Part 1: mFRR Design Info session

Reminder of the MARI design

15/02/2023 | Sybille METTENS

Context of this Information session

- This presentation is **not intended to describe** the operation of the **mFRR product**
- The purpose is to:
  - **Provide** some **reminders** of the differences **between** the operation of mFRR **before & after MARI**
  - Present the **design changes since** the **last** publication of the **Design Note**

Agenda

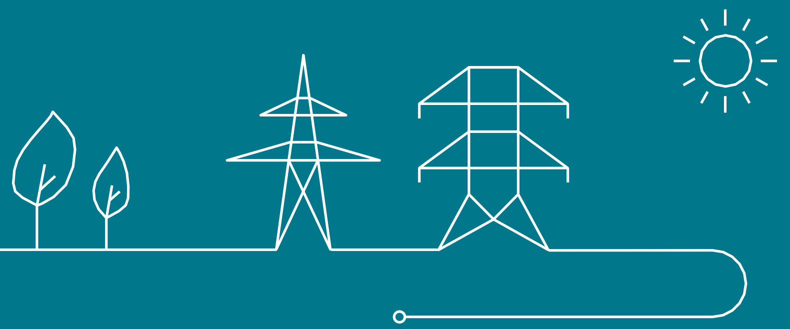
1. Info session
    - Planning
    - Energy Bidding
    - Bids selection
    - Activation
    - Remuneration
    - Activation control & penalties
    - CRI Impacts

2. New design topics
    - Penalty scheme for Activation Control
    - Penalty for Contracted Bids
    - Update of Bids after BE GCT & Baselines after RDGCT

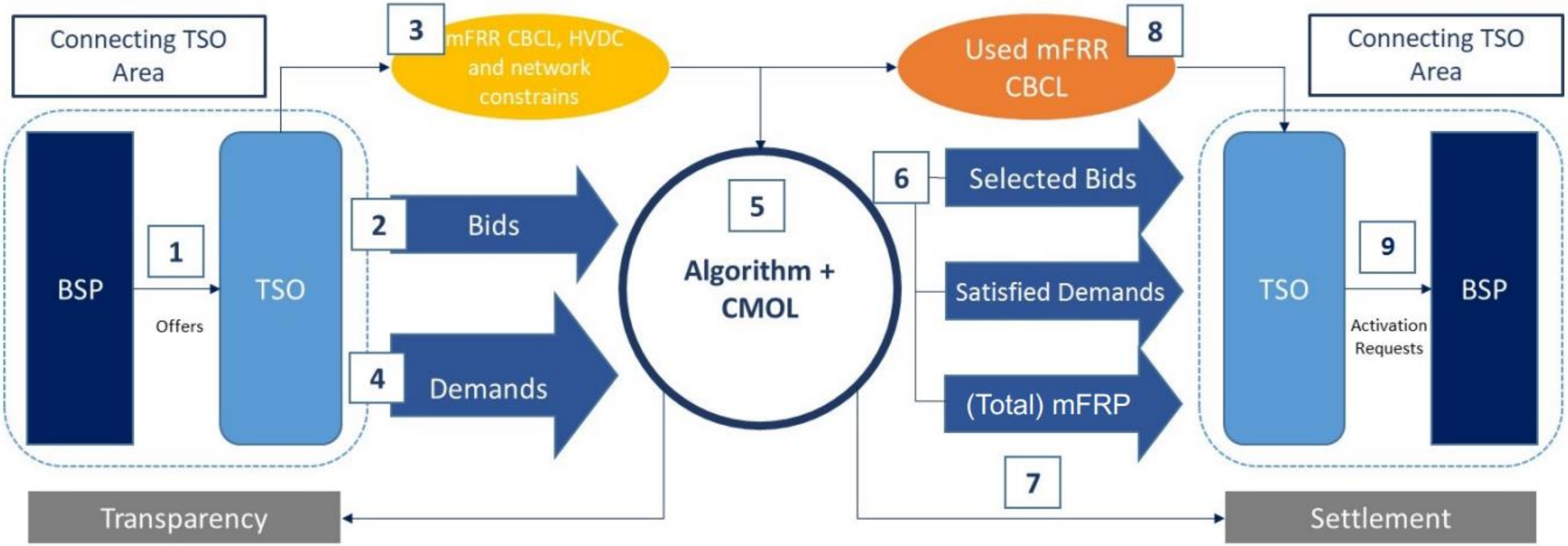
As a reminder, the local Go Live of MARI is foreseen for February 2024

2023				2024			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Public consultation (T&C mFRR, T&C BRP and Balancing rules)			February 2024: mFRR **Local Go Live**	April 2024: mFRR **connection to MARI**		

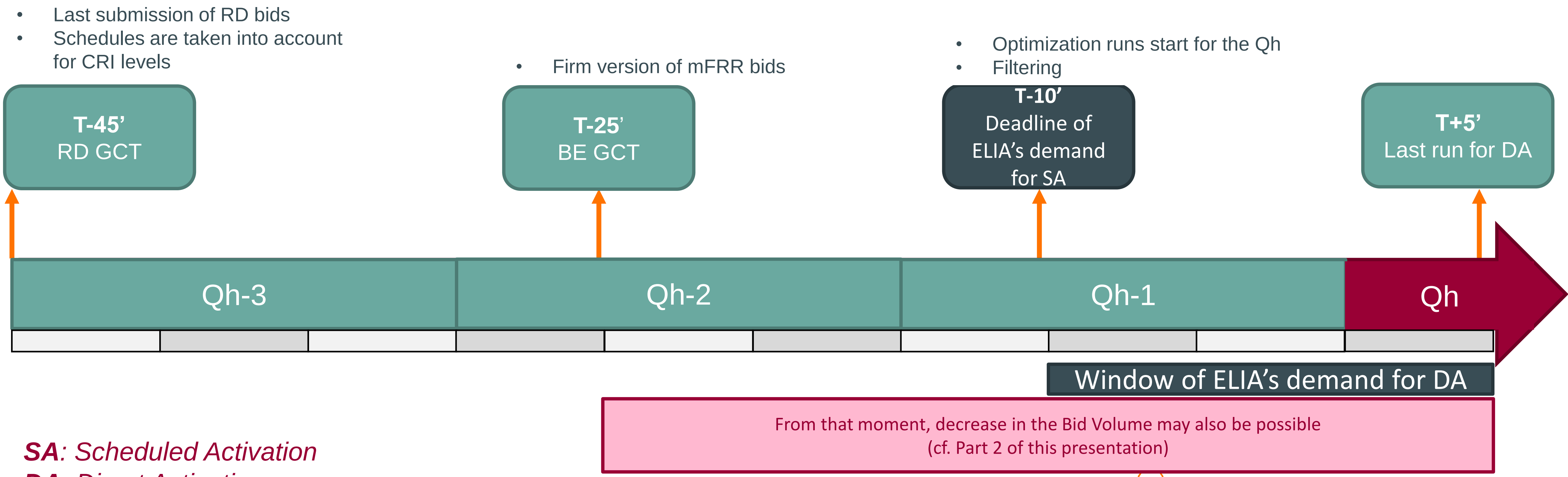
mFRR Energy Bidding



ELIA transmits the mFRR Energy Bids received from the BSP to MARI


Connecting TSO Area
3
mFRR CBCL, HVDC and network constrains
Used mFRR CBCL
8
Connecting TSO Area
BSP
1
Offers
TSO
2
Bids
4
Demands
5
Algorithm + CMOL
6
Selected Bids
Satisfied Demands
(Total) mFRP
7
TSO
9
Activation Requests
BSP
Transparency
Settlement

The deadline to submit an mFRR Energy Bid (BE GCT) is at T-25’



- Last submission of RD bids
- Schedules are taken into account for CRI levels

T-45’
RD GCT

- Firm version of mFRR bids

T-25’
BE GCT

- Optimization runs start for the Qh
- Filtering

T-10’
Deadline of ELIA’s demand for SA

T+5’
Last run for DA

Window of ELIA’s demand for DA

From that moment, decrease in the Bid Volume may also be possible
(cf. Part 2 of this presentation)

***SA**: Scheduled Activation*
***DA**: Direct Activation*

Specifications to be provided by the BSP & requested by MARI

Properties	Details
Direction	• Positive energy = increase in net injection/decrease in net offtake ("incremental bid", "upward activation") • Negative energy = decrease in net injection/increase in net offtake ("decremental bid", "downward activation")
Activation Type	Bid is available for Scheduled and Direct Activation (SA + DA) OR for Scheduled Activation only (SA only)
(Maximum) Bid Volume	• Min offered volume = 1 MW • Volume granularity = 1 MW
Bid divisibility	An mFRR Energy bid may be fully divisible, partly divisible or not divisible (indicated by the BSP thanks to the Minimum Bid Volume)
Bid Price	• Price granularity = 0,01 €/MWh • Price is capped: ○ Until the first time ELIA connects to the mFRR Platform, -13.500 €/MWh ≤ price ≤ 13.500 €/MWh ○ After the first time ELIA has connected to the mFRR Platform, the price must be in line with the methodology for pricing balancing energy and cross-zonal capacity used for the exchange of balancing energy or operating the imbalance netting process in accordance with EBGL art. 30(1)
Exclusive Group	Cf. next slides
Parent-child relation	Cf. next slides
Quater-hour linking	Cf. next slides

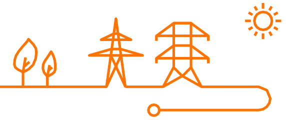
Additional specifications to be provided by the BSP & requested by ELIA

Properties	Details
List of DP	• Only DP included in the Pool (= The list of DP included in the BSP Contract mFRR or in the BSP-DSO Contract) of the BSP can be included in an mFRR Energy Bid • mFRR Energy may be offered on an aggregation of DP_{SU} as long as all the DP_{SU} belong to the same Technical Facility • A BSP may offer mFRR Energy on any group of DP_{PG} • Any DP_{PG} included in an mFRR Energy Bid for a certain Qh cannot be included in an aFRR Energy Bid or in a Supporting aFRR Providing Group for the same Qh • If one or more DP(s) are part of an mFRR Energy Bid & included in a zone of High Level of CRI, the BSP will not be authorized to submit this mFRR Energy Bid if this mFRR Energy Bid aggravates the risk of congestion (direction of the bid = direction of the CRI)
Link with mFRR Capacity	The BSP has to indicate to ELIA whether the mFRR Energy Bid is offered in respect of an mFRR capacity obligation

Simple/complex bid: Bid type definition

- **Simple bids** = The smallest component in the bid structure of the mFRR platform which consists of one price and one volume for a single Qh

- **Complex bid*** = Combination of simple bids grouped together, which can be cleared only under specific rules → Used to model technical and economical behaviors of energy assets
    - **Parent-child bid**** = 2 or more simple bids within the **same QH**, where a bid (the child) can only be activated if another specific bid (the parent) is activated as well
    - **Exclusive bid** = 2 or more simple bids within the **same QH**, for which at most one of the bids can be activated



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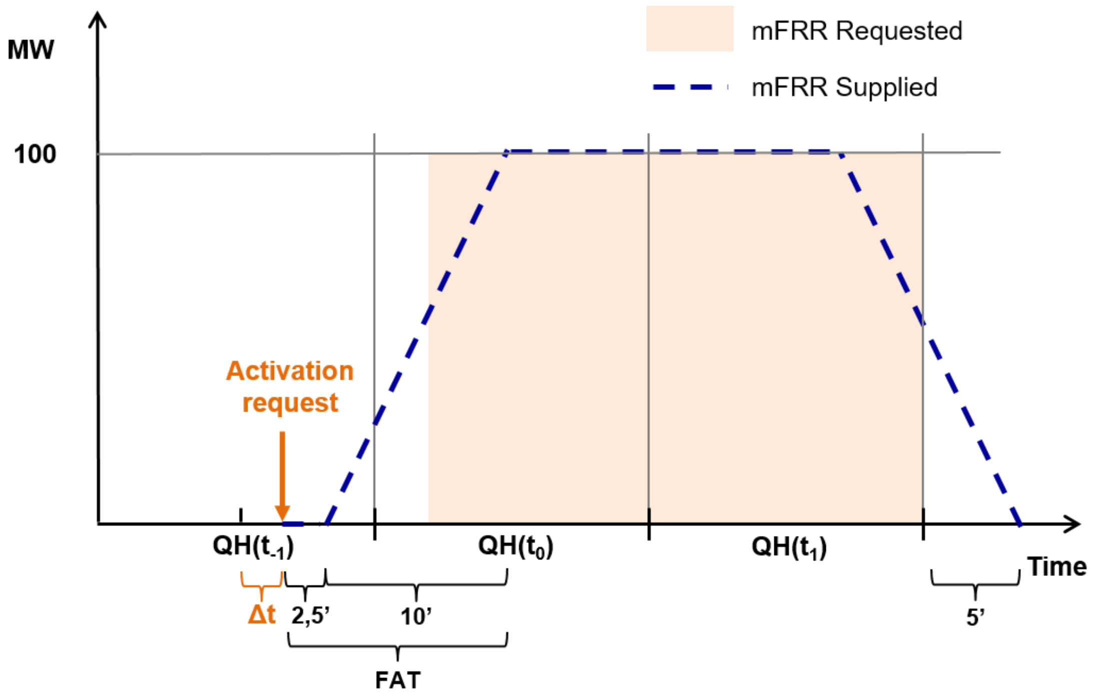
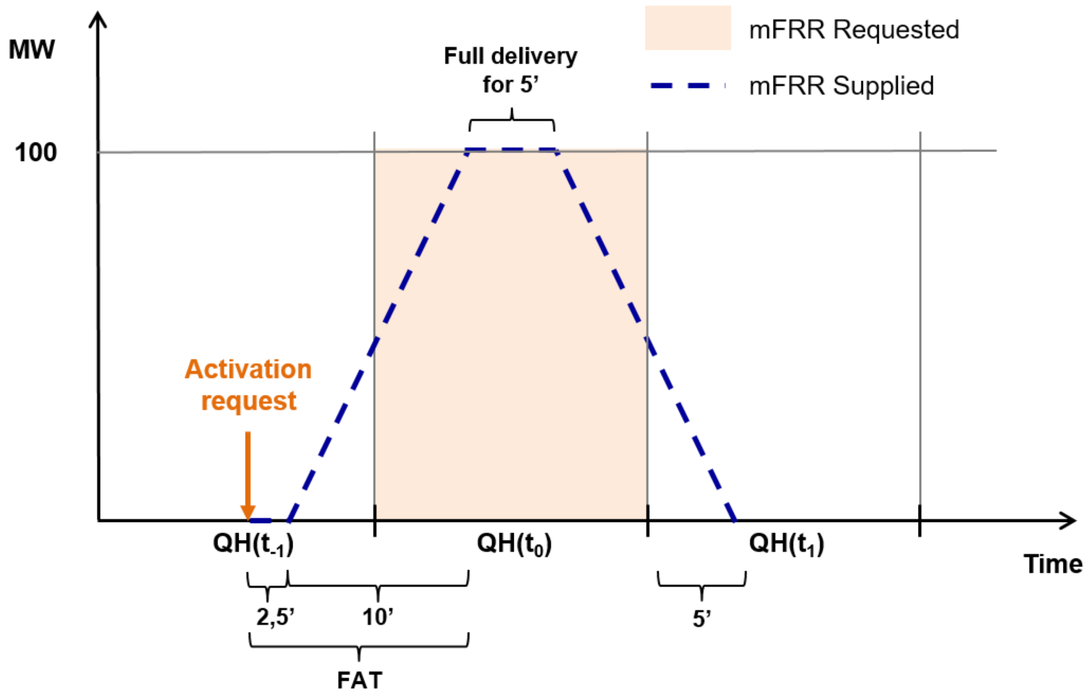
*Or ‘economic link’
** Or multipart bid

The activation of previous Qh(s) may impact the possible activation for Qh0 & the BSP must be able to define bidding strategy



