ERSE
ENTIDADE REGULADORA
DOS SERVIÇOS ENERGÉTICOS

REPORT

MONITORING OF THE COMPLIANCE WITH MACZT MINIMUM LEVELS

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REPORT

Analysis of Portugal-Spain interconnection capacity and monitoring of compliance with the minimum levels of margin available for cross-zonal trade in 2022

July 2023

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1 INTRODUCTION

The current context of energy transition as well as the intention to implement the European internal electricity market, make interconnection capacity a key factor for the evolution and integration of energy systems.

The European Council of 23 and 24 October 2014 considered, in its conclusions [1], that the Commission, supported by the Member States, should take measures to ensure compliance with a minimum target of 10% of existing electricity interconnections, by 2020, at least for the Member States that had not yet reached a minimum level of integration into the internal energy market. The European Council further noted that the Commission should also periodically report to the European Council with the aim of achieving a target of 15% by 2030.

On the other hand, Article 16(8) of Regulation (EU) 2019/943[2] of the European Parliament and of the Council, of 5 June 2019, on the internal market for electricity, establishes the minimum values for the capacity of the interconnection to be made available by transmission system operators (TSOs) for cross-zonal trade:

"8. Transmission system operators shall not limit the volume of interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones. Without prejudice to the application of the derogations under paragraphs 3 and 9 of this Article and to the application of Article 15(2), this paragraph shall be considered to be complied with where the following minimum levels of available capacity for cross-zonal trade are reached:

(a) for borders using a coordinated net transmission capacity approach, the minimum capacity shall be 70 % of the transmission capacity respecting operational security limits after deduction of contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009;

[1] https://www.consilium.europa.eu/en/meetings/european-council/2014/10/23-24/

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0943

(b) for borders using a flow-based approach, the minimum capacity shall be a margin set in the capacity calculation process as available for flows induced by cross-zonal exchange. The margin shall be 70 % of the capacity respecting operational security limits of internal and cross-zonal critical network elements, taking into account contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009.

The total amount of 30 % can be used for the reliability margins, loop flows and internal flows on each critical network element."

Article 59(1)(h) of Directive (EU) 2019/944[3] of the European Parliament and of the Council, of 5 June 2019, on common rules for the internal market in electricity, provides that the regulatory authority of each Member State is responsible for "Ensuring that transmission system operators make available interconnector capacities to the utmost extent pursuant to Article 16 of Regulation (EU) 2019/943;".

In this sense, this report intends, on the one hand, to assess the evolution and current status of the interconnection capacity between Portugal and Spain, and, on the other hand, to assess the degree of compliance with the minimum level of available capacity for cross-zonal trade, foreseen in Article 16(8) of Regulation (EU) 2019/943.

Pursuant to Articles 121 and 122 of the Administrative Procedure Code, ERSE notified REN, in its capacity as the Portuguese TSO, so that, if willing, REN would comment on the draft report on the "Analysis of Portugal-Spain interconnection capacity and monitoring of compliance with the minimum levels of margin available for cross-zonal trade in 2022".

REN sent its comments to the draft report on 11 July 2023, in particular on the number of cases where fallback procedures have been used.

ERSE took good note of REN's comments, having made some clarifications in the text of the report, however they did not lead to any change in the conclusions for this final version of the report.

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0944

2 ANALYSIS OF PORTUGAL-SPAIN INTERCONNECTION

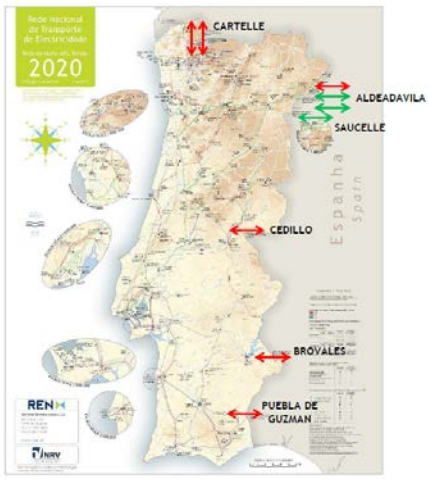
2.1 FRAMEWORK

The management of interconnections between Portugal and Spain is based on an implicit allocation model of available capacity for commercial purposes, exclusively through the daily and intraday markets, in addition to the possibility of the explicit use of financial mechanisms to cover the risk of the use of the interconnection. Congestion management is based on the application of a market splitting mechanism[4].

2.2 EVOLUTION OF INTERCONNECTION CAPACITY

The current interconnection between Portugal and Spain consists of six 400 kV lines and three 220 kV lines, in a total of nine interconnection lines, identified below.

Figure 2-1 – Interconnection lines between Portugal and Spain



Lines
400 kV lines:
Alto Lindoso – Cartelle 1
Alto Lindoso – Cartelle 2
Lagoaça – Aldeadávila
Falagueira – Cedillo
Alqueva – Brovales
Tavira – Puebla de Guzman
220 kV lines:
Pocinho – Aldeadávila 1
Pocinho – Aldeadávila 2
Pocinho – Saucelle

[4] Auction mechanism for the interconnection capacity between two systems (known as price zones – bidding zones), implicit in the offers that agents make in the daily market, and which presupposes the existence of a single market managed by a single market operator. When the interconnection capacity between the two systems is greater than the load flows resulting from the closing of the market, the interconnection is not congested and there is a single market price, the same for both systems. Otherwise, when the interconnection capacity is lower than the load flows resulting from the market closure, the interconnection is congested at its limit and the markets are separated in terms of price, which is higher in the import market and lower in the export market.

In terms of transmission capacity, these lines, which thermal limits depend on the ambient and operating temperature conditions used by the operators of the interconnected networks, present the values shown in Table 2-1.

Table 2-1 – Thermal capacities of the interconnection lines between Portugal and Spain

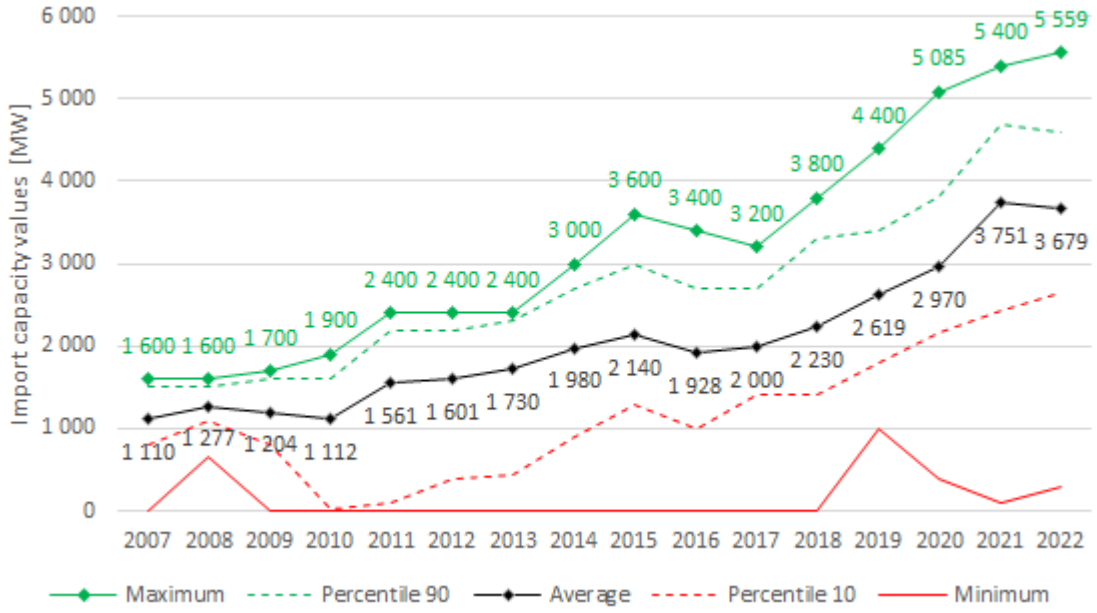
Lines	Minimum thermal capacity [MVA]
400 kV lines:	
Alto Lindoso – Cartelle 1	1499
Alto Lindoso – Cartelle 2	1499
Lagoaça – Aldeadávila	1469
Falagueira – Cedillo	1386
Alqueva – Brovales	1280
Tavira – Puebla de Guzman	1386
220 kV lines:	
Pocinho – Aldeadávila 1	374
Pocinho – Aldeadávila 2	374
Pocinho – Saucelle	360
Total	9627

Source: REN – Interconnection Characterization as of 31 December 2022

Thus, for the purposes of characterizing the value of the interconnection capacity, the sum of the minimum values of the thermal capacities of the lines that constitute the interconnection is 9627 MVA.

