RTE report on balancing 2022-2023

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1 Executive summary

1.1 Introduction

Réseau de Transport d'Electricité (hereinafter referred to as 'RTE') is the French TSO. It is part of the Continental Europe (CE) synchronous area, and manages its LFC block which is equal to its LFC area, scheduling area and monitoring area.

Pursuant Art. 60(1) of the Electricty Balancing Regulation, RTE publishes a report on balancing covering the calendar years 2022 and 2023.

The French market is underpinned by the concept of balance responsible party. The balance responsible parties are financially responsible for their imbalances. The French balancing model is based on a decentralised dispatch of power generating units or demand response facilities.

Closer to real-time, the power system is managed in a proactive way by RTE. The French balancing market relies on a unit-based scheduling process which gives TSO detailed forecast information about the status of the power system. In order to balance the French power system, RTE uses a dynamic system to calculate the available balancing capacity during the course of the day.

Supply-demand balance and network constraints are jointly managed. This results in integrated processes: an action performed for balancing purposes within the balancing market is also analysed against the impact that it has on the grid.

Convinced of the benefits of establishing a European balancing market, RTE has been involved since the early phase in almost all the European projects. RTE joined the Trans European Replacement Reserves Exchange platform (TERRE platform) in December 2020.

RTE is also preparing its connection to the European platforms:

- for the exchange of balancing energy from frequency restoration reserves with automatic activation (PICASSO platform) by the end of 2024. As a first step towards its connection to PICASSO, RTE has launched a local call for tenders for aFRR activation in November 2023, switching from a pro-rata mode for activation and a settlement based on the Spot price, to a merit-order mode for activation and a settlement based on the French Local Marginal Price;

- for the exchange of balancing energy from frequency restoration reserves with manual activation (MARI platform) by the end of 2025. As a first step towards its connection to MARI, RTE will be sharing its ATCs on the platform from July 2024.

As of 1 March 2024, 241 BRPs are active on the French balancing market. In 2023, the average system imbalance is 370.9 MWh for an ISP with a positive imbalance and -324.2 MWh for a negative imbalance. In average, the system has a positive imbalance 54.4% of the ISPs and a negative imbalance 45.5% of the ISPs.

As for the BSPs, 75 are active as of 1 March 2024, including: producers connected to the transmission grid with a legal obligation to offer their available power on the balancing market, renewable energy producers, storage facility providers, aggregators providing demand side flexibility.

The French balancing market keeps evolving to include the specificities of technologies such as storage, renewables and demand-side management and will pursue its evolution towards an efficient integration of flexibility sources.

Demand-side response is able to participate to all French balancing markets for the different timeframes and in 2023, demand-side management contributed to respectively 10% of FCR, 1% of aFRR and 36 % of mFRR/RR procured volumes.

The participation of storage facilities in FCR has significantly increased in 2022 and 2023: by the end of 2023, 500MW of batteries were certified for FCR. Due to the change in the procurement of aFRR in June 2024 (switch from prescription with a secondary market to a primary market with a call for tender for aFRR), the certified aFRR volume of storage facilities has also increased in 2023: by the end of 2023, 28 MW of batteries were certified for aFRR.

1.2 Progress, timeline towards joining the European platforms and / or balancing capacity cooperations

European balancing platform for the activation of balancing energy	Accession timeline	Reasoning for derogation and status of the derogation (granted or not)
RR Platform	Connected since December 2020	
aFRR Platform	Q4 2024	Delay in implementation + connection conditioned to high prices mitigation measures submitted to ACER's approval - granted
mFRR Platform	Q4 2025	Delay in implementation - granted
IN Platform	Connected since February 2016	

Balancing capacity cooperations	FCR cooperation member Status (MoU, project, member, observer…)	Accession timeline
FCR cooperation	Member	**Connected since January 2017**

Question:	Please select an option:
Q1: Did you carry out regulatory and IT developments for allowing Demand, RES and Storage to participate at European balancing platforms	**Yes**
1.1. If response in Q1 is "no", why?	Non applicable.
1.2. If response in Q1 is "yes", what were the main results"?	Storage facility providers currently participate to TERRE platform. Demand-side management and storage facilities participate to the local tender for aFRR activation, and will participate to the aFRR standard platform once RTE is connected.
Q2: Did you carry out regulatory and IT developments for adopting standard energy products (aFRR, mFRR, RR balancing energy products) in your system?	**Yes**

Question:	Please select an option:
1.1. If response in Q2 is "no", why?	Non applicable.
1.2. If response in Q2 is "yes", what were the main results?	- Connection to TERRE platform in December 2020 - Connection to PICASSO platform expected in Q4 2024: all regulatory and IT developments have been carried out except for the upcoming high prices mitigation measures. RTE has reached the first step towards the connection to PICASSO by launching the national tender for aFRR activation. - Connection to MARI platform expected on Q4 2025: regulatory and IT developments are currently being carried out.
Q4: Do you procure a standard product for balancing capacity?	**YES – since June 2024, RTE procures a standard product for aFRR capacity through a national tender.**
Q5: What are the main characteristics?	**Non-applicable.**
Q6: Did you assess the potential for exchange of balancing capacities or sharing of reserve?	**Yes**
6.1. If response in Q6 is "no", why?	Non applicable
6.2. If response in Q6 is "yes", what were the main results?	RTE's Research & Development is currently leading studies to assess this potential.
Q7: Are you already involved in a BCC as a member or as an observer?	**No**

1.3 Evolutions of the terms and conditions for BRPs and BSPs related to the EB regulation implementation during the last 2 calendar years and further evolutions foreseen for the future

Evolution of the terms and conditions for BSP
Content
Market Rules: Chapter 4 – Frequency Ancillary Services • **Evolution of the T&Cs related to the participation of storage facilities, decentralised demand response and flexibility aggregations to FCR and aFRR (approved, version applicable as of 1 September 2022 and version applicable as of 1 April 2024)** • **Evolutions required for the resumption of the national call for tender for aFRR capacity in June 2024 (approved, version applicable as of 1 April 2024)** • **Introduction of elastic demand for aFRR energy (Not submitted, application in Q4 2024)**

