MEMORANDum

To BSP's of mFRRda

CLASSIFICATION C1 - Public Information
DATE October 22, 2021
REFERENCE
FROM SON-SY

SUBJECT Product information mFRRda (incident reserve)

DECISION ☐
INFORMATION ■

TenneT takes great care in translation of this document. It is however possible that this translation could be multiple interpretable or incorrect. In case of discrepancies due the translation of the Dutch Document, the Dutch document shall prevail.

1. Definitions

Definition	Abbriviation	Formally known as
automatic Frequency Restoration Reserve	aFRR	Regulatingpower
manual Frequency Restoration Reserve, schedule activated	mFRRsa	Reservepower
manual Frequency Restoration Reserve, direct activated	mFRRda	Incident reserve
Balancing Service Provider	BSP	BSP
Balance Responsible Party	BRP	PV
Imbalance Settlement Period	ISP	PTE
Full Activation Time	FAT	Voorflank
DeActivation Period	DAP	Naflank

All used definitions and abbreviations are to be found in thr EB-GL and/or the SO-GL[1]

2. General

For maintaining the real-time power balance of the Netherlands, TenneT TSO BV (TenneT-NL) mainly uses Frequency Restoration Reserve (FRR) offered to TenneT-NL by market parties. In case of incidents and substantial long-lasting power deviations TenneT-NL manually activates mFRRda. This document describes the requirements on the product mFRRda and which information needs to be exchanged.

[1] EB-GL: Regulation (EU) 2017/2195 from commission Regulation (EU) of 23 November 2017 establishing a guideline on electricity balancing
SO-GL: Regulation 2017/1485 from Commission Regulation (EU) of 2 August 2017 establishing a guideline on electricity transmission system operation

3. **Obligations, determining quantity, payments and sanctions**

3.1 Contract obligation

The Balancing Service Provider (BSP) for mFRRda has the obligation, over the entire contract period, to be able to draw or supply the power agreed from the Dutch grid on call from TenneT. In case of upward mFRRda, by decreasing the electrical load (demand from the network) or increasing production (supply to the network). In case of downward mFRRda, by increasing the load or by decreasing production

3.2 Imbalance adjustment

For every Imbalance Settlement Period (ISP), beginning with the five- minute-period immediately following the five-minute-period in which the call is given and ending with the five- minute-period following the five-minute period in which TenneT has ended the call the energy quantity called for will be corrected by TenneT on the imbalance of the balance responsible party (BRP) of the connection point on which the mFRRda is delivered. This means that if too little or too much is supplied or withdrawn, this will be settled via the imbalance settlement described in the System Code. For a graphical explanation, see Appendix 1 and 2.

3.3 Payments

The mFRRda,called for by TenneT, will be paid for on the basis of measured five-minute- periods of the energy regulated upward or downward, with a maximum per ISP of the maximum energy supplied or drawn with the power called up or down.

It is noted that if mFRRda is called for, the reference value applies for the entire Energy Settlement period (also see Appendix 1 and 2). If the call covers multiple ISP's and the company asset behind the connection is included in a portfolio that has its own deployment plan, then a change in the supply or withdrawal from the company asset behind the connection may result in imbalance for the BRP or insufficient response for the BSP mFRRda.

Upward mFRRda

The price for every ISP in the delivery period and the full activation time is equal to the deployment price in upward direction plus 10% for the ISP concerned or if higher, the EPEX-price[2] plus € 200 per MWh..

The price for the deactivation period is equal to the deployment price for the ISP concerned or if higher , the EPEX-price[2] plus € 200 per MWh.

For the entire energy settlement period, a minimum price applies of the EPEX price[2] raised by € 200 per MWh

For a graphical explanation, see Appendix 1.

