

## REPORT

**MAY 2022**

Implementation of the minimum threshold of 70% of interconnection capacities for cross-border trade at France's borders: review of the year 2021 and highlights.

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## EXECUTIVE SUMMARY

The revised Electricity Regulation (EU) 2019/943<sup>1</sup> as part of the Clean Energy Package adopted in 2019 introduced a minimum threshold of 70% of interconnection capacity to be available for cross-border trades. This threshold came into effect on 1 January 2020 for all European network operators. CRE must accordingly ensure that RTE (the French TSO), guarantees interconnection capacities that comply with electricity regulations on French borders in the capacity calculation regions Central West Europe (for the frontier with Belgium, Luxembourg and Germany), Italy North (for the Italian border) and South-West Europe (for the Spanish frontier).

The purpose of this report is to present the results and highlights of the year 2021.

As the minimum threshold of 70% is intended to increase cross-border exchanges, CRE analysed whether this threshold has been reached on the network lines used for the capacity calculation with regard to their capacity to allow additional cross-border exchanges that are bearing value at the European scale. In this context, CRE paid particular attention to the elements located in France that may constrain the interconnection capacities made available for cross-border exchanges (the so-called "limiting network elements"), as well as to the timeframes in which the capacities made available by the system operators effectively limit exchanges and prevent price convergence in the capacity calculation region. Outside of these situations, any additional capacity released does not actually increase cross-border exchanges. CRE accordingly considers that these situations, in which no gain is possible on a European scale, are compliant.

For the year 2021, the levels of interconnection capacity made available for cross-border exchanges by RTE meet the 70% criterion for more than 85% of the timeframes in the three regions evaluated. Therefore, RTE met nearly all its obligations in 2021. This high level of capacity offered bears witness to RTE's commitment to the construction of a European electricity market and confirmed the relevance of the French network's structuring to support cross-border exchanges.

Beyond the implementation of the minimum threshold of 70%, RTE has, throughout the year 2021, continued its work to develop tools to ensure such levels of exchange capacity without penalising the security of network operation. These so-called "validation" tools identify whether the lines in the network offer sufficient capacity to meet the 70% criterion and propose adding the necessary capacity to reach the threshold. If the available remedial actions allow for this increase in cross-border capacity, the increase, called a "virtual margin", is added to the capacity scheduled for market coupling at the daily deadline. The implementation of these tools in the three calculation regions has enabled RTE, from 2022 onwards, not to have to request a derogation from the CRE regarding compliance with the 70% threshold.

At the European level, these corrective actions are mainly costly actions such as redispatching or countertrading. However, France stands out for its use of topological remedial actions in addition to costly remedial actions. These inexpensive remedial actions allow the redirection of flows on the network by modifying its topology. Thanks to this optimisation of the network, additional capacities are available for cross-border exchanges. These tools and remedial actions make it possible to more systematically ensure capacity levels equal to or greater than 70% at French frontiers.

Finally, in view of the numerous exchanges with European and French stakeholders on the implementation of the 70% minimum threshold, RTE has made freely available<sup>2</sup> the data relating to the capacities available on all the network lines used in the capacity calculation for the Central West Europe, Italy North and South -West Europe regions. CRE fully supports this initiative and believes that open access to data is a useful transparency measure to develop a more complete understanding of the issues resulting from the implementation of the 70%.

<sup>1</sup> REGULATION (EU) 2019/943 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - of 5 June 2019 - on the internal market for electricity (europa.eu)

<sup>2</sup> <https://opendata.reseaux-energies.fr/pages/accueil/>

## 1. A REMINDER OF THE CONTEXT OF THE IMPLEMENTATION OF THE 70% AT FRENCH BORDERS

Following the exit of the United Kingdom from the European Union on 1 January 2021, France is now integrated into only three capacity calculation regions: the Central West Europe, Italy North and South- West Europe regions. It is in coordination within these regions that the system operators calculate for each timeframe the capacities that can be offered for cross-border exchanges between the different countries of the European electricity market.

In order to ensure capacity for these exchanges, a minimum threshold of 70% of the network capacity available for cross-border exchanges (the "70% criterion") has been introduced in the revision of the Electricity Regulation as part of the Clean Energy Package adopted in 2019 (hereinafter the "Electricity Regulation")<sup>3</sup>. It came into effect on 1 January 2020.