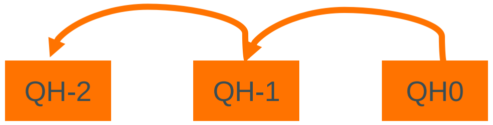


→ MARI has defined the Bid properties: Technical Linking & Conditional Linking

Principle: Switch the availability status of the bids from available to unavailable (or vice-versa) to avoid unfeasible activations

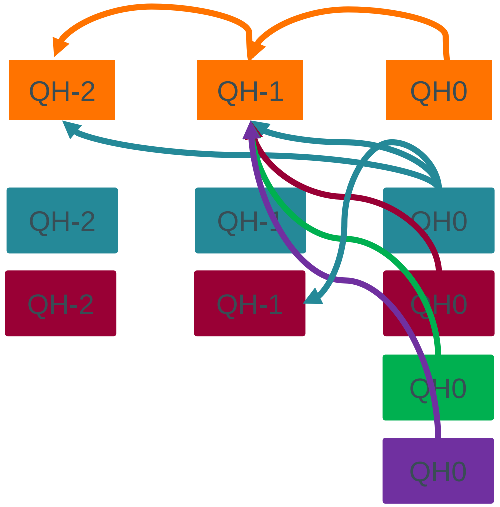
The technical & conditional links are used to avoid performing unfeasible activations

- ’**Technical linking**’ means the **linking of two bids** (simple or complex) of a BSP **in two consecutive QHs**, needed to
    - ensure that a bid in QH0 is not available for activation if the bid in the previous quarter hours was activated in DA (avoid performing unfeasible activations)
    - avoid the activation of the same balancing resource twice

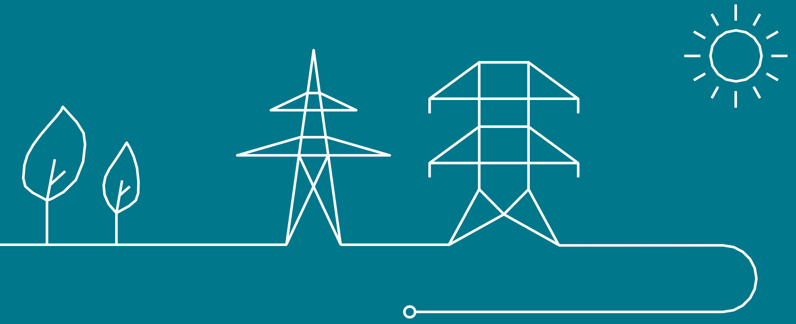


- ‘**Conditional linking**’ means **links between bids** of a BSP **between different consecutive QHs**, allowing BSPs to offer more flexibility, to reflect efficiently their underlying cost structure in their offered bids, to maximize the opportunity of being activated & to avoid unfeasible activations

Example of conditional link: *Not available if linked bid activated / Not available for DA if linked bid subject to DA / Available only if linked bid activated / Available only if linked bid not activated / Etc.*



Selection procedure



A new way of determining the local mFRR energy clearing price & the European clearing price (CBMP), has been defined

- mFRR Energy is remunerated **paid-as-cleared**

- If ELIA is disconnected from MARI, the **local selection** procedure is **used as fallback**

- The clearing price is based on:
  - **local merit order** lists in case of **local** selection (when not connected yet or disconnected to MARI)
  - **common merit order** lists in case of **European** selection

- Both selections take into account the new **explicit bid** properties

Based on the information transmitted by the connecting TSOs, MARI creates common merit order lists & determines the mFRR Energy Bids to activate

Inputs for MARI to select the mFRR Energy Bids to be activated* for the Qh:

- The CMOLs
- The demand(s) of each TSOs
- The information on cross-border capacities
- The availability status, the properties, the types (simple or complex) & the links (technical or conditional) of each mFRR Energy Bid
- The activations of the previous Qh

→ **MARI platform sends the selection of mFRR Energy Bids in its own LFC Block to each TSO**

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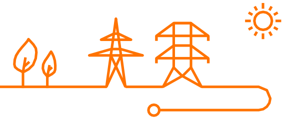
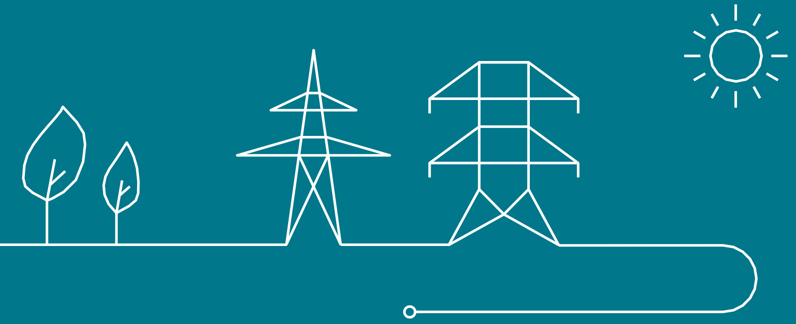
* The activation of mFRR Energy Bids in Belgium will not necessarily be due to a demand from ELIA

Per Qh, MARI platform performs one optimization for SA and potentially one or more optimizations for DA

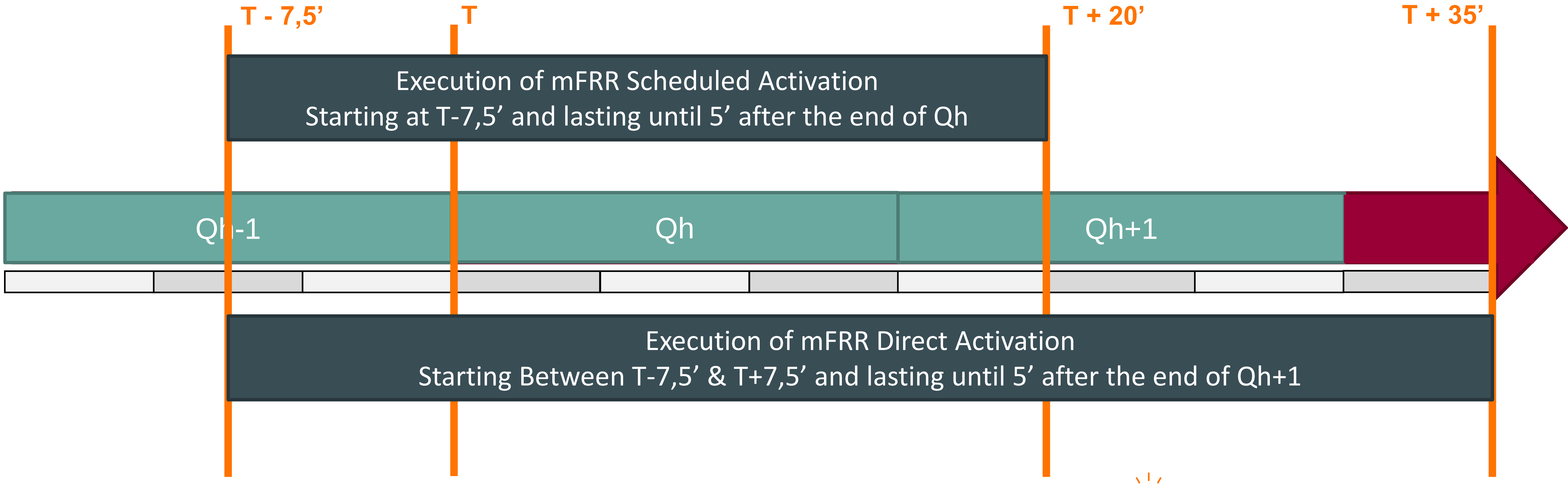
- mFRR Energy **Bids available only for SA** are only **included in one merit order**
- mFRR Energy **Bids available for** both **SA+DA** may be **included in more than one merit order**
- The **remaining volume on partially activated** bids will **not** be **considered as available for consecutive** optimizations in the same **Qh**
- If both positive and negative volumes are offered on the same providing group during the same Qh, **mFRR Energy Bids may be selected for SA** (If not technically possible, a BSP can avoid this by using bid properties – cf. slide 11):
    - ○ **in both directions** → Due to the counter activations, there might be activations in the 2 directions requested as output of the AOF (On the contrary of PICASSO where bids can be activated in only one direction at the end of each AOF)
    - ○ **in one direction & for DA in the other direction** → SA optimization run will optimize the 2 directions at the same time while each DA run will run in one direction



Activation



MARI can request SA and/or DA for each Qh


T - 7,5’

T

T + 20’

T + 35’

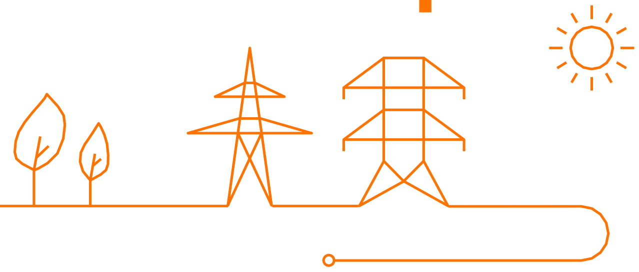
Execution of mFRR Scheduled Activation
Starting at T-7,5’ and lasting until 5’ after the end of Qh

Qh-1

Qh

Qh+1

Execution of mFRR Direct Activation
Starting Between T-7,5’ & T+7,5’ and lasting until 5’ after the end of Qh+1



After mFRR Balancing GCT, ELIA may activate partially or entirely one or more mFRR Energy Bid(s)

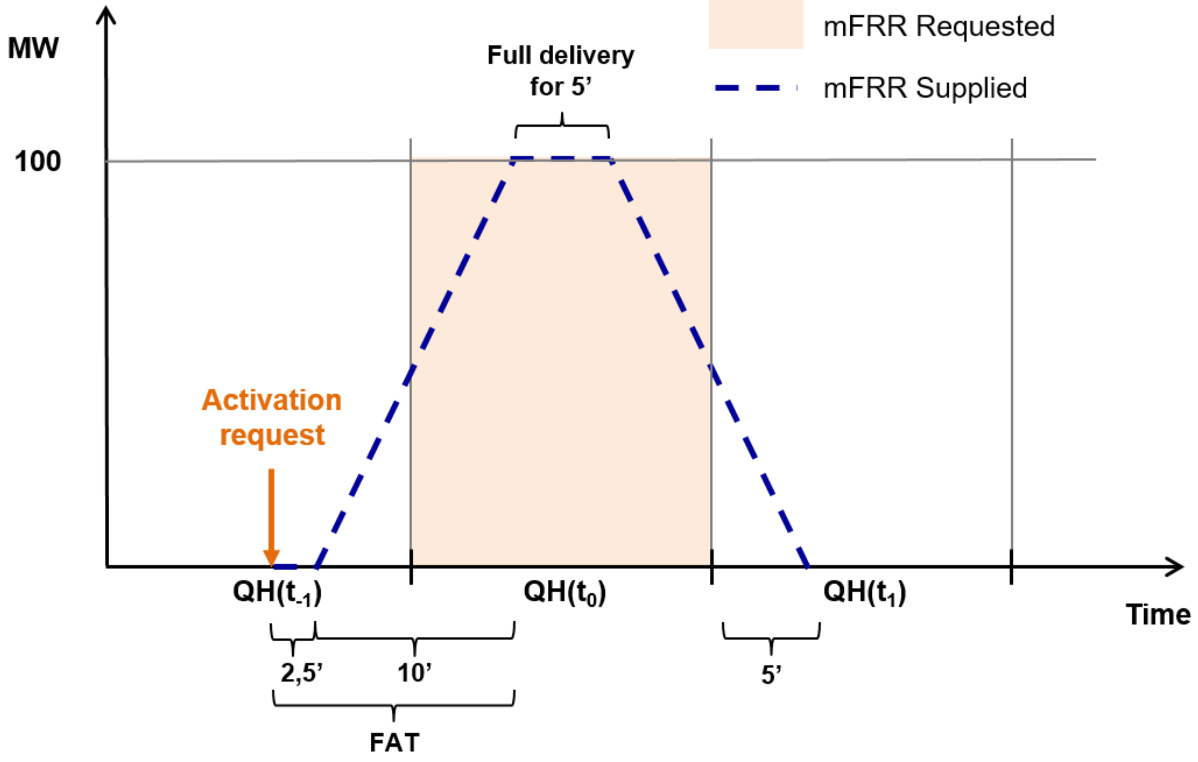
- **An activation request** sent by ELIA **comprises** the following information:
    - The **context** of the activation (Balancing or congestion)
    - The **start and end time** of the activation
    - The **type of activation** (DA or SA)
    - The **mFRR Requested**

- For each Qh, **to perform the activation**, **the BSP may choose** among **the DPs** included in the concerned mFRR Energy Bid and/or the DP(s) included in the concerned Supporting mFRR Providing Group

- From the activation request, the **BSP must respond by sending ELIA 2 acknowledgement messages**:
    - **1st acknowledgement** (BU ACK1): This message includes the list of DP that the BSP will use to deliver mFRR Requested & the expected contribution per DP (Best estimate)
    - **2nd acknowledgement** (BU ACK2): This message confirms the list of DP used to deliver mFRR Requested & the contribution per DP

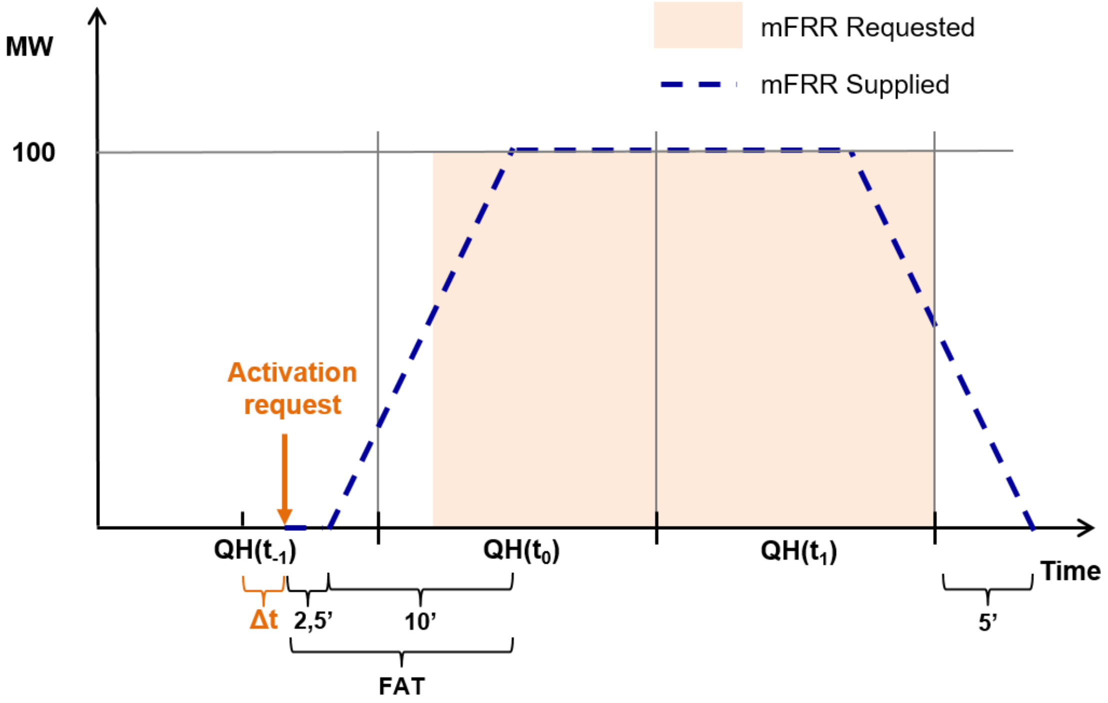
Scheduled Activation

- A SA request for QH(t_0) is sent 7.5’ before the start of QH(t_0)
- mFRR Requested is reached by the end of the Full Activation Time
- The full delivery period, during which mFRR Requested is delivered, lasts for exactly 5’
- The power level returns to the Baseline within 5’ after the end of QH(t_0)