[2] AEPEX-price for that hour that was established the day before

Downward mFRRda

The price for each ISP in the delivery period and the full activation time is equal to the deployment price in downward direction minus 100 €/MWh for the relevant ISP or, if this is lower, the EPEX-price[3] reduced by € 250 per MWh[4].
The price will frequently be a negative value. When the value is negative, TenneT pays the BSP. If the determined prices of the deployment price in downward direction - 100 €/MWh and EPEX-price[3] minus 250 €/MWh - are both positive, no settlement of the energy occurs.

The price for the ISP's in the deactivation period, is equal to the deployment price in downward direction for the relevant ISP or, if this is lower, the EPE-price[3] reduced by € 250 per MWh.
The price will frequently be a negative value. When the value is negative, TenneT pays the BSP. If the determined prices of the Deployment Price in downward direction and EPEX-price minus 250 €/MWh are both positive, no settlement of the energy occurs.
For a graphical explanation, see Appendices 2 and 3.

3.4 Determining the quantity

To determine the quantity of energy drawn or supplied by the BSP a number of factors are important:

1. Energy settlement period: The period starting the five-minute-period immediately following the five-minute period in which TenneT made the call till the end of the delivery period plus 20 minutes or if sooner the five minute period in which the reference value[5] is reached.
2. The metered values: the accountable metered five-minute-kWh values of the by BSP activated connections (§4.2) which the BSP makes available to TenneT.

Upward mFRRda

The quantity of energy supplied is now determined as follows:
For every five-minute period during the energy settlement period, the metered value is deducted from the reference value (for production systems that can be scaled up this is the metered value minus the reference value). Only metered data of the connections which are communicated via electronic messaging by BSP will be taken into account. The difference between reference value and metered data determines for every five-minute period the energy the BSP supplied to TenneT. The quantity of energy supplied by the BSP to TenneT per ISP is determined by adding up for every ISP within the energy settlement period the calculated differences in the three five-minute periods.

The quantity of energy that is not supplied is determined as follows:

[3] EPEX-price for that hour that was established the day before
[4] The average EPEX peakprice usually is around 50 €/MWh. With this in mind a fee of EPEX-250 for mFRRda downward comes at the same level as incident reserve upward.
[5] Reference value: The value of the energy exchanged by the supplier on the delivery point in the five-minute period prior to the five-minute period in which the call is done.

For all five-minute periods within the delivery period for which the response was deficient, the quantity of energy not supplied is determined. To do this, the quantity of energy supplied per five-minute period, which is determined as described above, will be deducted from the requested supply in this five-minute period. A result greater than zero means that energy was not supplied and also determines the quantity of energy not supplied. For a graphical explanation, see Appendix 1.

Downward mFRRda

The quantity of energy drawn is now determined as follows:
For every five-minute-period during the energy settlement period, the reference value is deducted from the metered value. Only metered data of the connections which are communicated via electronic messaging by BSP will be taken into account. The difference between reference value and metered data determines for each five-minute-period the energy drawn from the grid by the supplier. The quantity of energy drawn per ISP is determined by adding up for every ISP within the energy settlement period the calculated differences in the three five-minute-periods.

The quantity of energy not drawn is now determined as follows:
For all five-minute-periods within the delivery period for which the response was deficient, the quantity of energy not drawn is determined. To do this, the quantity of energy drawn per five-Minute-Period, which is determined as described above, will be deducted from the requested withdrawal in this five-minute-period. A result greater than zero means that energy was not drawn and also determines the quantity. For a graphical explanation, see Appendix 2.

3.5 Sanctions

Every calendar day in which for one or more five-minute-periods the BSP does not respond, does not respond with the full power called for, or does not respond within the agreed full activation time to a call or does not supply or withdraw mFRRda for the time desired by TenneT, this of course to be determined within the practical accuracies of signal transfer and/or metered values, will be considered to be a case of poor response, and the BSP will pay a penalty to TenneT. The amount and structure of the penalty are specified in more detail in the (model) contract.

There is no (financial) sanction on every period that the mFRRda is reported as being not available. Non Availability shall be noted in a track record. If the 'non-availability' exceeds the limit of 1% very often TenneT will get in contact with the BSP and if necessary withhold (partially) the BSP's prequalification. This is specified in more detail in the (model) contract.