However, the Electricity Regulation states that temporary derogations from the 70% criterion may be granted to TSOs by national regulatory authorities<sup>4</sup>. Due to the time needed to set up operational tools to ensure compliance and monitoring of the 70% criterion in the three calculation regions, CRE has granted RTE temporary derogations for 2020 for the capacity calculation regions Central West Europe, Italy North and South-West Europe<sup>5</sup>. A new temporary derogation has been granted to RTE for 2021 for the South-West Europe capacity calculation region<sup>6</sup>.

At the request of the European Commission, the Agency for the Cooperation of Energy Regulators ("ACER") has recommended a methodology for calculating and assessing the level of interconnection capacity actually made available for cross-border exchanges within the European Union ("EU")<sup>7</sup>. Based on this calculation and assessment method, ACER has published two biannual overviews of the interconnection capacities available for cross-border exchanges throughout the EU in 2020<sup>8</sup>. It plans to publish an annual report for the year 2021.

Under the provisions of the Electricity Regulation, however, it is the responsibility of the national regulatory authorities to ensure that this minimum threshold is respected by TSOs. CRE is therefore responsible for ensuring that RTE guarantees interconnection capacities that comply with electricity regulations on France's various borders. It uses this power to make a systematic assessment of the compliance of interconnection capacities made available for cross-border exchanges by RTE and to identify areas of progress in the optimisation of these capacities, while seeking transparency for the benefit of all stakeholders.

In December 2020, CRE published a first interim report on the implementation of the 70% criterion at French frontiers in the first half of 2020<sup>9</sup>. It was supplemented by a second report covering the second half of 2020, published in June 2021<sup>10</sup>. It presents CRE's approach to ensuring that the application of this minimum threshold actually leads to an increase in cross-border exchanges when these can generate value on a European scale. As a reminder, CRE pays particular attention to the lines of the French network that may constrain the interconnection capacities made available for cross-border exchanges (called "limiting network elements" at the end of the capacity calculation), as well as to the timeframes in which the interconnection capacities made available for cross-border exchanges are fully used, which results in a lack of convergence of electricity prices within a capacity calculation region.

CRE's analyses for the year 2021 are presented in the section 2 of the report. CRE then returns, in the section 3, to the tools developed by RTE for a more systematic guarantee of the 70% criterion and to make the related data freely available.

<sup>3</sup> Article 16(8) of the REGULATION (EU) 2019/943 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 June 2019 on the internal market for electricity

<sup>4</sup> Article 16(9) of the Electricity Regulation

<sup>5</sup> Deliberation of the Energy Regulatory Commission of 12 December 2019 on the decision to grant derogations from the minimum levels of available capacity for cross-zonal exchanges in the capacity calculation regions Core, Italy North and South-West Europe <https://www.cre.fr/Documents/Deliberations/Decision/derogations-aux-niveaux-minimaux-de-capacite-disponible-pour-les-echanges-entre-zones-dans-les-regions-de-calcul-de-capacite-core-italie-nord-et-e> (renewed on the 18th of June 2020 for the Core region)

<sup>6</sup> Deliberation of the Energy Regulatory Commission of 26 November 2020 concerning the decision to grant a derogation from the mini-maximum levels of available capacity for exchanges between zones in the South-West Europe capacity calculation region, <https://www.cre.fr/Documents/Deliberations/Decision/octroi-de-derogation-aux-niveaux-minimaux-de-capacite-disponible-pour-les-echanges-entre-zones-dans-la-region-de-calcul-de-capacite-europe-du-sud-o>

<sup>7</sup> ACER Recommendation 01/2019 on the implementation of the minimum margin available for cross-zonal trade pursuant to Article 16(8) of Regulation (EU) 2019/943, [https://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf](https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf)

<sup>8</sup> See for example ACER Report on the Result of Monitoring the Margin Available for Cross-Zonal Electricity Trade in the EU in the Second Semester of 2020, [https://documents.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER%20MACZT%20Report%20S2%202020.pdf](https://documents.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20MACZT%20Report%20S2%202020.pdf)

<sup>9</sup> <https://www.cre.fr/Documents/Publications/Rapports-thematiques/mise-en-oeuvre-du-seuil-minimal-de-70-des-capacites-d-interconnexion-pour-les-echanges-aux-frontieres-francaises-point-d-etape-et-perspectives>

