ERSE
ENTIDADE REGULADORA
DOS SERVIÇOS ENERGÉTICOS

REPORT

ANALYSIS OF PORTUGAL-SPAIN INTERCONNECTION CAPACITY AND MONITORING COMPLIANCE WITH THE MINIMUM LEVELS OF CAPACITY AVAILABLE FOR INTERZONAL TRADE

2023

September 2024

TABLE OF CONTENTS

1 INTRODUCTION

The current context of energy transition and the deepening of the European internal electricity market make interconnection capacity a key element in the evolution and integration of energy systems.

The European Council of 23 and 24 October 2014 considered in its conclusions that the Commission, supported by the member states, should take measures to ensure that a minimum target of 10% of existing electricity interconnections is met by 2020, at least for those member states that have not yet reached a minimum level of integration into the internal energy market. The European Council also stated that the Commission should also periodically submit a report to the European Council with the aim of achieving a 15 per cent target by 2030.

In addition, Article 16(8) of Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal electricity market establishes the minimum interconnection capacity values 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;
>
> b) […]
>
> 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 of the European Parliament and of the Council of 5 June 2019 concerning common rules for the internal market in electricity, as amended, states that the regulatory

authority of each member state is responsible for "ensuring that transmission system operators make available interconnection capacities to the utmost extent pursuant to Article 16 of Regulation (EU) 2019/943;".

With this in mind, the aim of this report is, on the one hand, to assess the evolution and current state of interconnection capacity between Portugal and Spain and, on the other hand, to gauge the degree to which the national transmission system operator is complying with the minimum levels of capacity available for interzonal trade set out in Article 16(8) of Regulation (EU) 2019/943. It should be noted that the analysis of regulatory compliance may differ between the two countries, since the responsibilities of each network in limiting the amount of interconnection capacity offered to the market are determined.

2 ANALYSIS OF THE PORTUGAL - SPAIN INTERCONNECTION

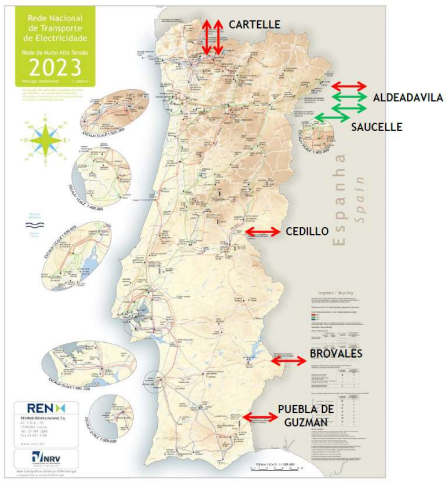
2.1 FRAMEWORK

The management of the interconnections between Portugal and Spain is based on a model of implicit allocation of the capacity available for commercial purposes, exclusively through the daily and intraday markets, plus the possibility of explicit use through financial mechanisms to cover the risk of price decoupling. Congestion resolution makes use of the market splitting mechanism[1]).

2.2 EVOLUTION OF INTERCONNECTION CAPACITY

The current interconnection between Portugal and Spain consists of 6 lines at 400 kV and 3 lines at 220 kV, totalling 9 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

[1] An auction mechanism for interconnection capacity between two systems (known as bidding zones), implicit in the bids that agents make on the day-ahead market, which assumes the existence of a single market managed by a single market operator. When the interconnection capacity between the two systems is greater than the energy traffic resulting from the market closure, the interconnection is not congested and there is a single market price, equal for both systems. Otherwise, when the interconnection capacity is less than the energy traffic 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 importing market and lower in the exporting market.

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

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

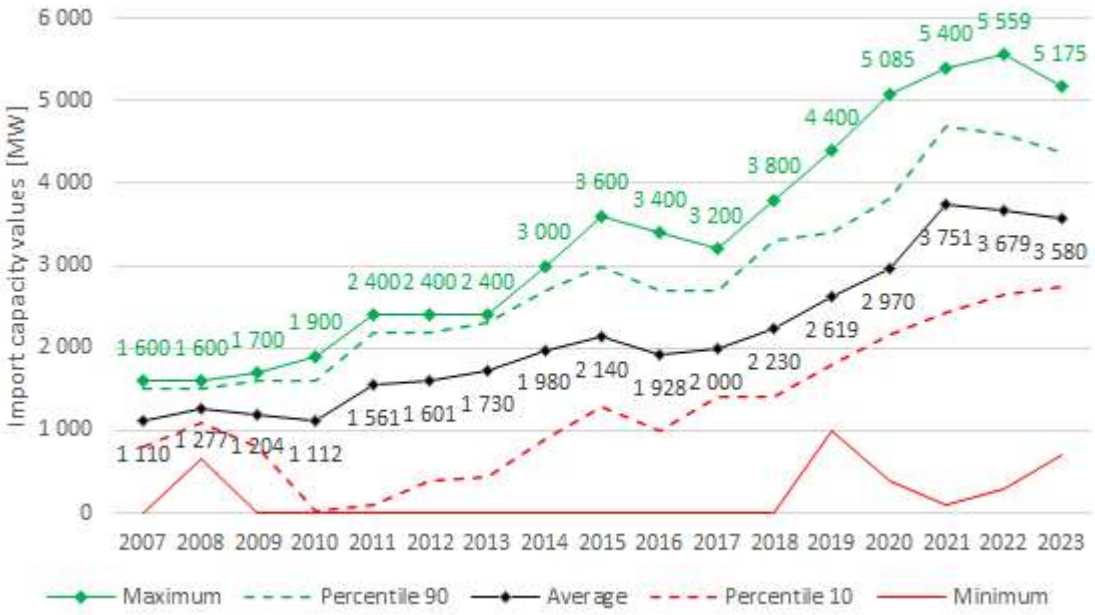
Line	Minimum thermal capacity [MVA]
400 kV lines:	
Alto Lindoso – Cartelle 1	1499
Alto Lindoso – Cartelle 2	1499
Lagoaça – Aldeadávila	1469
Falagueira – Cedillo	1386
Alqueva – Brovales	1280
Tavira – Puebla de Guzman	1386
220 kV lines:	
Pocinho – Aldeadávila 1	374
Pocinho – Aldeadávila 2	374
Pocinho –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

Source: REN - Characterisation of Interconnections on 31 December 2023

Thus, for the purposes of characterising the value of the interconnection's capacity, the sum of the minimum values of the thermal capacities of the lines that make up the interconnection is 9627 MVA.

The following figures illustrate the evolution of the interconnection capacity available for commercial purposes, in the importing and exporting directions, between 2007, when the Iberian Electricity Market (MIBEL) came into operation, and 2023.

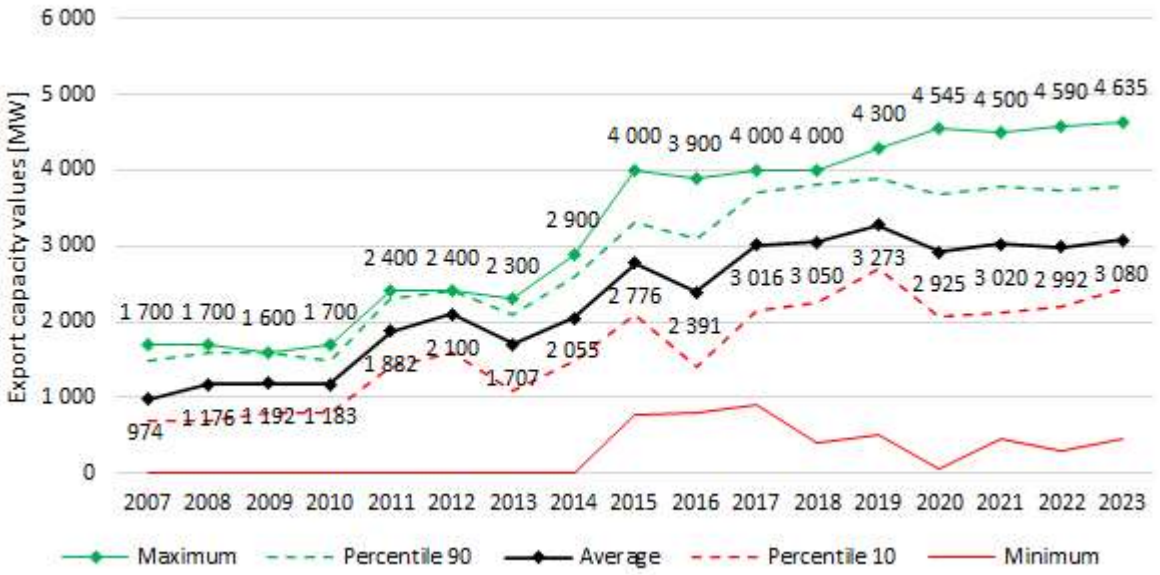
Figure 2 2 - Evolution of interconnection capacity available for commercial purposes - Imports