The following figures illustrate the evolution of the interconnection capacity available for commercial purposes, in the import and export directions, between 2007, the year in which the Iberian Electricity Market (MIBEL) came into operation, and 2022.

Figure 2-2 – Evolution of interconnection capacity available for commercial purposes - Import

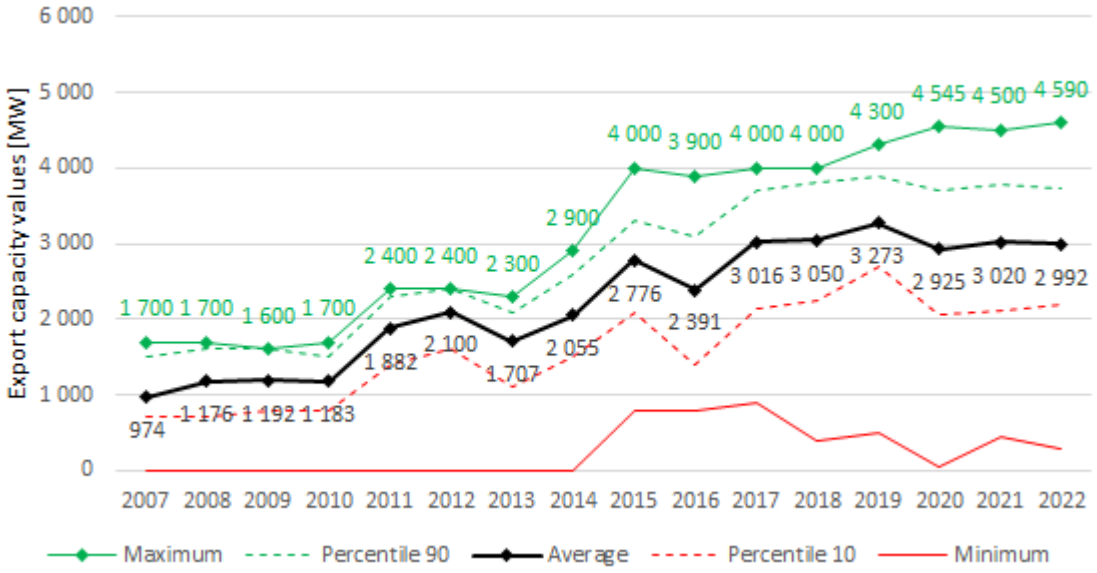


Source: REN data

During the period under review, the upward trend already observed from 2017 to 2021 is confirmed in 2022, reaching a maximum value of 5559 MW. In terms of average values, there is a slight decrease compared to the value observed in 2021, from 3751 MW to 3679 MW. It should be noted that practically in all years there are zero or almost zero values, although the 1st decile[5] is close to the average value.

[5] The 1st decile is the cut-off point for the lowest 10% of the data, i.e., the 10th percentile.
The 90th percentile is the threshold for 90 per cent of the lowest data, i.e. the 9th decile.

Figure 2-3 – Evolution of interconnection capacity available for commercial purposes - Export



Source: REN data

In terms of export capacity for commercial purposes, the characteristic values observed in 2021 were maintained, with the maximum and average values in the same order of magnitude, respectively 4590 MW and 2992 MW. In terms of the occurrence of zero values, it is less frequent than that of imports, with the 1st decile remaining in the neighbourhood of the average value.

2.3 EVOLUTION OF CONGESTION AND CONGESTION INCOME

In 2022, congestion income for the interconnections between Portugal and Spain, resulting from the difference in zonal prices after applying the market splitting, reached a total of 9.63 million euros, a value higher than the one recorded in 2021 (4.15 million of euros). This increase is explained not only by the slight increase in the number of hours of congestion, but essentially by the strong increase in market prices.

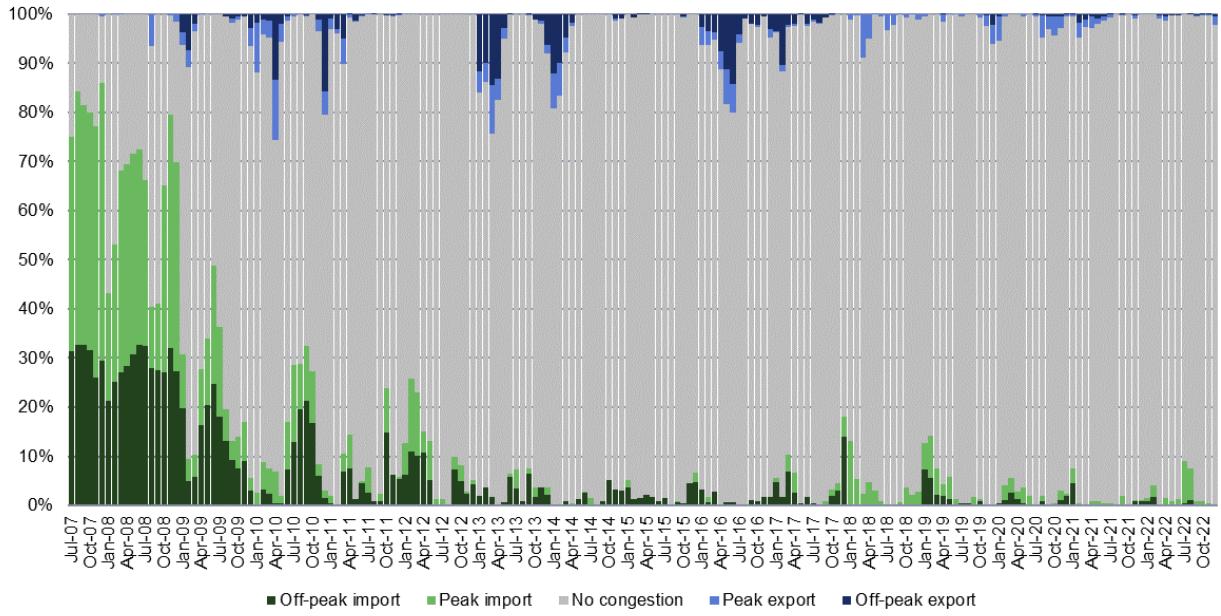
Translated into the total number of ours of congestion, the change from 230 hours in 2021 to 251 hours in 2022 (in both directions of the interconnection) continues to reflect a strong market integration.

In terms of price differential, in 2022, there was a positive average spread of 0.37 €/MWh, in the import direction, higher than the one recorded in 2021, also in the import direction, of 0.07 €/MWh. The values of the price differential remained reasonably low throughout the year, with an inversion in the direction of

congestion in some months of the year.

The following figure illustrates the use of the available commercial capacity, in both directions, on the Portugal-Spain interconnection, in the period from July 2007 (beginning of the MIBEL) to December 2022, making it possible to identify the reduction in the number of hours of congestion in both directions.