<sup>10</sup> <https://www.cre.fr/Documents/Publications/Rapports-thematiques/mise-en-oeuvre-du-seuil-minimal-de-70-des-capacites-d-interconnexion-pour-les-echanges-aux-frontieres-francaises-point-d-etape-a-fin-2020-et-pe>

## 2. ASSESSMENT OF THE YEAR 2021 ON FRENCH BORDERS

The CRE's assessment is broken down into two successive stages of analysis. These analyses, presented in the rest of the section, were carried out by CRE to assess the compliance of the interconnection capacities provided by RTE on the different French borders with the Electricity Regulation.

First of all, using several criteria, CRE tried to determine the timeframes within which the offer of additional capacity on the French network elements used for the coordinated capacity calculation provided added value for the European market and to assess the percentage of cases where the capacity offered by RTE exceeded 70% of the capacity of the network network elements. Then, CRE analysed the capacity offered to the European market in the relevant timeframes.

### 2.1 Analysis of compliance with the "70% criterion" on the French network elements used for the coordinated capacity calculation

According to Article 16 of the Electricity Regulation, RTE is obliged to maximise the capacity made available for cross-border exchanges on the French network elements used for the coordinated capacity calculation for each capacity calculation region to which France belongs. The parameter to be maximised corresponds to the ratio between the capacity made available for cross-border exchanges and the operational limit of each network element (also called "*maximum flow*" or "Fmax").

This margin ("MACZT") is determined by a process of estimating the distribution of market flows internal and external to the capacity calculation region<sup>11</sup> on each element of the French network used for the coordinated capacity calculation.

When analysing compliance with the 70% criterion, CRE considered that in certain configurations, an increase in the capacity available for cross-border exchanges would not generate any value for the European electricity system while at the same time generating unnecessary costs.

CRE thus determined the share of timeframes within which guaranteeing the 70% criterion provided value at the European scale by excluding the timeframes corresponding to the following criteria:

1. **Unsaturated interconnection:** in situations where market coupling results in a situation where the optimal allocated capacity is less than the total interconnection capacity available for cross-border exchanges, there is no incentive to increase cross-border capacity. This is when there is a price convergence situation in the capacity calculation region.
2. **Absence of a limiting French network element:** non-limiting network elements, i.e. those that do not limit the domain available for capacity allocation<sup>12</sup>, have no direct influence on the interconnection capacities made available to the market. Increasing their margin would not increase cross-border exchanges.

CRE considers that the timeframes covered by these two criteria comply with the provisions of the revised electricity regulation, as an increase in the margins available on the TSOs' network elements would not have made it possible to increase the capacity made available for cross-border exchanges within these timeframes.

Figure 1 categorises, for each capacity calculation region to which France belongs, the timeframes for the year 2021 according to the criteria presented above.

<sup>11</sup> The Margin Available for Cross-Zonal Trade ("MACZT"), the sum of the Margin from Coordinated Capacity Calculation ("MCCC") and the Margin from Non-coordinated Capacity Calculation ("MNCC"), is defined in ACER Recommendation 01/2019

<sup>12</sup> Here we use the convention that "limiting elements" refers to the element that limits the domain of possible configurations to exchanges and "active elements" to the element that actually limits exchanges during allocation.