Source: REN data

During the period in question, as far as maximum values are concerned, the upward trend seen between 2017 and 2022 was reversed, and in 2023 there was a decrease in the maximum value to 5,175 MW. In terms of average values, the value recorded fell again compared to the previous year to 3580 MW, but remained close to the highest historical average value recorded in 2021 of 3751 MW. On the other hand, there was an increase in the minimum value recorded. It should also be noted that practically every year there are zero or almost zero values, although the 1st decile is close to the average value.

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



Source: REN data

In terms of export capacity for commercial purposes, the characteristic values observed in 2022 were maintained, with the maximum and average values in the same order of magnitude, at 4635 MW and 3080 MW respectively. In terms of the occurrence of zero values, it is less frequent than for imports, with the 1st decile remaining in the neighbourhood of the average value.

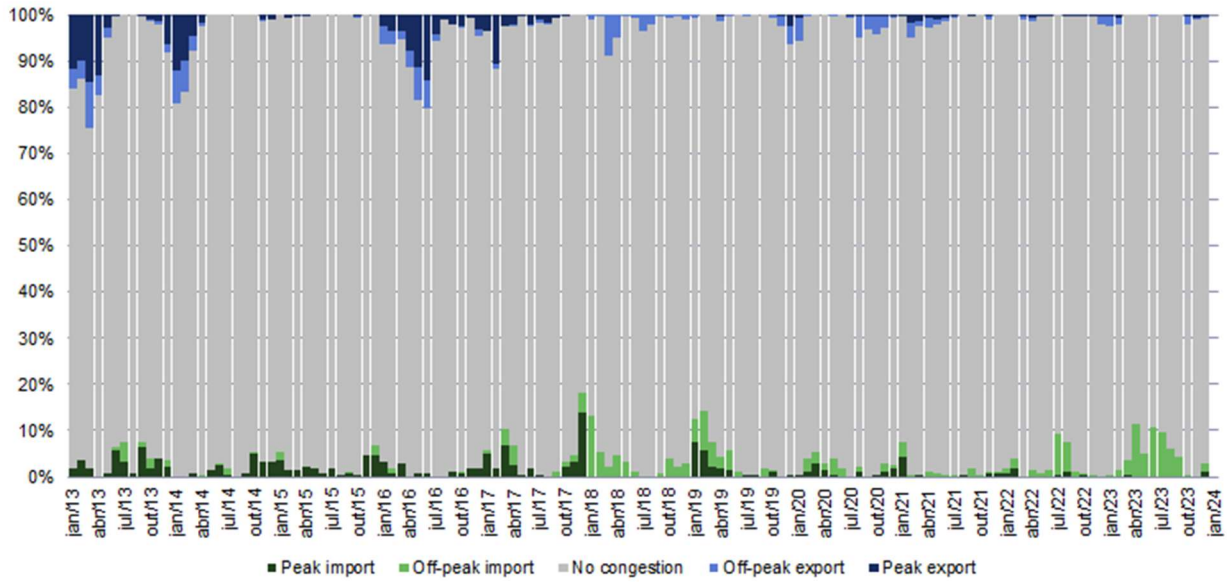
2.3 EVOLUTION OF CONGESTION AND CONGESTION RENTS

In 2023, the congestion rents for the interconnection between Portugal and Spain, resulting from the difference in zonal prices after the application of market separation, totalled 29.56 million euros, much more than in 2022 (9.63 million euros). This increase is explained not only by the slight increase in the number of hours of congestion, but essentially by the simultaneous occurrence of higher hourly price differences than in recent years and high values of interconnection capacity in those hours.

Translated into the total number of hours of congestion, the change from 251 hours in 2022 to 464 hours in 2023 (in both directions of the interconnection) continues to reflect the strong integration of the Iberian markets.

The following figure illustrates the utilisation of available commercial capacity in both directions on the Portugal-Spain interconnection over the last 10 years, and it is possible to identify the hours of congestion in both directions.

Figure 2 4 - Monthly percentage of congested hours on the Portugal-Spain interconnection, 2013 to 2023

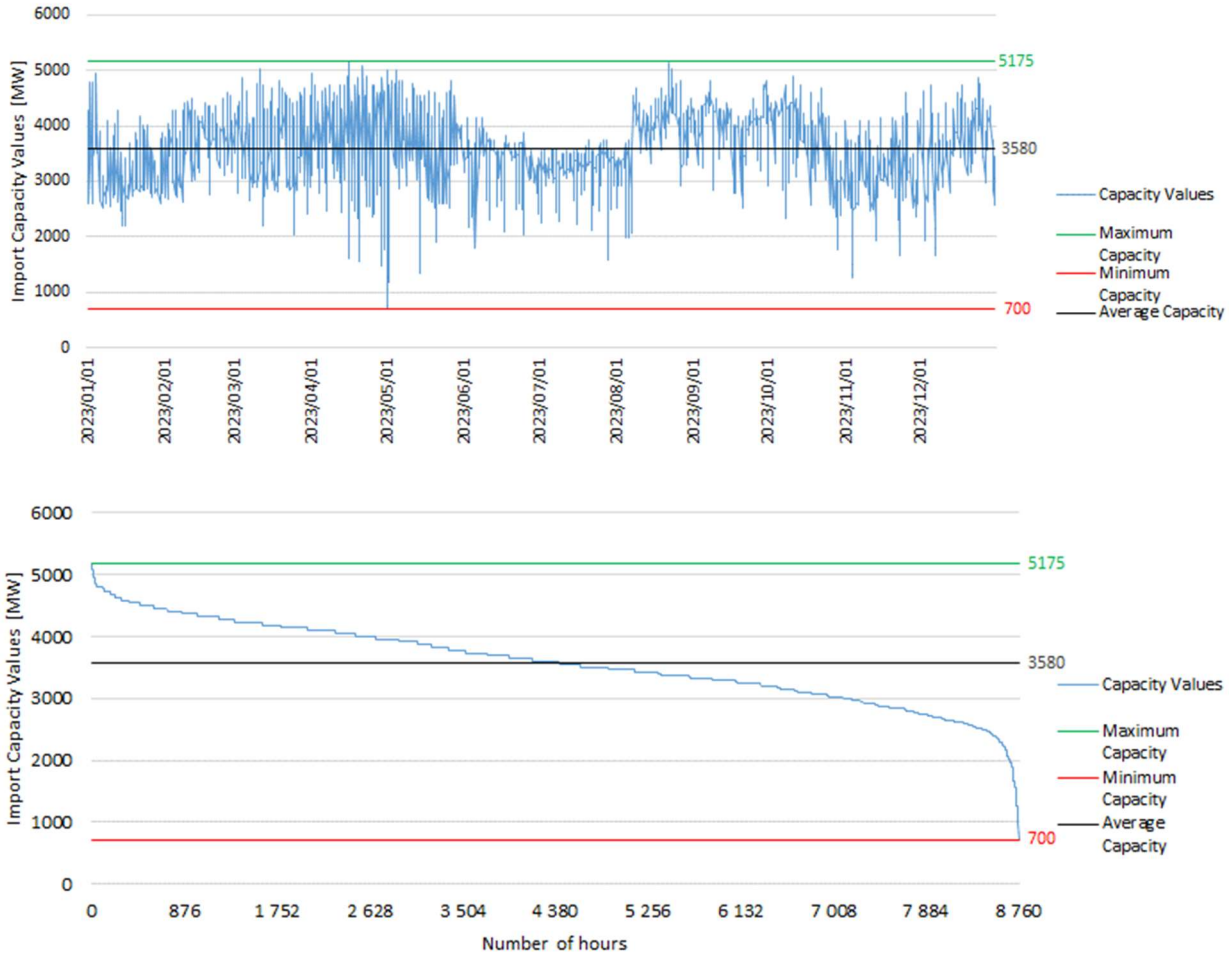


Source: REN and OMIE data

2.4 ANALYSIS OF THE YEAR 2023

In 2023, the hourly values of interconnection capacity made available to the dialling operator for commercial purposes were as shown in the following figures.