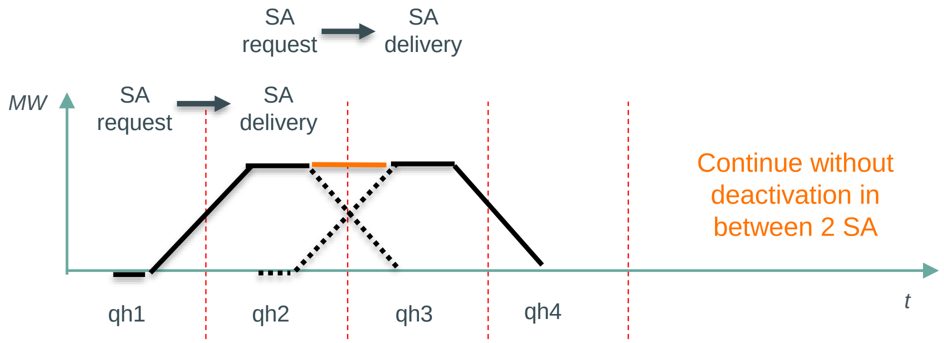

MW
100
Full delivery
for 5’
mFRR Requested
mFRR Supplied
Activation
request
QH(t_{-1})
QH(t_0)
QH(t_1)
Time
2,5’
10’
5’
FAT

Direct Activation

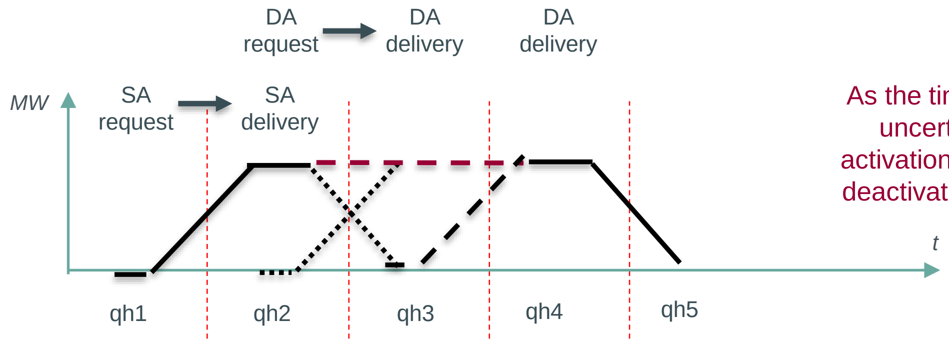
- A DA request for QH(t_0) can be sent during the 15’ after the SA request for QH(t_0)
- mFRR Requested is reached by the end of the Full Activation Time;
- The full delivery period, during which mFRR Requested is delivered, continues into the consecutive QH(t_1)
- The power level returns to the Baseline within 5’ after the end of QH(t_1)



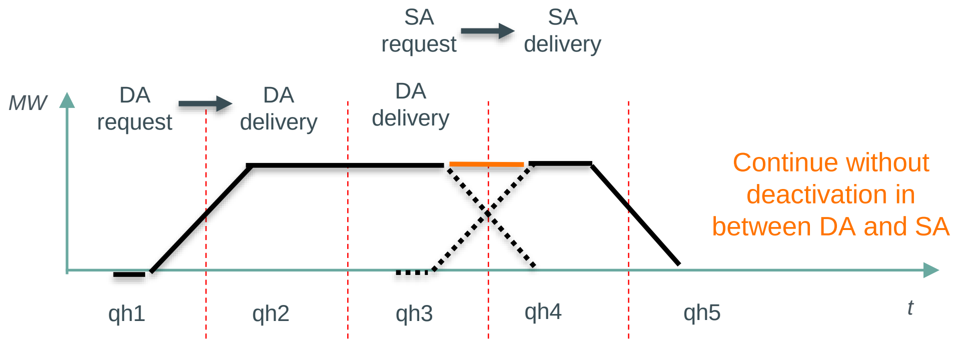
ELIA may request consecutive activations on the same providing group in the same direction


SA
request
SA
delivery
MW
SA
request
SA
delivery
qh1
qh2
qh3
qh4
t

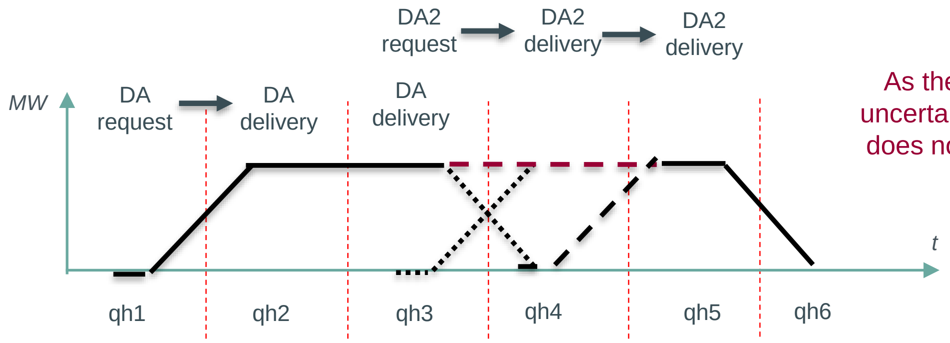
Continue without deactivation in between 2 SA


DA
request
DA
delivery
DA
delivery
MW
SA
request
SA
delivery
t
qh1
qh2
qh3
qh4
qh5

As the timing of the 1st DA request is uncertain, it is possible that the activation does not continue without a deactivation between the SA and DA.

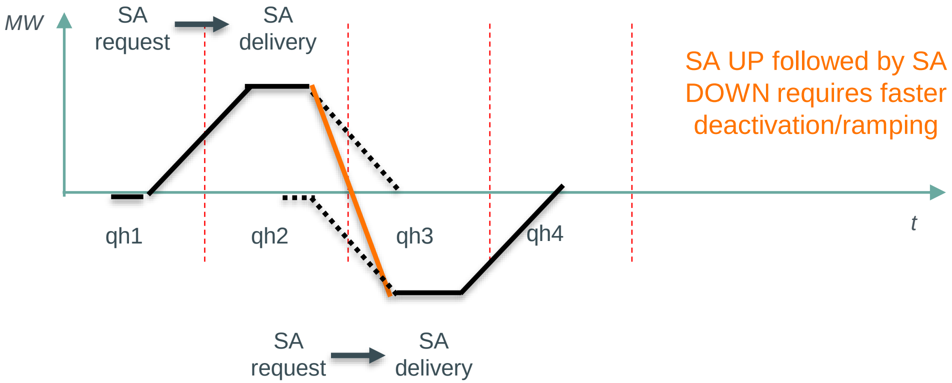

SA
request
SA
delivery
MW
DA
request
DA
delivery
DA
delivery
qh1
qh2
qh3
qh4
qh5
t

Continue without deactivation in between DA and SA

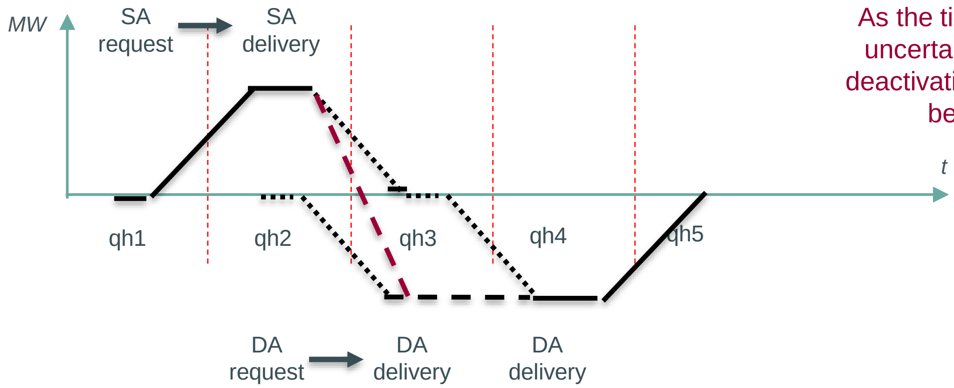

DA2
request
DA2
delivery
DA2
delivery
MW
DA
request
DA
delivery
DA
delivery
t
qh1
qh2
qh3
qh4
qh5
qh6

As the timing of the 2nd DA request is uncertain, it is possible that the activation does not continue without a deactivation between the 2 DA.

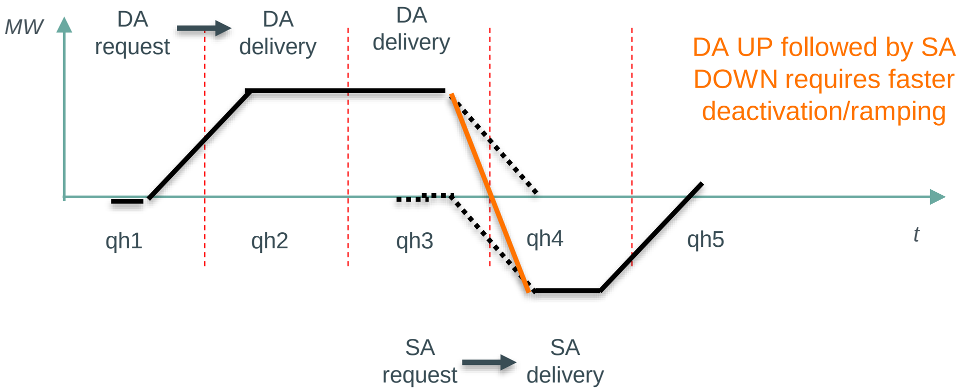
ELIA may request consecutive activations on the same providing group in opposite direction


MW
SA request
SA delivery
qh1
qh2
qh3
qh4
t
SA request
SA delivery

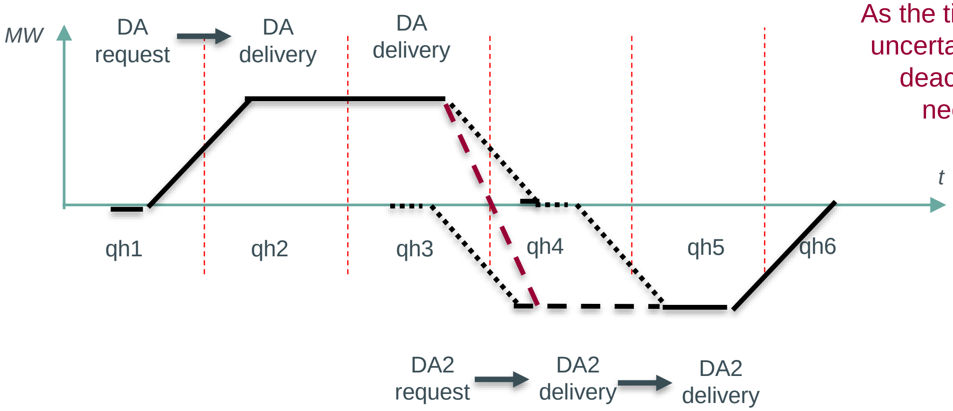
SA UP followed by SA DOWN requires faster deactivation/ramping


MW
SA request
SA delivery
qh1
qh2
qh3
qh4
qh5
t
DA request
DA delivery
DA delivery

As the timing of the 1st DA request is uncertain, it is possible that a faster deactivation/ramping would be needed between the SA and DA.

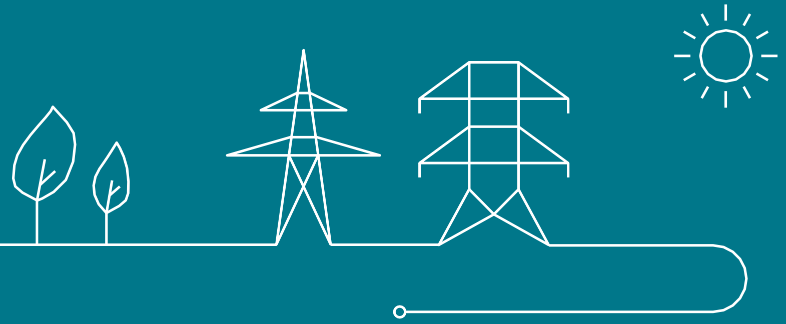

MW
DA request
DA delivery
DA delivery
qh1
qh2
qh3
qh4
qh5
t
SA request
SA delivery

DA UP followed by SA DOWN requires faster deactivation/ramping


MW
DA request
DA delivery
DA delivery
qh1
qh2
qh3
qh4
qh5
qh6
t
DA2 request
DA2 delivery
DA2 delivery

As the timing of the 2nd DA request is uncertain, it is possible that a faster deactivation/ramping would be needed between the 2 DA.

Remuneration



Once connected to MARI, the clearing prices for the mFRR Energy activated in the ELIA LFC Block will be determined on a European level

- mFRR Energy remuneration is based on **paid-as-cleared** principles

→ **All mFRR Energy Bids in the same selection are remunerated at the same clearing price**

- In case of **2 activations in opposite direction** during the same Qh, each activation is **remunerated separately***

- In case of **local selection**, the mFRR energy **clearing prices** are determined **based on** ELIA's selection in the **local merit order** list

- When connected to MARI, the **mFRR energy clearing prices** are determined by MARI platform per uncongested area and are called the "Cross-Border Marginal Prices" (**CBMP**)

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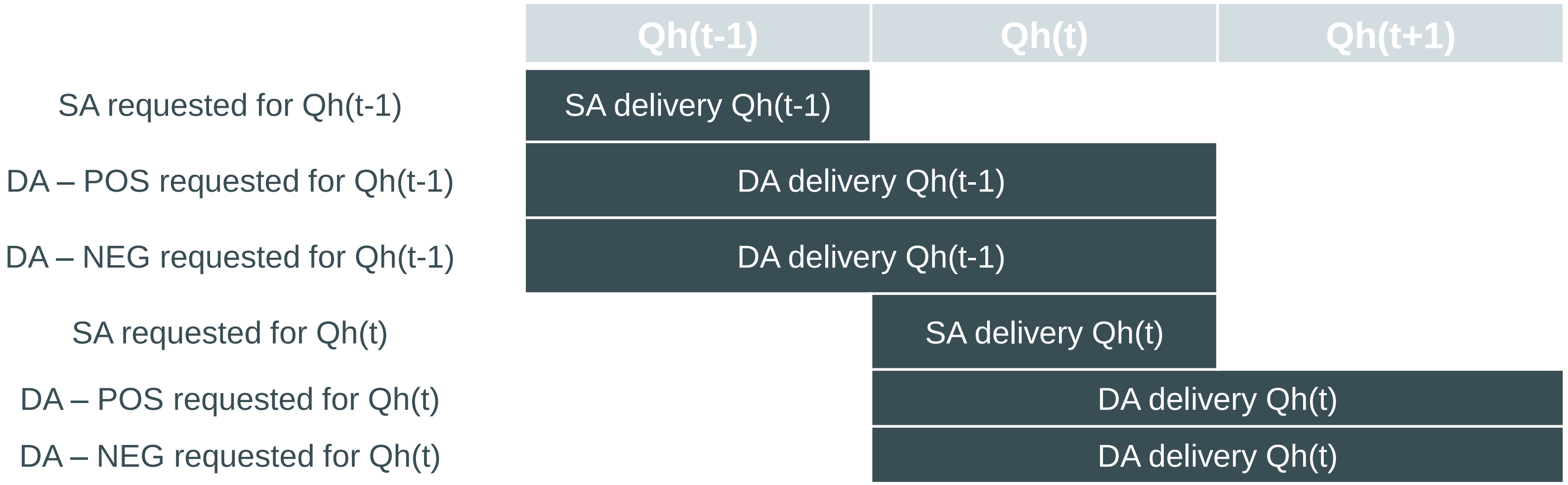
*In case the BSP has 2 bids activated in SA in 2 different directions, the BSP will be remunerated for the 2 directions separately but with the same price

Per Qh(t), up to 5 mFRR energy clearing prices can be determined, depending on the types of TSO mFRR demands treated in Qh(t) & Qh(t-1)

- There can be **multiple moments of DA** in positive or negative direction **requested during a same Qh**
- All **DA require a delivery in Qh(t) & Qh(t+1)**



