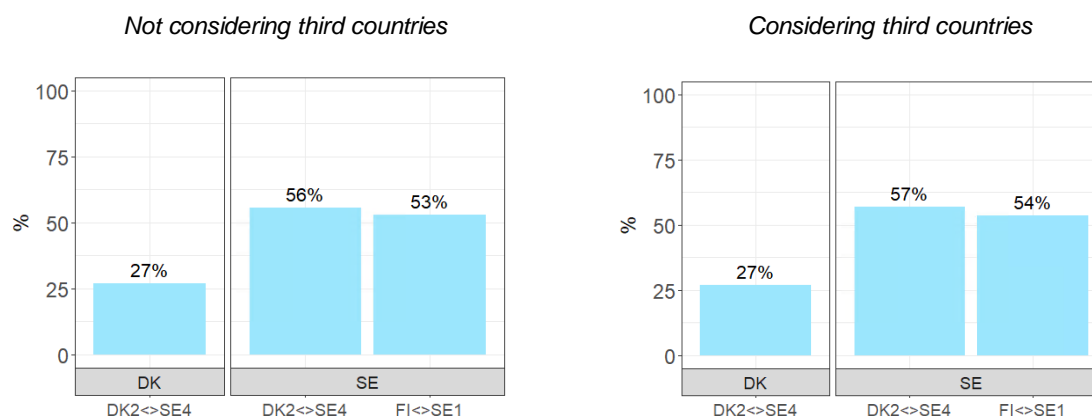
(17) Overall, the two figures above show that the performance of the Nordic TSOs with regard to the MACZT is very diverse, depending on the border and TSO.

- On the border between Finland and Sweden1, the Finnish TSO met the target for both directions and for all hours of 2020. On the same border, the Swedish TSO met the target for 90% of the hours in the direction from Sweden1 to Finland and for only 15% of the hours in the opposite direction.
- On the border between Denmark2 and Sweden4, the Danish TSO met the target for almost all hours of 2020; on the same border, the Swedish TSO reached the target for 67% of the hours in the direction from Denmark2 to Sweden4, and for only 10% of the hours in the opposite direction.

(18) Finally, Figure 5 illustrates the room for improvement by showing the average relative MACZT on the network elements where the minimum 70% was not reached in 2020. The

figure shows that the efforts to be made by Denmark for the few hours where the target is not met are substantial, with an average MACZT of only 27%. For Sweden, where the average relative margin reaches 53 to 56%, the efforts to be made are also relevant. Finland is not displayed in the figure because it reached the minimum 70% target for all declared elements in 2020.

Figure 5: Average margin available on elements where the minimum 70% target is not reached, in the Nordic region – 2020



Average relative MACZT (margin available for cross-zonal trade) on elements where the minimum 70% target is not reached
 MACZT = margin available for cross-zonal trade

Source: ACER calculation based on TSOs data.

Notes: Finland is not displayed because it reached the minimum 70% target the minimum 70% target for all hours of 2020.

For 22% of the hours, Sweden did not provide sufficient data to calculate the level of MACZT. The figure encompasses only the hours for which sufficient data was provided.

- (19) Moreover, the figures show that the exchanges with Norway appear to have a limited impact on the level of MACZT on the Swedish borders. However, as mentioned above, the data provided by the Swedish TSO considered Norway as a whole, instead of considering separate exchanges with each Norwegian bidding zone. This approximation may have affected the accuracy of the estimated exchanges with Norway.
- (20) Finally, with regard to the causes explaining why cross-zonal capacities are often constrained in the Nordic area, all Nordic TSOs reported that allocation constraints or dynamic constraints were often the reason limiting the cross-zonal capacity on the analysed borders. Details on the specific allocation constraints reported by the TSOs are included below.
- (21) On the border Finland-Sweden 1, TSOs reported that dynamic constraints on the Finnish side, mainly rotor angle oscillations issues, is the main reason limiting the capacity of the border in the direction from Finland to Sweden1 (100% of the time for Finland, 92% of the time for Sweden). In the opposite direction (Sweden1 to Finland), allocation constraints were not relevant in 2020.
- (22) On the border Denmark2-Sweden4, both directions are in general limited by thermal constraints. However, in the direction Denmark2 to Sweden4, TSOs reported that the thermal constraint that is relevant is the Temporary Admissible Transmission Loading (TATL), which is the maximum loading that can be accepted on an element a limited time. Therefore, TSOs consider that the amount of upregulation reserves in the importing region

sets the possibility to increase the capacity given to the market up towards the TATL, and is thus relevant in the capacity calculation.

- (23) While meeting the minimum 70% target is a legal obligation that does not depend on the capacity calculation method applied by TSOs (i.e. either the net transmission capacity, NTC-based method, or the flow-based method), ACER expects that the implementation of the flow-based method in the Nordic region will increase the coordination in capacity calculation, leading to a greater transparency in the provision of data for monitoring, and overall to a larger amount of cross-zonal capacity made available to the market.