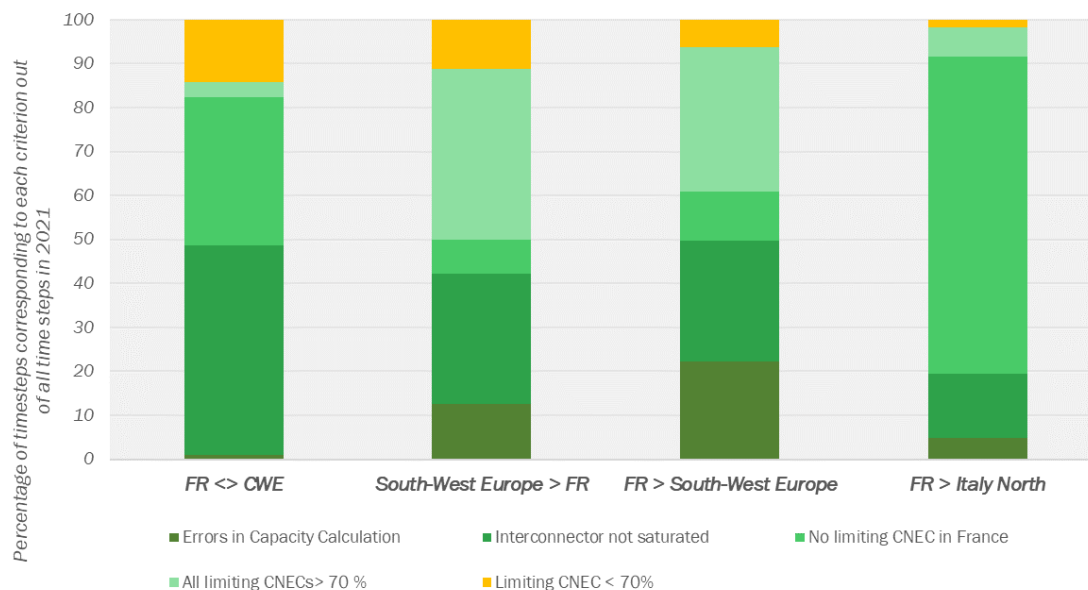


Figure 1 - Categorisation of timeframes by criterion in the year 2021 in the three capacity calculation regions of which France is a part.

Source: data from RTE, analysis from CRE

Notes: (1) In the Italy North region, only the import direction from France to Italy is currently calculated in a coordinated manner by TSOs.

Interpretation: At the France-Spanish border, in the import direction (South-West Europe to France), about 27% of the timeframes in 2021 corresponded to a price convergence situation (unsaturated interconnection), 11% to a situation where the capacity calculation was not constrained by a French network element, and 13% to errors in the capacity calculation. These timeframes are considered to be in accordance with the provisions of the revised electrical regulations. As a result, in 89% of the cases, RTE met the 70% criterion and in the remaining 11% of cases, the French network's limiting lines provided less than 70% margin to cross-border exchanges. A similar reading can be applied to other borders.

In the Central West Europe and Italy North regions, more than 80% of the timeframes are covered by the two criteria above, timeframes for which additional measures by RTE would not have led to an increase in the capacity offered. Therefore, RTE met nearly all its obligations in 2021. This demonstrates the relevance of CRE's choice to pay particular attention to the remaining timeframes. The timeframes showing an error in the capacity calculation are mainly timeframes where only the data monitoring phase to monitor the capacity level had failed. In these cases, the calculation process defined the maximum capacity available for cross-border exchanges. However, these occurrences must be kept to a minimum and are carefully monitored by CRE and its counterparts at regional level.

In the light of the criteria, Table 1 specified the average monthly percentage of timeframes during which RTE has guaranteed capacities that comply with the revised electricity regulations.

	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021	October 2021	November 2021	December 2021	2021
CWE/Central West Europe	86%	83%	88%	93%	95%	96%	94%	94%	87%	60%	69%	85%	86%
Italy North	97%	98%	98%	99%	96%	98%	99%	98%	98%	98%	100%	100%	98%
South-West Europe	82%	86%	92%	96%	98%	93%	97%	96%	90%	82%	89%	95%	91%

Table 1 - Average monthly percentage of timeframes within which RTE guaranteed capacities in compliance with the revised electricity regulations in the four capacity calculation regions to which France belongs

Source: data from RTE, analysis from CRE

The 2021 results are high in all three calculation regions evaluated.

- In the **Italy North** region, more than 98% of the relevant timeframes complied with the revised electricity regulations.

- In the **South-West Europe** region, there was compliance in more than 91% of the timeframes. This compliance rate is well above the commitment made by RTE in the context of the derogation granted for the year 2021 for the South-West Europe region. RTE had indeed committed to respect the 70% criterion in 80% of the timeframes in this region. The significant level of timeframes indicating a calculation error is related to a data uplift issue during November and December 2021. This problem has since been corrected.
- The very good results for the **Central West Europe** region were overshadowed by a one-off deterioration in compliance in October and November 2021 due to the unavailability of facilities during this period. The situation returned to normal in December 2021.

