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# REPORT

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Report on the implementation of the minimum threshold of 70% of interconnection capacity for cross-border trade at the French borders for 2020: assessment and outlook

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**EXECUTIVE SUMMARY**

The minimum threshold of 70% of interconnection capacities (70% requirement) was introduced during the revision of the Internal Market for Electricity (IME) Regulation as part of the Clean Energy Package adopted in 2019. It pursues the objective that a significant part of the interconnection capacities be available for exchanges within the internal electricity market. It came into force for all European transmission system operators on 1 January 2020. Under the provisions of the IME Regulation, the responsibility for enforcing this minimum threshold by transmission system operators lies with the national regulatory authorities. CRE is thus responsible for ensuring that RTE guarantees interconnection capacities in compliance with the IME Regulation on the various French borders.

Since the beginning of 2020, CRE has therefore systematically monitored the capacities made available for cross-border exchanges by RTE thanks to detailed data reported for each capacity calculation region. An interim report on the implementation of the 70% requirement was published in December 2020, setting out the compliance approach and results for the first half of 2020<sup>1</sup>. This report aims to present the results for the second half of 2020 and to provide an outlook for the coming years.

In the second half of 2020, and building on the first half, it appears that the levels of interconnection capacity made available to cross-border exchanges by RTE are high, with average levels of between 75% and 100% of the maximum capacity of the network elements depending on the capacity calculation region. Under the current conditions of structure and operation of the French electricity grid, RTE is therefore fully involved in the construction of the internal electricity market.

In order to ensure that interconnection capacities allow for an effective increase in cross-border exchanges, CRE analyses the achievement of the 70% requirement on the network elements considered in the capacity calculation according to their ability to support additional value-bearing exchanges on a European scale. In this context, CRE pays particular attention to the elements located in France that may constrain the interconnection capacities made available for cross-border exchanges (known as "limiting elements") as well as to the time steps in which the capacities made available by the transmission system operators actually limit exchanges and prevent price convergence in the capacity calculation region. Outside these situations, any additional capacity released does not effectively increase cross-border exchanges. CRE therefore categorises these situations, in which no gain would be possible on a European scale, as compliant, because it is not possible for RTE to increase the capacity made available for cross-border exchanges in these time steps and it is not desirable to undertake costly actions on a European scale at a pure loss.

The results of this analysis for the months of the second half of 2020 are presented below.

	July 2020	August 2020	September 2020	October 2020	November 2020	December 2020	H2 2020
<b>Core/Central-Western Europe</b>	87%	99%	89%	95%	94%	99%	<b>94%</b>
<b>Italy North</b>	98%	98%	98%	99%	96%	98%	<b>98%</b>
<b>South-Western Europe</b>	85%	84%	89%	85%	88%	88%	<b>86%</b>
<b>Channel</b>	100%	100%	98%	100%	100%	100%	<b>100%</b>

Table - Average monthly percentage of time steps during which RTE has guaranteed capacity in line with the revised IME Regulation in the four capacity calculation regions of which France is a part.

Source: RTE data, CRE analysis

Beyond the implementation of the 70% requirement, RTE has worked throughout 2020 on the development of tools to increase its ability to ensure such capacity levels without leading to the operational limits being exceeded on the network elements concerned. These tools, already deployed in the Core/Central- Western Europe region, identify whether available remedial actions would ensure the operational feasibility of higher capacity levels than those directly derived from the capacity calculation. In the future, these tools will therefore make it possible to more systematically provide capacity levels equal to 70% at the French borders.

Lastly, considering the numerous exchanges with European and French stakeholders on the implementation of the 70% requirement, RTE has initiated a project to publish in open access the data relating to the available capacity on all the network elements considered in the capacity calculation of the Core/Central-Western Europe, Italy North and South-Western Europe regions. CRE fully supports this initiative and believes that open access to the data will allow all European and French stakeholders to develop a more complete understanding of the issues resulting from the implementation of the 70% requirement.