4. Requirements

TenneT sets the following requirements on keeping mFRRda available to TenneT and supplying mFRRda at the request of TenneT.

4.1 Type of power

There are 2 types of mFRRda. Downward mFRRda and upward mFRRda.

Upward mFRRda can be supplied by reducing the electricity demand from the grid (load reduction) or by increasing the power supply (raise production).
For mFRRda from spinning reserve, the contracted power and also the power that must be available to ramp up (ramp speed) must be kept available on the production unit. This means that the unit cannot run at full power. In addition, the production must have a stable profile to be able to determine unambiguously the realization of the supplied mFRRda and the reference value.
For sheddable loads the demand from the grid, in situations the where there no call for mFRRda, is minimally the contracted value.

Downward mFRRda can be supplied by increasing the demand from the grid (load) or by decreasing the supply(production).
Downward mFRRda as spinning reserve on running units, the contracted power must be kept available at the production unit. This means that the unit may not run at its technical minimum power. In addition, the production must have a stable profile to make determination of the realized energy and the reference value unambiguously possible.
In a similar way for installations which increase load the maximum baseload is equal to the technical maximum of the connection minus the contracted mFRRda.

4.2 Origin of mFRRda

For the supplied or withdrawn power, it must be explicitly stated through which connection(s) the power will be realised. These must be connections to the Dutch public electricity grid, not necessarily the TenneT grid.

An individual Installation can only have an mFRRda contract in one direction.
Connections which are part of a pool can conditionally be part of upward and downward mFRRda

- All connection points which will deliver up- and downward mFRRda are merged in 1 list
- The total power registered on the list must be minimally equal to the sum of all contracts upward and downward
- Connection points which are prequalified for both directions, can only be contracted at 1 prequalified BSP.
- Each connection point can only be pre-qualified at 1 BSP for mFRRda at the same time.
- Connections cannot be operated for up and downward simultaneously. TenneT has the opportunity to simultaneously do a upward and downward request as a test.
- If delivery can't be verified article 11 of the contract (lack of response) will be fully applicable for all

contract which are not met at that moment.
- An explanation in the offer how mFRRda in up and downward direction is garanteed

With a view to verifiability, no mFRRda can be supplied or withdrawn to a connection that is also used for participation in automatic/continuous power control or energy control[6] [7], with the exception of the control for frequency support (Frequency Containment Reserve; FCR). If the mFRRda BSP participates with the same unit in FCR, the burden of proof lies with the supplier to show, if requested, that both calls have been filled.

4.3 Minimum quantity for the contract

The minimum quantity of the contracted mFRRda volume is 20 MW.

4.4 Availability

The mFRRda offered must be exclusively available to TenneT for the entire agreed contract period(s).

When awarding a contract, TenneT will first examine tenders for mFRRda that offer a percentage availability that meets the specifications or higher. Only if these tenders do not result in sufficient power TenneT will consider other tenders.

4.5 Full activation time

The time period (in minutes), calculated from the start of the five-minute period immediately following the five-minute period in which TenneT made the activation request, within which the supply of power as requested by TenneT must be fully realised.

The full activation time for upward mFRRda must be as short as possible, preferably 10 minutes or less, but a maximum of 15 minutes.

The full activation time for downward mFRRda must be as short as possible with a maximum of 10 minutes.

4.6 Dispatch requirements

Minimum activation period per call

This is the deliveryperiod for which it is guaranteed that the offered power can be fully activated without interruption. The delivery period immediately follows the full activation time as agreed with the BSP.
This guaranteed period must be at least 60 minutes.

[6] These also include controls other than TenneT's secondary control.
[7] The reason is to have a pure Metered Value for control purposes. See 2.7

Maximimum time between deployments
De time between deployments should be as brief as possible, maximum of 6 hours or less.