**2.2 Analysis of the capacities offered to cross-border exchanges for the relevant timeframes.**

CRE considers that while compliance with the 70% threshold is a statutory requirement, it is essential to offer the maximum amount of capacity available for cross-border exchanges within the relevant timeframes, regardless of compliance with this threshold. Indeed, compliance with the 70% threshold is not an end in itself, but a tool for cross-border exchanges.

Figure 2 breaks down the set of relevant timeframes according to their margin level.

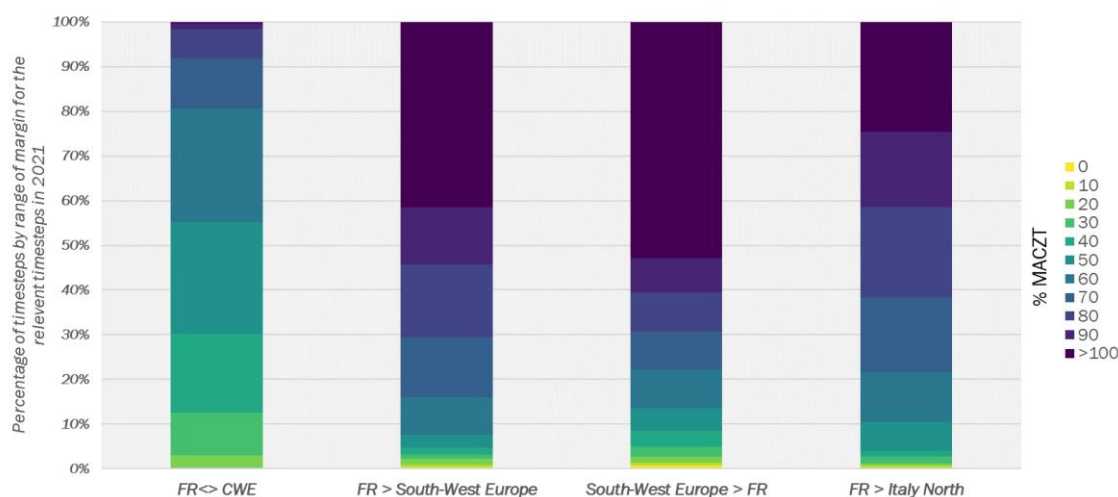


Figure 2 - Categorisation of timeframes by decile rank of margin levels, for the relevant timeframes (two limiting branch categories in Figure 1).

Source: data from RTE, analysis from CRE

Notes: (1) In the Italy North region, only the import direction from France to Italy is currently calculated in a coordinated manner by transmission grid managers.

Interpretation: At the France-Spain border, in the import direction (France to South-West Europe), among the relevant timeframes (not covered by the two criteria described above, thus corresponding to only some of the hours of the 6-month period), about 42% of the timeframes presented a margin level higher than 100%, mainly due to an expected initial configuration in the opposite direction, thus providing more margin than the total capacity of the network element. The next decile includes the timeframes with these margins between 90 and 100%, which corresponds to about 13% of the timeframes. Considering the top four categories, we can observe that about 84% of the relevant timeframes exceeded the 70% margin criterion.

A similar reading can be applied to other frontiers.

It is possible to observe that the margins offered to cross-border exchanges were, for a majority of timeframes, very high. In the South-West Europe and Italy North regions, these margins very frequently exceeded the required 70% threshold. Conversely, there are very few periods when the capacity available for cross-border exchanges was really low. This is confirmed by Figure 3, which evaluates the average margin level offered when the 70% threshold was not met. In this case, the average level of capacity made available was always above 50% in all three regions. Even if the 70% threshold was not reached, the capacity made available remained high and constituted a real contribution to cross-border exchanges.