Figure 2 5 - Hourly values of interconnection capacity available for commercial purposes in 2023 - Imports



Source: REN data

Figure 2 6 - Hourly values of interconnection capacity available for commercial purposes in 2023 - Exports

Source: REN data

Analysing these figures, you can see that the values are naturally concentrated around their average value, which is around 3580 MW for imports and 3080 MW for exports. Although there are no zero values, there are some extremely low values, such as 700 MW in the import direction and 450 MW in the export direction.

2.4.1 NTERCONNECTION CAPACITY - MAXIMUM, MINIMUM AND AVERAGE VALUES

Analysing the available data[2] With regard to the capacities made available to the market in 2023, it was possible to see that, in terms of imports, the maximum capacity was 5,175 MW, recorded between 10am and 11am on 16 April 2023. The minimum capacity recorded was 700 MW, recorded between 4pm and 7pm on 1 May 2023.

With regard to exports, the maximum capacity was 4635 MW, recorded between 5am and 6am on 13 February 2023. The lowest recorded capacity was 450 MW, recorded between 12 noon and 3pm on 2 April 2023.

In terms of average capacity values, there was a value of 3580 MW in the importing direction and a value of 3080 MW in the exporting direction. Compared to the previous year, there was a decrease in the average capacity value in the importing direction (3679 MW in 2022) and an increase in the exporting direction (2992 MW in 2022).

2.4.2 ANALYSIS OF THE INTERCONNECTION CONGESTION

One of the most important indicators for assessing the performance of the interconnection is the number of hours of congestion.

In 2023 there were 464 hours of congestion out of a total of 8760 hours, which represents just 5.3 per cent of the total.

Analysing by time of day, there was a greater number of hours of congestion between H8[3] and H19, with the highest incidence in H14 (53 hours of congestion in 2023).

The same analysis, but broken down by import and export direction, showed that between H2 and H6, on H16 and H24 all the hours of congestion were in the import direction. On the other hand, at H7, H8 and H22, there was congestion only in the exporting direction. In the period between H10 and H19, the number of hours of congestion in the importing direction was clearly higher at H1 and H23. At H9 and H21, the

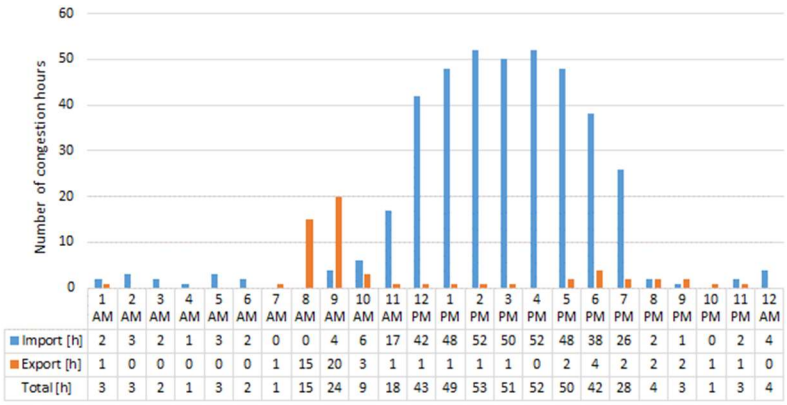
[2]Data available: https://mercado.ren.pt/PT/Electr/Explora%C3%A7%C3%A3odosistema/Interlig/CapProg/Paginas/Mercado.aspx .

[3] H#: Notation used to designate the '#' hour of the daily market.

opposite was true, with more congestion in the exporting direction. Finally, the number of hours of congestion recorded on H20 throughout the year was the same in both the importing and exporting directions. Despite the low number of hours of congestion recorded in 2023, it should also be emphasised that of the 464 hours recorded, 405 (87%) were in the importing direction.

The high levels of solar production in Spain lead to low market prices in the Spanish zone of MIBEL, which justifies the number and profile of hours of congestion between H11 and H19 coinciding with the solar production profile.

Figure 2 7 - Number of congested hours, by time of day, in 2023

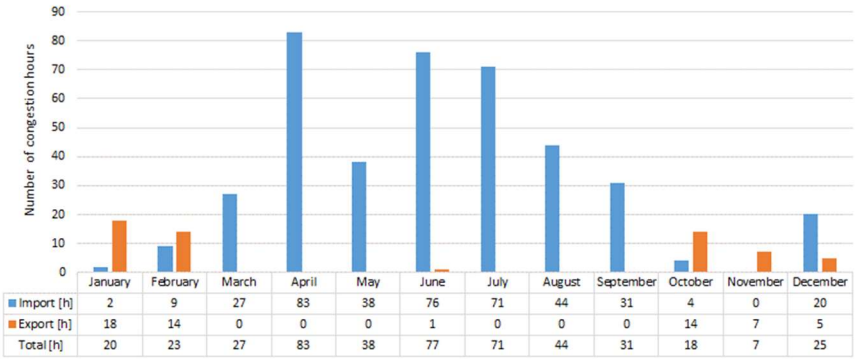


	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM
Import [h]	2	3	2	1	3	2	0	0	4	6	17	42	48	52	50	52	48	38	26	2	1	0	2	4
Export [h]	1	0	0	0	0	0	1	15	20	3	1	1	1	1	1	0	2	4	2	2	2	1	1	0
Total [h]	3	3	2	1	3	2	1	15	24	9	18	43	49	53	51	52	50	42	28	4	3	1	3	4

Analysing the situation by month of the year, it can be seen that the hours of congestion were mainly concentrated in the spring and summer months, with the highest number of hours of congestion in April (83 hours) and the lowest number of hours of congestion in November (7 hours).

Broken down by import and export situations, it was found that in January, February, October and November congestion was mostly in the export direction, with the opposite occurring in the remaining months of the year.

Figure 2 8 - Number of congested hours per month in 2023



	January	February	March	April	May	June	July	August	September	October	November	December
Import [h]	2	9	27	83	38	76	71	44	31	4	0	20
Export [h]	18	14	0	0	0	1	0	0	0	14	7	5
Total [h]	20	23	27	83	38	77	71	44	31	18	7	25