- **Evolution of the T&Cs related to the participation of renewable energy sources to FCR and aFRR (under discussion)**

Market Rules : Chapter 2 – Balancing Mechanism

- **Introduction of the standard energy bids for mFRR (approved, version applicable as of 1 April 2024)**
- **Introduction of an additional day-ahead scheduling gate after the first intra-day auction (approved, version applicable as of 1 April 2024)**
- **Switch to 96 gates for scheduling (approved, version applicable as of 1 April 2024)**

mFRR-RR terms and conditions

- **Evolutions regarding mFRR/RR dimensioning and the mFRR product (under discussion)**

Evolution of the terms and conditions for BRP (Market Rules : Chapter 3 - Balance Responsible Party System)

Content

- **Implementation of the European methodology defining the new imbalance settlement at synchronous borders in accordance with Articles 50(3) and 51(1) of the Electricity Balancing Guideline (approved and version applicable as of 1 September 2021)**

- **Establishment of the European methodology for the harmonisation of balance responsible party imbalance settlement, based on Article 52(2) of the Electricity Balancing Guideline. (approved and Version applicable as of 1 September 2021)**

- **Implementation of the 15-minute Imbalance Settlement Period in accordance with Article 53(1) (approved and Version applicable as of 1 April 2022. In accordance with the provisions of Article 62(9) of the EB regulation, the French regulator has granted a derogation to defer the introduction of a 15-minute imbalance settlement period to 1 January 2025.)**

- **Evolutions regarding financial securing of BRPs (Approved version applicable as of 1 September 2022)**

Evolution of the terms and conditions for BRP – “Content” should include, among other information, the following content as per the Articles 52, 53, 54 and 55 in the EB Regulation:

Question:	Please select an option:
Q1. Was 15-min Imbalance Settlement Period (ISP) implemented by 1 January 2022?	**Derogation**
1.1. If response in Q1 is "derogation" or "exemption", until when was this derogation/exemption granted?	January 2025
Q2. Has your TSO made use of additional components pursuant ISH Methodology Art 9(6) as per 1 January 2022?	**Yes**
2.1. Scarcity component?	Not considered
2.2. Incentivizing component?	Implemented (with a dedicated coefficient)
2.3. Component related to financial neutrality of the TSO?	Implemented (with a dedicated coefficient)
Q3. Has your TSO made use of dual pricing as per 1 January 2022?	**No**
3.1. Condition (a)	Not considered
3.2. Condition (b)	Not considered
3.3. Condition (c)	Not considered
3.4. Condition (d)	Not considered
3.4. Condition (e)	Not considered

1.4 Summaries and main results of the analysis of Articles 60(2)(a-f):

1.4.1 Procurement of balancing capacities

Over the course of the years 2022 and 2023:

- RTE has procured on average 502 MW of FCR through a European tender, the FCR cooperation, performed daily:

	2022	2023
TSO need (MW)	489	514
Total procurement cost (M€)	88	25
Average annual capacity price (k€/MW/y)	180	48.6

- RTE has prescribed daily an average of 709 MW of aFRR to the French stakeholders:

	2022	2023
TSO need (MW)	720	698
Total procurement cost (M€)	104	136
Average annual capacity price (k€/MW/y)	144	194

- RTE has jointly procured mFRR and RR through an annual national tender and a daily tender:

mFRR/RR	2022		2023	
	Annual	**Daily**	**Annual**	**Daily**
TSO need (MW)	1000	500	750	750
Total procurement cost	10	13	228	14.6
Average annual capacity price (k€/MW/y)	10	17.3	304	29.2

RTE contributes to the European discussions about the opportunities for the exchange of balancing capacity and sharing of reserves but considers that certain pre-requisites have to be met before joining such a cooperation for the procurement of balancing capacity:

- resumption of the national tender for aFRR capacities (effective since June 2024)
- connection to the PICASSO and MARI platforms (by the end of 2024 and 2025 respectively)
- harmonization of standard balancing capacity products within potential balancing capacity cooperations;
- the approval of the different methodologies to build any cooperation on a stable and comprehensive regulatory framework.

1.4.2 Balancing the French system in real-time

In December 2020, RTE joined the TERRE platform. After a period of operation of under control, RTE started a 24/7 operation of TERRE in March 2022. In 2022 and 2023, the liquidity on TERRE has stabilized to a few hundred MW. However, the use of specific products is still necessary to cover all the imbalance.

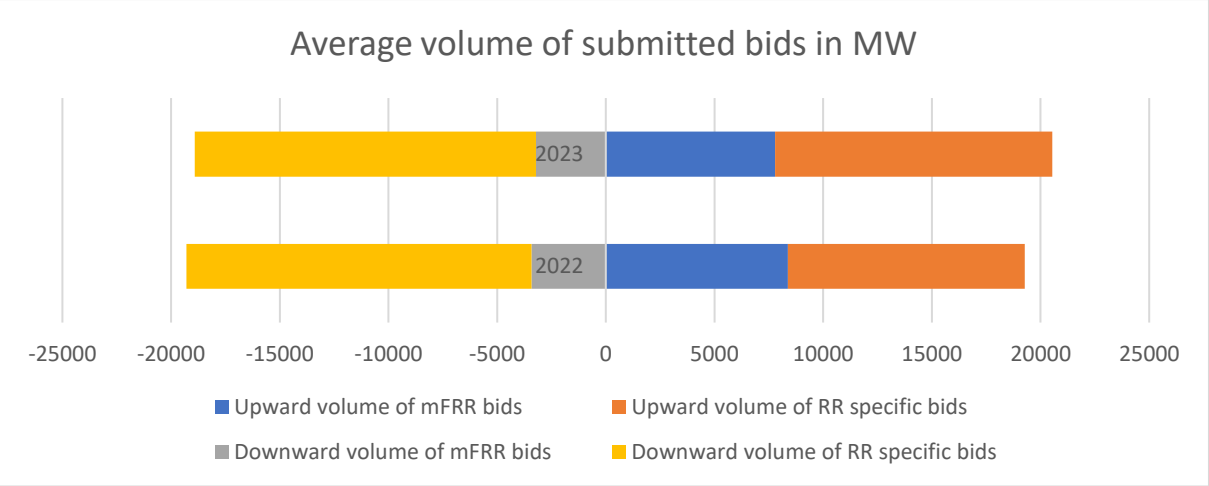

Figure 1: Volume of submitted specific bids in MW for 2022 and 2023

In 2022 and 2023, there were on average 20.5 GW of upward submitted bids and 18.9 GW of downward submitted bids per ISP.

