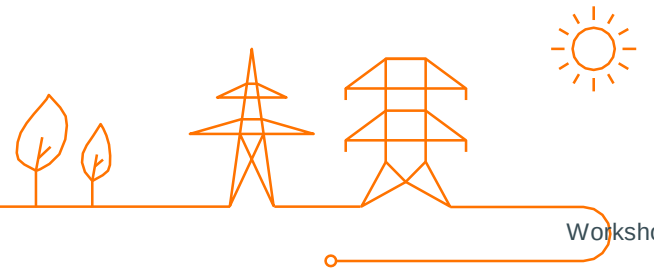
Workshop “Explicit Bidding”

Working Group Balancing & Task Force iCAROS

11 March 2020

Agenda

1. Purpose of the workshop and planning for design finalization
2. Bid properties and Bid level – Introduction
3. Bid properties – Simple bids
4. Bid properties – Additional properties for congestion bids
5. Bid properties – Additional (simple) properties for mFRR energy bids
6. Bid properties – Complex bids
7. Bid level for single-unit bids
8. Next steps



Purpose and planning

Purpose of the workshop

- Present ideas so far on properties for explicit energy bids for congestion and for mFRR.
    - Focus: common aspects of bid properties and not the specific rules per product.
- Present design change on bid level for PGM with PU-level outage planning & scheduling.
- Get participant's feedback on feasibility for special cases and/or gaps.
- Use feedback to finalize designs (see planning).

Note that for the mFRR service Elia has to take into account the rules that are set or will be set in the MARI project (for the implementation of the European platform for mFRR energy bids).

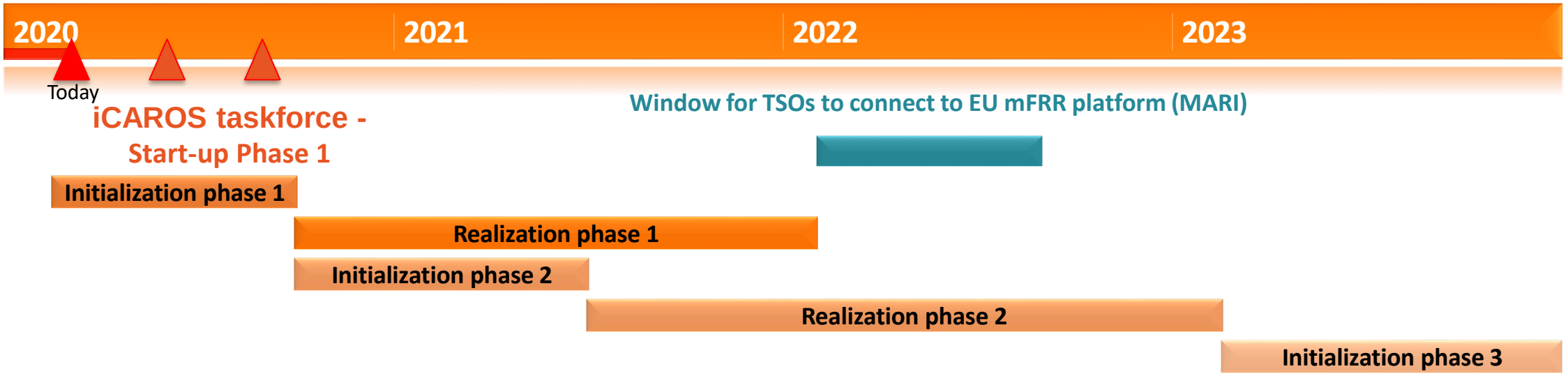
mFRR/MARI

- **mFRR IF** has been approved by ACER on 24 January 2020 and foresees that:
  - ⇒ mFRR European platform should be operational 30 months later, therefore the legal deadline is **24 July 2022**.
  - ⇒ High level planning will be communicated by the European track.
  - ⇒ A **European stakeholder workshop** will be foreseen within the 6 months.

- Review **mFRR design proposal** by end 2020 (consultation of design note end 2020/early 2021)

iCAROS phased implementation

→ Phasing reflects operational prioritization and is cocreated with SGUs & DSOs
→ no big bang but safeguarding operational robustness



Phase 1

- Congestion management
- ID scheduling
- CRI

TSO/SGU COCREATION

Phase 2

- Outage planning (TSO/DSOs)
- DA scheduling

TSO/SGU/DSOs COCREATION

Phase 3

- Scheduling (TSO/DSOs)
- Congestion management (TSO/DSOs)

TSO/SGUs/DSOs COCREATION

iCAROS

Bid properties & Bid level
Introduction

Overview of bid properties

Per energy bid per quarter-hour:

Bid level question =
"Which delivery points do we allow in a 'single-unit' bid?"