2.4.3 ANALYSIS OF THE PRICE DIFFERENCES IN SITUATIONS OF CONGESTION (MARKET SPLITTING)

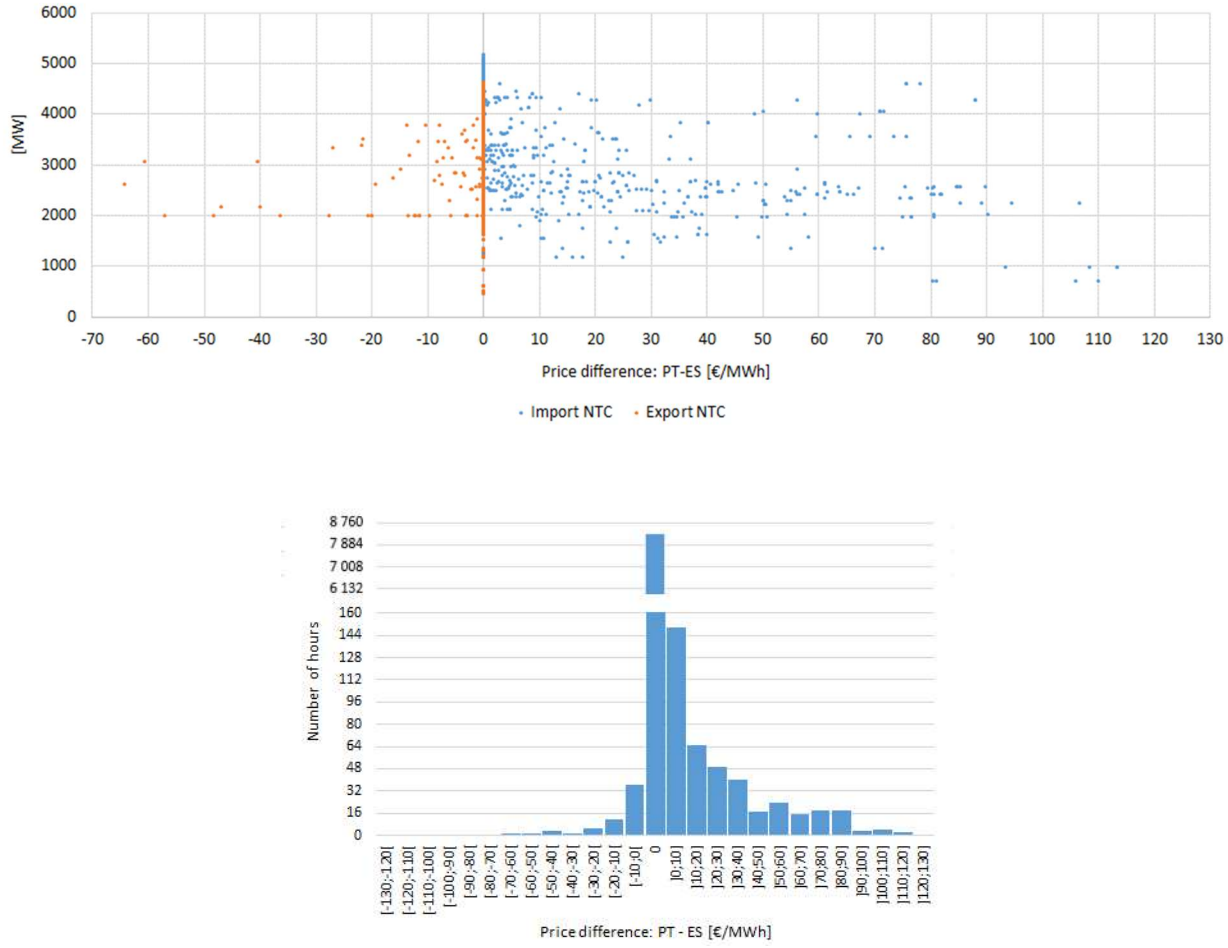
Analysing the price differences between Portugal and Spain during congestion, it can be seen that the biggest price difference in the importing direction (price in Portugal higher than the price in Spain) was 113.45 €/MWh, recorded between 1pm and 2pm on 1 May 2023. On the other hand, the biggest price difference in the exporting direction (price in Spain higher than the price in Portugal) was 64.35 €/MWh, recorded at 8pm on 16 October 2023. These figures represent a slight decrease in the maximum price difference compared to 2022 in the importing direction (from 122.39 €/MWh to 113.45 €/MWh) and around half in the exporting direction (from 119.10 €/MWh to 64.35 €/MWh).

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

It can be seen that congestion situations occurred for NTC values between 450 MW and 4799 MW. The biggest price difference in the importing direction (113.45 €/MWh) occurred with an NTC value of 900 MW. In the exporting direction, the biggest price difference (119.10 €/MWh) occurred with an NTC value of 2610 MW.

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

Figure 2 9 - Comparison between capacities made available (NTC) and price differences on the market



Source: REN and OMIE data

Knowing that during 94.7 per cent of the 8760 hours of the year 2023 there was no congestion on the interconnection, with the consequent zero price differential between Portugal and Spain, it should also be noted that only in around 4.6 per cent of the hours of the year was the price differential greater than 2 €/MWh.

3 MONITORING COMPLIANCE WITH THE MINIMUM LEVELS OF CAPACITY 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 compliance with the minimum levels of capacity available for interzonal trade is framed within the legal and regulatory context already mentioned in Chapter 1.

3.1.2 DEROGATION REQUESTS

With the aim of facilitating progressive compliance by Member States with the aforementioned levels for capacity available for cross-zonal trade, Article 16(9) of Regulation (EU) 2019/943 allows regulatory authorities to grant a derogation from the requirement set out in Article 16(8), in relation to the minimum interconnection capacity offered, at the request of transmission system operators.

On 28 November 2022, ERSE received a fourth request from REN, in its capacity as the Portuguese TSO, for a one-year derogation to comply with the minimum MACZT levels in 2023.[4].

This new request for a derogation was justified on the basis of operational security issues in the system and the additional risks that could be introduced by new processes and tools that make it possible to make higher interconnection capacities available to the market.

According to REN, in terms of processes, the difficulties were mainly related to the more frequent use of corrective actions with costs, given the lack of operational experience in processes with intensive use of this type of action, which could lead to operational security risks.

With regard to the new tools to be developed and used, REN identified that on 1 January 2023, the RCC (Regional Coordination Centre) would still be working on the process of migrating the current capacity

[4] MACZT – *Margin Available for Cross-Zonal Trade*.

calculation IT tool to a new tool based on a different technology, a migration that would be necessary to complete the tool's alignment with the SWE Region's capacity calculation methodology.[5].

The derogation request for 2023 included the following clauses:

a) REN undertook to offer at least the minimum capacity necessary to fulfil the minimum MACZT levels in 82.5% of the hours of the year covered by the derogation;

b) During the derogation period, the RCC and the TSOs of the SWE Region had to:

   i. Complete the process of migrating the current IT tool for calculating RCC capacity to a new IT tool with different technology;

   ii. Complete the implementation of the second Intraday Capacity Calculation;

   iii. Continue development of the Long-Term Capacity Calculation and Coordinated Safety Analyses.

After analysing the request for derogation described above, it was approved by ERSE on 2 January 2023.

3.1.3 METHODOLOGY FOR MONITORING COMPLIANCE WITH MINIMUM MACZT LEVELS

To monitor compliance with the minimum levels of MACZT, this report used the methodology described in detail in the ERSE report 'Analysis of Portugal-Spain interconnection capacity and monitoring of compliance with the minimum limits of available capacity for interzonal trade in 2020'[6], based on ACER Recommendation 01/2019[7].

In this report, ERSE also follows, to the extent applicable, the provisions of ACER's Practice Note on Monitoring Available Capacity for Interzonal Trade[8].

[5] South-West Europe Region: The south-western European region made up of Portugal, Spain and France.

[6] https://www.erse.pt/media/tjxbitoz/relat%C3%B3rio-interliga%C3%A7%C3%A3o-e-maczt-2020.pdf.

[7] https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf.

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

3.1.4 PERIOD ANALYSED

The period of analysis considered in this report was the whole of 2023.

As mentioned in point 3.1.2, ERSE accepted a derogation request from REN regarding compliance with the minimum MACZT levels, and the derogation period granted was one year.

In this context, ERSE is responsible for following up and monitoring the evolution of the levels of interconnection capacity made available for interzonal trade and the progress of compliance with the minimum levels established, as well as assessing compliance with the objectives of the derogation.

3.1.5 DATA USED

This report has used the data resulting from Coreso's[9] calculations, which were made available by REN..

3.2 RESULTS

Figure 3 1 illustrates the level of compliance with the minimum MACZT levels ($\frac{MACZT}{Fmax^{10}} \geq 70\%$) on 2023.

- In 83.8 per cent of the MTUs[11] the minimum MACZT levels[12] were met (green area in the figure, MACZT > 70 per cent).
- In 5.6 per cent of MTUs, the minimum levels of MACZT with limiting CNEC[13] in Portugal were not met.
- Em 2,3% das MTU o CNEC identificado não pertenceu ao sistema elétrico português (área a branco da figura).