Figure 2-4 – Monthly percentage of hours of congestion on the Portugal-Spain interconnection, 2007 to 2022

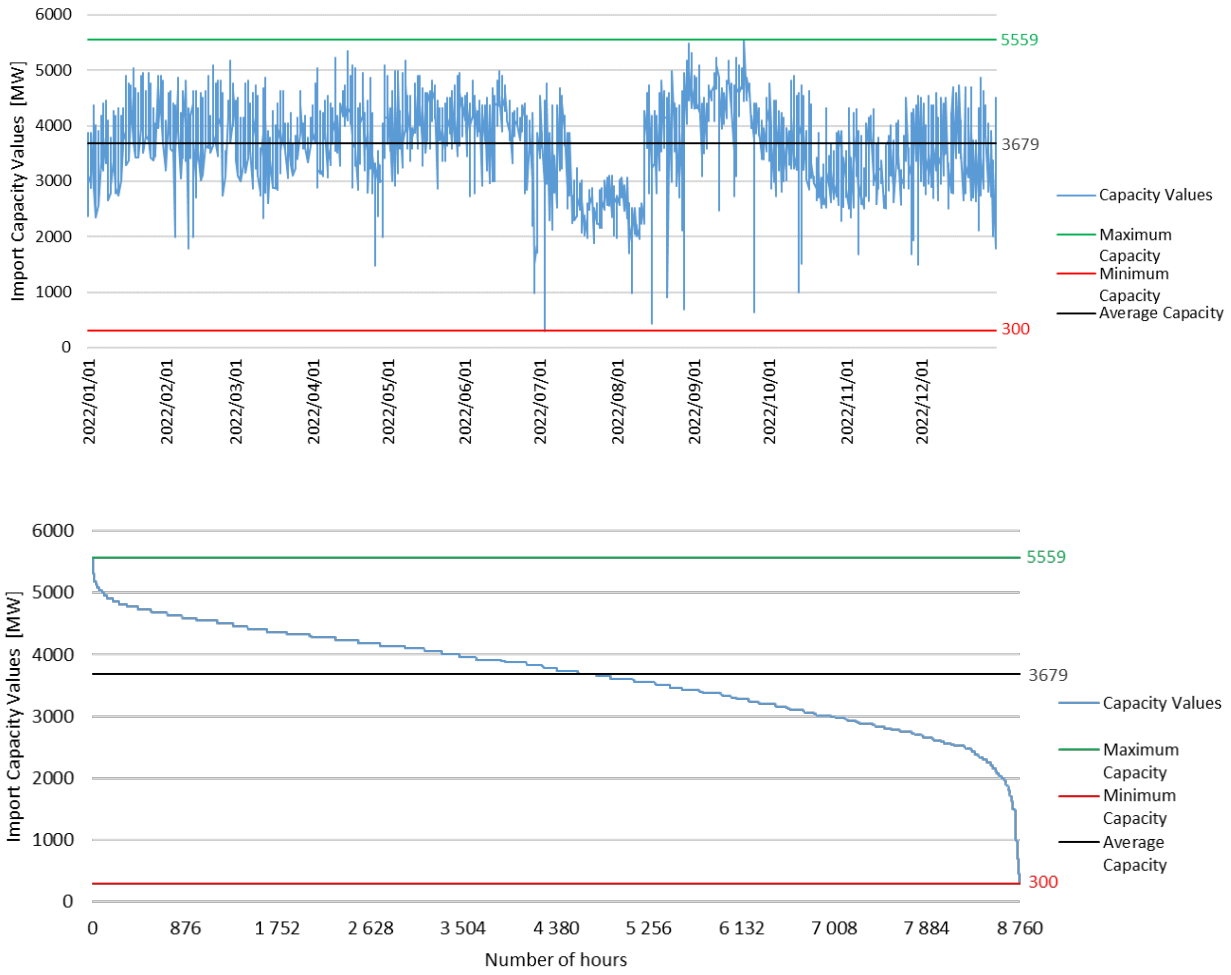


Source: REN and OMIE data

2.4 ANALYSIS OF YEAR 2022

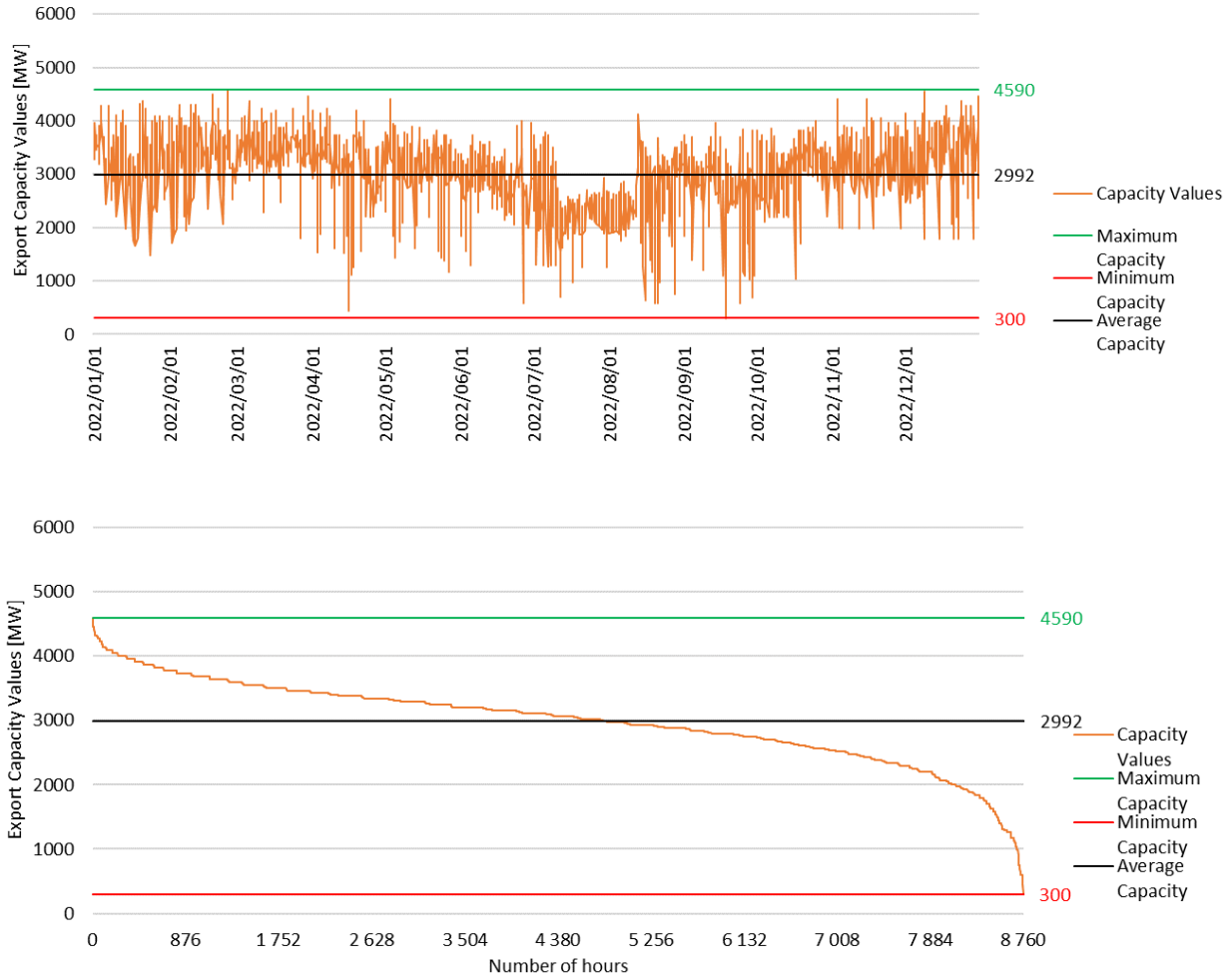
In 2022, the hourly values of the interconnection capacity available for commercial purposes were the ones shown in the following figures.

Figure 2-5 – Hourly values of interconnection capacity available for commercial purposes in 2022 – Import



Source: REN data

Figure 2-6 – Hourly values of interconnection capacity available for commercial purposes in 2021 – Export



Source: REN data

Through the analysis of these values, it is possible to verify that they are naturally concentrated around their average value, which is around 3679 MW for import and 2992 MW for export. Although there is no occurrence of null values, in some rare occasions extremely low values were recorded, values around 300 MW in both import and export directions.