<sup>1</sup> <https://www.cre.fr/en/Documents/Publications/Thematic-reports/interim-report-and-outlook-on-the-implementation-of-the-minimum-threshold-of-70-of-interconnection-capacity-for-cross-border-trade-at-the-french-b>



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

The minimum threshold of 70% of the network capacities to be made available for cross-border trade ("70% requirement") was introduced during the revision of the Internal Market for Electricity Regulation ("IME Regulation") as part of the Clean Energy Package adopted in 2019<sup>2</sup>. It entered into force on 1 January 2020.

The IME Regulation does however provide for temporary derogations from the 70% requirement that can be granted to transmission system operators ("TSOs") by the national regulatory authorities ("NRAs")<sup>3</sup>. Due to the need for RTE to develop tools to be able to respond to the operational paradigm shift represented by the introduction of the 70% requirement, CRE granted RTE temporary derogations for 2020 within the capacity calculation regions Core/Central-Western Europe, Italy North and South-Western Europe, corresponding to the Belgian and German borders, the Italian border and the Spanish border respectively<sup>4</sup>. A new temporary derogation was granted to RTE for 2021 within the South-Western Europe capacity calculation region<sup>5</sup>.

At the request of the European Commission, the Agency for the Cooperation of Energy Regulators ("ACER") has recommended a methodology for calculating and monitoring the level of interconnection capacity available for cross-border trade in the European Union ("EU")<sup>6</sup>. Based on this calculation and monitoring methodology, ACER publishes since the end of 2020 a half-yearly overview of the interconnection capacities made available for cross-border trade across the EU<sup>7</sup>.

Under the provisions of the IME Regulation, however, the responsibility for enforcing this minimum threshold by the TSOs lies with the NRAs. CRE is thus responsible for ensuring that RTE guarantees interconnection capacities in compliance with the IME Regulation on the various French borders. It uses this competence to systematically assess the compliance of the interconnection capacities made available for cross-border trade by RTE and to identify ways of continuing to make progress in optimising these capacities, while seeking to ensure transparency for the benefit of all stakeholders.

In December 2020, CRE published an interim report on the implementation of the 70% requirement at the French borders in the first half of 2020<sup>8</sup>. The interim report set out the approach followed by CRE to ensure that the application of the 70% requirement leads to an increase in cross-border exchanges and thus to the creation of net value for consumers, and the associated results. As a reminder, CRE pays particular attention to the French network elements that may constrain the interconnection capacities made available for cross-border exchanges (known as "limiting elements" at the end of the capacity calculation), as well as to the time steps in which the interconnection capacities made available for cross-border exchanges are fully used, which results in electricity price differences within the considered capacity calculation region.

CRE's analyses for the second half of 2020 are presented in the section 2 of this report. CRE then returns, in section 3, to the tools developed by RTE to guarantee the 70% requirement more systematically, as well as to the initiative to publish data relating to the 70% requirement at the French borders in open access.

<sup>2</sup> Article 16(8) of Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market in electricity (recast), <https://eur-lex.europa.eu/legal-content/FR/TXT/HTML/?uri=CELEX:32019R0943&from=FR> (hereinafter "IME Regulation")

<sup>3</sup> Article 16(9) of the IME Regulation

<sup>4</sup> Deliberation of the Commission de régulation de l'énergie of 12 December 2019 on the decision to grant derogations to the minimum levels of available capacity for inter-zone trade in the Core, Italy North and South-Western Europe capacity calculation regions, <https://www.cre.fr/en/Documents/Deliberations/Decision/derogations-from-the-minimum-levels-of-available-capacity-for-cross-zonal-trade-in-the-core-italy-north-and-south-west-europe-capacity-calculation> (renewed on 18 June 2020 for the Core capacity calculation region)

<sup>5</sup> Deliberation of the Commission de régulation de l'énergie of 26 November 2020 on the decision to grant derogations to the minimum levels of available capacity for inter-zone trade in the South-Western Europe capacity calculation region, <https://www.cre.fr/Documents/Deliberations/Decision/octroiroi-de-derogation-aux-niveaux-minaux-de-capacite-disponible-pour-les-echanges-entre-zones-dans-la-region-de-calcul-de-capacite-europe-du-sud-o>