General - Simple bid properties
- Direction
- Bid price
- (Maximum) Bid volume
- Minimum Bid volume (= indicator of partial divisibility)
- List of delivery points (incl. EAN codes)

General - Complex bid properties
- Exclusive Group ID
- Parent/child relation
- Conditional linking (economical link with activation during previous quarter-hours)
- Technical linking (link with activation during previous quarter-hours)

Additional mFRR properties

- Activation type (direct/scheduled)

Additional congestion bid properties

Set by the Scheduling Agent
- Activation delay
- Maximum activation time

Bid properties to reflect limited coordinability

Specific rules per product may apply for the use of simple and complex bid properties.

General principles

- Design finetuning on explicit bidding serves for both congestion bids and mFRR energy bids

- Aim for harmonization
    - Across balancing and congestion
    - Across national and European balancing

- Aim for harmonization
    - In terms of bid properties
    - In terms of bid level for ‘single unit bids’

Bid properties:
Simple bids

Overview of bid properties – simple bids (1)

Direction	= positive energy or negative energy Positive energy = incremental bid = activation increases net injection / decreases net load Negative energy = decremental bid = activation decreases net injection / increases net load
List of DP	= List of delivery points (incl. EAN codes) - see further slides *Specific rules per product*
Bid price	- Activation price in €/MWh - Granularity = 0,01 €/MWh - No separate bid property to reflect a 'fixed cost' as other bid properties allow to separate volumes with only variable activation costs from volumes leading to additional fixed costs *Specific rules per product*

(EBGL art. 46)	**Positive bid price**	**Negative bid price**
Positive energy	Payment from Elia to provider	Payment from provider to Elia
Negative energy	Payment from provider to Elia	Payment from Elia to provider

Overview of bid properties – simple bids (2)

(Maximum) bid volume	- Bid granularity = 1 MW - Minimum value = 1 MW *Specific rules per product*
Minimum bid volume	- Bid granularity = 1 MW - Minimum value = 0 MW *Specific rules per product*

Based on bid volumes the divisibility of the bid is determined:

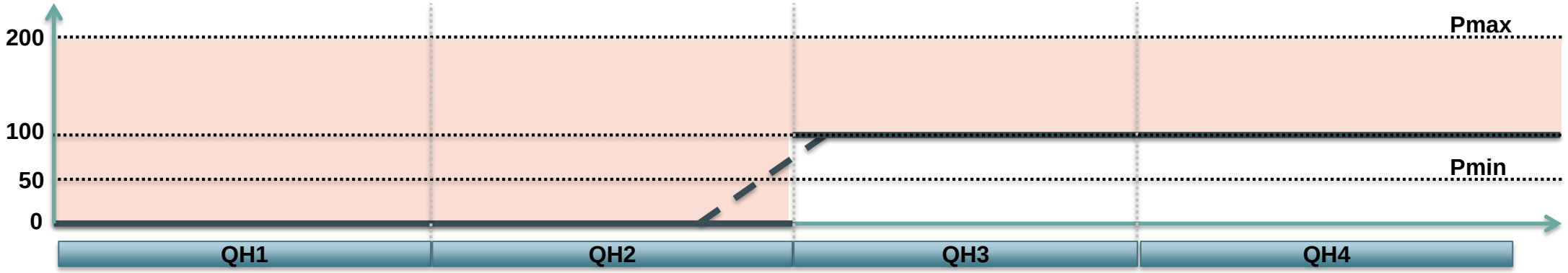
- fully **indivisible** bid volume
  min. bid volume = max. bid volume
- **divisible** bid volume (partially indivisible)
  0 MW < min. bid volume < max. bid volume
- **fully divisible** bid volume
  min. bid volume = 0 MW

Example 1: context

- PGM with installed capacity of 200MW
- No PU detail required for outage planning & scheduling
- Single-unit energy bids for congestion and for mFRR

- Assume: Start-up & shut-down possible within mFRR Full Activation Time
- Assume: no contracted balancing capacity (only free bids)