Dispatch instruction
Communication of the start and end of dispatch of the mFRRda between BSP and TenneT is done by phone and electronic messaging as described in § 4.10**Fout! Verwijzingsbron niet gevonden.**. In the communication the requested volume and if possible the prospective duration will be exchanged.

The phone contact is the binding instruction for delivering mFRRda. The electronic messaging is mend for settlement of the delivery of mFRRda and for communication with the BRP's concerning involved connections for the delivery of mFRRda.

4.7 Verification options

The mFRRda BSP has to facilitate TenneT to verify that the power adjustment requested by TenneT is realized correctly. TenneT places the following requirements on the control options:

For mFRRda, a check is made using the accountable 5-minute kWh metered value of the activation of the by BSP reported contracted objects of the BSP concerned. The metering must be carried out by a licensed metered data responsible party. It is the responsibility of the mFRRda BSP to ensure that these metered data are available on a 5-minute basis and that they can be made available in a timely fashion to TenneT after an activation in accordance with the contract.

If the upward mFRRda is supplied from generation capacity, the BSP of mFRRda must notify to TenneT the maximum production capacity that in the event of a call can always be supplied to the connection concerned. In a situation in which no upward mFRRda is requested from the BSP mFRRda , the maximum power supplied to the connection cannot exceed this maximum production capacity minus the contracted mFRRda.

If the downward mFRRda is supplied from generation capacity, the BSP mFRRda must notify TenneT of the minimum production capacity that in the event of a call can always be supplied to the connection concerned. In a situation in which no downward mFRRda is requested from BSP mFRRda, the power supplied to the connection cannot underrun the minimum production capacity plus the contracted downward mFRRda.

TenneT can require from the BSP mFRRda that it demonstrates by a test that the ultimate generation capacity can indeed be realized.

4.8 Balance Responsibility

Every connection that supplies mFRRda must have covered its program responsibility with a registered BRP. This information must be sent to TenneT in by TenneT prescribed formats and procedures.

4.9 Electricity supplier on the connection(s) of BSP mFRRda

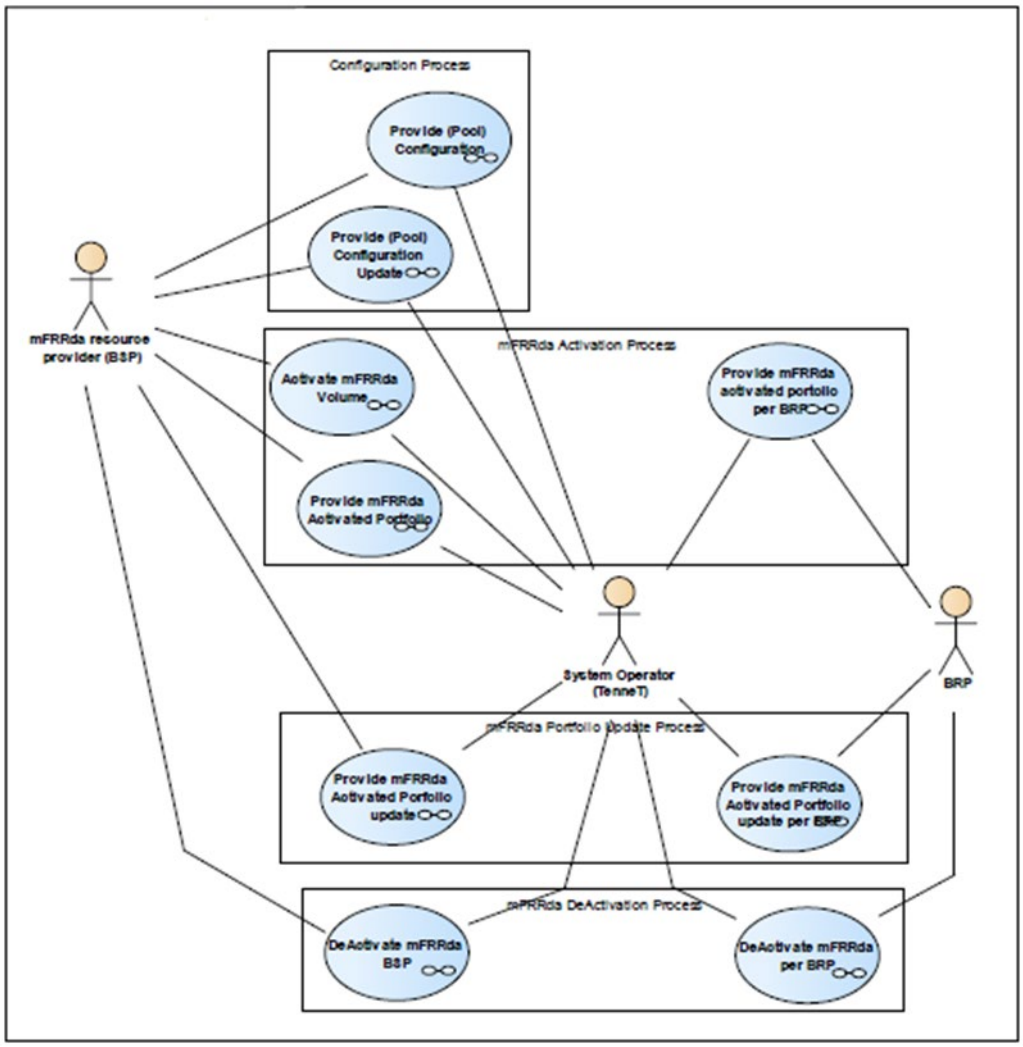
If a difference arises resulting from the supply of mFRRda between the electricity measured at the connection(s) of the supply point of the BSP and the electricity supplied by the electricity supplier(s), it is the responsibility of the BSP mFRRda to reach an understanding with the electricity supplier(s) on agreements about this, including any possible settlement of this difference.