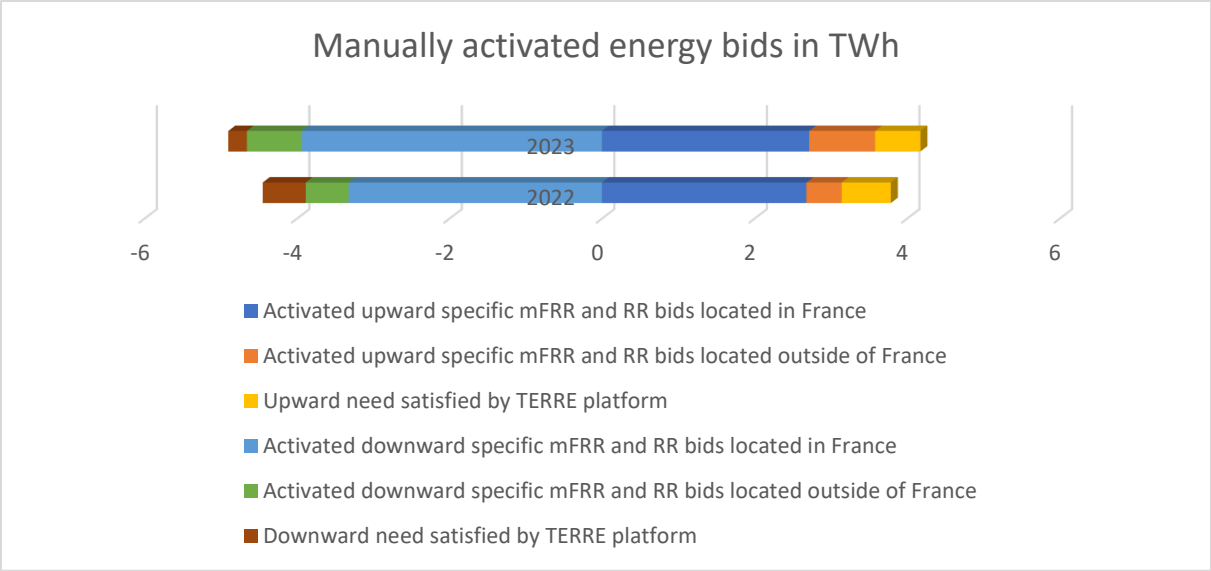

Figure 2: Volume of activated bids in TWh for 2022 and 2023

In 2022:

- 644 GWh of upward needs were satisfied by the TERRE platform, representing 17% of the upward mFRR/RR energy activated to balance the system;
- 562 GWh of downward needs were satisfied by the TERRE platform, representing 12% of the downward mFRR/RR energy activated to balance the system.

In 2023:

- 594 GWh of upward needs were satisfied by the TERRE platform, representing 14% of the upward mFRR/RR energy activated to balance the system;
- 243 GWh of downward needs were satisfied by the TERRE platform, representing 5% of the downward mFRR/RR energy activated to balance the system.

1.4.3 Justification for using specific mFRR and RR energy products

Specific products activated locally will remain necessary to balance the system as the standard products do not allow for all imbalance to be reabsorbed. Although the liquidity on TERRE has stabilized to a few hundred MW in 2022 and 2023, it is not sufficient to cover all the imbalance. Therefore, as RTE cannot request more than what is submitted by French BSPs on the platform, the use of specific products to balance the system in energy is still required.

These specific products are also necessary for coordinated management of supply-demand balance and network constraints.

Furthermore, activating only standard balancing energy bids from mFRR and RR could have foreclosure effects on certain capacities currently participating to these markets.

Lastly, specific products remain necessary to continuously monitor available adequacy margins and risks at various relevant times, and where necessary restore the required level of margins by activating means with a longer activation time. Standard products, available close to real time, are shared by definition (they can be activated to satisfy another TSO's need) and consequently they cannot meet this purpose.

2 Whereas

This document provides a report in accordance with Article 60 of the Commission Regulation (EU) 2017/2195 establishing a guideline on electricity balancing (hereafter referred to as the "Electricity Balancing regulation") for years 2022 and 2023.

Article 60

TSO report on balancing

1. At least once every two years, each TSO shall publish a report on balancing covering the previous two calendar years, respecting the confidentiality of information in accordance with Article 11.

2. The report on balancing shall:

(a) include information concerning the volumes of available, procured and used specific products, as well as justification of specific products subject to conditions pursuant to Article 26;

(b) provide the summary analysis of the dimensioning of reserve capacity including the justification and explanation for the calculated reserve capacity requirements;

(c) provide the summary analysis of the optimal provision of reserve capacity including the justification of the volume of balancing capacity;

(d) analyse the costs and benefits, and the possible inefficiencies and distortions of having specific products in terms of competition and market fragmentation, participation of demand response and renewable energy sources, integration of balancing markets and side-effects on other electricity markets;

(e) analyse the opportunities for the exchange of balancing capacity and sharing of reserves;

(f) provide an explanation and a justification for the procurement of balancing capacity without the exchange of balancing capacity or sharing of reserves;

(g) analyse the efficiency of the activation optimisation functions for the balancing energy from frequency restoration reserves and, if applicable, for the balancing energy from replacement reserves.

3. The report on balancing shall either be in English or at least contain an executive summary in English.

4. Based on previously published reports, the relevant regulatory authority in accordance with Article 37 of Directive 2009/72/EC shall be entitled to require changes to the structure and content of the next TSO report on balancing.