	Qh(t-1)	Qh(t)	Qh(t+1)
SA requested for Qh(t-1)	SA delivery Qh(t-1)		
DA – POS requested for Qh(t-1)	DA delivery Qh(t-1)		
DA – NEG requested for Qh(t-1)	DA delivery Qh(t-1)		
SA requested for Qh(t)		SA delivery Qh(t)	
DA – POS requested for Qh(t)		DA delivery Qh(t)	
DA – NEG requested for Qh(t)		DA delivery Qh(t)	

Per Qh(t), up to 5 mFRR energy clearing prices can be determined, depending on the types of TSO mFRR demands treated in Qh(t) & Qh(t-1)

1 Clearing price for **SA** (both positive and negative direction) requested for and delivered in Qh(t)

$$Clearing\ Price_{SA\ ,Qh(t)}$$

2 Clearing price for **DA** in positive direction requested for and delivered in Qh(t)

$$max[Clearing\ Price_{SA\ ,Qh(t)};Marginal\ Bid\ Price_{DA,positive,Qh(t)}\ ]$$

3 Clearing price for **DA** in negative direction requested for and delivered in Qh(t)

$$min\ [Clearing\ Price_{SA\ ,Qh(t)})\ ;Marginal\ Bid\ Price_{DA,negative,Qh(t)}$$

4 Clearing price for **DA** in positive direction requested for Qh(t-1) and delivered in Qh(t)

$$max\ [Clearing\ Price_{SA\ ,Qh(t)};Marginal\ Bid\ Price_{DA,positive,Qh(t-1)}\ ]$$

5 Clearing price for **DA** in negative direction requested for Qh(t-1) and delivered in Qh(t)

$$min\ [Clearing\ Price_{SA\ ,Qh(t)};Marginal\ Bid\ Price_{DA,negative,Qh(t-1)}]$$

Activated mFRR Energy Bids are remunerated based on the clearing & the mFRR Energy Requested (in MWh) for the concerned Qh

$$Remuneration = mFRR\ Energy\ Requested\ \times mFRR\ Energy\ Clearing\ Price$$

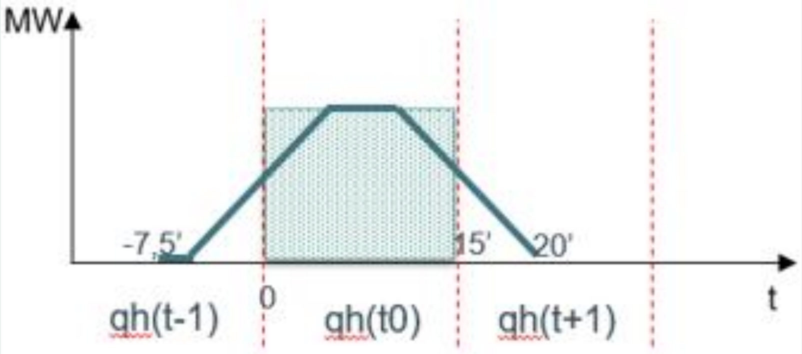
$$mFRR\ Energy\ Requested = mFRR\ Requested \times \frac{\Delta t}{15} \times \frac{1}{4}$$

Where, Δt is the delay between the point of scheduled activation & the moment at which the activation was requested

Examples

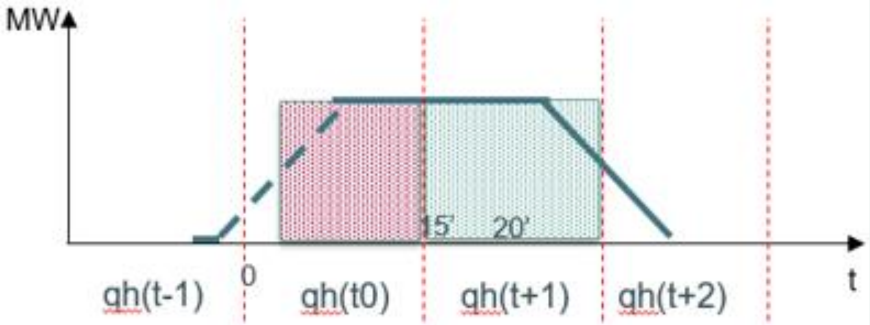
The activation request for a Qh is received at or BEFORE the point of Scheduled Activation of this same Qh

As the activation request for Qh(t) is received at the point of SA of Qh(t), $\Delta t = 15' - 0' = 15'$

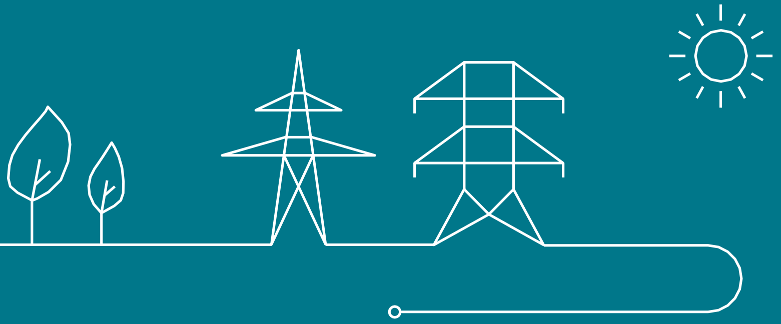


The activation request for a Qh is received AFTER the point of Scheduled Activation of this same Qh

- For **Qh(t)**, as the activation for Qh(t) is requested at t-5', so 2,5' after the point of SA of Qh(t): $\Delta \boldsymbol{t} = 15' - 2{,}5' = \mathbf{12{,}5'}$
- For **Qh(t+1)**, as the activation for Qh(t+1) is requested at t-5', so before the point of SA of Qh(t+1): $\Delta \boldsymbol{t} = 15' - 0' = \mathbf{15'}$



Activation control



All activated mFRR Energy Bid are subject to an activation control

ELIA considers the activation control as **non-compliant if** at least one of the following conditions is satisfied for the concerned Qh:

- ELIA has determined an mFRR **Energy Discrepancy > 0** MWh; and/or
- The **BSP sent neither its 1st nor its 2nd BU ACK** message to ELIA on time*

$$mFRR\ Energy\ Discrepancy = mFRR\ Energy_{\ to\ be\ Supplied} - \sum_{1}^{DP\ contributing\ to\ mFRR\ Requested} mFRR\ Energy_{\ Supplied}$$

Where,

- If Qh includes **no ramping phase**, $mFRR\ Energy_{\ to\ be\ Supplied} = \mathbf{100\%} \times \frac{1}{4} \times mFRR\ Requested$
- If Qh includes **one ramping phase**, $mFRR\ Energy_{\ to\ be\ Supplied} = \mathbf{90\%} \times \frac{1}{4} \times mFRR\ Requested$
- if Qh includes **two ramping phases**, $mFRR\ Energy_{\ to\ be\ Supplied} = \mathbf{80\%} \times \frac{1}{4} \times mFRR\ Requested$

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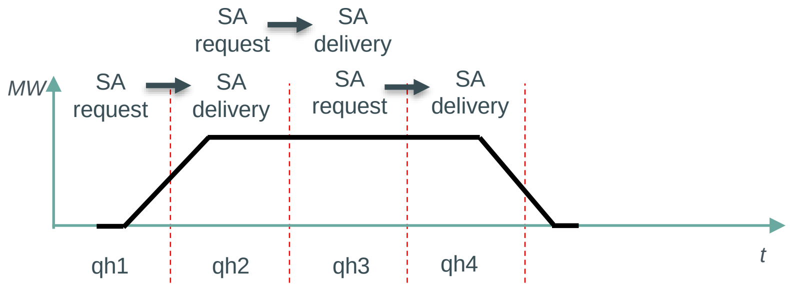
*The obligation to provide both BU ACK messages still remain for all BSPs

Examples of a non-compliant activation control for a SA

If Qh includes **no ramping phase**, $mFRR\ Energy_{\ to\ be\ Supplied} = \mathbf{100}\% \times \frac{1}{4} \times mFRR\ Requested$

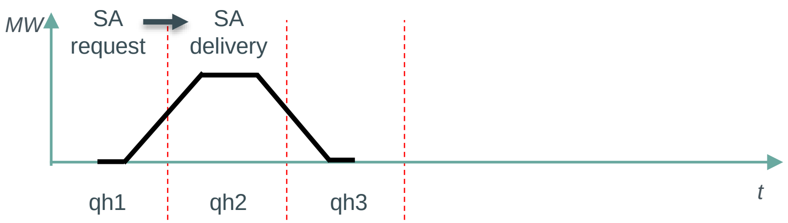
If Qh includes **one ramping phase**, $mFRR\ Energy_{\ to\ be\ Supplied} = \mathbf{90}\% \times \frac{1}{4} \times mFRR\ Requested$

If Qh includes **two ramping phases**, $mFRR\ Energy_{\ to\ be\ Supplied} = \mathbf{80}\% \times \frac{1}{4} \times mFRR\ Requested$


SA request
SA delivery
MW
SA request
SA delivery
SA request
SA delivery
qh1
qh2
qh3
qh4
t

	Qh1	Qh2	Qh3	Qh4	Qh5
mFRR Requested (MW)	0	50	50	50	0
Energy to be supplied (MWh)*	0	11,25	12,5	11,25	0
Baseline(MW)	NA	20	20	10	NA
Active power measured (MW)	NA	40	50	60	NA
Energy supplied (MWh)	NA	5	7,5	12,5	NA
Ramping	NA	1	0	1	NA
Ramping Factor	NA	90%	100%	90%	NA
Energy discrepancy (MWh)	NA	6,25	5	0	NA

Qh2 & Qh3 are non-compliant


MW
SA request
SA delivery
qh1
qh2
qh3
t

	Qh1	Qh2	Qh3
mFRR Requested (MW)	0	50	0
Energy to be supplied (MWh)*	0	10	0
Baseline(MW)	NA	20	NA
Active power measured (MW)	NA	65	NA
Energy supplied (MWh)	NA	11,25	NA
Ramping	NA	2	NA
Ramping Factor	NA	80%	
Energy discrepancy (MWh)	NA	0	NA

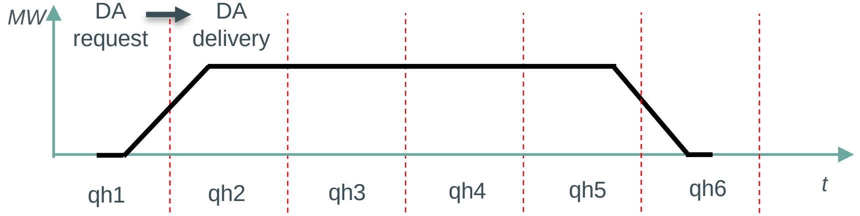
Examples of a non-compliant activation control for a DA

If Qh includes **no ramping phase**, $mFRR\ Energy_{\ to\ be\ Supplied} = 100\% \times \frac{1}{4} \times mFRR\ Requested$

If Qh includes **one ramping phase**, $mFRR\ Energy_{\ to\ be\ Supplied} = 90\% \times \frac{1}{4} \times mFRR\ Requested$

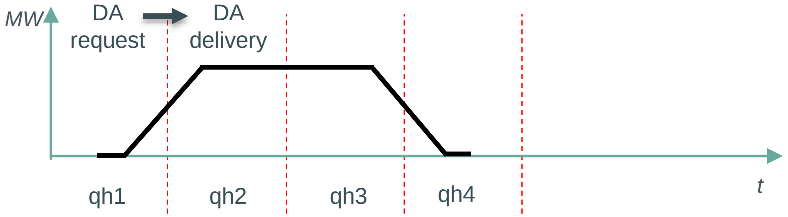
If Qh includes **two ramping phases**, $mFRR\ Energy_{\ to\ be\ Supplied} = 80\% \times \frac{1}{4} \times mFRR\ Requested$

DA request → DA delivery



	Qh1	Qh2	Qh3	Qh4	Qh5	Qh6
mFRR Requested (MW)	0	50	50	50	50	0
Energy to be supplied (MWh)*	0	11,25	12,5	12.5	11,25	0
Baseline(MW)	NA	20	20	10	10	NA
Active power measured (MW)	NA	40	40	40	40	NA
Energy supplied (MWh)	NA	7,5	7,5	12,5	12,5	NA
Ramping	NA	1	0	0	1	NA
Ramping Factor	NA	90%	100%	100%	90%	NA
Energy discrepancy (MWh)	NA	3,75	5	0	0	NA

Qh2 & Qh3 are non-compliant



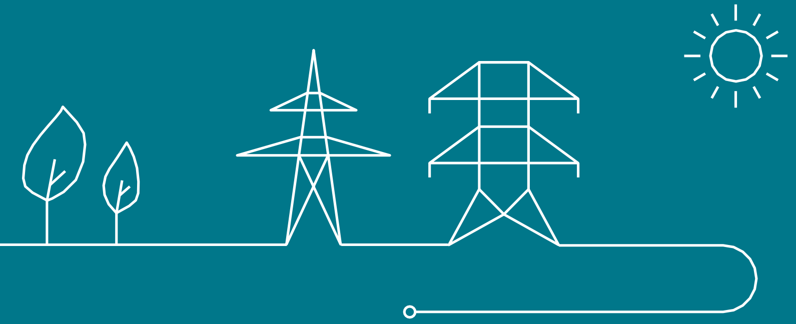
	Qh1	Qh2	Qh3	Qh4
mFRR Requested (MW)	0	50	50	0
Energy to be supplied (MWh)*	0	11,25	11,25	0
Baseline(MW)	NA	20	20	NA
Active power measured (MW)	NA	60	65	NA
Energy supplied (MWh)	NA	10	11,25	NA
Ramping	NA	1	1	NA
Ramping Factor	NA	90%	90%	NA
Energy discrepancy (MWh)	NA	1,25	0	NA

Qh2 is non-compliant

The rest of the process to be followed for the activation control is described in Part 2 of this presentation

Cf. Part 2 of this presentation

CRI Impact



CRI levels have been defined to avoid that balancing activations generate congestions

ELIA informs the BSP of the CRI levels changes for day D per electrical zone (hourly granularity), starting from day D-1 via the dedicated ELIA web page & via a B2B message

3 levels of CRI:

Low CRI

No congestion risks

MW cap = ∞

→ **incr./decr. is tolerated by the grid**

Medium CRI

Congestion forecasted in case of incr./decr. of production in the zone

MW cap > 0

→ **Only a volume of MW Cap of production incr./decr. is tolerated**

High CRI

Congestion risks

MW cap = 0 MW

→ **No incr./decr. of production is tolerated**

The Congestion Risk Indicator (CRI) represents the congestion risks in a zone and is determined:

… **for a direction**	Incremental Decremental Both incremental and decremental
… **for a specific duration**	Start hour – End hour
… **for a geographic zone**	380kV Langerbrugge West Langerbrugge East Schaerbeek Merksem Liège Stalen Ruien Hainaut West Hainaut East

The CRI is used

- To set a limit (=MWCap) on the energy allowed to be activated in the zone; and
- To request a Return to Schedule in real time in the direction of the congestion risk

Activations for balancing purposes should not cause or aggravate congestion risks

- The **CRI is indicative before BE GCT**:
  - The ‘final CRI’ may be different than the CRI communicated before BE GCT due to changes in schedules, RT measurement deviations, bid updates or remedial actions taken to solve a congestion risk
  - The CRI before BE GCT serves to inform the BSP of the risk that the concerned mFRR Energy Bid(s) may be filtered (= declared as “unavailable”)

  → Before BE GCT, the **BSP** has the opportunity to take action – and **is encouraged to** do so – based on the CRI information and **update its concerned bids to increase the volume availability**

- **At BE GCT**, the BSP is informed of the **effective unavailability** of:
  - The mFRR Energy Bid(s) impacted by a Medium or a High Level of CRI
  - The DP listed in the Supporting mFRR Providing Group impacted by a Medium or a High Level of CRI

An indicative CRI before BE GCT gives the following message:

🟩 **Low CRI**

DP is usable

🟧 **Medium CRI**

DP may become unusable*

🟥 **High CRI**

DP is unusable

*Note that ELIA cannot give more information in case of a medium CRI as the final usability of a DP will depend on the merit order of the firm bids after BE GCT