<sup>6</sup> ACER Recommendation 01/2019 on the implementation of the minimum interconnection capacity threshold under 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>7</sup> See e.g. ACER Report on the Result of Monitoring the Margin Available for Cross-Zonal Electricity Trade in the EU in the First Semester of 2020, [https://acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/MACZT%20report%20-%20S1%202020.pdf](https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/MACZT%20report%20-%20S1%202020.pdf)

<sup>8</sup> <https://www.cre.fr/en/Documents/Publications/Thematic-reports/interim-report-and-outlook-on-the-implementation-of-the-minimum-threshold-of-70-of-interconnection-capacity-for-cross-border-trade-at-the-french-b>

## 2. ASSESSMENT OF THE FRENCH BORDERS IN THE SECOND HALF OF 2020

This section covers two types of analysis that CRE carried out in order to assess the compliance of the interconnection capacities provided by RTE on the various French borders with the IME Regulation.

Firstly, CRE determined the proportion of time steps in which guaranteeing 70% of the capacity released on the French network elements considered in the coordinated capacity calculation of the various regions was useful, by means of transparent criteria defined just below. Thereafter, over these time steps, CRE assessed the percentage of cases in which the capacity released by RTE exceeded 70% of the capacity of the network elements.

### 2.1 Analysis of compliance with the "70% requirement" on the French network elements considered in the coordinated capacity calculation

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

These margins are determined through a process of estimating the distribution of market flows internal and external to the capacity<sup>9</sup> calculation region on each French network element considered in the calculation. The hypotheses and input data are those used for the daily capacity calculation operational process, considering the best estimate of flows from countries outside the European Union.

When analysing compliance with the 70% requirement, CRE considers that in certain configurations, an increase in the capacity made available for cross-border exchanges (potentially costly if it requires the mobilisation of preventive and/or curative measures) would not generate any value for the European electricity system while generating unnecessary expenditure.

Consequently, CRE determined the share of time steps in which guaranteeing the 70% provided value for European end consumers by excluding the time steps corresponding to the following criteria:

1. **Non-saturated interconnection:** in situations where market coupling delivers an optimum allocation where the allocated capacity is less than the total interconnection capacity available for cross-border trade, there is no value in providing further cross-border capacity. This is equivalent to a price convergence situation in the capacity calculation region.
2. **Absence of a limiting French network element:** non-limiting network elements, i.e. those which do not bound the area available for capacity allocation<sup>10</sup>, have no direct influence on the interconnection capacities made available to the market. While their margin should always be optimised by the TSOs, it is not worthwhile to implement costly remedial actions so that the margin of these elements is systematically increased to 70%.

CRE considers that the time steps covered by these two criteria shall be deemed compliant with the provisions of the revised IME Regulation, as it is not possible for the concerned TSOs to increase the capacity made available for cross-border exchanges within these timeframes.

Figure 1 provides a breakdown of the time steps for the second half of 2020, for each capacity calculation region of which France is a part, according to the criteria presented above.

<sup>9</sup> It thus corresponds to the concept of *Margin Available for Cross-Zonal Trade* ("MACZT"), itself the sum of the *Margin from Coordinated Capacity Calculation* ("MCCC") and the *Margin from Non-coordinated Capacity Calculation* ("MNCC"), defined in ACER Recommendation 01/2019.

<sup>10</sup> Here we use the contract whereby "limiting branch" refers to the branch that limits the domain of possible configurations to exchanges and "active branch" refers to the branch that actually limits exchanges during allocation.