4.10 Data Exchange in case of dispatch of mFRRda

The BSP mFRRda offers the power per individual connection point to TenneT by means of a message according a by TenneT prescribed manner. This message has to be sent every month, utterly 5 working days before the end of the month in which relevant changes in relation to (new) connection points, power output, BRP etc has taken place.

In case of interim changes the BSP sends an update with an entry date which at least lies 1h and 5 minutes in the future. The last received message is regarded as the correct composition off connection points at the BSP.
A message always contains a complete set of connection points which are valid for all contracts of the supplier during specified period.

The offered volume is activated by TenneT by means of a message. This message is sent to the BSP so he is aware how much power he has to deliver.
Within five minutes the BSP has to inform TenneT on which connection points how much power is dispatched. TenneT then informs the BRP of the specific connections how much power is being dispatched. The imbalance adjustment to a BRP is done on basis of the called power at the specific connections of that BRP.



4.11 Formats

The BSP shall report the non-availability, the supply of the Metered Values and, if applicable, the joining of active pool participants to TenneT using the formats prescribed by TenneT.

5. mFRRda in a pool

The formation of a pool has as an advantage for TenneT that mFRRda may possibly be offered that otherwise would not be offered. As such, it enlarges the market. The disadvantage, however, is that a pool can complicate the administrative and technical procedures of the pool participants, BSP as aggregator and TenneT.

A small (generation) installation normally does not have its own grid connection, but is installed behind a grid connection. The BSP mFRRda can choose (possibly in consultation with its BRP to have the supply determined based on the metered production at the (generation) installation, instead of the value metered at

the grid connection. This must also be done based on accountable five minute metered kWh values. The metering[8] must be carried out by a licensed Metered Data Responsible Party. All as stipulated in law and regulatory requirements.
If behind the connection multiple installations are operational it is not allowed that ramping of one installation (for mFRRda purposes) will lead to automatically ramping the same amount in the opposite direction by another installation.