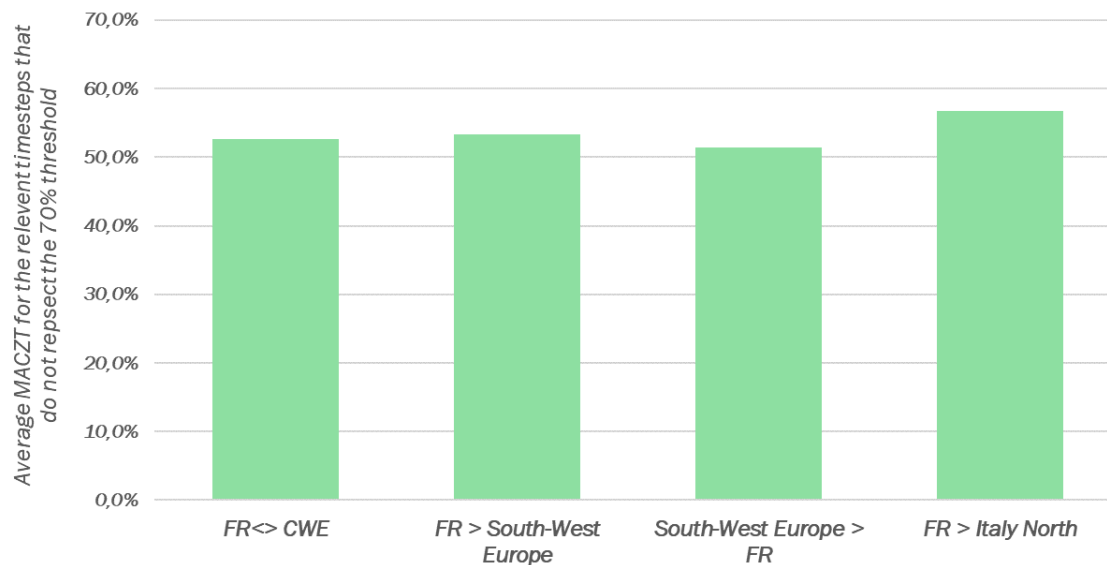


Figure 3 - Average margin offered for relevant timeframes not reaching the 70% threshold (< 70% limiting branches category in Figure 1)

Source: data from RTE, analysis from CRE

Notes: (1) In the Italy North region, only the import direction France to Italy is currently calculated in a coordinated manner by transmission grid managers.

**Interpretation:** At the France-Spain border, in the export direction (France to South-West Europe), among the relevant timeframes (not covered by the two criteria described above, thus corresponding to only some of the hours of the 6-month period), the average level of margins offered was 53% when it did not reach the 70% threshold.

A similar reading can be applied to other frontiers.

### 3. HIGHLIGHTS

In accordance with the commitments made under the temporary derogations granted by CRE for 2020<sup>13</sup> within the capacity calculation regions of Core /Central West Europe, Italy North and South-West Europe, RTE continued the work begun in 2020 to develop tools to increase its capacity to ensure margin levels of 70% without exceeding operational limits on the network lines concerned. This derogation was renewed by CRE for the year 2021 for the South-West Europe capacity calculation region. These so-called "validation" tools identify whether the network elements do not offer sufficient capacity to meet the 70% criterion and propose adding the necessary capacity to reach this threshold. If the available remedial actions allow for this increase in cross-border capacity, this increase, called "virtual margin", is added to the capacity scheduled for market coupling at the daily deadline.

At the European level, corrective remedial actions are mainly costly remedial actions such as re-dispatching or countertrading. Although France also uses costly remedial actions, it differs from its European neighbours in the use of non-costly remedial actions, the topological remedial actions. Thanks to the investments made in the French electricity network, RTE is able to modify the topology of the network and accordingly the electricity flows. This French specificity allows the network to be controlled in order to avoid congestion as much as possible, at a lower cost, and without modifying its production plan, which would otherwise require the use of thermal production units that emit more CO<sub>2</sub>. CRE believes that topological remedial actions are essential assets that should be used more widely in the operation of the European electricity market.

The so-called "validation" tools were deployed on 17 February 2021 in the "Core/Central West Europe" capacity calculation region, in October 2021 in the "Italy North" region and in early 2022 for the "South-West" region, in which a minimum level of countertrading to be made available for cross-border exchanges was introduced on the same date. These tools make it possible to guarantee the 70% criterion on all the lines of the network used for the capacity calculation for a greater number of timeframes. CRE is pleased with the operational deployment of the validation tools in the three capacity calculation regions, which have enabled RTE not to request a new derogation for the year

<sup>13</sup> CRE deliberation of 12 December 2019 on the decision to grant derogations to the minimum levels of available capacity for exchanges between zones in the Core, Northern Italy and South-West Europe capacity calculation regions



2022. For the first time, French borders are not subject to any derogation in the context of the implementation of the 70% criterion.