2.4.1 INTERCONNECTION CAPACITY – MAXIMUM, MINIMUM AND AVERAGE VALUES

Analysing the available data[6] regarding the capacities made available to the market, in 2022, it was possible to verify that in the import direction the maximum capacity was 5559 MW, having been recorded between 8 pm and 12 am on 21 September 2022. The minimum capacity value recorded was 300 MW, having been recorded between 8 am and 12 pm on 3 July 2022.

Regarding the export direction, the maximum capacity was 4590 MW, recorded between 5 am and 6 am on 25 February 2022. The minimum capacity value was 300 MW, recorded between 5 am and 7 am on 18 September 2022.

In terms of average capacity values, they were of 3679 MW in the import direction and 2992 MW in the export direction. In relation to the previous year a decrease of the average capacity values was observed both in import (3751 MW in 2021) and export direction (3020 MW in 2021).

2.4.2 INTERCONNECTION CONGESTION ANALYSIS

One of the most relevant indicators to assess interconnection performance is the number of hours of congestion verified.

In 2022, there was interconnection congestion in 251 hours out of a total of 8760 hours, which represents only 2.9% of the total.

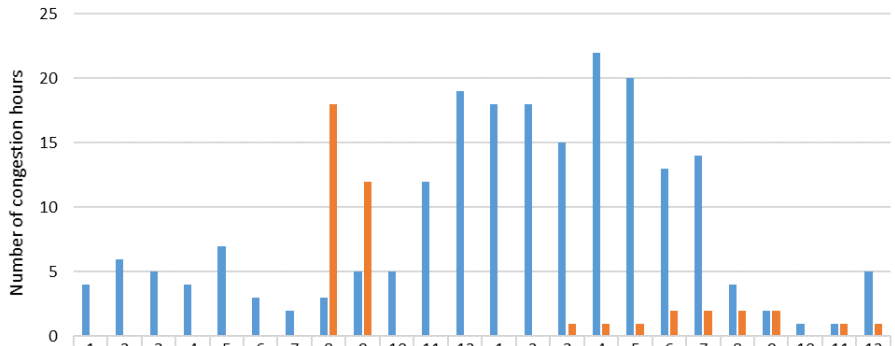
Analysing by period of the day, it was found that the highest number of interconnection congestion hours occurred between 8 am and 7 pm, with the highest incidence at 4 pm (23 hours of congestion in 2022).

Carrying out the same analysis, but disaggregating the results by import and export direction, it was found that between 1 am and 7 am, 10 am and 2 pm and at 10 pm all congestion hours were in the import direction. Between 3 pm and 8 pm and at 12 am, there was congestion mainly in the export direction. Finally, between 9 pm and 11 pm the number of hours of congestion observed throughout the year was equal both in the import and export direction. Despite the low number of interconnection congestion hours

[6] Data available in: https://mercado.ren.pt/PT/Electr/Explora%C3%A7%C3%A3odosistema/Interlig/CapProg/Paginas/Mercado.aspx

recorded in 2022, it should also be noted that of the 251 hours recorded, 208 (83%) were in the import direction.

Figure 2-7 – Number of interconnection congestion hours, in 2021

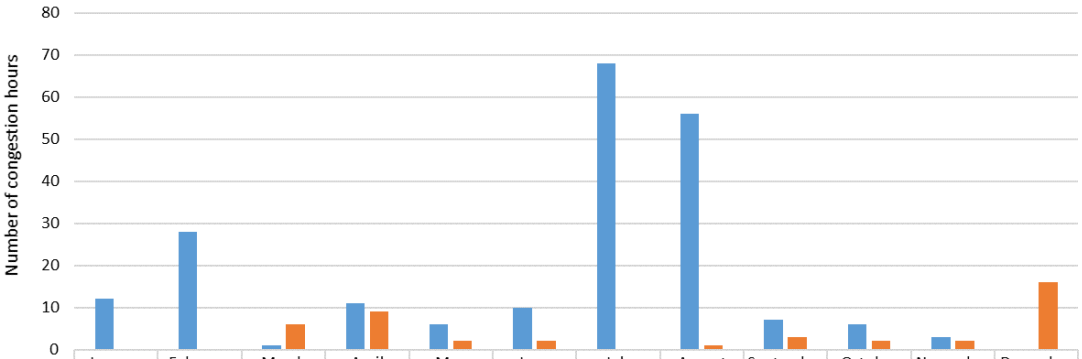


	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM
Import [h]	4	6	5	4	7	3	2	3	5	5	12	19	18	18	15	22	20	13	14	4	2	1	1	5
Export [h]	0	0	0	0	0	0	0	18	12	0	0	0	0	0	1	1	1	2	2	2	2	0	1	1
Total [h]	4	6	5	4	7	3	2	21	17	5	12	19	18	18	16	23	21	15	16	6	4	1	2	6

Doing a similar analysis by month of the year, we see that the interconnection congestion hours were concentrated mainly in summer months, with the highest number of congestion hours in July (68 hours) and the lowest number of hours of congestion in November (5 hours).

Evaluating separately import and export situations, it was found that in March and December interconnection congestion was mostly verified in the export direction, while in the remaining months it was mostly in the import direction.

Figure 2-8 – Number of interconnection congestion hours, by month, in 2021



	January	February	March	April	May	June	July	August	September	October	November	December
Import [h]	12	28	1	11	6	10	68	56	7	6	3	0
Export [h]	0	0	6	9	2	2	0	1	3	2	2	16
Total [h]	12	28	7	20	8	12	68	57	10	8	5	16

2.4.3 ANALYSIS OF PRICE DIFFERENCES IN CONGESTION SITUATION (MARKET SPLITTING)

Analysing the price differences between Portugal and Spain[7], which occurred in a situation of interconnection congestion, it can be seen that the biggest price difference in the import direction (price in Portugal higher than the price in Spain) was 122.39 €/MWh, recorded at 12 pm on 28 August 2022. On the other hand, the biggest price difference in the export direction (price in Spain higher than the price in Portugal) was 119.10 €/MWh, recorded at 9 am on 18 November 2022. These values represent an increase of the maximum price difference values, in relation to 2021, to approximately the double in the import direction (from 64.87 €/MWh to 122.39 €/MWh) and to more than the triple in the export direction (from 33.35 €/MWh to 119.10 €/MWh).