3 Abbreviations

Abbreviation	Full name
ACER	Agency for the Cooperation of Energy Regulators
BRP	Balancing responsible party
BSP	Balancing service provider
CRE	Commission de régulation de l'énergie – French NRA
DSO	Distribution system operator
EB	Electricity Balancing
FCR	Frequency containment reserve
aFRR	Automatic frequency restoration reserve
mFRR	Manual frequency restoration reserve
IGCC	International Grid Control Cooperation
ISP	Imbalance settlement period
LER	Limited Energy Reservoir
MARI	Manually Activated Reserves Initiative
MW	Mega-watt
MWh	Mega-watthour
TWh	Tera-watthour
NRA	National regulatory authority
PICASSO	Platform for the International Coordination of Automated frequency restoration and Stable System Operation
RTE	Réseau de Transport d'Electricité
RR	Replacement reserve
SO	System operation
TERRE	Trans European Replacement Reserves Exchange
TSO	Transmission system operator
TURPE	"Tarif d'Utilisation du Réseau Public d'Electricité" - tariff paid by grid users

4 List of figures

5 Electricity balancing in France

The electricity balancing market is the final deadline to ensure frequency stability on the power system. It continuously maintains equality between the power injected into the grid (electricity generated nationally or imported from abroad) and the power withdrawn from it (electricity consumed nationally or exported abroad). On an open market where a multitude of market parties can independently manage their asset portfolio (producers, suppliers, traders, etc.), it is also the final deadline to ensure compliance with the technical constraints of the power system, such as those linked to the network flows.

In France this task has been entrusted to RTE in accordance with the provisions of article L. 321-10 of the French Energy Code.

5.1 Design of the French balancing model

The model implemented in France is underpinned by two fundamental pillars:

- provide the balance responsible parties (hereinafter referred to as the "BRPs") with the ability to optimize their portfolios and anticipate the balance of their perimeter up to close to real time;
- enable the TSO to take the most appropriate decisions for balancing the system, including when making forecasts, and ensure coordinated management of the grid constraints associated with the supply-demand balance and grid power flows. These decisions rely on predictive analyses produced by the TSO based on data sent by the market parties at different timeframes.

In France, the BRPs are financially responsible for their imbalances. The design of the imbalance settlement price aims to incentivise the balancing of BRPs starting D-1 and to reduce the need for the TSOs to take action in real-time.

Balancing the French power system involves decentralised management of the dispatching of generation means or consumption flexibility. Market parties are responsible for dispatching available capacity (production means and consumption flexibilities). However, closer to real time, the power system is managed by the TSO. After the cross border intraday gate closure time, only RTE is allowed to perform operations which might affect the system's balance.

In order to balance the French power system, RTE dynamically calculates the balancing capacity required during the course of the day. This model relies on a continuous monitoring of available margins and risks at various relevant times. In the event of discrepancy between available margins and the margins required in relation to the risk criteria as defined by the public authorities, special measures are implemented as part of the balancing market in order to increase the capacity available to RTE.

5.2 Actors of the French balancing model

As of 1 March 2024, 241 BRPs are active on the French balancing market. In 2023, the average system imbalance is 370.9 MWh for an ISP with a positive imbalance and -324.2 MWh for an ISP with a negative

imbalance. In average, the system has a positive imbalance 54.4% of the ISPs and a negative imbalance 45.5% of the ISPs.

As for the BSPs, 75 are active as of 1 March 2024, including: producers connected to the transmission grid with a legal obligation to offer their available power on the balancing market, renewable energy producers, storage facility providers, aggregators providing demand side flexibility.

The French balancing market keeps evolving to include the specificities of technologies such as storage, renewables and demand-side management and will pursue its evolution towards an efficient integration of flexibility sources:

- Demand-side response is able to participate to all French balancing markets for the different timeframes and in 2023, demand-side management contributed to respectively 10% of FCR, 1% of aFRR and 36 % of mFRR/RR procured volumes.

- The participation of storage facilities in FCR has significantly increased in 2022 and 2023: by the end of 2023, 500MW of batteries were certified for FCR. Due to the upcoming change in the procurement of aFRR (switch from prescription with a secondary market to a primary market with a call for tender for aFRR), the certified aFRR volume of storage facilities has also increased in 2023: by the end of 2023, 28 MW of batteries were certified for aFRR.

- RTE continuously aims at removing all the barriers that could prevent the full participation of renewable energy resources to balancing, in both upward and downward direction, and is currently working with its National Regulation Authority and with the French Government to compel them to offer their available capacity downwards.

6 Procurement of balancing capacity

6.1 Dimensioning of balancing capacity

In accordance with art-60(b), RTE provides the summary analysis of the dimensioning of reserve capacity including the justification and explanation for the calculated reserve capacity requirements

The main principles for the dimensioning of balancing reserves are stipulated in the European System Operation Regulation and further specified for RTE in the Load-frequency control block agreement approved by the French regulatory authority in accordance with the System Operation Regulation.

RTE is forming one load-frequency control block (LFC Block) and applies the following main principles:

- After an incident, the TSO shall be able to restore frequency and cross-border exchanges in its balancing area in less than 15 min. The dimensioning of reserves available in less than 15 min shall be based on the dimensioning incident. For RTE, it corresponds to the loss of the biggest production unit connected to the grid, which was in 2022 and 2023 a 1500 MW nuclear power plant (upward) and usually a pomp storage unit of 1280 MW or a HVDC link of 1000 MW (downward);
- The dimensioning of reserves shall aim at respecting control deviation quality criteria stipulated in the System Operation Regulation, which were the following for RTE in 2023:
    - control deviation, on a quarter hour period, shall be below 205 MW with a probability greater than 70%;

- control deviation, on a quarter hour period, shall be below 387MW with a probability greater than 95%.

In accordance with these principles, RTE dimensions the required reserve capacity with a combination of automatic and manual reserves:

- RTE procures at least 500 MW of automatic frequency restoration reserve (aFRR), upward and downward, which can be activated in less than 6min40s (709 MW in average);
- RTE procures at least 1000 MW of manual frequency restoration reserve (mFRR), upward only, which can be activated in less than 13 min, with a maximum of 4 activations per MW contracted, corresponding to 4h of energy per day; 1000 MW being the difference between the maximum power of the biggest nuclear power plant and the minimum procured aFRR capacity.
- Lastly, RTE procures a maximum of 500 MW (the same amount as the minimum requirement for aFRR) of replacement reserve (RR), upward only, which can be activated in less than 30 min, with a maximum of 4 activations per MW contracted, corresponding to 3h of energy per day.