Additional consequences for the pool participants must be covered by the aggregator and are not within TenneT's area of responsibility.
The following table presents the consequences for the parties involved in pooling

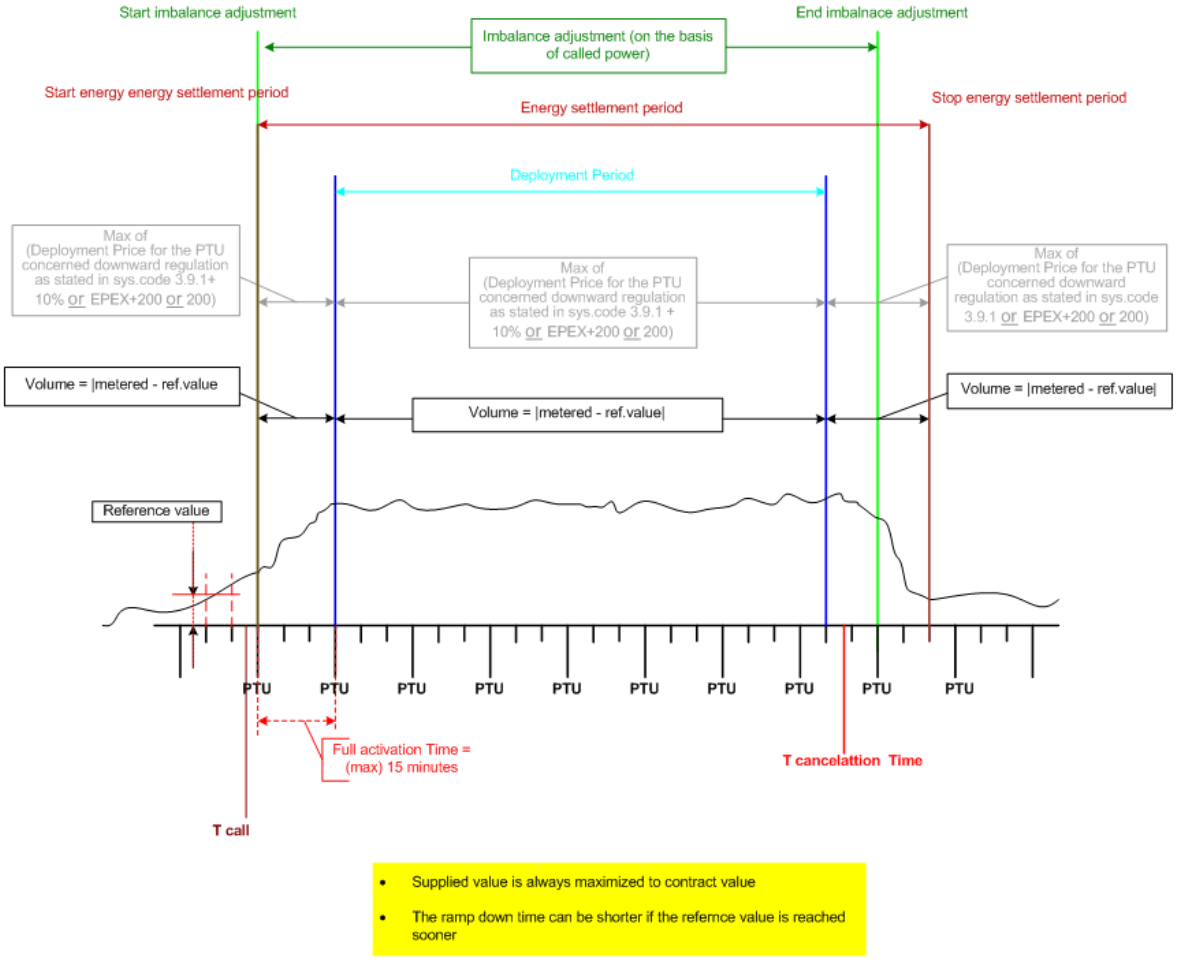
[8] Measurement and the measuring apparatus must be conform the Metering Code.