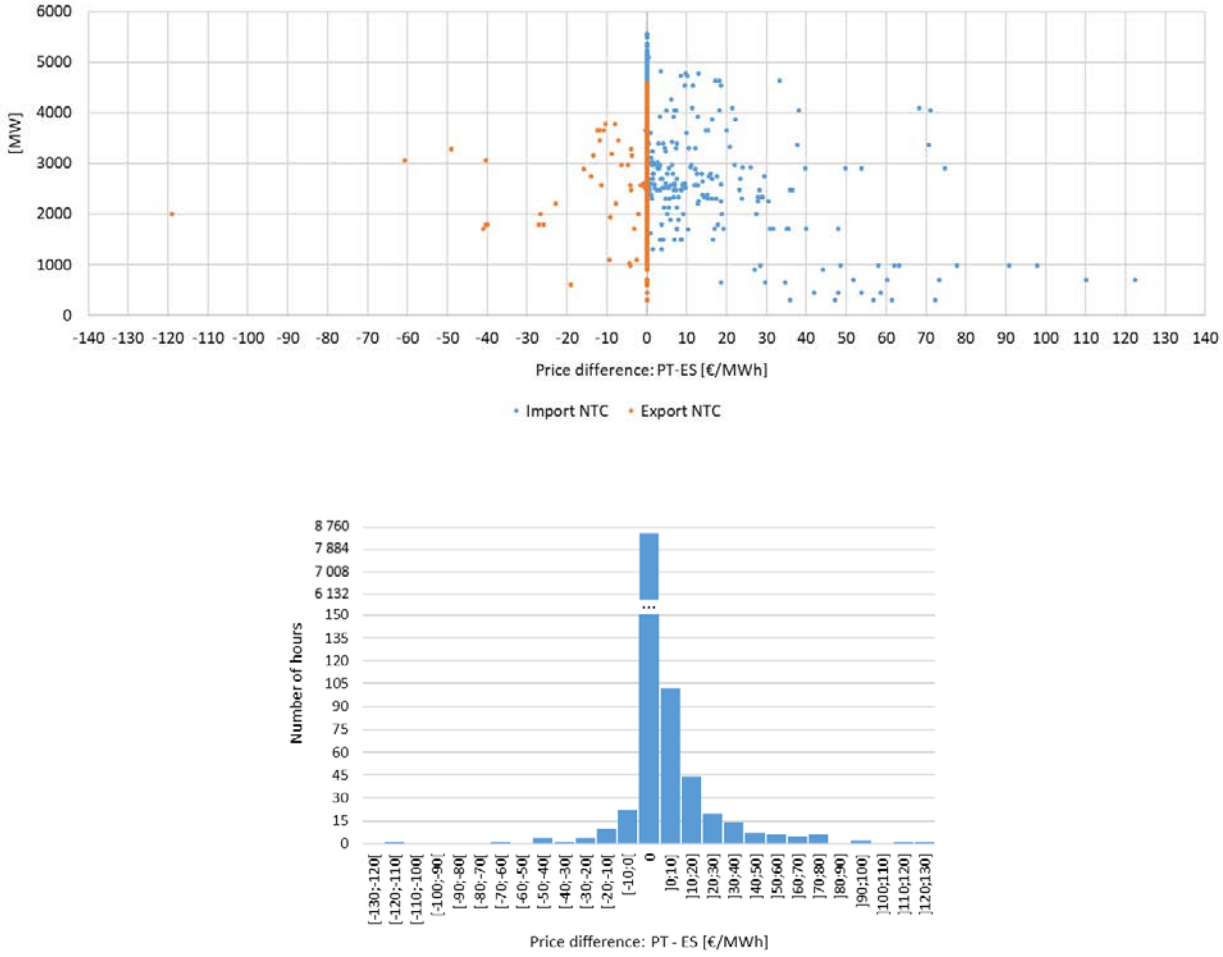
Figure 2-9 compares the price differences observed with the values of capacity made available for commercial purposes (Net Transfer Capacity - NTC), in the import and export directions.

One may observe that all interconnection congestion situations occurred for NTC values between 300 MW and 5085 MW. The highest price difference in the import direction (122.39 €/MWh) occurred for a NTC value of 700 MW. In the export direction the highest price difference (119.10 €/MWh) occurred for a NTC value of 2000 MW.

[7] https://www.mercado.ren.pt/PT/Electr/InfoMercado/InfOp/MercOmel/Paginas/Precos.aspx

Analysing the available data, it is also noticeable that there is no significant correlation between the values of capacity made available for commercial purposes and the congestion of the interconnection, seeing that the largest number of congestion situations (and even the highest price differences) did not occur for the lowest NTC values.

Figure 2-9 – Comparison between NTC and price differences in the market



Source: REN and OMIE data

Knowing that during 97.1% of the 8760 hours in 2022 there was no interconnection congestion, with the consequent zero price differential between Portugal and Spain, it is also worth highlighting that only in about 2.5% of the hours of the year the price differential was higher than 2 €/MWh.

3 MONITORING OF THE COMPLIANCE WITH THE MINIMUM LEVELS OF MARGIN AVAILABLE FOR CROSS-ZONAL TRADE (ARTICLE 16(8) OF REGULATION (EU) 2019/943)

3.1 FRAMEWORK

3.1.1 LEGAL CONTEXT

The obligation to monitor the compliance with the minimum level of available capacity for cross-zonal trade is part of the legal and regulatory context already referred to in Chapter 1.

3.1.2 DEROGATION REQUESTS

In order to facilitate a progressive compliance with the aforementioned minimum level of available capacity for cross-zonal trade by Member States, Article 16(9) of Regulation (EU) 2019/943 allows regulatory authorities to grant a derogation from the requirement set out in paragraph 8 of the same article, in relation to the minimum interconnection capacity offered, at the request of the transmission system operators:

"9. At the request of the transmission system operators in a capacity calculation region, the relevant regulatory authorities may grant a derogation from paragraph 8 on foreseeable grounds where necessary for maintaining operational security. Such derogations, which shall not relate to the curtailment of capacities already allocated pursuant to paragraph 2, shall be granted for no more than one-year at a time, or, provided that the extent of the derogation decreases significantly after the first year, up to a maximum of two years. 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."

In 9 November 2021, ERSE received from REN, in its capacity as the Portuguese TSO, a third request for a one-year derogation to comply with the minimum levels of MACZT[8].

[8] MACZT – Margin Available for Cross-Zonal Trade

This new derogation request was justified on the basis of operational security issues of the system and on the additional risks that could be introduced by the new processes and tools needed in order to provide higher interconnection capacities to the market.

According to REN, at the process level, the difficulties would mainly be related to the more frequent use of costly remedial actions, having in mind the lack of operational experience in processes with intensive use of these type of actions, which could lead to operational security risks.

Regarding the new tools to develop and use, REN, identified that on 1 January 2022, the necessary tools to evaluate if the minimum level of interconnection capacity was met, and if not, to calculate the additional capacity needed, would still not be available.

The derogation request for 2022 included the following clauses:

a) REN committed to offer in 75% of the hours of the year covered by the derogation, at least the minimum capacity needed in order to comply with the minimum levels of MACZT;

b) During the derogation period, the RCC (Regional Coordination Centre) and the SWE[9] (South-West Europe) TSOs should:

   i. Introduce the necessary developments to the regional validation tool in order to align it with the amendment of the capacity calculation methodology that was, at the time, in the process of approval;

   ii. Finalize the development and commissioning of the publication of information on the Joint Allocation Office (JAO) platform, as foreseen in the amendment of the capacity calculation methodology, as well as the implementations related to data collection foreseen in Article 82(4) of the CACM Regulation, and start the development of the long-term capacity calculation;

   iii. Initiate the migration from the current RCC capacity calculation tool to a new tool based on a different technology;

[9] SWE Region: South-West Europe Region composed by Portugal, Spain and France.

iv. Initiate the necessary developments to the intraday capacity calculation second run, as well as the long-term capacity calculation and the coordinate security analysis.

After the analysis of the derogation request described above, it was approved by ERSE on 28 December 2021.

3.1.3 MONITORING OF THE COMPLIANCE WITH THE MINIMUM LEVEL OF MACZT

For the monitoring of the compliance with the minimum levels of MACZT, the methodology used in this report was the one described in detail in ERSE's report "Analysis of Portugal-Spain interconnection capacity and monitoring of compliance with the minimum level of margin available for cross-zonal trade in 2020"[10], that was based on ACER's Recommendation 01/2019[11].

In this report ERSE also follows, to the extent applicable, the provisions of ACER's Practical Note on monitoring the margin of capacity available for cross-zonal trade[12].

3.1.4 ANALYSED PERIOD

The period of analysis considered in this report was the entire year of 2022.

As mentioned in point 3.1.2, ERSE accepted a request for a one-year derogation by REN to comply with the minimum MACZT levels.

In this context, it is ERSE's responsibility to follow up and monitor the evolution of the level of interconnection capacity made available for cross-zonal trade and the progress towards compliance with the established minimum levels, as well as the assessment of the compliance of the objectives of the derogation.

[10] https://www.erse.pt/media/qp3fakz1/interconnection-and-maczt-monitoring-report-2020.pdf

[11] https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf

[12] https://extranet.acer.europa.eu//Official_documents/Acts_of_the_Agency/Publication/ACER%20and%20NRAs%20practical%20note%20MACZT.pdf

3.1.5 DATA USED

In this report data from the calculations made by Coreso[13] were used. These data were made available by REN.

3.2 RESULTS

3.2.1 GLOBAL RESULTS

Figure 3-1 demonstrates the level of compliance with the minimum MACZT level ($\frac{MACZT}{Fmax}$[14] $\geq 70\%$) during 2022.