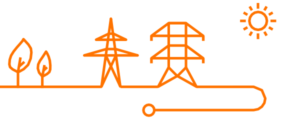
mFRR Energy Bids are filtered at T-10’

The bidding tool will mark as « unavailable » the filtered bids

DP included in mFRR energy bid	CRI impact on DP usability	Bid availability status
DP1	[empty = usable]	available
DP2		
DP3		

DP included in mFRR energy bid	CRI impact on DP usability	Bid availability status
DP1	Non-usable	unavailable
DP2		
DP3		

DP included in mFRR energy bid	CRI impact on DP usability	Bid availability status
DP1	Non-usable	unavailable
DP2	Non-usable	
DP3	Non-usable	

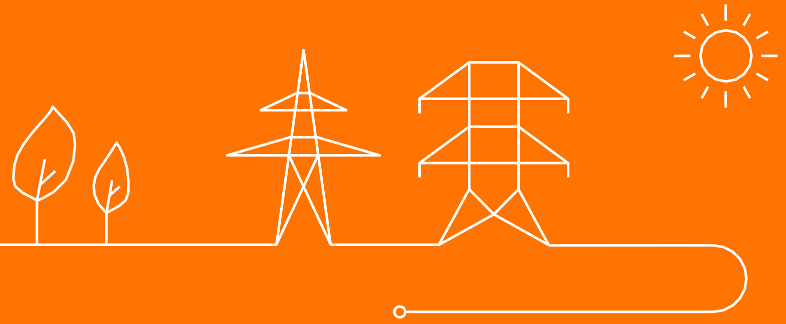


Part 2: mFRR Design Workshop

Changes in the design since last Design Note

15/02/2023 | Sybille METTENS

Penalty Scheme for Activation Control



For each non-compliant activation, the BSP is financially penalized & the penalty depends on $\Delta E_{qh(t)}$, factor1, & mFRR Energy Price$_{qh(t)}$

$$Penalty \ = factor1 \times mFRR\ energy\ discrepancy\ \times mFRR\ energy\ price$$

Where,

- $factor1$ depends on the direction of the net mFRR requested compared to the need of the ELIA LFC block during the concerned Qh:
  - $factor1 = 0{,}25$ in case of ‘same direction’
  - $factor1 = 1$ in case of ‘opposing direction
- $mFRR\ energy\ price$ is the maximum clearing price at which mFRR is settled by ELIA (across all BSPs) in the concerned direction for the concerned Qh

Update

For each non-compliant activation, the BSP is financially penalized & the penalty depends on the CBMP & the Imbalance Price

$$Penalty = mFRR\ energy\ discrepancy \times penalty\ price$$

The **penalty price** is composed of two elements:

- A **minimum penalty** which equals to $|0{,}25 \times CBMP|$
- An **additional penalty** (to discourage any possibilities of arbitration) which equals to $|Imbalance\ Price - CBMP|$ & is only applicable if:

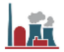
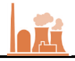
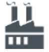
mFRR activation	Applicable if
Upward	Imbalance price < CBMP
Downward	Imbalance price > CBMP

The unique **CBMP to be considered** for a Qh for all BSPs **is the maximum clearing price** at which mFRR is settled by ELIA (across all BSPs in Belgium) in the concerned direction for the Qh (cf. slide 27)

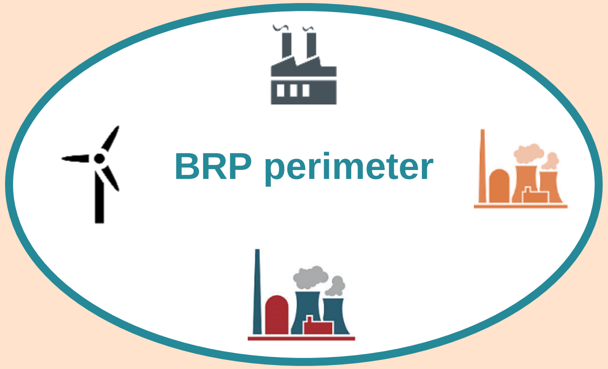
Examples to illustrate how a risk of gaming is discourage with the new penalty formula

Assumptions:

- The Power plant declared a Schedule of 10 MWh
- A request for SA is sent by ELIA to the concerned BSP → mFRR Energy Requested = 20 MWh
- The CBMP is equal to 100 €/MWh
- The remuneration for the delivery of mFRR Requested is: 20 MWh x 100 €/MWh = 2k€
- For the concerned Qh, the RT metering are the following:

	10 MWh
	5 MWh
	2 MWh
	- 17 MWh
BRP correction	-20 MWh
TOTAL	**-20 MWh**

Non-compliant activation

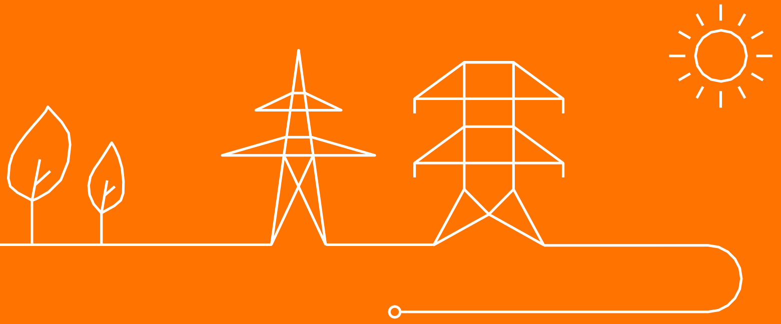


The BSP does not deliver anything (it stays at its Schedule)
→ Energy discrepancy: 20 MWh

	Imbalance settlement	SA and BRP total financial account	Penalty
Imbalance Price: 200 €/MWh	$-20\,MWh \times 200\,\text{€}/MWh = -4k\text{€}$	$2k\text{€} + (-4k\text{€}) = -2k\text{€}$	$Energy\ Discrepancy \times \lvert 0{,}25 \times CBMP \rvert$ $= 20MWh \times \lvert 0{,}25 \times 100\text{€}/MWh \rvert = \mathbf{0{,}5}\boldsymbol{k}\ \text{€}$
Imbalance Price: -300 €/MWh	$-20\,MWh \times (-300)\,\text{€}/MWh = 6k\text{€}$	$2k\text{€} + 6k\text{€} = 8k\text{€}$	$Energy\ Discrepancy \times (\lvert 0{,}25 \times CBMP \rvert + \lvert Imbalance\ Price - CBMP \rvert)$ $= 20MWh \times (\lvert 0{,}25 \times 100\text{€}/MWh \rvert + \lvert -300\text{€}/MWh - 100\text{€}/MWh \rvert) = \mathbf{8{,}5}\boldsymbol{k}\text{€}$

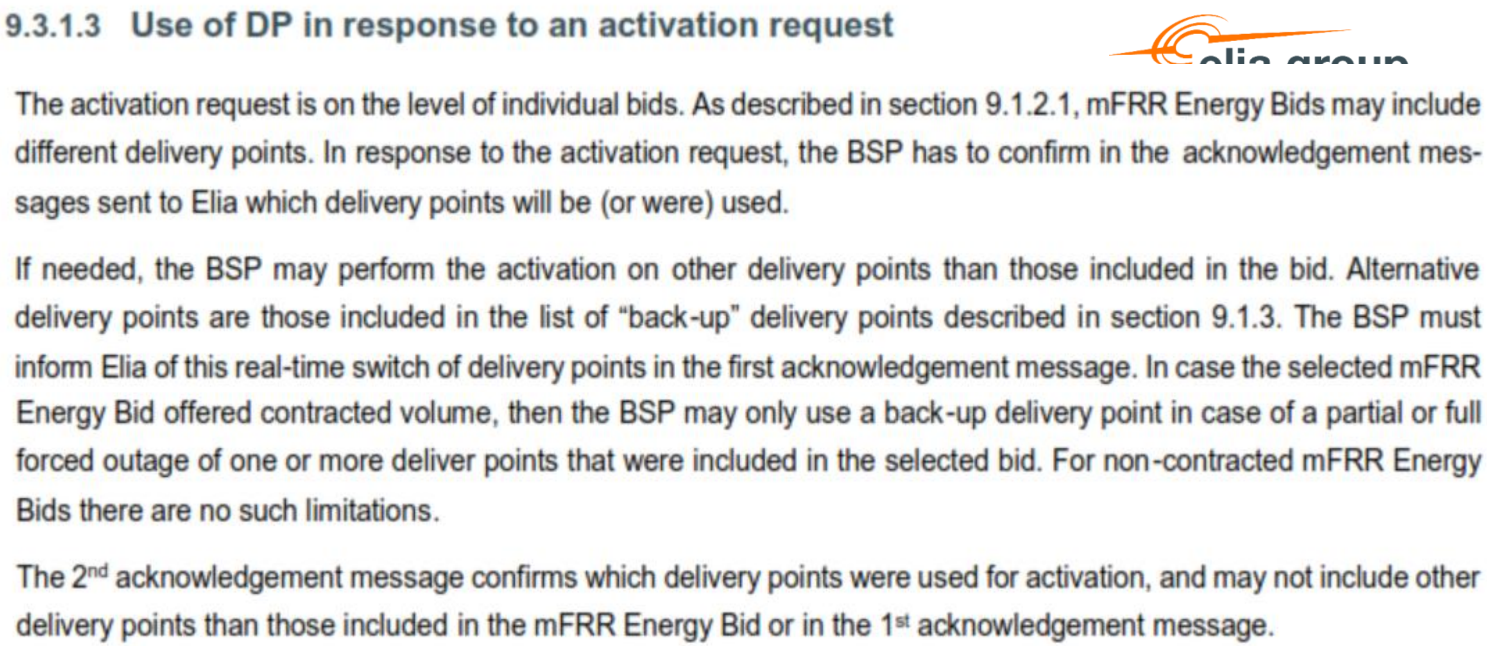
Risk of gaming is discouraged as the benefits from the arbitration are neutralized

Penalty for Contracted Bids



Design Note

For contracted bids, the BSP must supply energy with the DPs that were included in its contracted Energy Bid

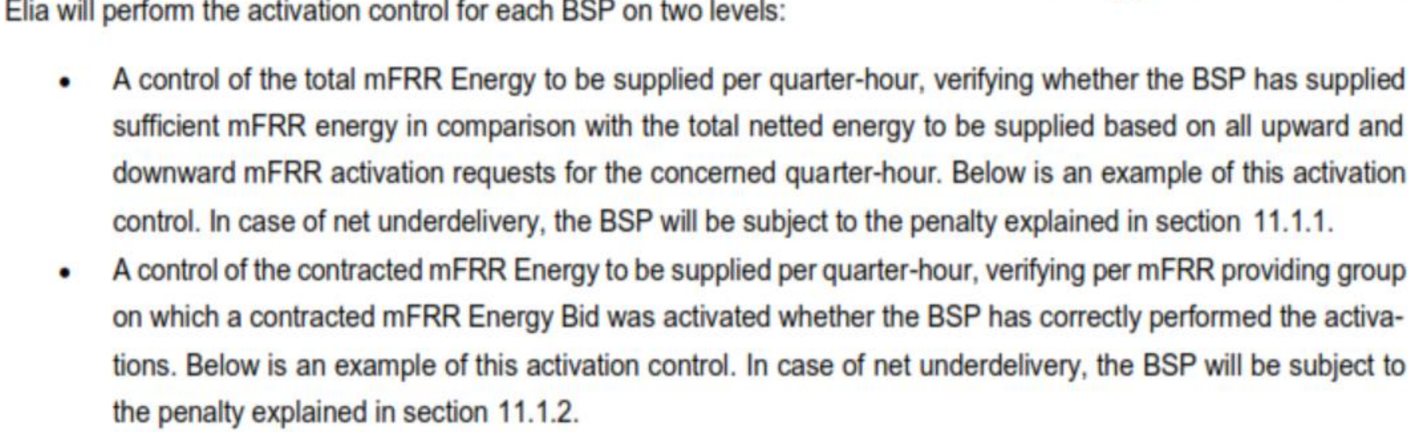


9.3.1.3 Use of DP in response to an activation request

The activation request is on the level of individual bids. As described in section 9.1.2.1, mFRR Energy Bids may include different delivery points. In response to the activation request, the BSP has to confirm in the acknowledgement messages sent to Elia which delivery points will be (or were) used.

If needed, the BSP may perform the activation on other delivery points than those included in the bid. Alternative delivery points are those included in the list of "back-up" delivery points described in section 9.1.3. The BSP must inform Elia of this real-time switch of delivery points in the first acknowledgement message. In case the selected mFRR Energy Bid offered contracted volume, then the BSP may only use a back-up delivery point in case of a partial or full forced outage of one or more deliver points that were included in the selected bid. For non-contracted mFRR Energy Bids there are no such limitations.

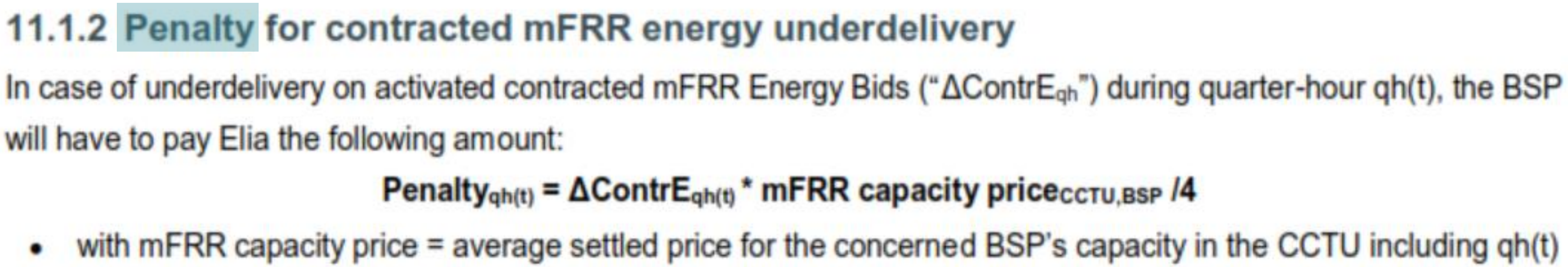
The 2nd acknowledgement message confirms which delivery points were used for activation, and may not include other delivery points than those included in the mFRR Energy Bid or in the 1st acknowledgement message.



10.1.1 Activation control of mFRR Energy bid

Elia will perform the activation control for each BSP on two levels:

- A control of the total mFRR Energy to be supplied per quarter-hour, verifying whether the BSP has supplied sufficient mFRR energy in comparison with the total netted energy to be supplied based on all upward and downward mFRR activation requests for the concerned quarter-hour. Below is an example of this activation control. In case of net underdelivery, the BSP will be subject to the penalty explained in section 11.1.1.
- A control of the contracted mFRR Energy to be supplied per quarter-hour, verifying per mFRR providing group on which a contracted mFRR Energy Bid was activated whether the BSP has correctly performed the activations. Below is an example of this activation control. In case of net underdelivery, the BSP will be subject to the penalty explained in section 11.1.2.