As of today, this dimensioning of reserves ensures compliancy with the associated indicators to assess the frequency control deviation quality management. However, RTE keeps monitoring these indicators and implements a strategy to alleviate the risk of frequency quality degradation. In that goal, RTE is considering the possibility to procure downward mFRR capacity and is currently leading discussing this topic with market parties. Dimensioning of reserves will also be rediscussed in the following years to prepare the implementation of the Market Design Reform.

6.2 Procurement of balancing capacity

In accordance with art-60(c), RTE provides the summary analysis of the optimal provision of reserve capacity including the justification of the volume of balancing capacity.

6.2.1 Prequalification of balancing reserves

In accordance with the System Operation regulation, the connecting TSO is responsible for the prequalification of the balancing capacities. All the steps to qualify the capacities based on the requirements of the System Operation regulation are described in the national terms and conditions for Frequency Ancillary Services.

In 2022, prequalification for FCR of storage facilities has been included in the national terms and conditions for Frequency Ancillary Services. In 2023, prequalification steps were modified for decentralized demand-response, in order to adapt the process to thermosensitive assets. Flexibilities with non-permanent power limitations, which were previously forbidden for Frequency Ancillary Services, have also been allowed to be prequalified.

By the end of 2023, there were 124 MW of demand side management and 500 MW of storage facilities certified for FCR.

6.2.2 *Frequency containment reserve (FCR) – European tender*

Procurement provisions

In January 2017, RTE joined the FCR cooperation, a European tender organised by six European countries: Germany, Austria, Belgium, Denmark, the Netherlands and Switzerland. As a consequence, France has replaced its national prescription by a cross-border European tender of FCR. Belgium, Denmark and Slovenia have joined the FCR cooperation between 2020 and 2021, and Czech Republic in 2023.

From July 1st of 2020 onwards, the FCR cooperation runs a daily day-ahead tender with 4-hour granularity products. This tender covers over 1500 MW of procured FCR capacity, which represents more than 50% of the 3000 MW required at the continental European synchronous area level.

The FCR cooperation aims at (i) improving economic efficiency and reduce procurement costs of frequency containment reserve, (ii) fostering competition and (iii) facilitating the entry of new market participants and new technologies.

Results of the FCR tender

The cost of procuring FCR is covered by the tariff paid by grid users called TURPE for "Tarif d'Utilisation du Réseau Public d'Electricité".

	2022	2023
TSO need (MW)	489	514
Total procurement cost (M€)	88	25
Average annual capacity price (k€/MW/y)	180	48.6

In 2022, France has exported 50 MW in average compared to a total need of 489 MW. The average price of FCR in France was 22.26 €/MW/h, with a maximum price at 282.72 €/MW/h in April and a minimum at 0 €/MW/h in January.

In 2023, RTE has exported 135 MW in average compared to a total need of 514 MW. The average price of FCR in France was 7.48 €/MW/h, with a maximum price at 62.12 €/MW/h in September and a minimum at 0.36 €/MW/h in July.

FCR prices have significantly increased in 2022 due to the high SPOT prices. The average price in 2023 is significantly lower, following the decrease of the average SPOT prices. The amount of exported FCR has increased compared to 2022 due to the availability of nuclear power plants after a period of maintenance in 2022, and to the increasing part of storage facilities in the FCR procurement.

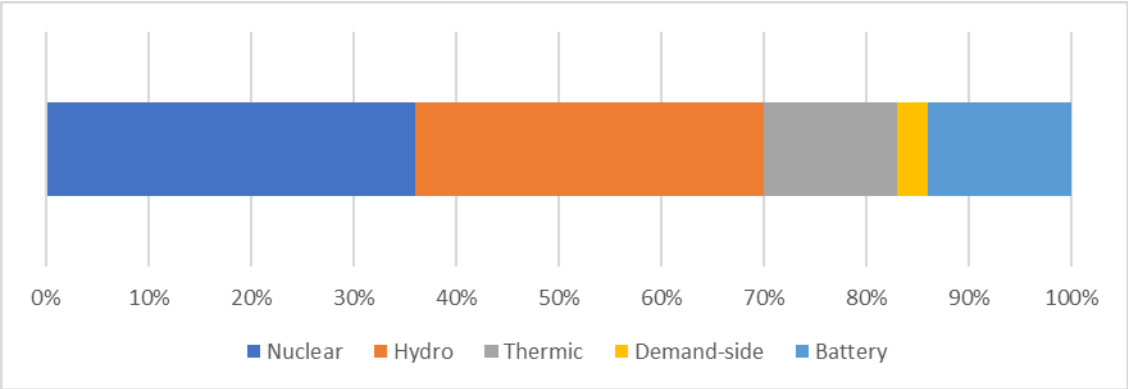

Figure 3: Certified capacities for FCR as of June 2024

6.2.3 Automatic frequency restoration reserve (aFRR) – National prescription

Procurement provisions

In accordance with Article 32 of Electricity Balancing Regulation, the procurement of aFRR capacity should be market-based and dissymmetric. RTE launched its first iteration of the national tender for the procurement of aFRR capacity in November 2021. However, due to high prices and a limited liquidity on the market, CRE asked RTE to suspend the tender until further notice after 3 weeks of operation, and granted RTE a derogation to Article 32 of Electricity Balancing Regulation to leave time to attract more liquidity to the aFRR procurement market and work on price mitigation measures before reopening the tender in June 2024

In 2022 and 2023, the procurement of aFRR has been performed through a national prescription to mandatory market participants with production units capable of providing ancillary services to the system and paid at a regulated price, around 10,6€/MW symmetric /30 min. Prescriptions are symmetric (upward and downward), on a pro-rata basis taking into consideration actual scheduling of capable production units. Capable capacities not under prescription (consumption sites and batteries) can propose their capacity to the mandatory market participants through a secondary market for the exchange or reserves between market participants.