	Pool participant	Aggregator (BSP)	TenneT
Pool formation	Binding to aggregator through an agreement		
	No load profile connection		
Exclusivity		Contracts between participants can be inspected by TenneT on request	On request, TenneT can inspect contracts between participants in connection with exclusivity
Technical availability and other technical requirements	Makes agreements with aggregator (BSP), enabling aggregator (BSP) to guarantee the required availability	Arranges and guarantees compliance with all technical requirements; in particular the availability and Call Time.	Applies the same technical requirements as for solo suppliers
Administrative requirements		Arranges and guarantees compliance with all administrative requirements; in particular the timely supply of messages, metered data, as well as coordination with BRP's and the regular energy suppliers to pool participants	Applies the same administrative requirements as for solo BSP of mFRRda
Quotation Request			Aggregator (BSP) is invited to tender.
Tendering		Tender to TenneT on behalf of all pool participants	
Award			Contract award (if selected) to aggregator(BSP)
Contract negotiations	Mandating aggregator - this can, for instance, be arranged in a pool agreement.	The basic principle is a mandate from all pool participants - this may not be a point of discussion in the negotiations with TenneT.	Negotiations are held with the aggregator
Reachability		Can be contacted continuously (24-7)	

	Pool participant	Aggregator (BSP)	TenneT
Activation	Activation by call via aggregator (BSP)	Forward TenneT call for activation to pool participants Inform the normal electricity suppliers of the pool participants	Call for activation to aggregator (BSP), informing BRP's of the connections involved
Accountable measurements	Forward to aggregator (BSP)	Forward to TenneT in the required format	TenneT can request the accountable metered data from the individual pool participants from the aggregator (BSP) and from the Metered Data Responsible Parties.
Invoicing/payment	Must be arranged with the aggregator (BSP)	Must be arranged with pool participants	Exclusively via aggregator
Balance Responsibility	Making arrangements with the Balance Responsible Party. In particular with administrative consequences and any invoicing of supplied energy	Assisting pool participant when making arrangements	The imbalance responsibility lies at the BRP of the connection Communicating with respect to implemented imbalance adjustment after an activation
Electricity Supplier	Making arrangements with the Energy Supplier on the connections points. In particular with respect to the consequences for supplying energy to the connection and settlement	Assisting pool participant when making arrangements	

	Pool participant	Aggregator (BSP)	TenneT
Imbalance adjustment	TenneT adjusts the imbalance of the BRP of every pool participant based on activated quantities.		TenneT corrects the activated quantity supplied by the connection on the imbalance of the BRP of the connection