11.1.2 Penalty for contracted mFRR energy underdelivery

In case of underdelivery on activated contracted mFRR Energy Bids ("$\Delta ContrE_{qh}$") during quarter-hour qh(t), the BSP will have to pay Elia the following amount:

$$\mathbf{Penalty_{qh(t)} = \Delta ContrE_{qh(t)} * mFRR\ capacity\ price_{CCTU,BSP} /4}$$

- with mFRR capacity price = average settled price for the concerned BSP's capacity in the CCTU including qh(t)

Update

ELIA suggests to delete the additional control for the Contracted Bids

- **Purpose of this control**: Ensure that the volume offered in a contracted Bid is available & that a lack of volume cannot be compensated through DP offered in a non-contracted bid

  → Availability test aims at addressing that risk too

- **Conclusion**: ELIA proposes to remove the additional control & therefore the obligation to only use DPs listed in the bid*****

  → It removes a barrier to entry for the BSPs

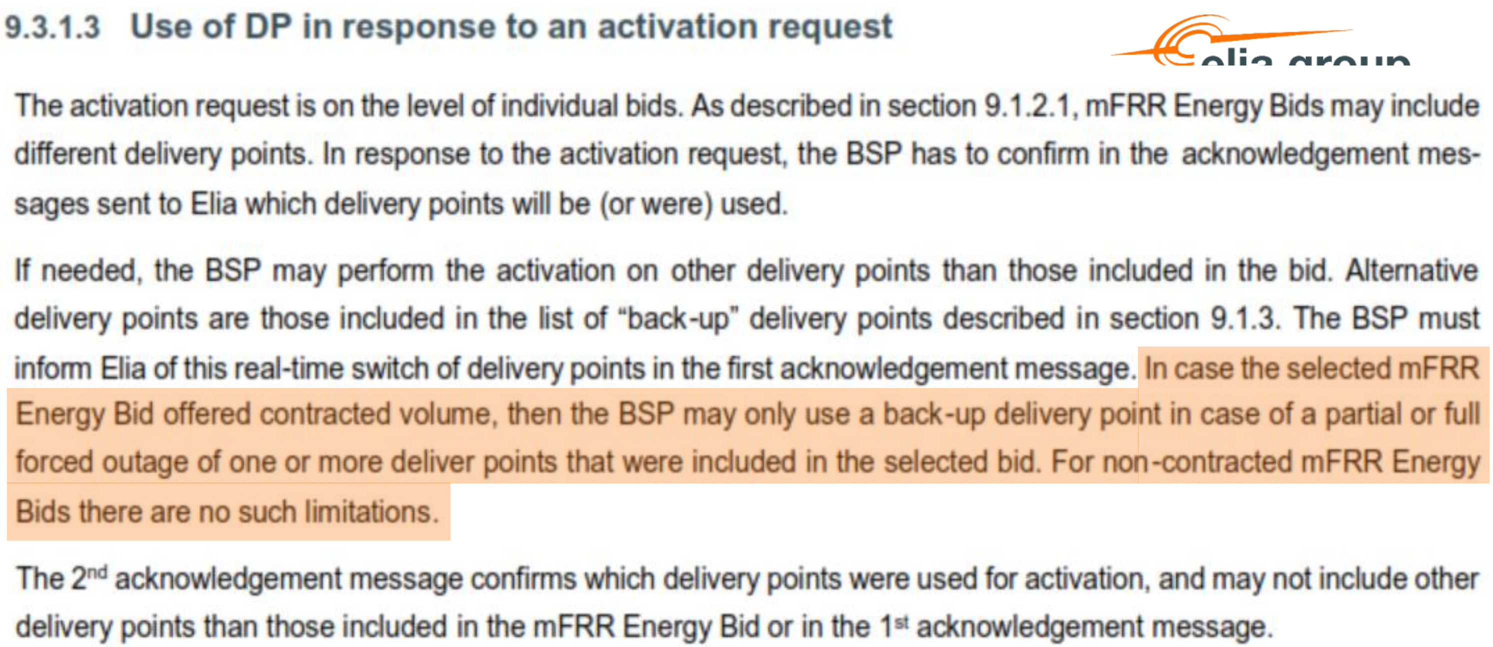
  → It simplifies the design as the process for non-contracted bids will apply for contracted bids

  → It avoids unnecessary complications in the design (and therefore possible issues for BSPs & for ELIA's implementation)

*****The obligations related to the Availability Tests remain !

Update

ELIA suggests to remove the obligation and therefore the related control & penalties

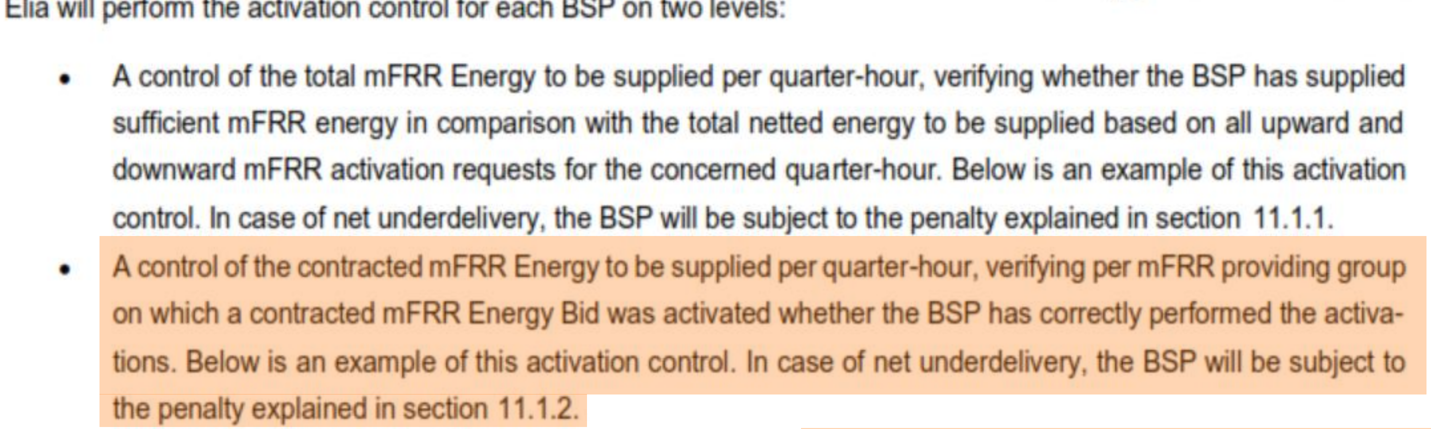


9.3.1.3 Use of DP in response to an activation request

The activation request is on the level of individual bids. As described in section 9.1.2.1, mFRR Energy Bids may include different delivery points. In response to the activation request, the BSP has to confirm in the acknowledgement messages sent to Elia which delivery points will be (or were) used.

If needed, the BSP may perform the activation on other delivery points than those included in the bid. Alternative delivery points are those included in the list of "back-up" delivery points described in section 9.1.3. The BSP must inform Elia of this real-time switch of delivery points in the first acknowledgement message. In case the selected mFRR Energy Bid offered contracted volume, then the BSP may only use a back-up delivery point in case of a partial or full forced outage of one or more deliver points that were included in the selected bid. For non-contracted mFRR Energy Bids there are no such limitations.

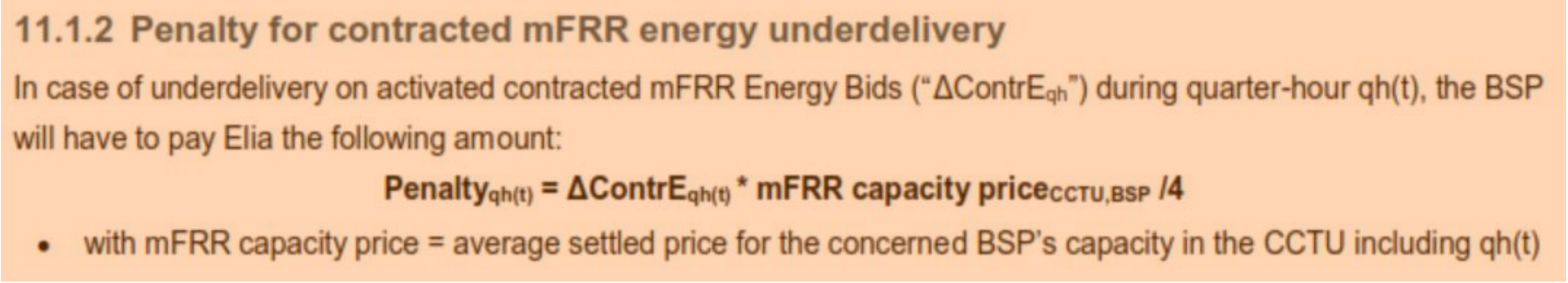
The 2nd acknowledgement message confirms which delivery points were used for activation, and may not include other delivery points than those included in the mFRR Energy Bid or in the 1st acknowledgement message.



10.1.1 Activation control of mFRR Energy bid

Elia will perform the activation control for each BSP on two levels:

- A control of the total mFRR Energy to be supplied per quarter-hour, verifying whether the BSP has supplied sufficient mFRR energy in comparison with the total netted energy to be supplied based on all upward and downward mFRR activation requests for the concerned quarter-hour. Below is an example of this activation control. In case of net underdelivery, the BSP will be subject to the penalty explained in section 11.1.1.
- A control of the contracted mFRR Energy to be supplied per quarter-hour, verifying per mFRR providing group on which a contracted mFRR Energy Bid was activated whether the BSP has correctly performed the activations. Below is an example of this activation control. In case of net underdelivery, the BSP will be subject to the penalty explained in section 11.1.2.



11.1.2 Penalty for contracted mFRR energy underdelivery

In case of underdelivery on activated contracted mFRR Energy Bids ("$\Delta ContrE_{qh}$") during quarter-hour qh(t), the BSP will have to pay Elia the following amount:

$$\mathbf{Penalty_{qh(t)} = \Delta ContrE_{qh(t)} * mFRR\ capacity\ price_{CCTU,BSP} /4}$$

- with mFRR capacity price = average settled price for the concerned BSP's capacity in the CCTU including qh(t)

Bid update after BE GCT & Baseline update after RDGCT

Market parties requested rules adaptations for Baseline & mFRR Energy Bid update

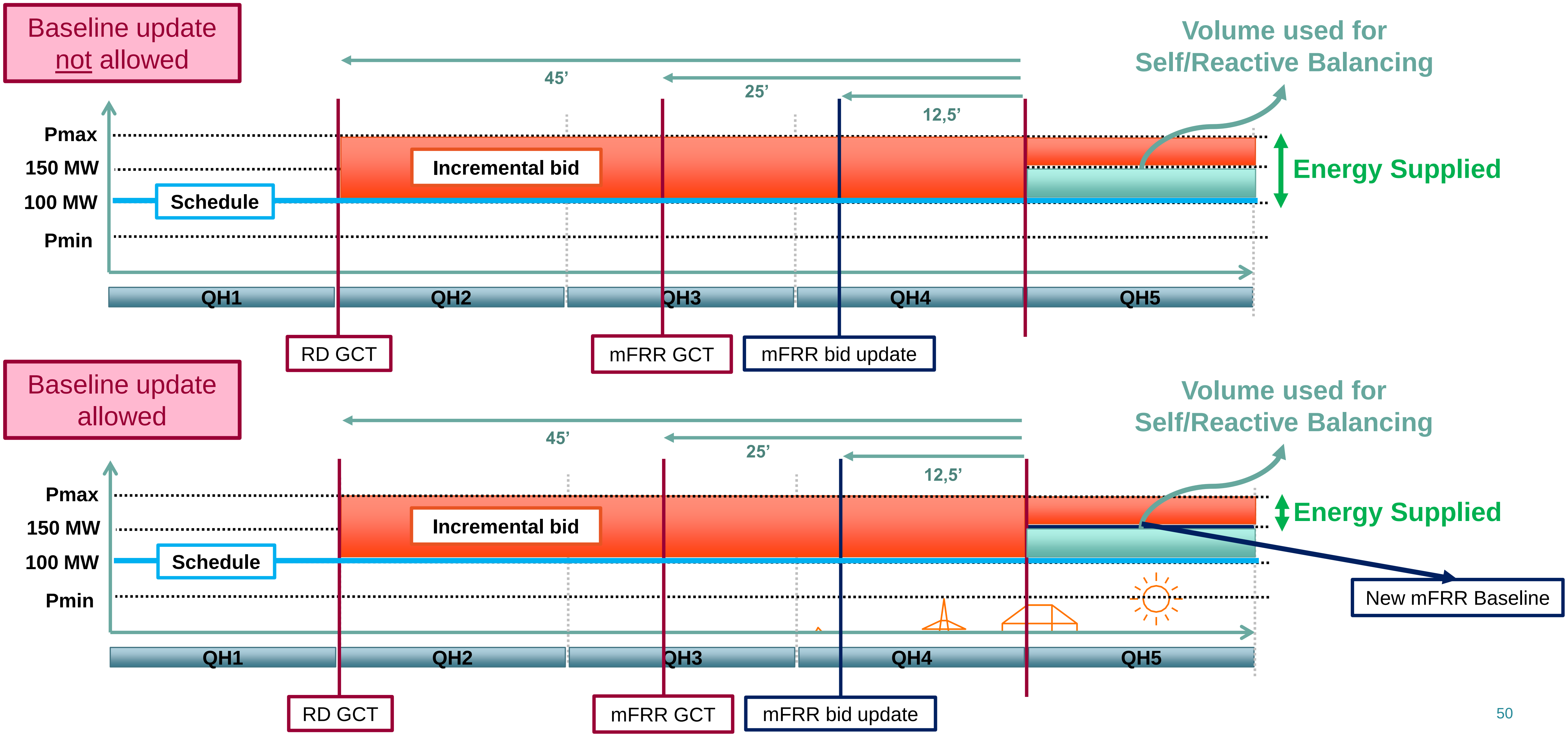
- Self/**Reactive Balancing*** **should be allowed** for Market Parties after BE GCT
- **With the current rules**, **doing Self/reactive Balancing may lead to unjustified penalties** in the Activation Control because the Baseline (= Daily Schedule provided by the SA) used for the Activation Control can only be updated until the RD GCT

→ To solve that issue, ELIA will allow the update of the Baseline after RD GCT

---

*Or Intraday trade

Illustration of the risks faced by the BSP in case the Baseline update is not allowed



Baseline update not allowed

Volume used for Self/Reactive Balancing

45’

25’

12,5’

Pmax

150 MW

100 MW

Pmin

Incremental bid

Schedule

Energy Supplied

QH1

QH2

QH3

QH4

QH5

RD GCT

mFRR GCT

mFRR bid update

Baseline update allowed

Volume used for Self/Reactive Balancing

45’

25’

12,5’