RTE set up an over-the-counter exchange mechanism to allow market participants to exchange reserves (FCR and aFRR). This mechanism, accompanied by an obligation to notify RTE of the exchange, optimizes how ancillary services (FCR and aFRR) are provided by capable capacities through a market mechanism. Mandatory market participants can transfer their obligation to another certified market participant.

Results of the national prescription of aFRR

The cost of procuring is determined by the need and a regulated price called "*Prix forfaitaire de capacité*". The cost of procuring aFRR is covered by the tariff paid by grid users called TURPE.

	2022	2023
TSO need (MW)	720	698
Total procurement cost (M€)	104	136
Average annual capacity price (k€/MW/y)	144	194

Reopening of the tender for aFRR procurement

The national tender for the procurement of aFRR has reopened in June 2024, replacing the current design relying on prescription and a secondary market to a primary market. The product is designed as follows:

- 1-hour dissymmetric capacity product;
- 1 MW granularity;
- Possibility of linking upward and downward bid to form symmetric offers;
- Possibility of linking a bid on several hours to form block bids;
- Pay-as-clear settlement, with two different prices for each direction.

Compared to 2021, the liquidity on the aFRR procurement market has improved:

- There are twice more potential participants compared to 2021;
- The volume of qualified capacities has significantly increased:
    - + 450 MW of qualified thermic units
    - + 80 MW of qualified storage and demand response.

RTE also introduced a new measure aiming at mitigating high prices, by forcing the upward prices and downward prices to be equal in case of symmetric bids. This measure will prevent bids to be selected in both directions when the bid price is low in only one direction.

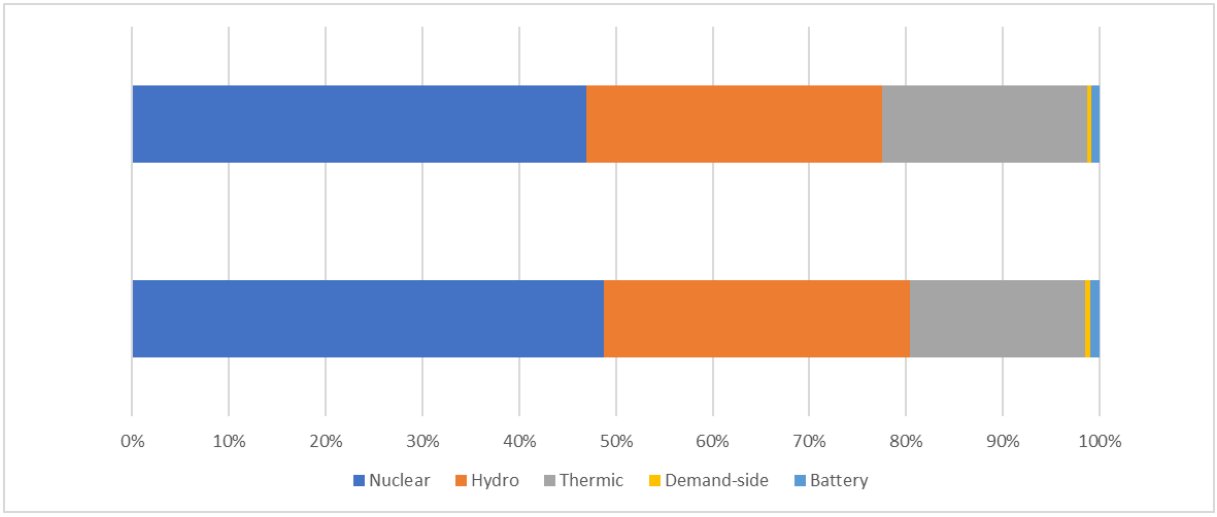

Figure 4: Certified capacities for aFRR as of June 2024

6.2.4 Tertiary reserves (mFRR and RR) – National daily and annual tender

Procurement modalities

Since June 1st, 2021, RTE procures 1500 MW of upward mFRR and RR balancing capacity through an annual and daily call for tender: at least 1000 MW of mFRR, available in 13 minutes, and the complementary volume of RR, available in 30 minutes. These tenders are open to production and consumption sites connected either to the TSO or the DSOs.

The current share contracted through the daily and the annual call for tender is the following: 50% of the total volume (750 MW) contracted through the daily tender, and 50% of the total volume (750MW) contracted through the annual tender. This share is to be re-evaluated each year and is validated by the French National Regulatory Authority (CRE), in accordance with the Clean Energy Package. The volume contracted through the daily call for tender is increased by a part of the volume contracted through the annual call for tender when the BSPs have declared their incapacity to fulfill their commitments on the relevant periods.

Results of the national annual tender (mFRR and RR)

mFRR/RR	2022		2023	
	Annual	Daily	Annual	Daily
TSO need (MW)	1000	500	750	750
Total procurement cost	10	13	228	14.6
Average annual capacity price (k€/MW/y)	10	17.3	304	29.2

Certified capacities for mFRR/RR

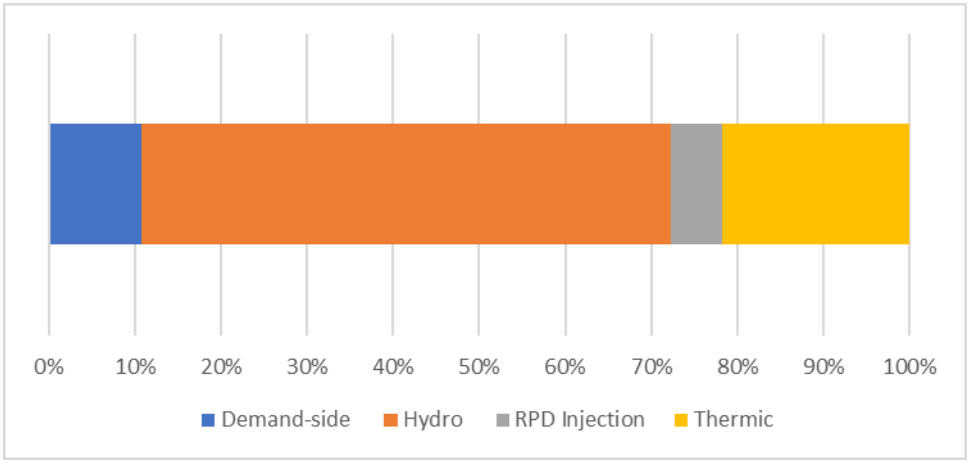

Figure 5: Certified capacities for mFRR/RR as of December 31st, 2023

Evolutions on the capacity market for mFRR/RR

In 2023, changes were made to the mFRR/RR Terms & Conditions to simplify some provisions on the mFRR/RR product. These simplifications aim at improving the accession of market participants to the mFRR/RR procurement market.