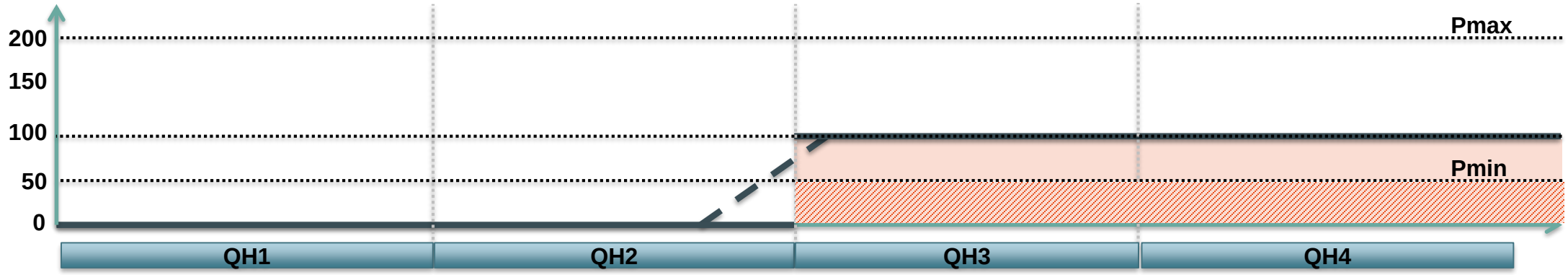
Example 1 : Incremental bid



Delivery point(s)	PGM 1	PGM 1	PGM 1	PGM 1
Direction	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)
(max) Bid volume	200 MW	200 MW	100 MW	100 MW
Minimum bid volume	50 MW	50 MW	0 MW	0 MW
Bid price	270,00 € / MWh	270,00 € / MWh	270,00 € / MWh	270,00 € / MWh

[Alternative for start-up: complex bid (parent/child property): see further]

Example 1 : Decremental bid



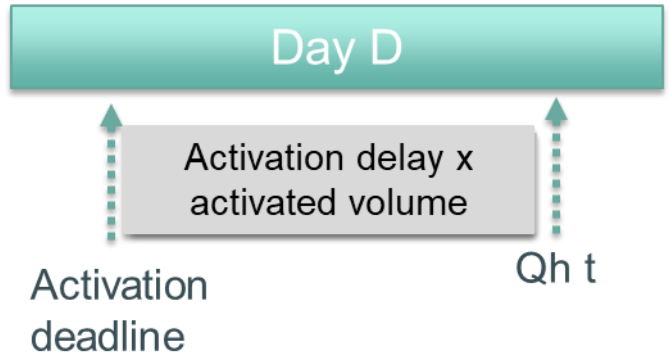
Delivery point(s)	/	/	PGM 1	PGM 1
Direction	/	/	Negative (decremental bid)	Negative (decremental bid)
(max) Bid volume	/	/	50 MW	50 MW
Minimum bid volume	/	/	0 MW	0 MW
Bid price	/	/	270,00 € / MWh	270,00 € / MWh

[shut-down = complex bid (creation of a child bid): see further]

Bid properties:
Additional properties for congestion bids

Overview of additional bid properties – simple bids – congestion bids

Activation delay	- Expressed in min/MW - Multiplied by the activated volume, it represents the deadline for ELIA to request the activation of the offered flexibility starting at quarter-hour qh t (only relevant when longer than mFRR Full Activation Time)

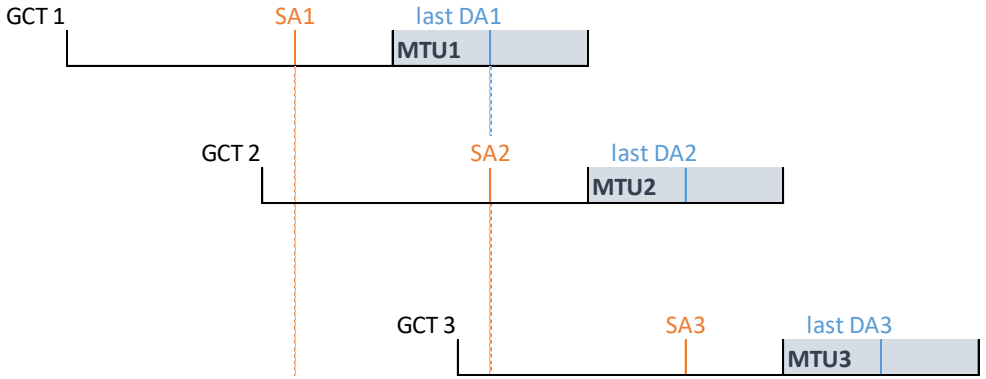


Maximum activation time	- Expressed in min - It represents the maximum number of consecutive quarter-hours that the flexibility can be activated *Specific calculation guidelines for energy limited units*