Pmax

150 MW

100 MW

Pmin

Incremental bid

Schedule

Energy Supplied

New mFRR Baseline

QH1

QH2

QH3

QH4

QH5

RD GCT

mFRR GCT

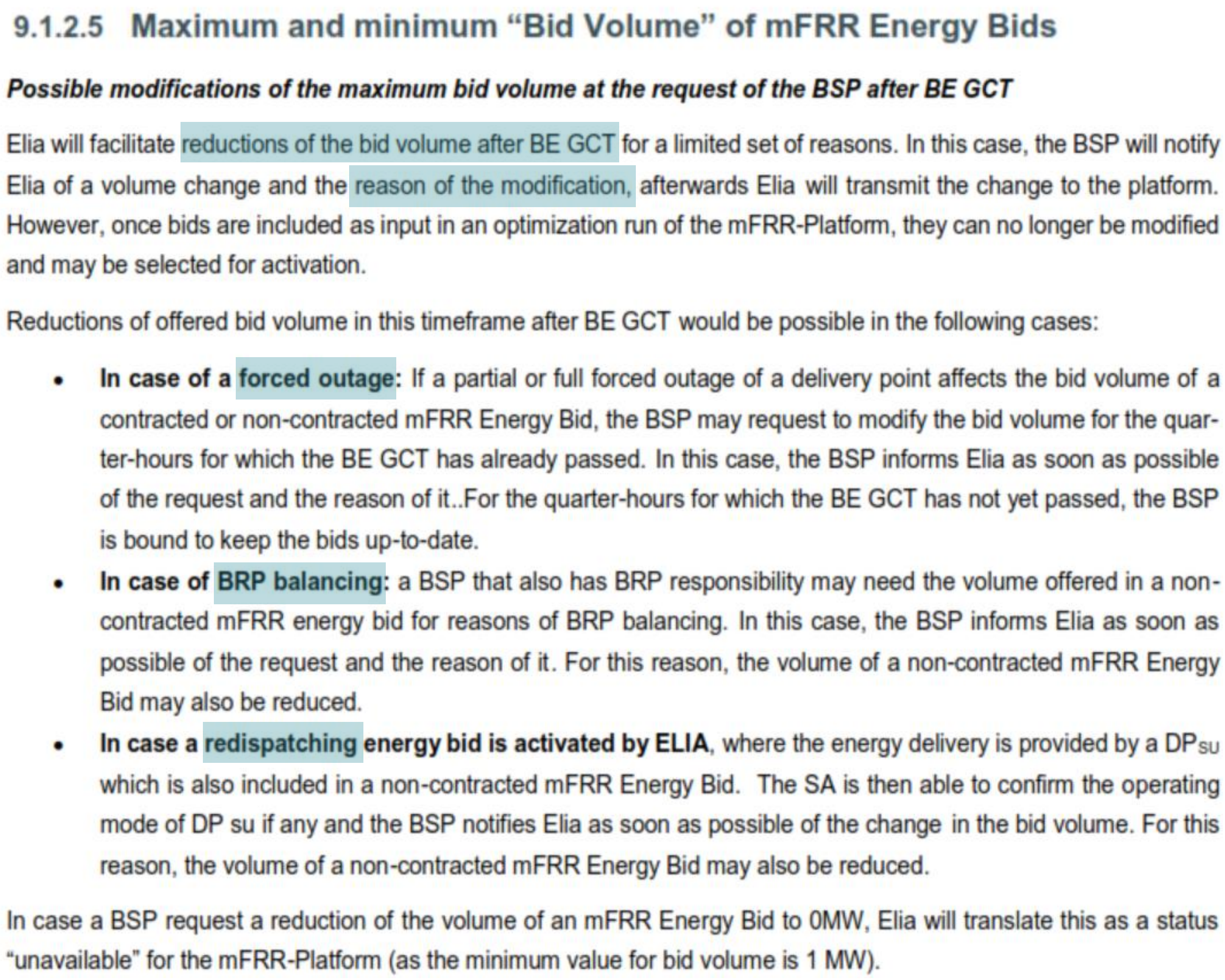
mFRR bid update

Generic rules for the Baseline & the mFRR Energy Bid update

- If the mFRR Energy Bid is updated **after BE GCT**, it is **only allowed to reduce** the Bid **Volume**
  - All other bid properties must remain unchanged
  - It is allowed to reduce the Bid Volume to 0MW → Bid becomes 'unavailable'
- Without prejudice to the rules defined in the following slides, an mFRR Energy Bid & a Baseline can be **updated between BE GCT and until** one of the 2 situations occurs:
  - 5 minutes after the start of the concerned Qh (**T+5'**)
  - ELIA sends an **activation request** for this mFRR Energy Bid
- **ELIA** will **not explicitly verify the coherency between** an mFRR Energy **Bid update &** its corresponding **Baseline(s) update**
  - ELIA will use the latest received mFRR Energy Bid & Baselines for the verification of the mFRR Requested in the Activation Control → If the updates are not coherent, this may lead to a penalty in the Activation Control
- In case a Baseline (respectively an mFRR Energy Bid) is rejected, the BSP should adapt the concerned mFRR Energy Bid(s) (respectively Baseline) accordingly
- There are **3 reasons** for a BSP **to update its bids**:
  - BSP wants to do Self-Balancing (Rebalance its portfolio) or Reactive Balancing (React to the Imbalance Price) or an Intraday Trade
  - BSP faces a Forced Outage
  - The same volume has been activated for Redispatching (Internal congestion)

Design Note

The rules detailed in the Design Note do not consider (potential) congestion issues, nor the possibility to update the Baselines



9.1.2.5 Maximum and minimum “Bid Volume” of mFRR Energy Bids

Possible modifications of the maximum bid volume at the request of the BSP after BE GCT

Elia will facilitate reductions of the bid volume after BE GCT for a limited set of reasons. In this case, the BSP will notify Elia of a volume change and the reason of the modification, afterwards Elia will transmit the change to the platform. However, once bids are included as input in an optimization run of the mFRR-Platform, they can no longer be modified and may be selected for activation.

Reductions of offered bid volume in this timeframe after BE GCT would be possible in the following cases:

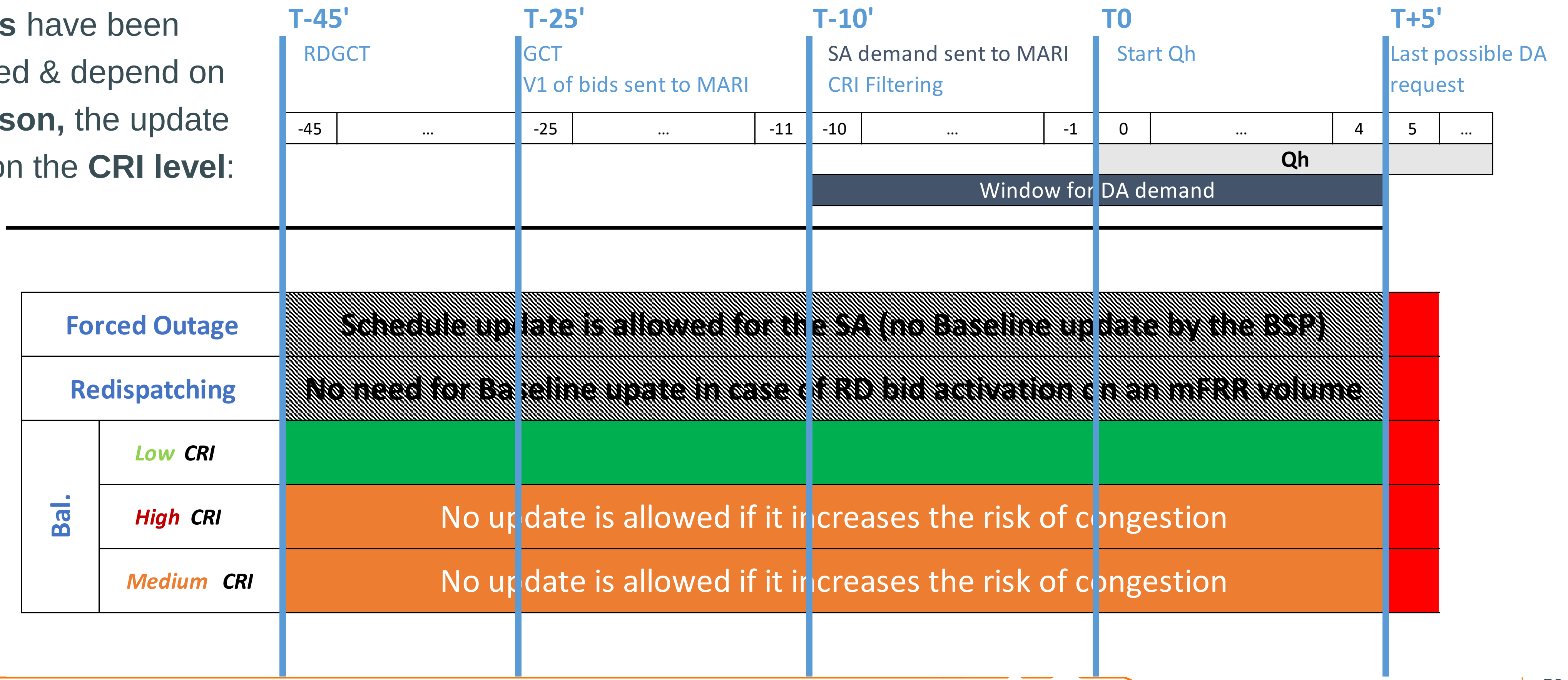
- **In case of a forced outage**: If a partial or full forced outage of a delivery point affects the bid volume of a contracted or non-contracted mFRR Energy Bid, the BSP may request to modify the bid volume for the quarter-hours for which the BE GCT has already passed. In this case, the BSP informs Elia as soon as possible of the request and the reason of it..For the quarter-hours for which the BE GCT has not yet passed, the BSP is bound to keep the bids up-to-date.
- **In case of BRP balancing**: a BSP that also has BRP responsibility may need the volume offered in a non-contracted mFRR energy bid for reasons of BRP balancing. In this case, the BSP informs Elia as soon as possible of the request and the reason of it. For this reason, the volume of a non-contracted mFRR Energy Bid may also be reduced.
- **In case a redispatching energy bid is activated by ELIA**, where the energy delivery is provided by a DP_{SU} which is also included in a non-contracted mFRR Energy Bid. The SA is then able to confirm the operating mode of DP su if any and the BSP notifies Elia as soon as possible of the change in the bid volume. For this reason, the volume of a non-contracted mFRR Energy Bid may also be reduced.

In case a BSP request a reduction of the volume of an mFRR Energy Bid to 0MW, Elia will translate this as a status “unavailable” for the mFRR-Platform (as the minimum value for bid volume is 1 MW).

Update

The authorization to update a Baseline should not result in new risks of congestion

Restrictions have been therefore defined & depend on the **update reason,** the update **direction and** on the **CRI level**:



T-45' RDGCT

T-25' GCT
V1 of bids sent to MARI

T-10' SA demand sent to MARI
CRI Filtering

T0 Start Qh

T+5' Last possible DA request

-45	…	-25	…	-11	-10	…	-1	0	…	4	5	…
								Qh				
					Window for DA demand							

		T-45' – T+5'	After T+5'
Forced Outage		Schedule update is allowed for the SA (no Baseline update by the BSP)	🟥
Redispatching		No need for Baseline upate in case of RD bid activation on an mFRR volume	🟥
Bal.	*Low* ***CRI***	🟩	🟥
	High ***CRI***	No update is allowed if it increases the risk of congestion	🟥
	Medium ***CRI***	No update is allowed if it increases the risk of congestion	🟥

Why is a Baseline update not allowed, when it concerns a DP in a zone with a High level of CRI & goes in the direction of this CRI?

Rules in a zone with High level of CRI UP (resp. DOWN), after RD GCT:

- **No increase** (resp. decrease) **of production** is tolerated
- **No activation** UP (resp. DOWN) is tolerated
- **No deviation from the Schedule** is tolerated in the UP (resp. DOWN) direction

Consequence if ELIA would allow the BSP to update a Baseline in a High level of CRI after RD GCT:

The **rules of the High CRI** are **not respected**

Conclusion:

- A request for **Baseline update** is **forbidden** by ELIA **if it concerns a DP in** a zone with **a High** level of **CRI &** if **this update aggravates the risk of congestion**
- An mFRR Energy **Bid** is **automatically filtered** by ELIA **if it concerns a DP in** a zone with **a High** level of **CRI &** if **this update aggravates the risk of congestion**

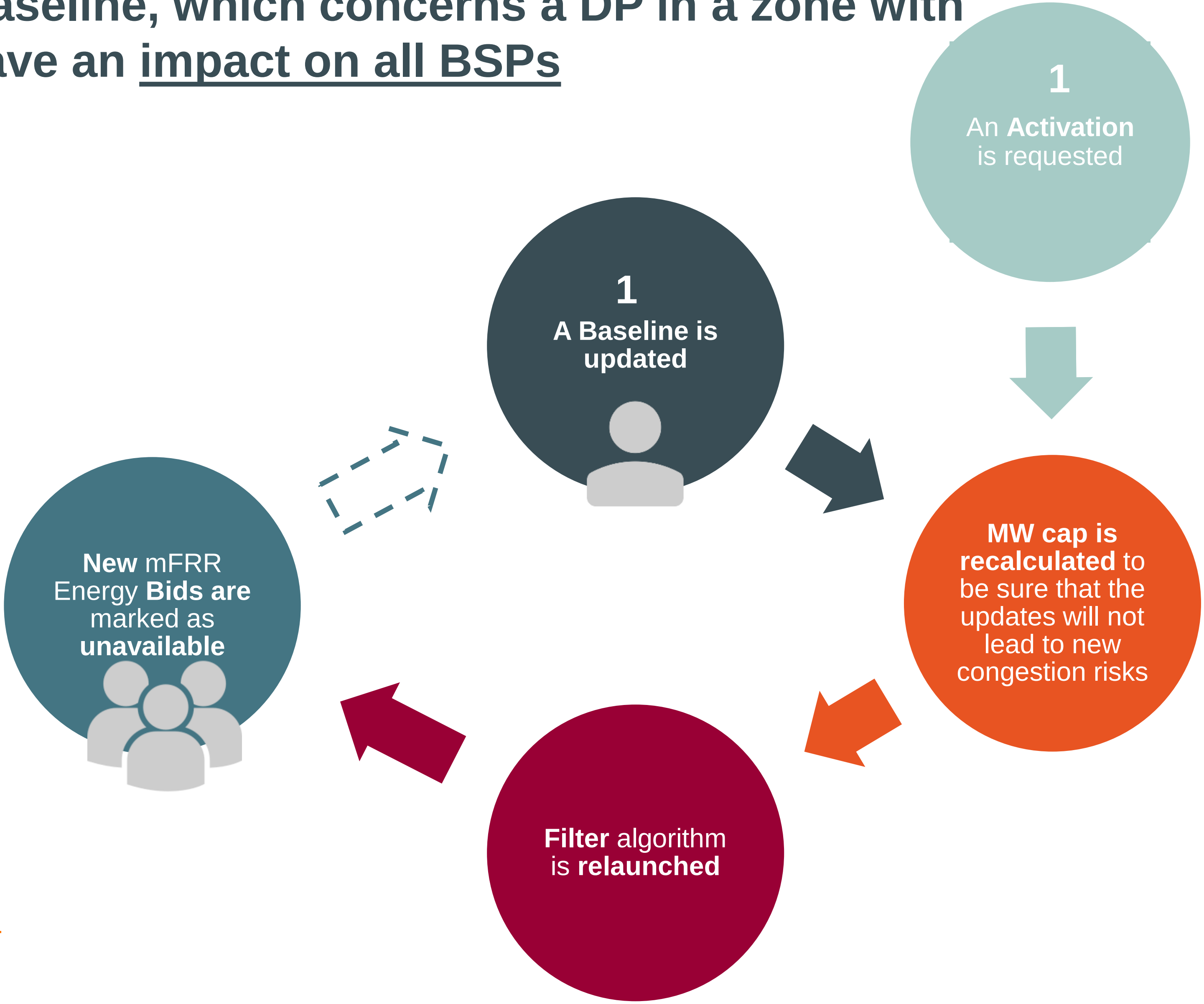
The action of one BSP on a Baseline, which concerns a DP in a zone with a Medium level of CRI, may have an impact on all BSPs

Rules in a zone with a Medium level of CRI:

- Each **Baseline update** & each **activation** are to be **taken into account for MW cap** determination
- **Each time a new MW cap is determined, a new filter is to be applied** for the mFRR Energy Bids

Impacts:

- **Bids availability** of all BSP in the zone is **adapted whenever a Baseline is updated**
- The **tools performance** is highly **impacted**



1

An **Activation** is requested

1

A Baseline is updated

MW cap is recalculated to be sure that the updates will not lead to new congestion risks