6.3 Establishing the framework for the future regional exchange of procured reserves

In accordance with art-60(e), RTE analyses the opportunities for the exchange of balancing capacity and sharing of reserves

Currently in France and in Europe, procurement of reserves is mostly performed at a national/local scale. RTE believes a regional procurement of reserves would be an interesting step forward as it increases market size and encourages competition.

FCR cooperation

RTE joined The FCR cooperation in January 2017. The tender has evolved towards a day-ahead tender with 4-hour products since July 1st, 2020. RTE took actively part in the evolutions and will pursue its involvement in this cooperation.

Exchanging of balancing capacity or sharing of reserves – aFRR and mFRR

Contrary to the FCR, the cross-border procurement of balancing capacity such as aFRR, mFRR and RR requires to allocate cross-zonal capacity to ensure the service procured can be delivered.

To foster the emergence of regional cooperation for the procurement of reserve, the Electricity Balancing regulation introduced the possibility for TSOs to allocate cross-zonal capacity for the exchange or the sharing of reserves, which was not possible before. The harmonized methodology on "Cross Zonal Capacity Allocation for the exchange of balancing capacity or sharing of reserves" in accordance with Article 40 (co-optimization) and with Article 41 (market based) of the Electricity Balancing regulation was approved by ACER in July 2023.

6.4 Justification for the procurement of balancing capacity without the exchange of balancing capacity or sharing of reserves

In accordance with art-60(f), TSO has to provide an explanation and a justification for the procurement of balancing capacity without the exchange of balancing capacity or sharing of reserves.

RTE actively contributes to the European discussions regarding Cross-border Capacity Allocation for the procurement of reserves, but considers that certain pre-requisites have to be met before joining such a cooperation for the procurement of balancing capacity:

- resumption of the national tender for aFRR capacities (by the end of June 2024)
- connection to the PICASSO and MARI platforms (by the end of 2024 and 2025 respectively)
- harmonization of standard balancing capacity products within potential balancing capacity cooperations;
- the approval of the different methodologies to build any cooperation on a stable and comprehensive regulatory framework.

7 Balancing the system in real time

According to art-60(a), this report includes information concerning the volumes of available, procured and used specific products, as well as justification of specific products subject to conditions pursuant to Article 26;

7.1 Use of specific and standard bids

7.1.1 Connection to the European balancing platforms

In December 2020, RTE joined the Trans European Replacement Reserves Exchange platform (TERRE platform). In order to ensure a smooth transition towards new processes guaranteeing system and operational security, RTE introduced a period of operation under control. During this period, RTE gradually increased its participation by connecting to a limited number of gates per day at the beginning, in working hours, to reach a 24/7 operation in March 2022. In 2022 and 2023, the liquidity on TERRE has stabilized to a few hundred MW. However, the use of specific products is still necessary to cover all the imbalance.

RTE is also preparing its connection to the European platform for the exchange of balancing energy from frequency restoration reserves with automatic activation (PICASSO platform) by the end of 2024. As a first step towards its participation to PICASSO, RTE launched its local merit-order for the activation of aFRR in late 2023. Until then, the activation of aFRR relied on a common signal sent to all the units, and the settlement of the activated aFRR was based on the day-ahead SPOT Price. The aFRR activation now relies on a merit-order list, and the settlement is based on the marginal price of the selected bids.

Lastly, RTE is working on its connection to the European platform for the exchange of balancing energy from frequency restoration reserves with manual activation (MARI platform) by the end of 2025. As a preliminary step for its connection to MARI, which is expected for late 2025, RTE will start sharing its ATCs to the platform in July 2024.

7.1.2 Volumes of submitted bids

Specific bids

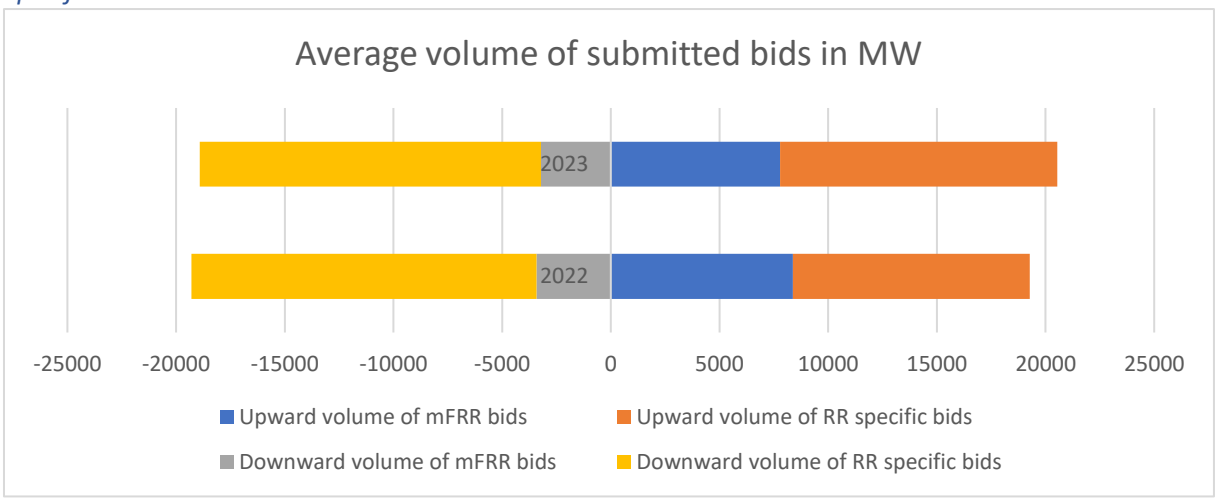

Figure 6: Volume of submitted specific bids in MW for 2022 and 2023

In 2022 and 2023, there were on average 20.5 GW of upward submitted specific bids and 18.9 GW of downward submitted specific bids per ISP.