As can be seen, the minimum MACZT[15] level was complied with in 79.4% of the MTUs[16] (green area in the figure).

In 1.3% of the MTUs (white area of the figure) the identified CNEC did not belong to the Portuguese electrical system.

The minimum level was not met in 3.4% of the MTU.

For about 16% of the MTUs (grey area of the figure) it was not possible to identify the CNEC[17] which made it impossible to monitor the compliance with the MACZT minimum level.

[13] RSC - Regional Security Coordinator, responsible for the SWE interconnection capacity calculation.

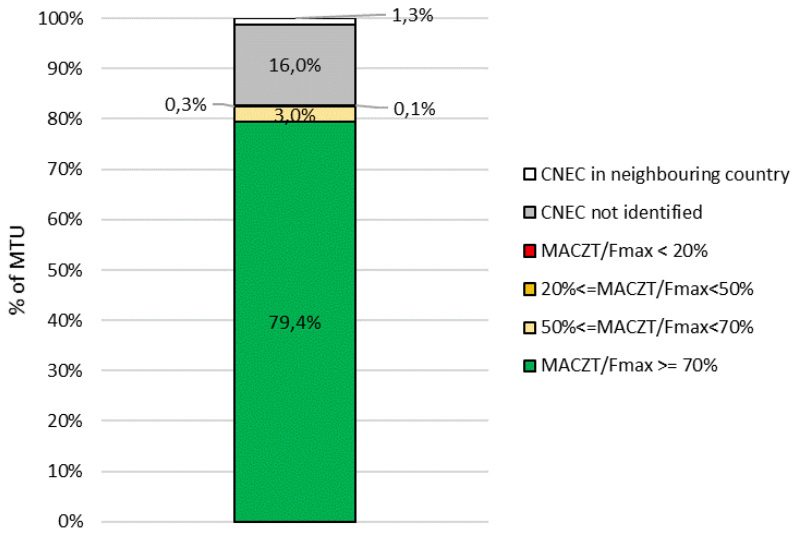
[14] Fmax – Represents the maximum flow on a critical network element, as referred to in Articles 23(3)(a) and 29(7)(a) of the CACM Regulation and applies equally to the flow-based and coordinated NTC approaches. It also means the capacity respecting operational security limits taking into account (or after deduction of) contingencies of critical network elements as referred to in Article 16(8) of Regulation (EU) 2019/943.

[15] The assessment of the compliance with the minimum MACZT level is carried out for each hour, separately in both directions of the considered border, meaning that, in reality, the number of cases expected to be evaluated is equal to 2 times the number of hours of the considered period.

[16] MTU –Market Time Unit. In this context, it also represents a specific hour and direction of the considered border.

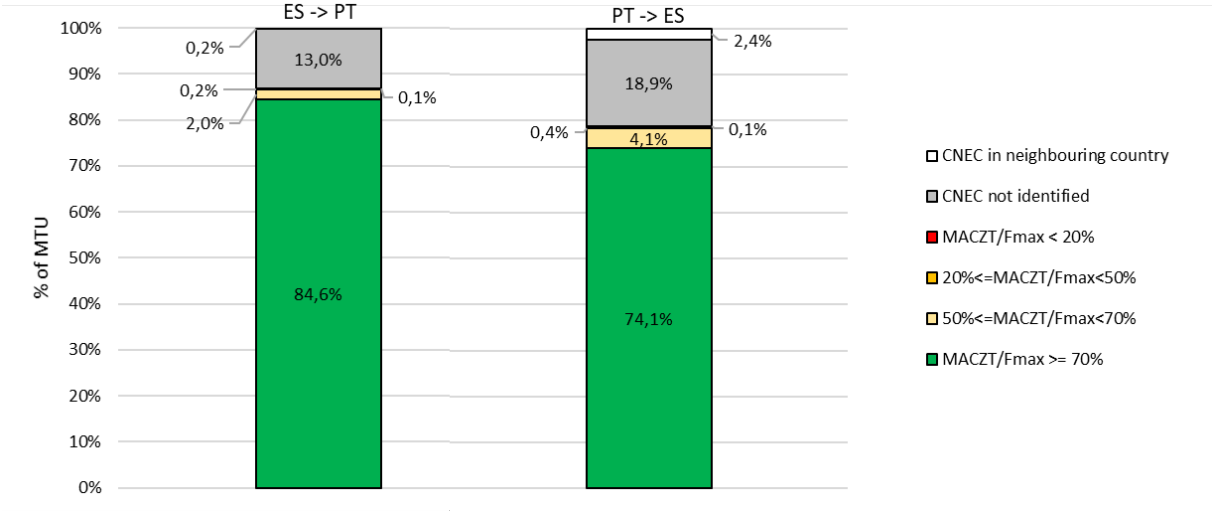
[17] CNEC –*Critical Network Element with Contingency*

Figure 3-1 – Compliance with the minimum MACZT level, in 2022, for both directions of the PT <-> ES border



Compliance with the minimum MACZT level is evaluated for each hour, in each direction of the considered border. Analysing the two directions separately (PT -> ES and ES -> PT), for the total of hours of 2022, it is possible to verify that the performance was better in the ES -> PT direction, with the minimum MACZT level being met in 84.6% of the MTUs (74.1% in the PT -> ES direction). It was also in this direction that a higher number of MTUs in which it was not possible to identify the limiting CNEC was observed, 13% (18.9% in PT -> ES direction).

Figure 3-2 - Compliance with minimum MACZT level, in 2022, in ES -> PT and PT -> ES directions



Taking into account the characteristics of the interconnections of the Portuguese electrical system with its neighbours, as well as its specific characteristics, accounting for the influence of third country flows or allocation constraints, in the calculation of these global results, was not considered applicable.

3.2.2 DETAILED ANALYSIS

The results presented above provide an overview of compliance with the minimum MACZT level, however, the available data allow a more detailed analysis of the degree of compliance of this minimum level.

Thus, starting again from the results for the total number of MTUs in 2022, it is possible to verify from Figure 3-3 that, of the 3.4% MTUs in which the minimum MACZT level was not achieved, 3% relate to cases in which MACZT values were between 50% and 70% of Fmax.

This finding suggests that, in some cases, a slight increase in the interconnection capacity made available to the market would allow compliance, in these MTUs, with the minimum MACZT level established.

Also, relating to the MTUs where the minimum MACZT level was not achieved, it is possible to verify by Figure 3-4 that the average MACZT/Fmax value was 58.9% for the total of these MTUs. Disaggregating by directions, Figure 3-5, shows that the average value was 58% in the ES -> PT direction and 59.5% in the PT -> ES direction.

On the other hand, it is also possible to verify that the number of MTUs in which it was not possible to identify the limiting CNEC (16% of the cases), as it does not allow the MACZT value to be quantified and additional NTC to be applied, if necessary, continues to contribute to non-compliance with the minimum level. As can be seen in Figure 3-3, the number of cases in which it was not possible to identify the limiting CNEC was higher than the number of cases in which the calculated MACZT was below 70% of the Fmax.

Those 16% of MTUs in which it was not possible to identify the CNEC were identified as cases of IT problems, problems with convergence of the capacity calculation tool or as situations in which the maximum generation capacity is reached without having been found a limiting CNEC (GLSK Limitation).

Isolating the situations of GLSK Limitation, it was found that they accounted for 3.1% of the MTUs. Although the number of cases of GLSK Limitation has been decreasing, it still represents a significant constraint on the compliance with the established minimum MACZT level.

Regarding the remaining cases, it is worth noticing the non-identification of CNEC for two full days:

- July 29th – Maintenance procedure by Coreso's IT Infrastructure supplier, on the connection to its data centre, which was not coordinated with Coreso. Coreso's procedures were reverted to the back-up coordination room, however this measure only allowed to ensure partial functioning. Regarding this incident, Coreso informed that it has implemented new functionalities and operational procedures to assure the correct functioning of all its services should a similar event happen again;

- October 30th – Coreso identified lack of data to carry out the monitoring.