[9] RCC - Regional Coordination Centre responsible for calculating capacity on interconnectors in the SWE region.

[10] Fmax - Represents the capacity in an CNE, taking into account security limits and considering contingencies, in accordance with Article 16(8) of Regulation (EU) 2019/943 and applies equally to the Flow-Based and Coordinated NTC approaches.

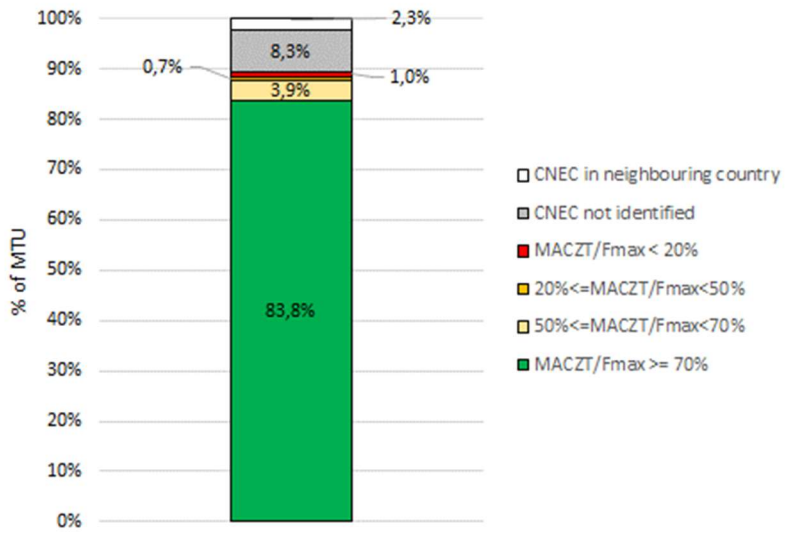
[11] MTU - Market Time Unit. In this context, it also represents a specific time and direction of the border under consideration.

[12] The assessment of compliance with minimum MACZT levels is carried out for MTU, separately in both directions of the border considered, i.e. the number of cases expected to be assessed is equal to 2 x the number of hours in the period considered.

[13] CNEC - Represents a critical network element with a contingency that is used in the capacity calculation.

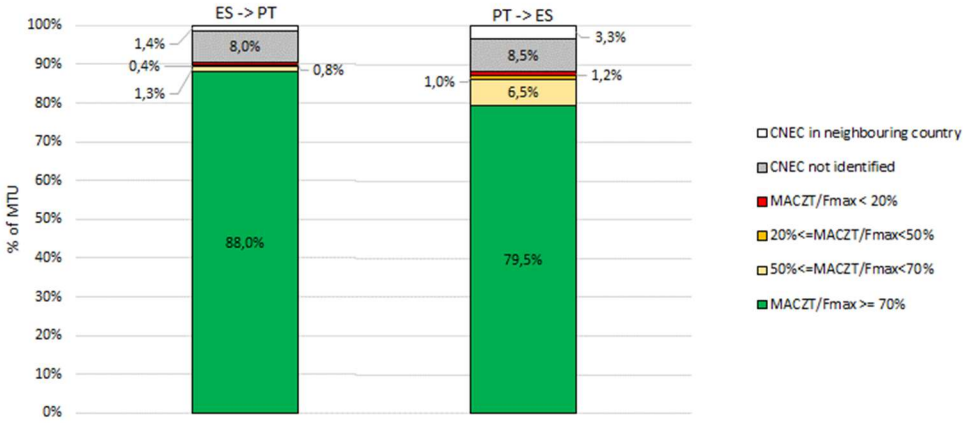
- In 8.3% of MTUs it was not possible to identify the limiting CNEC, which made it impossible to monitor compliance with the minimum MACZT levels (grey area in the figure).

Figure 3 1 - Compliance with minimum MACZT levels by the Portuguese TSO in 2023 on the PT-ES border in both directions



Compliance with the minimum MACZT levels is assessed for each MTU, in each direction of the border considered. Analysing the two directions separately (PT -> ES and ES -> PT), for all MTUs in 2023, it can be seen that performance was better in the ES -> PT direction, with the minimum MACZT levels having been met in 88.0% of MTUs (79.5% in the PT -> ES direction).

Figure 3 2 - Compliance with minimum MACZT levels in 2023 in the ES -> PT and PT -> ES directions



Taking into account the characteristics of the Portuguese electricity system's interconnections with its neighbours, as well as its specific characteristics, it is not considered applicable to calculate these general results accounting for the influence of flows from third countries or capacity allocation restrictions referred to in point 4 of ACER Recommendation 01/2019.

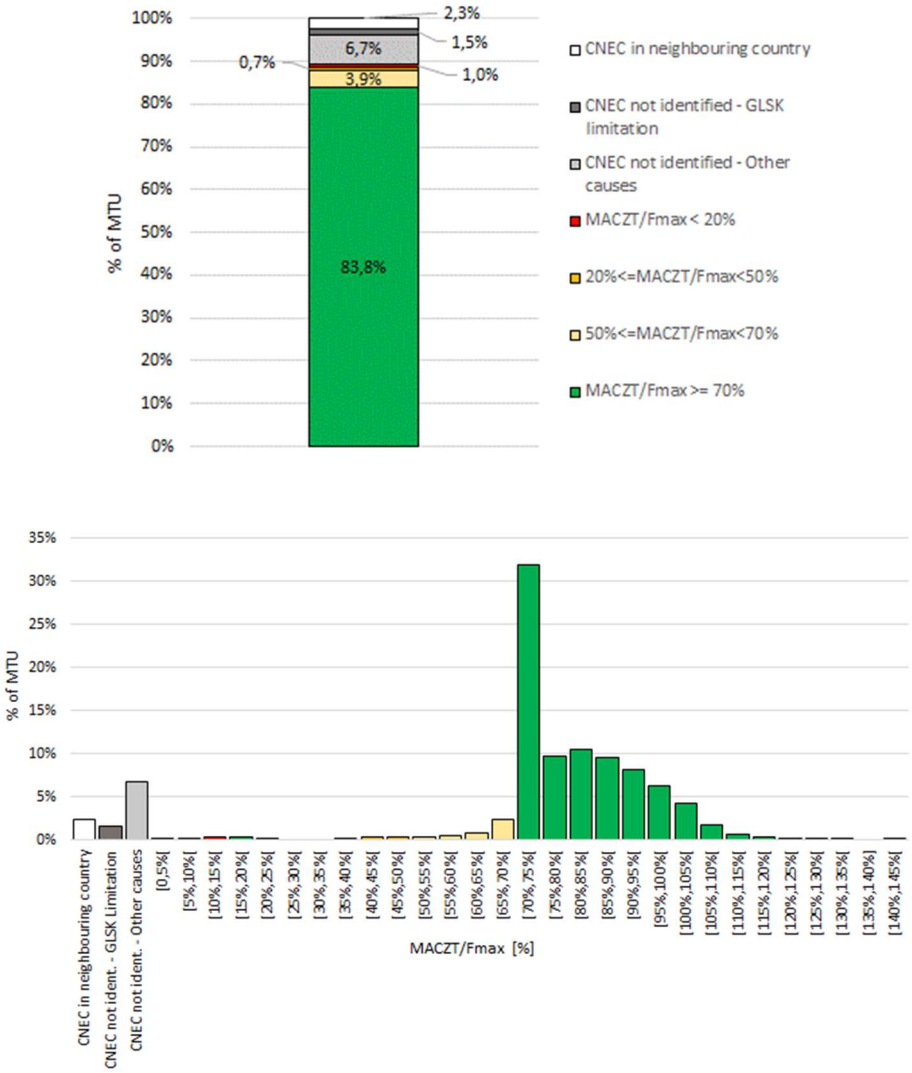
As already mentioned, there is no significant correlation between the values of capacity made available for commercial purposes and interconnection congestion, i.e. the greatest number of congestion situations (and even some of the highest price differences) did not occur for the lowest NTC values.