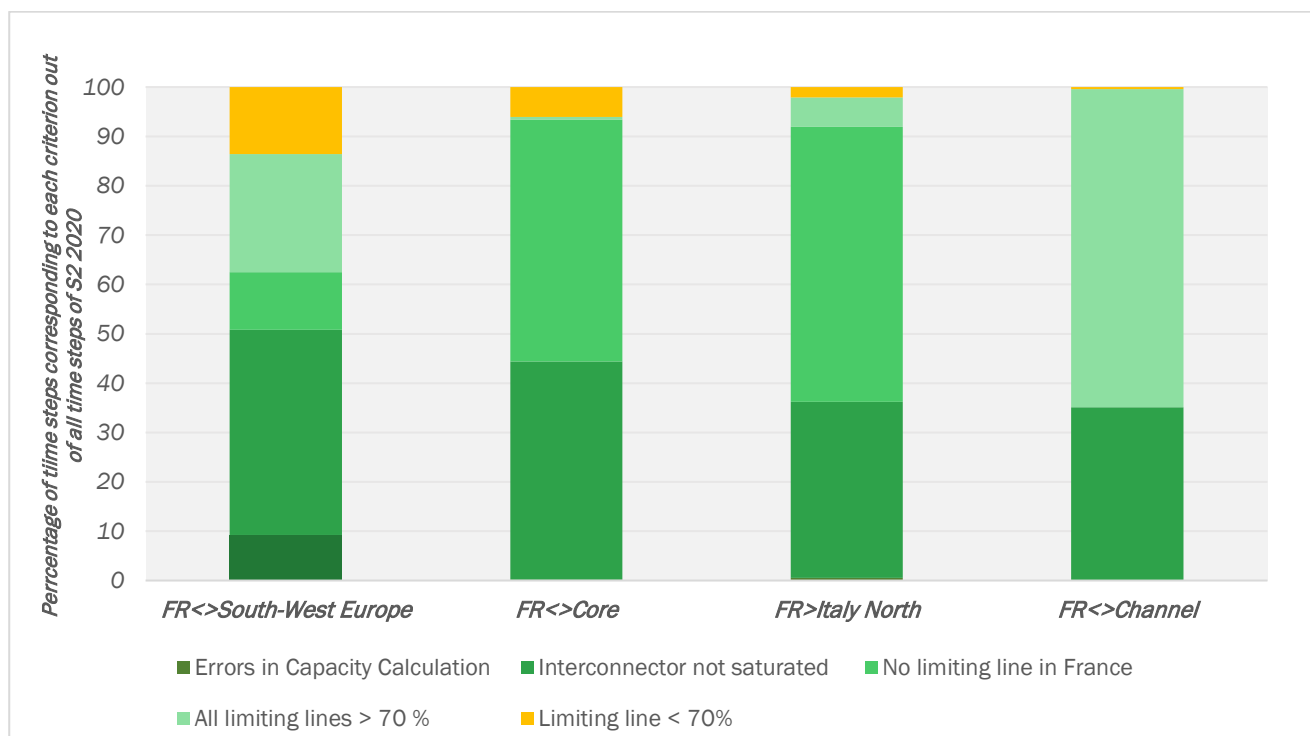


Figure 1 - Categorisation of time steps by criterion in the second half of 2020 in the four capacity calculation regions of which France is a part.

Source: RTE data, CRE analysis

Notes :

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

Interpretation : At the France-Spain border (FR<->South Western Europe), about 41% of the time steps in the second half of 2020 corresponded to a situation of price convergence (non-saturated interconnection), 12% to a situation where the capacity calculation was not constrained by a French network element and 9% corresponded to errors in the capacity calculation<sup>11</sup>. These time steps are deemed compliant with the provisions of the revised IME Regulation. As a result, in 86% of the cases, RTE complied with the 70% requirement and in the remaining 14% of the time, the limiting elements of the French network provided less than 70% margin to cross-border exchanges.

A similar interpretation can be applied to other borders.

In the Channel region, which consists exclusively of DC cables, the margins available for cross-border trade are close to 100% of the maximum flow. The reason for this is that the cables are controllable and are therefore not electrically influenced by the surrounding network elements.

In contrast, the Core/Central-Western Europe, Italy North and South-Western Europe regions are connected to France via AC power elements. These elements are sensitive to the influence of various physical flows linked to the large mesh of the European electricity networks, which may make it impossible to provide cross-border exchanges with a margin corresponding to the maximum flow on these elements. Despite this, CRE notes that the levels of margins made available for cross-border trade are overall high. The borders of France-Core/Central-Western Europe (considered as a whole because of the flow-based capacity calculation approach) and France-South-Western Europe frequently show situations of price equivalence, which means that the capacities released in the coordinated capacity calculation are deemed sufficient for the cross-border trade that market participants wish to execute.