Figure 3-3 – MACZT tiers, in 2022, in both directions of the PT <-> ES border

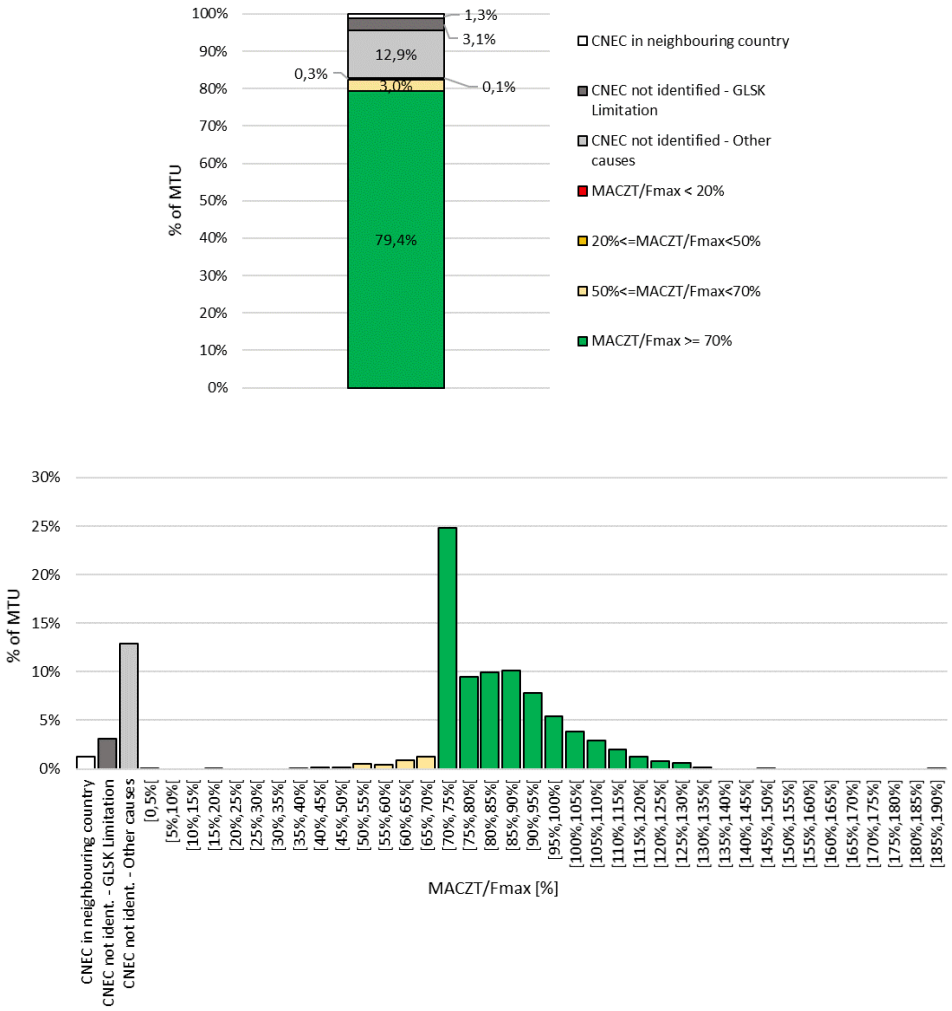


Figure 3-4 - Average MACZT/Fmax value for the total number of MTUs where the minimum MACZT level was not achieved, in 2022

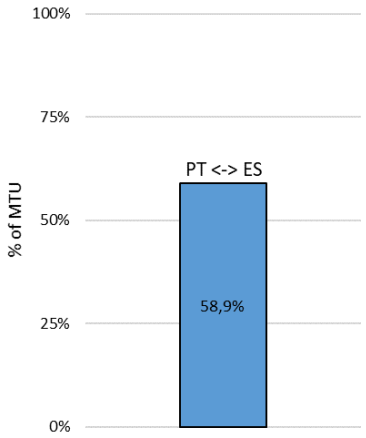
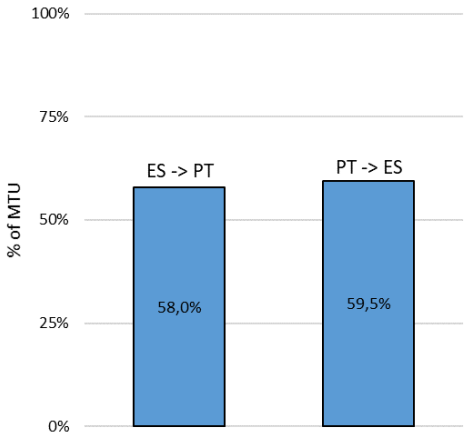


Figure 3-5 – Average MACZT/Fmax value for the total of MTUs where the minimum MACZT level was not achieved, for each direction, in 2022



Thus, it can be seen that, in order to achieve the objective of complying with the minimum MACZT level established in 100% of the MTUs, it will be necessary to progressively and significantly reduce the number of MTUs for which it is not possible to identify the limiting CNEC.

ERSE approved, on 1 February 2022, and after agreement between the SWE national regulatory authorities, the amendment of the methodology[18] for the calculation of the interconnection capacity available for commercial purposes on the daily and intraday timeframes, proposed by the SWE TSOs. In this context, the amended methodology included mechanisms and procedures that aim to reduce or eliminate situations of GLSK Limitation. Comparing the number of GLSK Limitation cases observed in 2022 and 2021, there was a reduction to about half. Nevertheless, these situations continue to make it impossible to evaluate the compliance with MACZT minimum levels in 3.1% of the cases. Thus, in order to progressively increase the level of compliance, it is of utmost importance that the number of MTUs in which this situation occurs continues to decrease.

Regarding the remaining situations in which it is not possible to identify the limiting CNEC, the amended methodology also includes fallback procedures that aim to make it possible to monitor compliance with the minimum MACZT level. These procedures comprehend two fundamental points:

i) The consideration of the NTC value calculated in a coordinated manner for the long-term timeframe (duly validated by the TSOs) when the calculation process for the daily timeframe has not been successful; and

ii) The consideration, for monitoring purposes, of the most representative CNEC from the previous quarter and average PTDFs for the same time period, in the cases where it is not possible to identify the limiting CNEC.

Article 15(2) of the methodology foresees an experimental period for the use of these procedures, and it assumes that their use will only be acceptable for a very reduced percentage of MTUs, being, thus, fundamental, that a very significant reduction of these situations is observed from the outset.

Comparing 2021 results to the ones observed in 2022, no significant evolution occurred in this matter, with these situations continuing to represent a significant number of MTUs (about 12.9%). It is considered that this percentage of cases is too high for the use of fallback procedures to be acceptable and that, as a result, it is not possible to assess the compliance with the minimum MACZT levels in these cases.

[18] https://www.erse.pt/media/a02fe4kw/swe-ccm-amendment_january2022_clean.pdf

Through the available data, it is also possible to verify which CNE[19] was identified for each MTU and thus disaggregate the results by CNE.

Table 3-1 lists the 11 CNE identified as responsibility of the Portuguese electrical system.

In fact, three of the identified CNEs, 10T-ES-PT-10004U (400 kV interconnection line Alto Lindoso – Cartelle 1), 10T-ES-PT-00008S (400 kV interconnection line Lagoaça – Aldeadávila) and 16TLAMMLGC-----S (400 kV internal line Armamar – Lagoaça), represented 87.8% of the MTUs in which it was possible to identify a CNE, being, therefore, those that contributed the most to the overall result. For these three CNE a very positive performance was verified, with a MACZT minimum level compliance of over 90% in all of them.