3.2.1 DETAIL ANALYSIS

The results presented above give an overview of compliance with the minimum MACZT levels, but the data available allows for a more detailed analysis of the degree of compliance with these levels.

So, starting again with the results for the total number of MTUs in 2023, Figure 3 3 shows that of the 5.6 per cent of MTUs in which the minimum MACZT levels were not met, 3.9 per cent relate to cases in which the MACZT values were between 50 and 70 per cent of the Fmax.

Figure 3 3 - MACZT scales, in 2023, on the PT <-> ES border in both directions



This suggests that an increase, in some cases slight, in the capacity made available to the market would allow the minimum MACZT levels to be met in these MTUs.

Still with regard to the MTUs in which the minimum MACZT levels were not met, it can be seen from Figure 3 4 that the average MACZT/Fmax value was 52.2 per cent for all MTUs. Breaking it down by direction, Figure 3 5 shows that the average value was 43.1% in the ES -> PT direction and 54.8% in the PT -> ES direction.

Figure 3 4 - Average MACZT/Fmax value for the total MTU in which the minimum MACZT levels were not met, in 2023

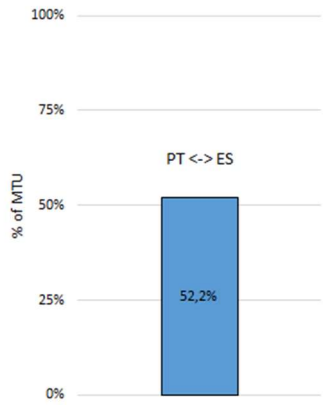
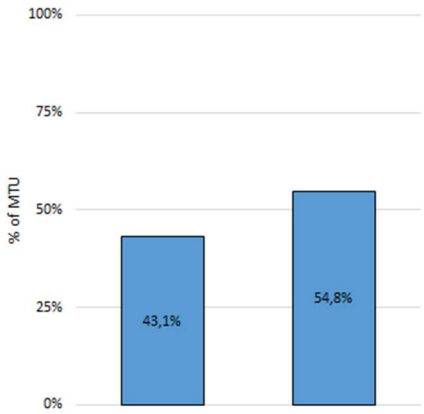


Figure 3 5 - Average MACZT/Fmax value for MTUs where MACZT levels were not met, by direction, in 2023



On the other hand, it can also be seen that the number of MTUs in which it was not possible to identify the limiting CNEC (8.3 per cent of cases), as it does not allow the MACZT value to be quantified or additional NTC to be applied if necessary, contributes to non-compliance with the minimum levels. 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 per cent of the Fmax.

These 8.3 per cent of MTU where it was not possible to identify the CNEC are identified as cases in which computer problems, convergence problems in the capacity calculation tool or situations in which maximum generation is reached without a limiting CNEC being found (GLSK Limitation) have occurred.

Isolating GLSK limitation situations, it can be seen that they accounted for 1.5% of MTU. Although the number of occurrences of this situation has been decreasing, it still represents a constraint on compliance with the minimum levels established.

With regard to the remaining cases, we would highlight, for example, the failure to identify CNECs for a full day (March 30) due to a global process failure, caused by a problem with the file submitted by the French TSO, which resulted in the impossibility of combining the network models of the three electricity systems in the SWE Region.

It can thus be seen that in order to achieve the goal of meeting the minimum levels set at 100% of MTUs, it is necessary to progressively and significantly reduce the number of MTUs for which the limiting CNEC is not identified.

Critical Network Elements

Using the data provided, it is also possible to check which CNE[14] has been identified for each MTU and thus disaggregate the results by CNE.

Table 3 1 lists the 13 CNEs identified as the responsibility of the Portuguese electricity system.

In fact, three of the CNEs identified, 10T-ES-PT-10004U (400 kV Alto Lindoso Cartelle 1 interconnection line), 10T-ES-PT-00008S (400 kV Lagoaça - Aldeadávila interconnection line) and 16TLAMMLGC-----S (400 kV Armamar - Lagoaça line), accounted for 87.8% of the MTUs in which it was possible to identify limiting CNEs, and therefore contributed the most to the overall result. These three CNEs performed very well, meeting the minimum MACZT levels in more than 90% of the MTU for all of them, i.e. the resulting interconnection capacity limitation was no less than 70% of Fmax.

[14] CNE – *Critical Network Element*)

Considering only the data for the CC MTU[15] in the table below, it can be seen that the CNE was an internal element of the Portuguese electricity system in 10% of the MTUs, having met the minimum MACZT levels in 89% of these situations, and that the CNE was an interconnection in 90% of these MTUs, having met the minimum MACZT levels in 94% of these situations.

Table 3 1 - Breakdown of results by NEC identified as the responsibility of the Portuguese electricity system

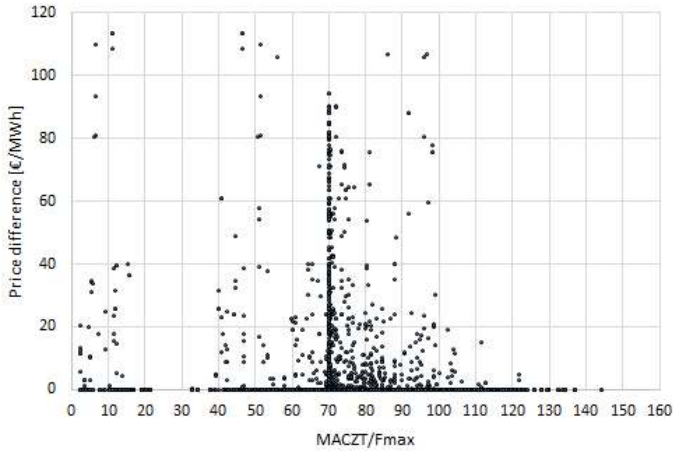
CNE		No. CC MTU	% of total CC MTU	MACZT ≥ 70% Fmax	MACZT < 70% Fmax
10T-ES-PT-000023	Pocinho - Aldeadávila 1 220 kV	2	0,01%	100%	0%
10T-ES-PT-000031	Alqueva - Brovales 380 kV	640	3,98%	97%	3%
10T-ES-PT-00005Y	Alto Lindoso - Cartelle 2 380 kV	625	3,89%	99%	1%
10T-ES-PT-00006W	Falagueira - Cedillo 400 kV	207	1,29%	62%	38%
10T-ES-PT-00007U	Pocinho - Saucelle 220 kv	17	0,11%	100%	0%
10T-ES-PT-00008S	Lagoaça - Aldeadávila 400kV	7267	45,22%	97%	3%
10T-ES-PT-10004U	Alto Lindoso - Cartelle 1 380 kV	5346	33,26%	91%	9%
16TLAMMLGC-----S	Armamar - Lagoaça 400 kV	1396	8,69%	99%	1%
16TLALPDV------F	Alto Lindoso - Pedralva 400 kV	3	0,02%	100%	0%
16TLAVFA-------T	Alqueva - Ferreira do Alentejo 400 kV	5	0,03%	100%	0%
16TLBLRJ-------0	Batalha - Ribatejo 400 kV	5	0,03%	0%	100%
16TLPMERPGS----7	Palmela - Évora 150 kV	71	0,44%	0%	100%
16TLPMPGO------1	Palmela - Pegões 400 kV	80	0,50%	0%	100%

Finally, the following figure compares the times when there was congestion (price difference value between Portugal and Spain different from zero) with the MACZT values calculated for those MTUs (in each direction when possible).

Analysing the available data, it can be seen that in 81% of the MTUs where congestion occurred and monitoring was possible, the MACZT values were higher than the minimum levels defined. Therefore, with regard to the price difference values between Portugal and Spain, it is not possible to find a relevant correlation between them and the MACZT values calculated for each MTU.

[15] CC MTU: *Capacity Calculation Market Time Unit*, which means the unit of time for calculating the capacity considered

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



3.3 ASSESSMENT OF COMPLIANCE WITH THE 2023 DEROGATION

In accordance with what was said in point 3.1.2, ERSE approved REN's request for a derogation to fulfil the minimum MACZT levels for 2023. In this request for derogation, REN made a number of commitments.