As the local merit-order for aFRR activation was only launched in late 2023, the aFRR bids have not been included in the graph above. From November 21st, 2023, to December 31rst, 2023, there were on average 830 MW of upward and downward submitted aFRR bids.

Standard bids

RR standard bids can be submitted up to fifty-five minutes before real time and can be activated for balancing purposes, or for international congestion management. There were on average 575 MW of upward available bids and 792 MW of downward available bids per balancing time unit in 2022, and 477 MW of upward available bids and 479 MW of downward available bids per balancing time unit in 2023.

The unavailable bids represent:

- 20% of upward submitted bids and 25% of downward submitted bids in 2022;
- 17% of upward submitted bids and 29% of downward submitted bids in 2023;

These bids are not shared to the RR platform for different reasons: for margin management, for congestion management or because a specific bid submitted for the same unit is being activated for security reasons.

7.1.3 Volumes of activated bids

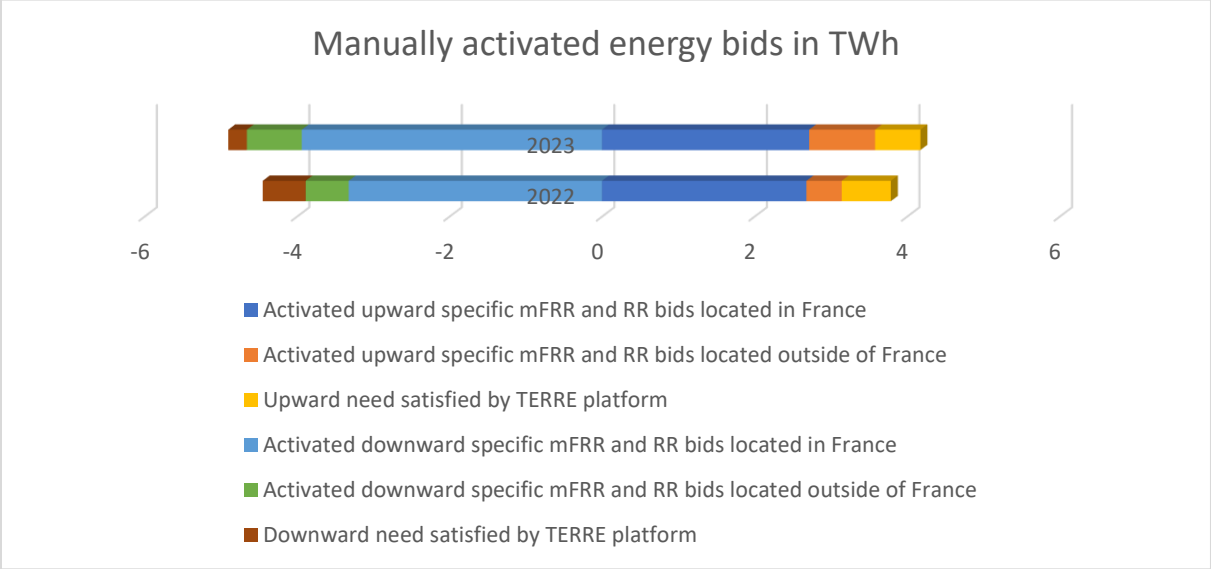

Figure 7: Volume of activated bids in TWh for 2022 and 2023

In 2022:

- 644 GWh of upward needs were satisfied by the TERRE platform, representing 17% of the upward mFRR/RR energy activated to balance the system;
- 562 GWh of downward needs were satisfied by the TERRE platform, representing 12% of the downward mFRR/RR energy activated to balance the system.

In 2023:

- 594 GWh of upward needs were satisfied by the TERRE platform, representing 14% of the upward mFRR/RR energy activated to balance the system;
- 243 GWh of downward needs were satisfied by the TERRE platform, representing 5% of the downward mFRR/RR energy activated to balance the system.

To balance its system, RTE also activates specific bids made by facilities located outside of France, also referred to as “exchange points”. These exchange points represented:

- 12 % of the activated specific upward bids and 13% of the activated specific downward bids in 2022;
- 21 % of the activated specific upward bids and 15% of the activated specific downward bids in 2023.

7.2 Justification for the use of specific bids

Specific products activated locally will remain necessary to balance the system as the standard products do not allow for all imbalance to be reabsorbed. Although the liquidity on TERRE has stabilized at a few hundred MW over the last two years, it is not sufficient to cover all the imbalance. Therefore, as RTE cannot request more than what is submitted by French BSPs on the platform, the use of specific products to balance the system in energy is still required.

Standard RR products also do not provide the same flexibility as some specific products, which can be used to face significant consumption variations. French consumption can increase or decrease with an almost 3000 MW gradient per quarter hour, while the global variation of production follows a staircase profile over a 30-minutes period. Therefore, RTE can face a significant imbalance at the beginning and at the end of an imbalance settlement period, leading to frequency deviations if it’s not reabsorbed. Some specific products can help absorbing this imbalance with a 5-minute granularity, contrary to standard RR products.

Specific products are also necessary for a coordinated management of supply-demand balance and network constraints. RTE uses specific products ahead of the gate closure time to proactively solve congestions issues identified ex-ante and manage flows on the grid.

Furthermore, activating only standard balancing energy bids from mFRR and RR could have foreclosure effects on certain capacities currently participating to these markets. RTE is currently assessing the ability for specific products to comply with the mFRR standard product and does so in coordination with market parties, to avoid annihilating the efforts made to facilitate the participation to new markets parties and technologies to the French balancing market.

Lastly, specific products remain necessary to continuously monitor available adequacy margins and risks at various relevant times, and where necessary restore the required level of margins by activating means with a longer activation time. Standard products, available close to real time, are shared by definition (they can be activated to satisfy another TSO’s need) and consequently they cannot meet this purpose.