Furthermore, exchanges between European stakeholders have highlighted the interest of increasing transparency on the precise levels of interconnection capacity made available by RTE at French borders. RTE has accordingly initiated a project to publish in open access the data relating to the levels of margins available on all the lines of the network used for the calculation of capacity in the regions of Core/Central West Europe, Italy North and South-West Europe. The first publication of these data took place on the "Open Data Energies Réseaux" (ODRE)<sup>14</sup> platform on 8 June 2021. It allows all actors who wish to do so to develop differentiated analyses based on different criteria relating to the contribution of the 70% to cross-border exchanges. The 2021 data will be shared in June 2022 on the same platform.

CRE fully supports this initiative by RTE and believes that free access to data will enable all French and European stakeholders to develop a more complete understanding of the issues involved in implementing the 70%.

In order to improve clarity for European stakeholders, ACER has developed an approach to harmonise the reports published by European regulators. CRE has been closely involved in the work to improve the understanding of the issues related to the implementation of the 70% criterion. In this respect, CRE is convinced of the need to encourage TSOs to maximise the cross-border capacity offered to market parties for all market timeframes times, when this can be of advantage to all concerned. Through this report, CRE wishes to reaffirm the importance of considering the timeframes and network elements that can bring value to the European electricity system.

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<sup>14</sup> <https://opendata.reseaux-energies.fr/pages/accueil/>

ANNEXES

The graphs below represent, for the regions of calculation of the Central West Europe, Italy North and South-West Europe capacities, the distribution of the margin level on the French network elements used for the calculation of the coordinated interconnection capacities.

They take the form of "boxplots", which read as follows:

- 50% of the values are included in the box, with the low and high ends representing respectively the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the statistical distribution;
- The middle line is the median of the values; and
- The low and high ends ("whiskers") are the 150% of the difference between the 25<sup>th</sup> and 75<sup>th</sup> percentiles from the maximum and minimum of the box defined above, respectively, for each month. Accordingly, data that exceed those whiskers correspond to extreme values.

Values above 100% correspond to situations where the network elements are considered to be able to accommodate physical flows in the opposite direction to the market, thus being able to accommodate market flows at levels exceeding their maximum capacity.

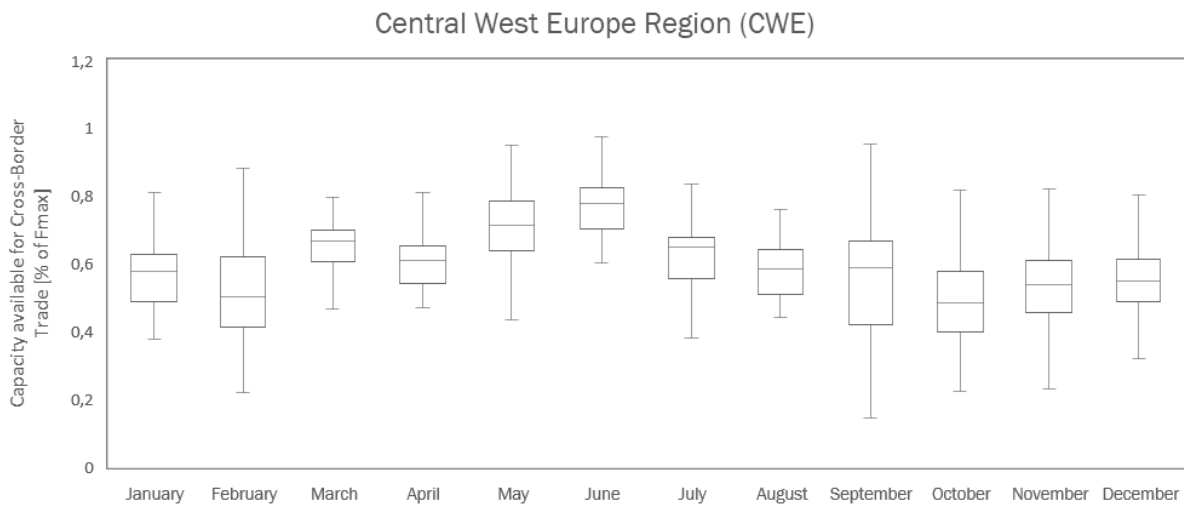


Figure 4 - Distribution of the margin level on the French network lines used for the calculation of the interconnection capacities of the Core/Central West Europe region