Figure 2 shows that, in the time steps where an increase in cross-border capacity would have provided value (corresponding to the "Limiting branches >70%" and "Limiting branches <70%" categories in Figure 1 above), the margins made available to cross-border trade are for a large majority of the time steps very high for the South-Western Europe and North Italy regions. The margins for the Core/Central-Western Europe region are more limited for a reduced number of time steps, but overall high: more than 70% of these time steps have a margin higher than 40%, and it is reasonable to expect that the national validation tool introduced by RTE (see section 3) in February 2021 could contribute to reduce the time steps that display a low margin.

<sup>11</sup> Where errors in the coordinated capacity calculation process result in the use of degraded modes by TSOs, it is not possible to have a detailed knowledge of the state of the lines in the network and therefore to assess their compliance with the 70% minimum threshold. However, these occurrences must be kept to a minimum and are carefully monitored by CRE and its counterparts at regional level.

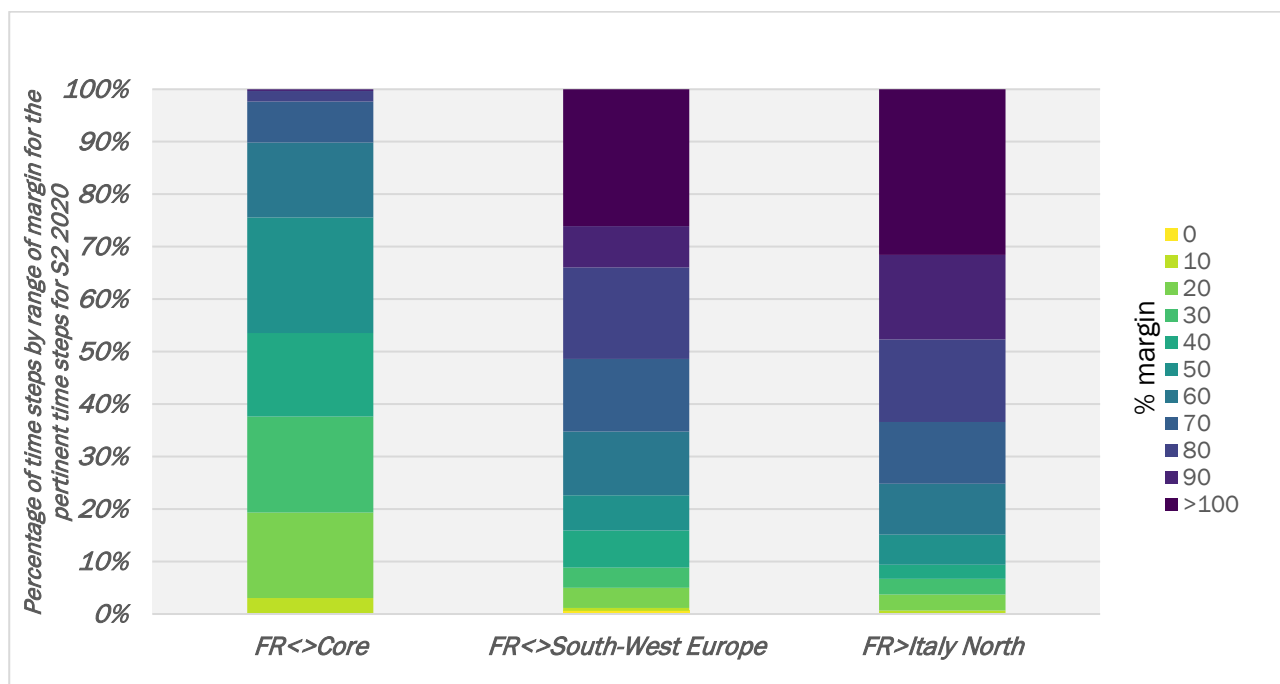


Figure 2 - Categorisation of time steps by decile rank of margin levels, for relevant time steps (two limiting branch categories in Figure 1)

Source: RTE data, CRE analysis

Notes:

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

**Interpretation** At the French-Spanish border (FR<->South Western Europe), of the relevant time steps (not covered by the two criteria described above, thus corresponding to only a part of the hours within the semester), about 27% of the time steps have a margin level higher than 100%, which is mainly due to an expected initial configuration in the opposite direction and thus provides more margin than the total capacity of the element. The following decile comprises the time steps with these margins between 90 and 100%, which corresponds to about 8% of the time steps. If the four higher categories are considered, it can be observed that about 67% of the relevant time steps exceed 70% margins.