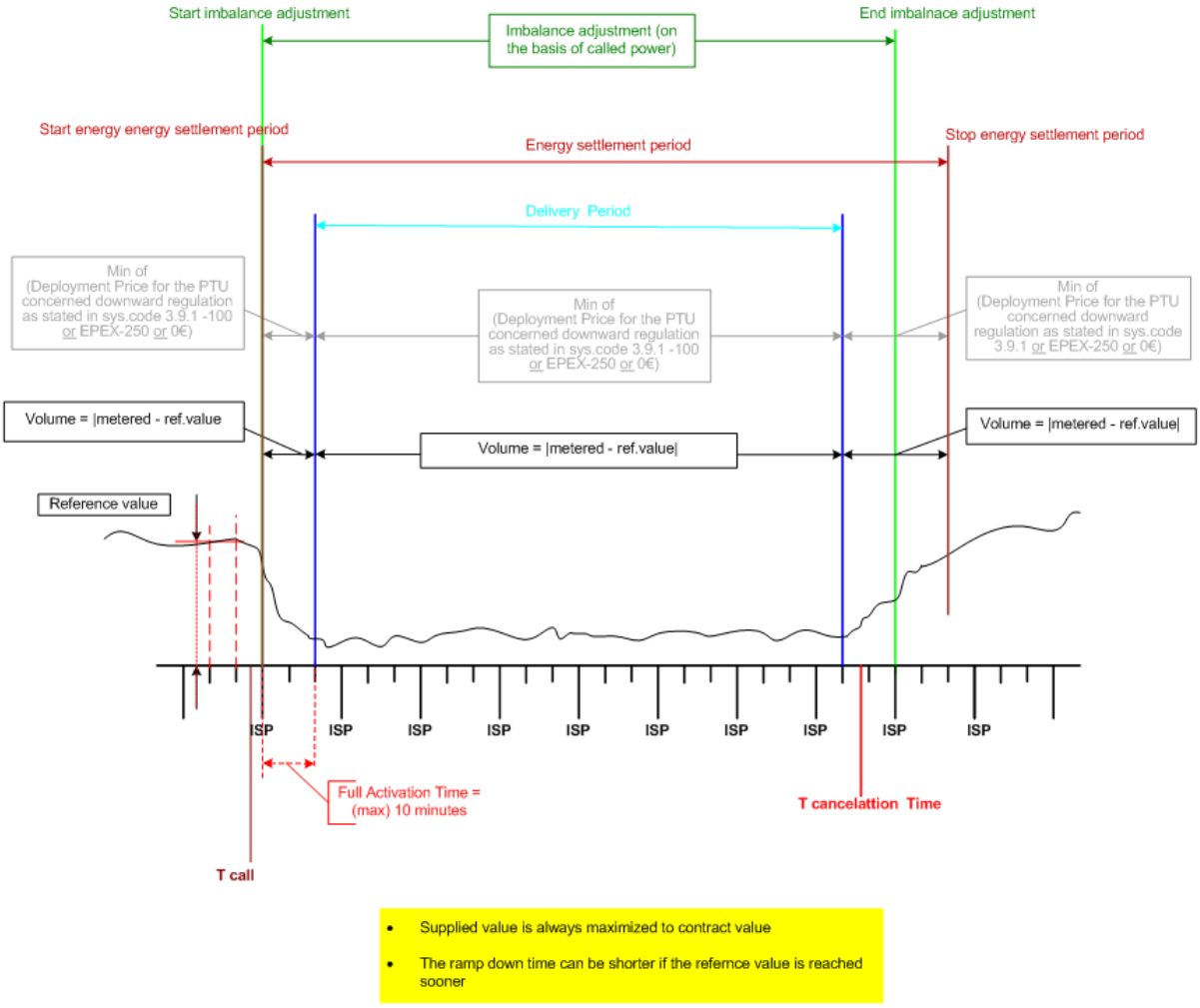
APPENDIX 1 mFRRda Upward scheme



„Delivery period":	means the period of delivery during which the balancing service provider delivers the full requested change of power in-feed to, or the full requested change of withdrawals from the system;
„Deactiv Ating period"	means the period for ramping from full delivery to a set point, or from full withdrawal back to a set point;
„Full activation time"	means the period between the activation request by the connecting TSO in case of TSO-TSO model or by the contracting TSO in case of TSO-BSP model and the corresponding full delivery of the concerned product;
"Energy settlement period"	de period consisting of „Full activation time" + „Delivery period" + "de-activation period"

In case of load shedding, the proposed Metered Value will be mirrored, however the principle remains the same

APPENDIX 2 mFRRda Downward scheme



„Delivery period":	means the period of delivery during which the balancing service provider delivers the full requested change of power in-feed to, or the full requested change of withdrawals from the system;
„Deactivating period"	means the period for ramping from full delivery to a set point, or from full withdrawal back to a set point;
„Full activation time"	means the period between the activation request by the connecting TSO in case of TSO-TSO model or by the contracting TSO in case of TSO-BSP model and the corresponding full delivery of the concerned product;
"Energy settlement period"	de period consisting of „Full activation time" + „Delivery period" + "de-activation period"

In case of increasing load, the proposed Metered Value will be mirrored reflected; however, the principle remains the same.

APPENDIX 3 Determination Price mFRRda Downward

When prices are negative, TenneT pays the Supplier.