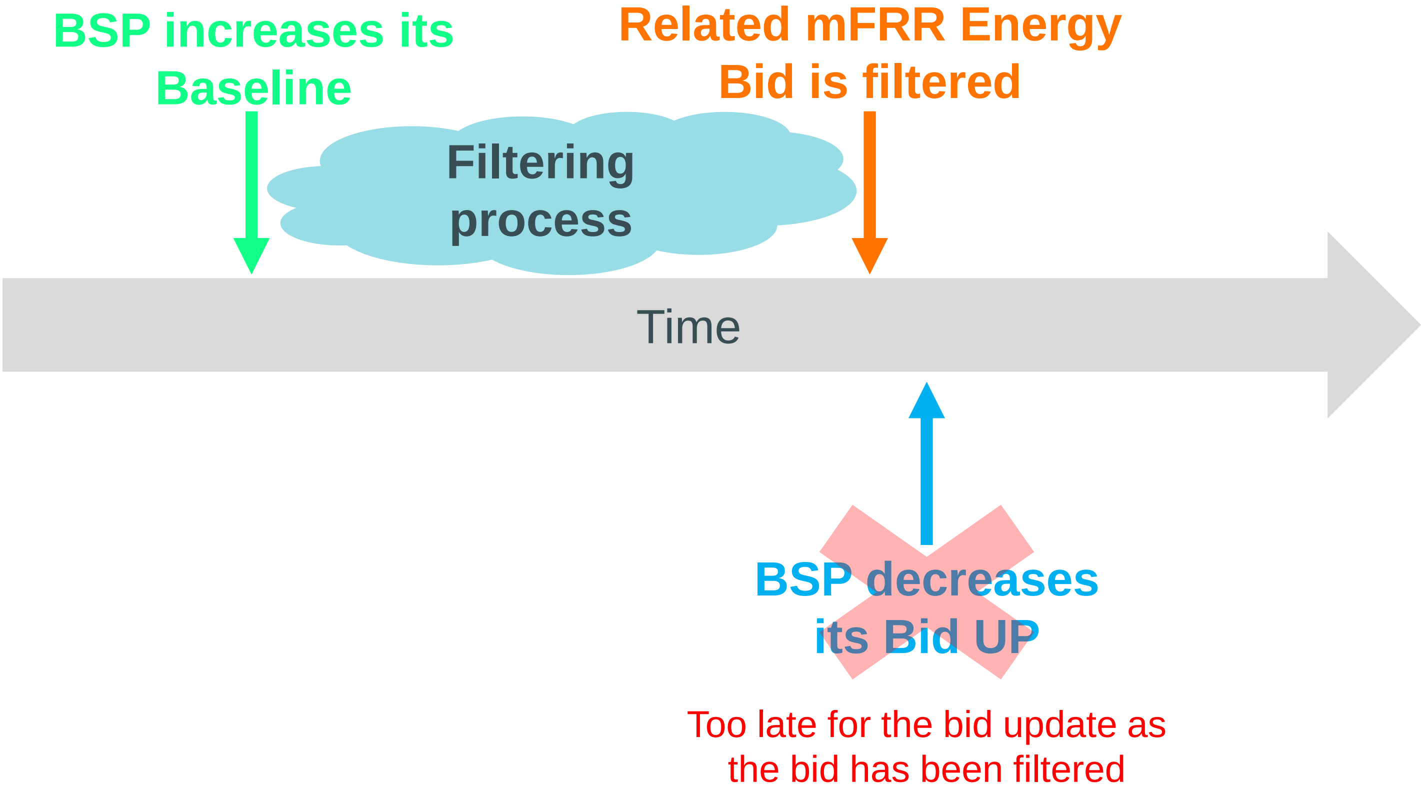
Filter algorithm is **relaunched**

New mFRR Energy **Bids are** marked as **unavailable**

Normal communication times between tools (of MARI, ELIA & the BSP) may lead to issues for the BSP, when an update which concerns a DP in a zone with a Medium level of CRI, is made

Assumptions:

- Only one BSP submitted a bid UP to MARI (the bid includes 1 DP)
- The concerned DP is in a zone with medium level of CRI in the UP idrection
- The BSP wants to decrease its Bid volume because he wants to do Self Balancing after BE GCT



BSP increases its Baseline

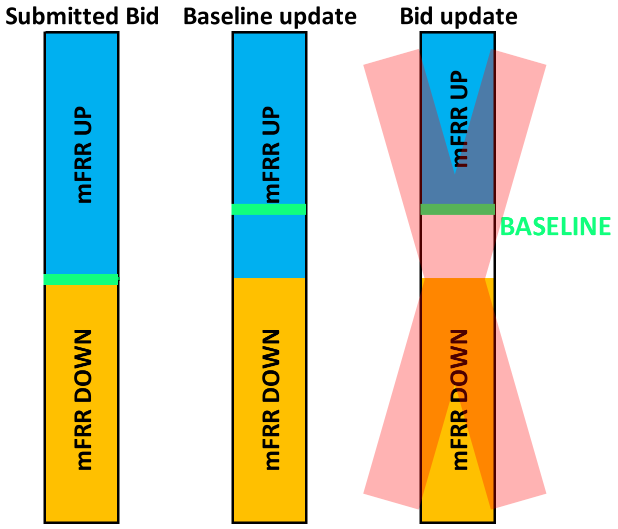
Related mFRR Energy Bid is filtered

Filtering process

Time

~~**BSP decreases its Bid UP**~~

Too late for the bid update as the bid has been filtered

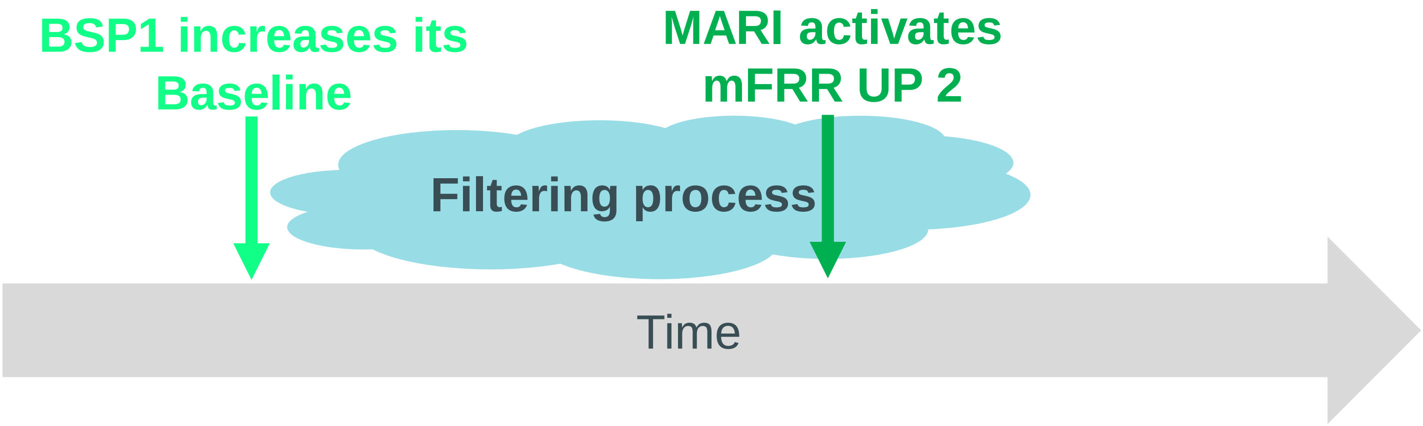

Submitted Bid
Baseline update
Bid update
mFRR UP
mFRR DOWN
mFRR UP
mFRR DOWN
mFRR UP
BASELINE
mFRR DOWN

The mFRR Energy Bid has been filtered BEFORE the BSP got the time to update its bid according to the Baseline update
→ The Bid has been filtered & the BSP will never be activated

Normal communication times between tools (of MARI, ELIA & the BSP) may lead to issues for the BSP, when an update which concerns a DP in a zone with a Medium level of CRI, is made

Assumptions:

- Only 2 BSPs submitted bids UP to MARI (each bid includes 1 DP)
- DP1 is in a High CRI UP (mFRR UP 1 is marked as “unavailable”) & DP2 is in a Medium CRI UP
- BSP1 wants to increase its Baseline because he wants to do Self Balancing



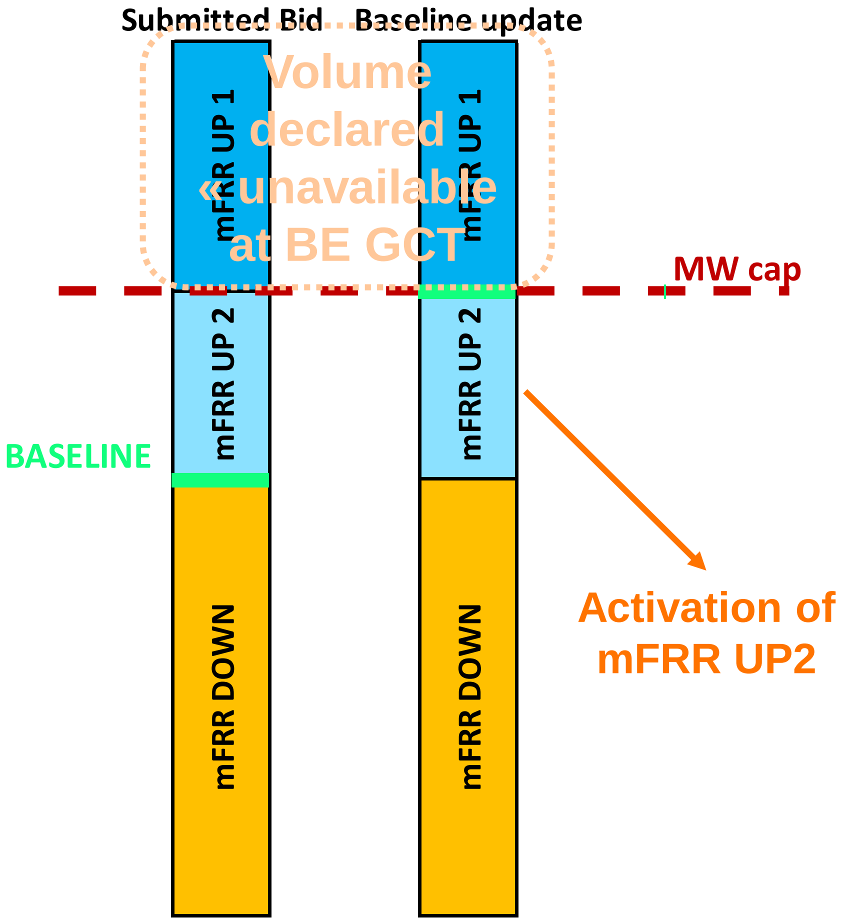
BSP1 increases its Baseline

MARI activates mFRR UP 2

Filtering process

Time

The mFRR Energy Bid “mFRR UP2” has been activated BEFORE ELIA got the time to filter mFRR UP 2 (because the Baseline update of BSP1 consumed the MW cap still available)
→ ELIA may faces congestion issues


Submitted Bid
Baseline update
Volume declared «unavailable» at BE GCT
mFRR UP 1
mFRR UP 1
MW cap
mFRR UP 2
mFRR UP 2
BASELINE
mFRR DOWN
mFRR DOWN
Activation of mFRR UP2

Conclusion: The rules are really complex & a process, covering all cases/risks and considering the communication times needed, cannot be defined

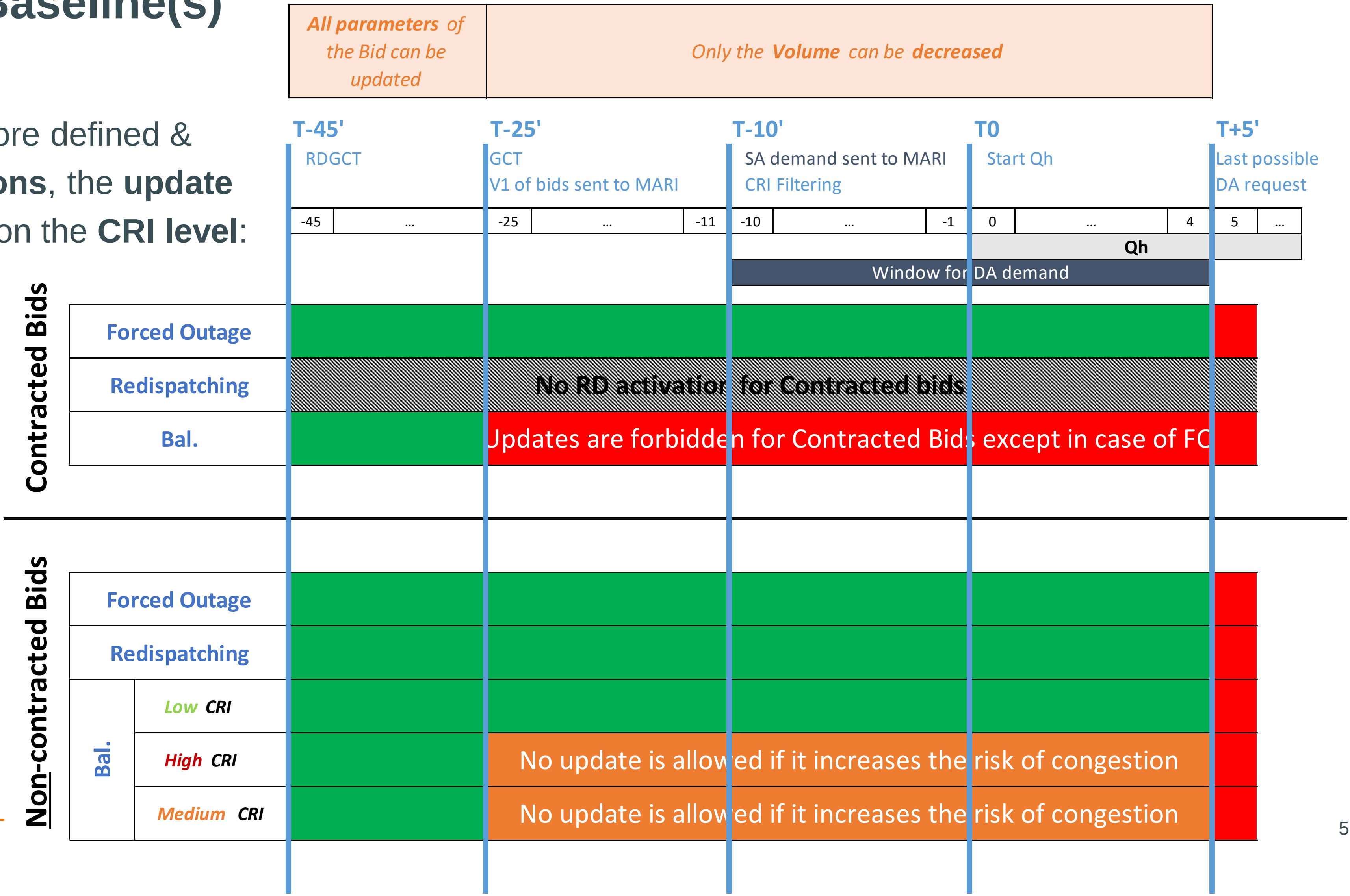
- A request for **Baseline update** is **forbidden** by ELIA **if** it concerns a **DP in** a zone with **a Medium** level of **CRI &** if **this update aggravates the risk of congestion**

- A request for mFRR Energy **Bid update** is **forbidden** by ELIA **if** it concerns a **DP in** a zone with **a Medium** level of **CRI &** if **this update aggravates the risk of congestion**

Update

The BSP has the responsibility to update its mFRR Energy Bids according to its Schedule(s)/Baseline(s)

Restrictions have been therefore defined & depend on the **Capacity obligations**, the **update reason,** the update **direction** and on the **CRI level**:



All parameters of the Bid can be updated

Only the Volume can be decreased

T-45' RDGCT

T-25' GCT V1 of bids sent to MARI

T-10' SA demand sent to MARI CRI Filtering

T0 Start Qh

T+5' Last possible DA request

-45
…
-25
…
-11
-10
…
-1
0
…
4
5
…
Qh
Window for DA demand
Contracted Bids
Forced Outage
Redispatching
Bal.
Non-contracted Bids
Forced Outage
Redispatching
Bal.
Low CRI
High CRI
Medium CRI

No RD activation for Contracted bids

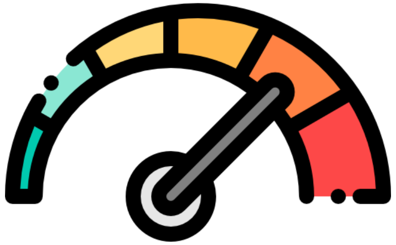
Updates are forbidden for Contracted Bids except in case of FO

No update is allowed if it increases the risk of congestion

No update is allowed if it increases the risk of congestion

Update

BSPs must use the Baseline & mFRR Energy Bid updates reasonably



- Updates should be **limited** as much as possible
- Each time, the BSP must have a **valid reason** for making updates
- ELIA reserves the right to sanction the BSP in case of misuse of the updates

Thank you

Local implementation – Contact persons

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