A similar interpretation can be applied to other borders.

Furthermore, in the Core/Central-Western Europe and Italy North regions in particular, the network elements of neighbouring TSOs have a greater impact on the coordinated capacity calculation, which results in a very low share of time steps where the French network elements are limiting. Therefore, additional measures on RTE’s side would not lead to higher levels of interconnection capacity.

CRE is fully engaged with its regional counterparts to jointly improve capacity calculation processes and cooperation between TSOs and thus increase the levels of interconnection capacity that can be made available for cross-border trade.

## 2.2 Percentage of time steps where RTE has guaranteed capacity in accordance with the revised IME Regulation

The Table 1 specifies the average monthly percentage of time steps during which RTE has guaranteed capacity levels in accordance with the revised IME Regulation, considering the criteria presented in the previous section.

	July 2020	August 2020	September 2020	October 2020	November 2020	December 2020	H2 2020
Core/Central-Western Europe	87%	99%	89%	95%	94%	99%	94%
Italy North	98%	98%	98%	99%	96%	98%	98%
South-Western Europe	85%	84%	89%	85%	88%	88%	86%
Channel	100%	100%	98%	100%	100%	100%	100%

**Table 1 – Monthly percentage of time steps during which RTE has guaranteed capacity levels in accordance with the revised IME Regulation in the four capacity calculation regions to which France belongs.**

*Source: RTE data, CRE analysis*

The results for the second half of 2020 are satisfactory in the four regions of which France is a part, confirming that the French network is sufficiently dimensioned to deliver high levels of cross-border trade.

Throughout 2020, in the Italy North and Channel regions, more than 98% of the relevant time steps are compliant with the revised IME Regulation, while in the Core/Central-Western Europe region compliance is achieved in 92% of time steps. The South-Western Europe region shows a slightly lower compliance rate, in 85% of time steps. Nevertheless, RTE is meeting its commitments under the derogations it was granted in the Core/Central-Western Europe, Italy North and South-Western Europe regions for the year 2020, i.e. 20% on all network elements in the Core/Central-Western Europe region in each time step and 70% on the limiting network elements in the Italy North and South-Western Europe regions in 70% of the relevant time steps.

### 3. OUTLOOK FOR THE COMING YEARS

In the early months of 2020, RTE developed tools to monitor in detail the level of interconnection capacity made available for cross-border trade at the French borders. CRE relies on data generated by these tools and reported to it by RTE as a basis for systematically assessing RTE's compliance with the 70% requirement and identifying areas for further progress in optimising these capacities. Besides the analyses presented in this report, CRE also monitors the distribution of the level of available margins on all the network elements considered in the capacity calculation of the Core/Central-Western Europe, Italy North and South-Western Europe regions.

Further to the publication of the CRE's interim report on the implementation of the 70% requirement at the French borders in the first half of 2020, numerous exchanges took place with several European and French parties. One of the issues that emerged from these discussions was the need to increase transparency on the precise levels of interconnection capacity made available by RTE at the French borders. Therefore, RTE has initiated a project to publish data on the available margin levels on all network elements considered in the capacity calculation of the Core/Central-Western Europe, Italy North and South-Western Europe regions in open access. This publication, in addition to the available margin levels, will also contain information on the limiting nature of these elements for capacity calculation as well as on the price levels in the different areas of the region. It will thus allow stakeholders to develop differentiated analyses according to different criteria regarding the contribution of the 70% requirement to cross-border trade. The launch is planned for June 2021 on the "Open Data Energies Réseaux" (ODRE) platform<sup>12</sup>, with a delivery of data for the whole of 2020 which will be followed in the future by half-yearly deliveries containing the data for the previous half-year.

CRE fully supports this initiative by RTE and believes that open access to data will allow all European and French stakeholders to develop a more complete understanding of the challenges resulting from the implementation of the 70% requirement.