The analysis of the fulfilment of the commitments set out in the approved derogation request concluded that REN, together with Coreso and the other SWE TSOs, achieved the following results:

1. It has completed the developments and started publishing information on the JAO[16] platform, as provided for in the change to the methodology for calculating the region's capacity, as well as the implementations related to data collection provided for in Article 82(4) of the CACM Regulation[17];

2. Continued the necessary developments in order to implement the migration from the current computer tool for calculating RCC capacity to a new computer tool based on a different technology;

3. Continued development of the second intraday capacity calculation, as well as the long-term capacity calculation and coordinated safety analyses;

[16] *Joint Allocation Office*.

[17] *Capacity Allocation and Congestion Management Regulation*.

4. Started work on calculating capacity for the balancing period.

With regard to the objective of complying with the minimum levels of MACZT laid down in the derogation, and according to the results shown in the previous points, it can be concluded that it was above the established minimum (compliance with the minimum levels of MACZT in 82.5 per cent of MTUs).

4 ASSESSMENT OF COMPLIANCE WITH MINIMUM MACZT LEVELS FOR IMDT PURPOSES

4.1 FRAMEWORK

On 1 February 2022, following an agreement between all the national regulators in the South West Europe (SWE) Region, ERSE approved the amendment to the methodology[18] for calculating the interconnection capacity available for commercial purposes at the daily and intraday horizons, proposed by the TSOs in the SWE Region. In this context, the methodology now includes mechanisms and procedures aimed at reducing or eliminating GLSK limitation situations. Comparing the number of GLSK limitation situations in 2023 and 2022, there has been a reduction of around half. However, these situations still make it impossible to assess compliance with minimum MACZT levels in around 1.5 per cent of cases. Therefore, in order to progressively increase compliance with the established levels, it is essential that the number of MTUs in which this situation occurs continues to decrease.

With regard to the remaining situations in which it is not possible to identify the limiting CNEC, the methodology also includes fallback procedures that make it possible to monitor compliance with the minimum MACZT levels. These procedures include two fundamental points:

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

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

Article 15(2) of the methodology for calculating interconnection capacity provides for a trial period for the use of these procedures, assuming that their use would only be acceptable for a very small percentage of MTUs, which is why it is essential to see a fairly significant reduction in these situations from the outset.

Comparing the results for 2022 with those for 2023, it can be concluded that there has been a positive evolution in this direction, with a reduction in the number of MTUs where it was not possible to identify the limiting CNEC from 16 per cent in 2022 to 8.3 per cent in 2023.

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

Given the significant evolution seen in the number of situations in which it is not possible to identify the limiting CNEC (a reduction of 50 per cent of cases), it is considered that the conditions have been met for the results of the use of the Fallback mechanism for monitoring MACZT to be taken into account for 2023, in observation of ERSE's Memorandum[19] on the Definition of criteria for assessing compliance with the minimum levels of MACZT for the purposes of the incentive to improve the technical performance of the RNT (IMDT).

The assessment of compliance with the minimum levels of MACZT for the purposes of defining the value of the IMDT follows particular criteria, taking into account the national context in which this incentive is applied. Even so, some of the criteria adopted by ERSE are in line with the ACER criteria in its 2023 assessment and published in its Report[20] on 'Capacities for cross-zonal trade and congestion management', such as 'Limiting element in the Spanish system' and 'Recognition of fallback procedures'.

Taking into account the criteria established in the Memorandum, the following changes are noted.

Limiting element in the Spanish system - 2.3 per cent of MTU

For the purposes of IMDT, the minimum levels of MACZT are considered to be met in cases where the limiting CNEC identified is not part of the Portuguese electricity system. This criterion has already been taken into account in the analysis presented.

The 2.32 per cent in both directions (407 MTU) corresponds to 3.26 per cent in the Portugal - Spain direction (286 MTU) and 1.38 per cent in the Spain - Portugal direction (121 MTU).

Recognition of fallback procedures - 4.87% of MTUs

The significant reduction in the number of MTUs in which the limiting CNE is not identified and, therefore, fallback is used, was ERSE's condition for accepting this fallback procedure. The significant 50 per cent

[19] ERSE memorandum issued in December 2023 on the definition of criteria for assessing compliance with the minimum levels of MACZT for the purposes of the incentive to improve the technical performance of the RNT (IMDT). This Memorandum was drawn up following comments from REN on the assessment of its compliance with the minimum level of capacity available for interzonal trade (MACZT).

[20] https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER_2024_MMR_Crosszonal_electricity_trade_capacities.pdf.

reduction from 2022 to 2023 therefore justifies taking the fallback results into account in the 2023 assessment.

The use of the most representative CNEC to monitor MACZT in the 1449 MTU where it was not identified made it possible to validate 853 MTU with MACZT>70% in both directions (4.87%), corresponding to 3.95% in the Portugal - Spain direction (346 MTU) and 5.79% in the Spain - Portugal direction (507 MTU).

The following figures compare the result of applying these criteria with ACER's assessment published in its report on the MACZT in 2023.

Figure 4 1 - ACER and ERSE assessment by direction in 2023

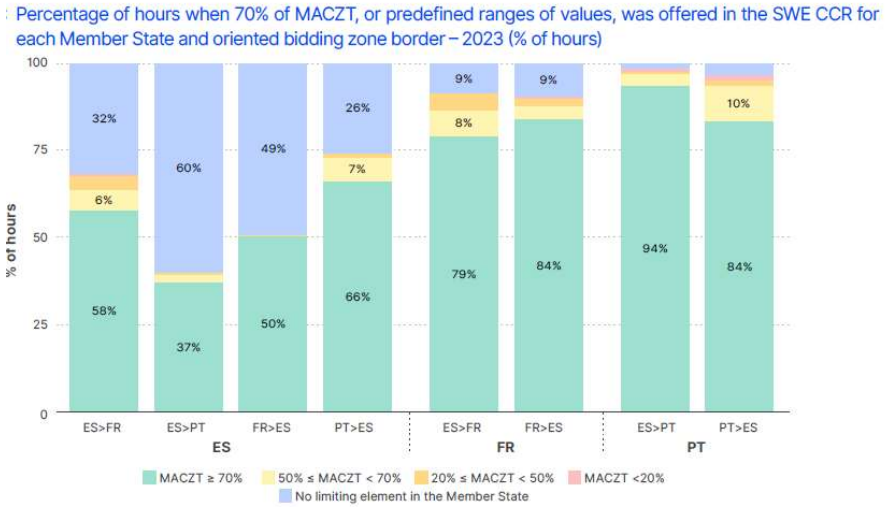
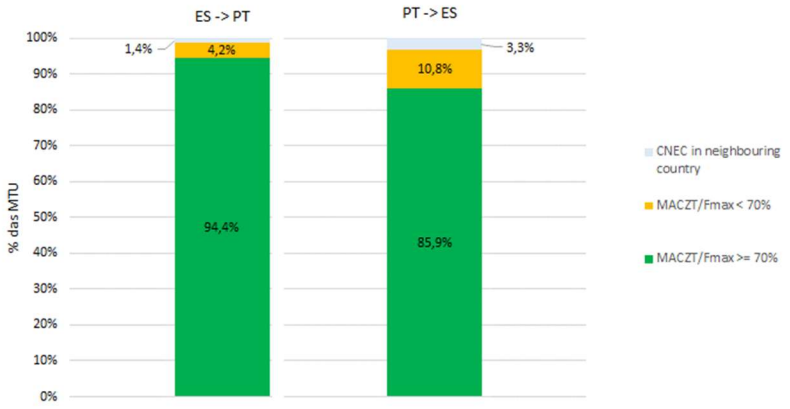


Figure 4 2 - ERSE evaluation by direction in 2023



NTC proposed by Coreso reduced by the Spanish TSO - 1.57 per cent of MTU.