Source: data from RTE, analysis from CRE

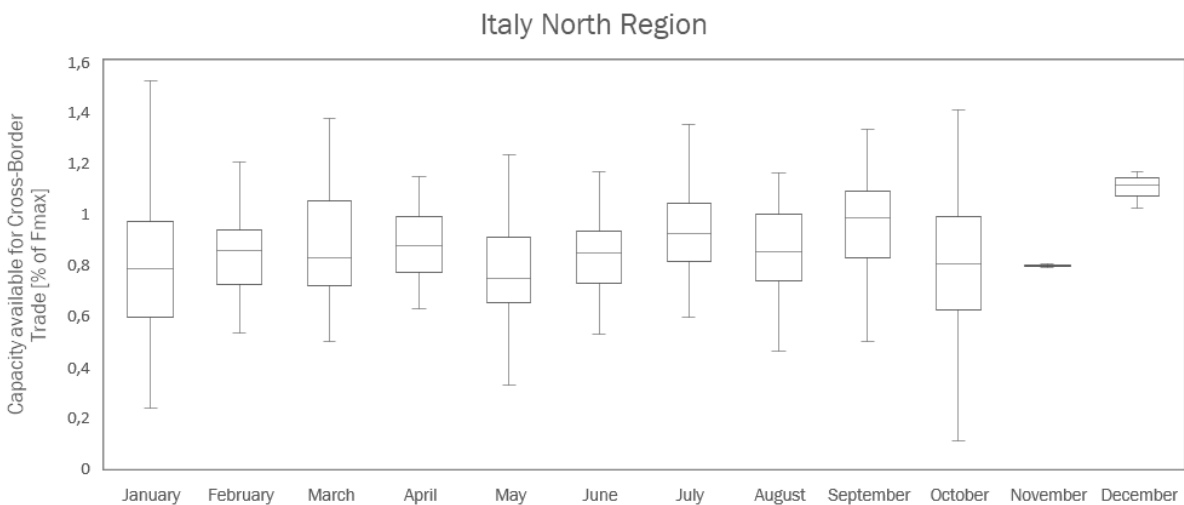


Figure 5 - Distribution of the margin level on the French network lines used for the calculation of the interconnection capacities of the Italy North region.

Source: data from RTE, analysis from CRE



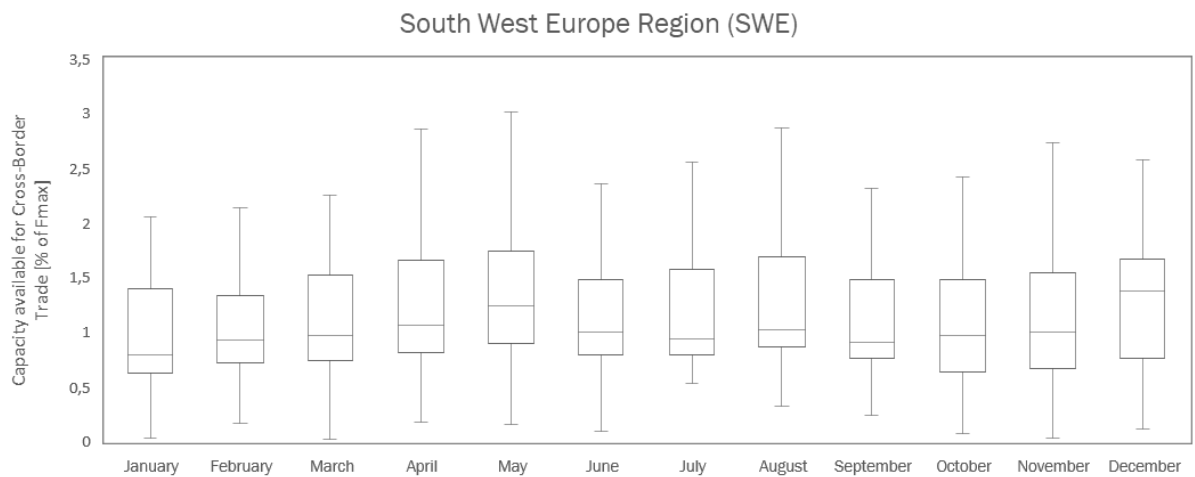


Figure 6 - Distribution of the margin level on the French network lines used for the calculation of the interconnection capacities of the South-West Europe region

Source: data from RTE, analysis from CRE