Furthermore, in accordance with the commitments made under the temporary derogations for 2020 within the Core/Central-Western Europe, Italy North and South-Western Europe capacity calculation regions, RTE has worked throughout 2020 to develop tools to increase its capacity to ensure margin levels of 70% without leading to the operational limits being exceeded on the network elements concerned. These tools, known as "validation tools", identify whether available remedial actions would ensure the operational feasibility, on the concerned network elements, of margin levels higher than those directly derived from the capacity calculation. If available remedial actions make an increase in cross-border capacity feasible, this so-called "virtual margin" is added to the capacity provided for day-ahead market coupling. These tools therefore make it possible to more systematically provide margin levels of 70% on the relevant network elements.

Such tools were deployed on 17 February 2021 in the Core/Central-Western Europe capacity calculation region. Results from the first few months confirm that these tools can guarantee 70% on all the network elements considered in the capacity calculation in a greater number of time steps than without them. These tools are expected to be implemented by September 2021 in the Italy North region and by the end of 2021 for the South-Western Europe region.

CRE welcomes this progress and asks RTE to complete the development, operational roll-out and stabilisation of validation tools in the three capacity calculation regions as soon as possible.

<sup>12</sup> <https://opendata.reseaux-energies.fr/pages/accueil/>



ANNEX

The charts below represent, for the capacity calculation regions Core/Central-Western Europe, Italy North and South-Western Europe, the distribution of the margin levels on the French network elements considered in the coordinated capacity calculation.

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

- 50% of the values are included within the box, with the low and high ends representing the 25<sup>th</sup> and 75<sup>th</sup> percentile of the distribution respectively;
- The orange line corresponds to the median of the values; and
- The lower and upper ends ("the whiskers") correspond to 125% of the delta between the 25<sup>th</sup> and 75<sup>th</sup> percentile, from the maximum and minimum of the box respectively, for each month. Consequently, the data points beyond those whiskers represent extreme values.

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

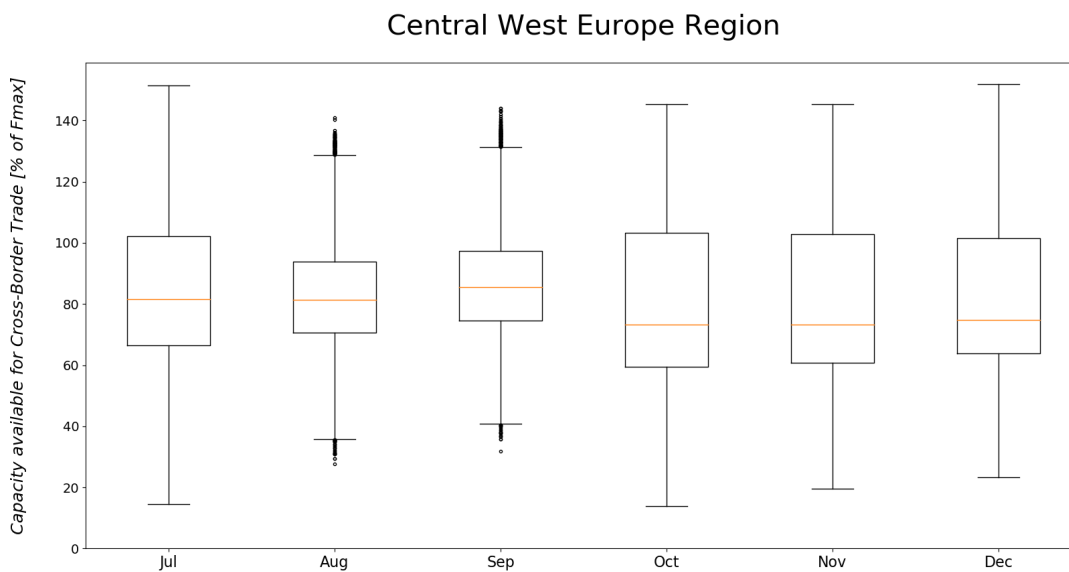


Figure 1 Distribution of the margin level on the French network elements considered in the calculation of the interconnection capacities of the Core / Central-Western Europe region