REN identified the situations in which there was a reduction by the Spanish TSO, disaggregating between those in which the minimum levels of MACZT would have been met if there had been no reduction in the NTC and those in which even with the capacity calculated before the reduction the minimum levels would not have been met.

The 1.57 per cent in both directions (275 MTU) corresponds to 2.74 per cent in the Portugal - Spain direction (240 MTU) and 0.4 per cent in the Spain - Portugal direction (35 MTU).

Additional value of scarce NTC due to the technical limit of Spanish counter-trading - 1.26 per cent of MTU.

In situations where the minimum levels of MACZT have not been met due to the technical limit of Spanish Counter Trading, it is considered that, for the purposes of IMDT, the criteria of MACZT ≥ 70% have been met, and REN has identified these situations.

However, when non-compliance occurs due to a limitation imposed by both the Portuguese and Spanish TSOs, the non-compliance also occurs due to a fact attributable to the Portuguese TSO, so it will continue to be attributed to both systems.

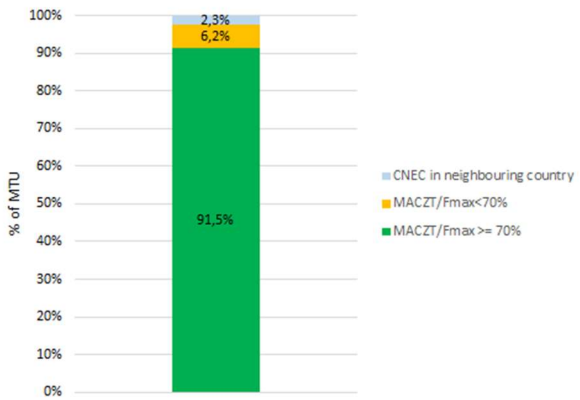
The 1.26% in both directions (221 MTU) corresponds to 1.64% in the Portugal - Spain direction (144 MTU) and 0.88% in the Spain - Portugal direction (77 MTU).

4.2 RESULTS

Accordingly, the results of the assessment of compliance with the minimum MACZT levels were updated as follows, illustrated in Figure 4.3.

- In 93.8 per cent of the MTUs (83.77+2.32+4.87+1.57+1.26) the minimum MACZT levels were met (MACZT > 70 per cent), of which 2.3 per cent correspond to the limiting CNEC located in Spain.
- Minimum MACZT levels were not met for 6.2 per cent of MTUs.

Figure 4 3 - ERSE valuation in both directions in 2023



5 REN PREVIOUS HEARING

On 2 August 2024, ERSE sent REN the Preliminary Report on 'Analysing Portugal-Spain interconnection capacity and monitoring compliance with the minimum levels of capacity available for cross-zonal trade in 2023' so that, if it wished, it could give its opinion at a prior hearing under the terms of articles 121 and 122 of the Code of Administrative Procedure.

In its reply, dated 22.8.2024, REN states that '... we are pleased to note that the values from the fallback process have been taken into account, thus recognising the effort made to significantly reduce the number of situations in which it is not possible to identify a limiting CNEC (Critical Network Element with Contingency), but that despite this, sufficiently high capacity values are made available to the market, complying with the established criteria'.

It also sends a set of additional comments on ERSE's criteria for assessing compliance with the MACZT for the purposes of the IMDT, as well as specific comments on the wording of some particular points in the Preliminary Report.

With regard to ERSE's criteria, the subject of the December 2023 Memorandum 'Definition of criteria for assessing compliance with minimum MACZT levels for the purposes of IMDT', REN repeats the comments already sent on 27 March 2024 via Letter REN-2175/2024, which were taken into account in the draft Preliminary Report.

As mentioned, REN also sent specific comments on the wording of some particular points, such as point 3.2, which ERSE has taken on board and amended the Report accordingly:

> *'a) Point 3.2 states that '2.3 per cent of the MTUs did not comply with the minimum MACZT levels with a limiting CNEC in Spain (white area of the figure)'. Taking into account that the MTUs, despite having a limiting CNEC in Spain, can comply with the minimum MACZT levels, it is suggested that the text be changed to '2.3 per cent of the MTUs did not have a CNEC in the Portuguese electricity system (white area of the figure)'.*

and points 3.2.1 and 3.3, which ERSE does not accept because they are not related to the Chapter to which they refer.

In fact, for the sake of clarity and transparency in drawing up the Preliminary Report, ERSE has taken care to separate the assessment of compliance with the MACZT taking into account the general case (Article 16(8) of Regulation (EU) 2019/943), which is the subject of Chapter 3, from the assessment of compliance with the MACZT for the purposes of IMDT, which is the subject of Chapter 4. REN's comments, which result from the assessment for IMDT purposes, are already included in Chapter 4, to which they relate, and do not fall under Chapter 3:

> *'b) In point 3.2.1, in the detailed analysis, after the following reference 'It is thus noted that in order to achieve the objective of complying with the minimum levels established in 100% of the MTU, it is necessary to progressively and significantly reduce the number of MTU for which the limiting CNEC is not identified', it is relevant to indicate that in these scenarios the methodology provides for the use of a fallback procedure for the purpose of monitoring compliance with the minimum levels of MACZT, thus being aligned with ACER's position and respective data and results made available in the report published annually by ACER.*
>
> *It is therefore suggested that the following text be added after the paragraph 'In the situations described above, in which it is not possible to identify the limiting CNEC, the methodology for calculating the interconnection capacity available for commercial purposes in the daily and intraday horizons includes a fallback procedure that makes it possible to monitor compliance with the minimum MACZT levels in these cases. The application of this fallback procedure has made it possible to validate that 4.87 per cent of MTUs comply with the minimum MACZT levels.'*

c) *In point 3.3, where it says 'With regard to the objective of the degree of compliance with the minimum MACZT levels provided for in the derogation, and according to the results shown in the previous points, it can be concluded that it was above the established minimum (compliance with the minimum MACZT levels in 82.5 per cent of the MTUs)', it is suggested that this information be completed with the verified values, thus bringing the previous point into line with the information published in the ACER report. To this end, it is proposed that the text be changed to 'With regard to the objective of the degree of compliance with the minimum levels of MACZT provided for in the derogation, and according to the results shown in the previous points, it can be concluded that it was above the established minimum (compliance with the minimum levels of MACZT in 82.5% of the MTU) with a compliance value of 88.64% of the MTU (83.77+4.87)'.*

6 CONCLUSIONS

According to European regulations, the regulatory authority of each Member State is responsible for assessing compliance with the minimum levels of MACZT.

After the first three monitoring exercises (2020, 2021 and 2022), and taking into account the commitments made by REN in the derogation request for 2023, approved by ERSE, this report assesses the current degree of compliance with these commitments.

As explained throughout the report, ERSE has reached the following main conclusions:

- In 93.8 per cent of the MTUs the minimum MACZT levels were met, of which 2.3 per cent correspond to the limiting CNEC located in Spain;
- 6.2 per cent of MTUs did not meet the minimum MACZT levels;
- In the exporting direction (PT->ES), the minimum MACZT levels were met in 91.3 per cent of the MTUs;
- In the importing direction (ES->PT), the minimum levels of MACZT were observed in 96.4% of the MTUs;
- The objectives of the derogation relating to the development of tools and methodologies for calculating and monitoring the capacity available for inter-zonal trade were met;
- The degree of compliance with the minimum levels of MACZT was above the commitment made by REN in the derogation request for 2023 (which was to comply with the minimum levels of MACZT in 82.5 per cent of the MTUs);
- The significant 50 per cent reduction in the number of MTUs in which the limiting CNE was not identified, from 2022 to 2023, justified the fallback procedure for monitoring MACZT in these cases in 2023;
- There is no significant correlation between the values of capacity made available for commercial purposes and interconnection congestion, i.e. the highest number of congestion situations did not occur for the lowest NTC values.

ERSE - Entidade Reguladora dos Serviços Energéticos

Rua Dom Cristóvão da Gama, 1 – 3.º
1400 - 113 Lisboa

+351 213 033 200
erse@erse.pt
www.erse.pt