Considering only the data for the MTUs in the table below, it can be seen that the CNE was an internal element of the Portuguese electrical system in 18% of the MTUs, having complied with the MACZT minimum level in 98% of these situations, and that the CNE was an interconnection in 82% of these MTUs, having complied with the minimum MACZT level in 96% of these situations

Table 3-1 – Results disaggregated by CNE identified as responsibility of the Portuguese electrical system

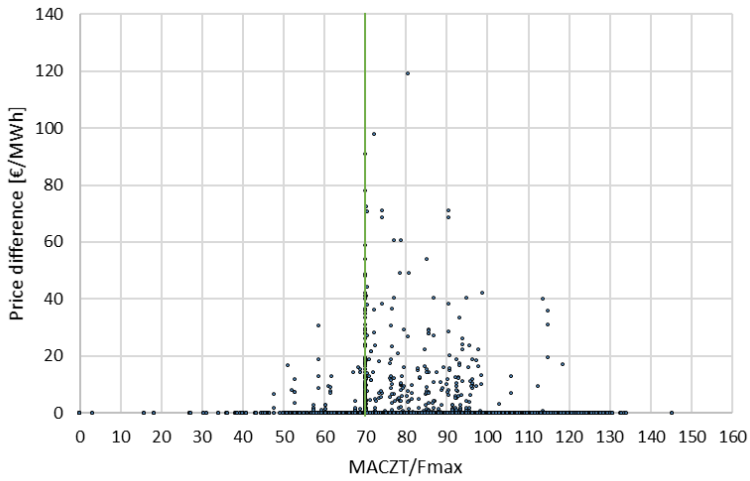
CNE		No. CC MTU	% of total CC MTU	MACZT ≥ 70% Fmax	MACZT < 70% Fmax
10T-ES-PT-000023	Pocinho - Aldeadávila 1 220 kV	86	0,58%	97%	3%
10T-ES-PT-000031	Alqueva - Brovales 380 kV	138	0,94%	100%	0%
10T-ES-PT-00005Y	Alto Lindoso - Cartelle 2 380 kV	274	1,86%	99%	1%
10T-ES-PT-00006W	Falagueira - Cedillo 400 kV	108	0,73%	100%	0%
10T-ES-PT-00007U	Pocinho - Saucelle 220 kv	14	0,10%	100%	0%
10T-ES-PT-00008S	Lagoaça - Aldeadávila 400kV	5935	40,31%	97%	3%
10T-ES-PT-10004U	Alto Lindoso - Cartelle 1 380 kV	5283	35,88%	93%	7%
16TLAMMLGC-----S	Armamar - Lagoaça 400 kV	1711	11,62%	97%	3%
16TLPGFR-------9	Pego - Falagueira 400 kV	3	0,02%	0%	100%
16TLPNAMM1-----E	Pocinho - Armamar 1 220 kV	946	6,42%	100%	0%
16TLALPDV------F	Alto Lindoso - Pedralva 400 kV	2	0,01%	100%	0%

[19] CNE – Critical Network Element

Finally, the figure below compares the hours when interconnection congestion occurred (price difference value, between Portugal and Spain, different from zero) with the MACZT values calculated for those hours (in each direction when possible).

Analysing the available data, it is possible to verify that in 89.9% of the MTUs where there was interconnection congestion, the MACZT values were higher than the defined minimum level. Thus, regarding the values of the price difference between Portugal and Spain, it is not possible to find a relevant correlation between them and the MACZT values calculated for each MTU.

Figure 3-6 – Comparison between MACZT/Fmax values and interconnection congestion situations



3.3 COMPLIANCE WITH THE DEROGATION FOR 2022

As explained in point 3.1.2, upon approval of the derogation request, made by REN, for the compliance with the MACZT minimum level in 2022, a set of commitments to be fulfilled by REN was established.

Analysing the compliance with the commitments established in the approved derogation request, REN, together with Coreso and the remaining SWE TSOs:

1. Implemented the necessary developments to the regional validation tool in order to adapt it to the amendments in the capacity calculation methodology;

2. Finalised the developments and started the publication of information in the JAO platform, as foreseen in the amendment of the capacity calculation methodology, as well as the implementations related to the data collection foreseen in Article 82(4) of the CACM Regulation;

3. Started the necessary developments to implement the migration from the current RCC capacity calculation tool to a new one based on different technology;

4. Finalised the implementation of the intraday capacity calculation first run;

5. Started the developments of the intraday capacity calculation second run, as well as the long-term capacity calculation and the coordinated security analyses.

Regarding the fulfilment of the derogation objective related to the degree of compliance with the minimum MACZT levels, and according to the results shown in the previous points, it is possible to conclude that it was above the established (compliance with the minimum MACZT level in 75% of MTUs), with the following distribution for all MTUs:

- Compliance with the minimum MACZT levels in 79.4% of the MTUs;
- Non-compliance with the minimum MACZT level in 3.4% of the MTUs;
- In 1.3% of the MTUs the identified CNEC did not belong to the Portuguese electrical system;
- In 16% of the MTUs it was not possible to identify the limiting CNEC.

4 REN'S PRIOR HEARING

Pursuant to Articles 121 and 122 of the Administrative Procedure Code, ERSE notified REN, in its capacity as the Portuguese TSO, so that, if willing, REN would comment on the draft report on the "Analysis of Portugal-Spain interconnection capacity and monitoring of compliance with the minimum levels of margin available for cross-zonal trade in 2022".

REN sent its comments to the draft report on 11 July 2023, in particular on the consideration, in this report, of the cases where fallback procedures were used for the purpose of monitoring the compliance with MACZT minimum levels.

As stated before, the number of cases where the methodology fails to identify the limiting CNEC has always been considered excessive, and, therefore, subject to measures to mitigate it, as was the case of the amendments approved on 1 February 2022, that included the fallback procedures foreseen in Article 15, admitting that their use would only be acceptable for a very reduced percentage of cases.

Article 15(2) of the methodology foresaw an experimental period for the use of these procedures, stating that "These measures are transitory, being its results subject to assessment after 6 months. If necessary, the measures shall be reviewed until the end of 2022.", which did not happen.

Comparing 2021 results to the ones from 2022, it was concluded that there was no significant evolution in this matter,

Comparing 2021 results to the ones observed in 2022, no significant evolution occurred in this matter, with these situations continuing to represent a significant number of cases (16%), therefore, It is considered that this percentage is too high for the use of fallback procedures to be acceptable and that, as a result, it is not possible to assess the compliance with the minimum MACZT levels in these cases, seeing that the assumptions and conditions that led to the approval of the fallback procedures foreseen in Article 15 were not verified.

Thus, for the purposes of the conclusions of this report, REN's arguments related to the assessment of the cases where CNECs were obtained through fallback procedures are not in question, but rather the consideration of these cases in the monitoring process, seeing that the assumptions that led to the approval of the fallback procedures were not verified nor the methodology reviewed.

In this regard, ERSE will notify REN on the need for TSOs to review the current methodology, as foreseen at the time of its approval.

Other than the cases related to the use of fallback procedures, REN also sent comments of distinct nature, which have been accepted and the report amended accordingly.

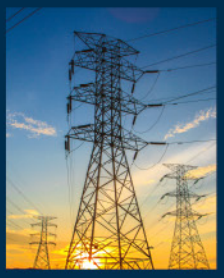
5 CONCLUSIONS

According to European Regulation, the assessment of the compliance with the minimum MACZT level is the responsibility of the regulatory authority of each Member State.

After two monitoring exercises (2020 and 2021), and taking into account the commitments assumed by REN in the derogation request for 2022, approved by ERSE, this report aims to assess the level of compliance with these commitments.

In this regard, the main conclusions of this report are:

- In 2022, the minimum MACZT level was observed in 79.4% of the MTUs in the Portugal-Spain border;
- In the export direction (PT->ES) the minimum MACZT level was observed in 74.1% of the MTUs;
- In the import direction (ES->PT) the minimum MACZT level was observed in 84.6% of the MTUs;
- In general, the objectives of the derogation related to the development of tools and methodologies for calculating and monitoring the available capacity for cross-zonal trade were fulfilled;
- The degree of compliance with the minimum MACZT level was above the commitment assumed by REN in the 2022 derogation request (compliance with the minimum MACZT level in 75% of the MTUs);
- Taking into account the persistency of a high number of cases in which it is not possible to identify the limiting CNEC, it is necessary that TSOs review the current methodology, as foreseen at the time of its approval.



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