Source: RTE data, CRE analysis

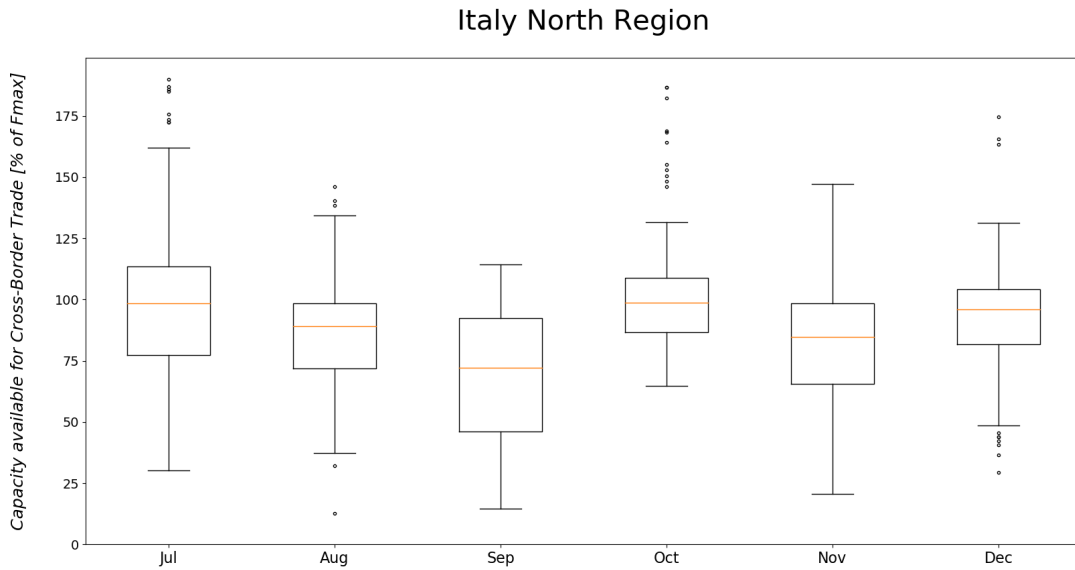


Figure 2 - Distribution of the margin level on the French network elements considered in the calculation of the interconnection capacities of the Italy North region

Source: RTE data, CRE analysis

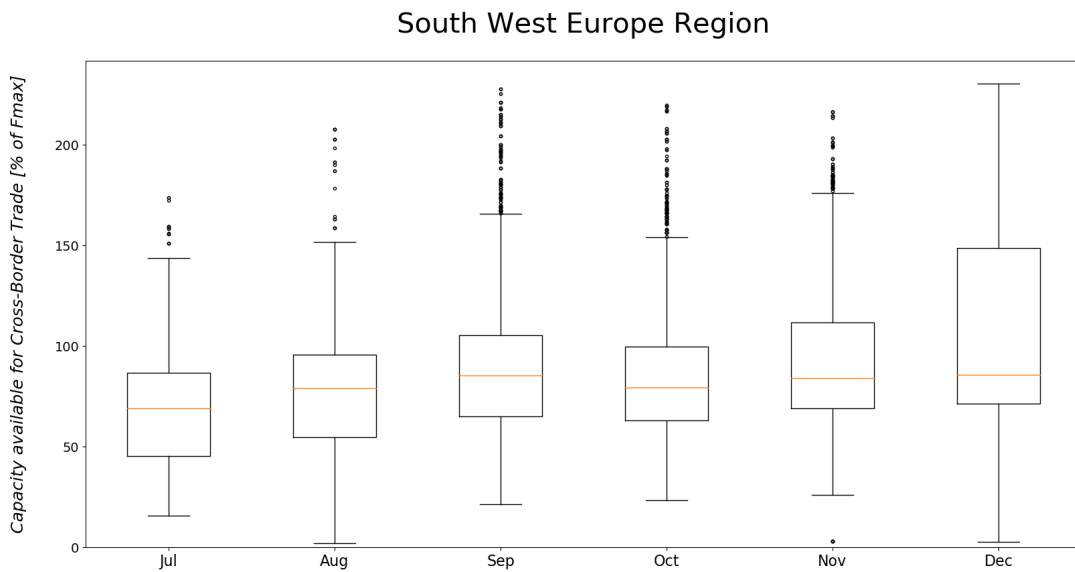


Figure 3 - Distribution of the margin level on the French network elements considered in the calculation of the interconnection capacities of the South-Western Europe region

Source: RTE data, CRE analysis