Bid properties:
Additional (simple) properties for mFRR energy bids

Overview of additional bid properties – simple bids – mFRR energy bids

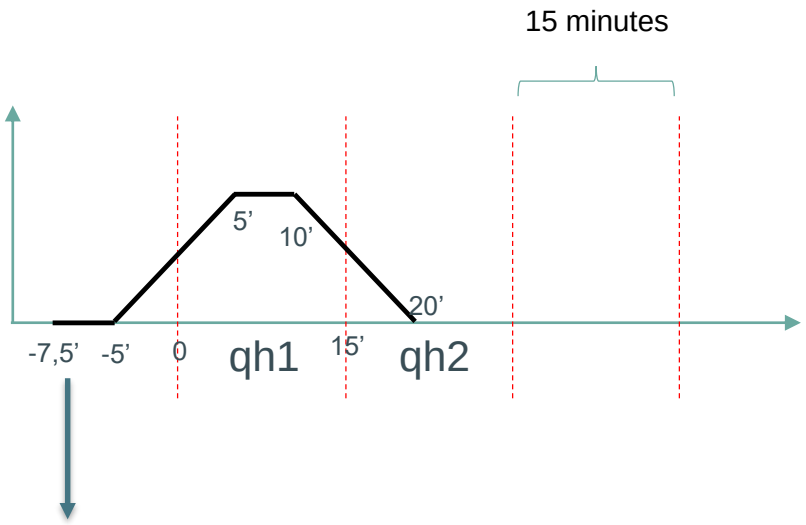
mFRR activation type	- "available for scheduled activation only" - "available for direct and scheduled activation"



- Scheduled activation (SA):
  - Single fixed point in time (« point of scheduled activation »), being [T-7,5'] = validity period SA
  - Delivery period <u>starts</u> at T+5' and lasts at least 5'
- Direct activation (DA):
  - Period between two points of scheduled activation, being] T-7,5' ; T+7,5' [= validity period DA
  - The delivery period of a bid for qh1 (MTU1) activated directly will last until the end of the delivery period of qh2
    => so the delivery period of a direct activation in qh1 ends at the earliest at T+25'
- Energy bids reflecting contracted balancing capacity must be of the type "available for direct and scheduled activation"

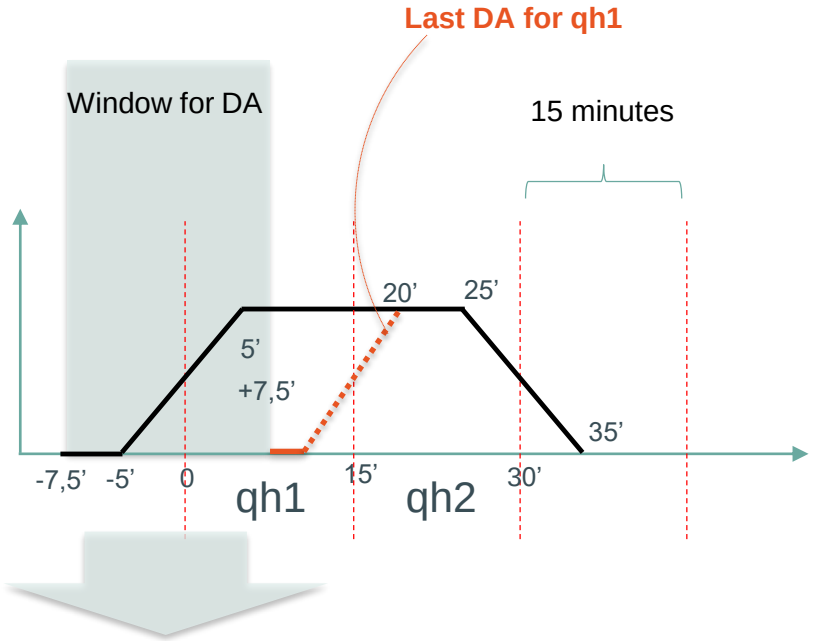
Activation type: Scheduled & direct activations (SA & DA)

Scheduled activation



Activation request at specific point in time (7,5 minutes before the start of the concerned quarter-hour)

Direct activation



Time window for activation request from before to after the start of the concerned quarter-hour

Bid properties:
Complex bids

Complex bid properties

Valid within 1 quarter-hour

- Exclusive Group ID
- Parent/child relation

To link between multiple quarter-hours

- Conditional linking (economical link with activation during previous quarter-hour)
- Technical linking (link with activation during previous quarter-hour)

Specific rules may be added in order to avoid performance issues in the selection algorithm.

Complex bid properties serve to:

- reflect the complexity in the technical reality of activation of active power (e.g., start-up required before further incremental flexibility is available)
- avoid the double activation of the same flexibility for the same purpose or avoid the activation of flexibility that cannot be activated together (use of exclusivity groups)
- take into account that at energy bid gate closure time for quarter-hour t, the activations for previous quarter-hours are not yet known (use of linking)

Exclusive groups

Group ID	Group of bids with mutual exclusivity for activation: only one bid can be selected for activation in the concerned quarter-hour

Rules:

- A bid can only belong to 1 exclusive group
- The bids in the exclusive group can have different properties (volume, price, …), except for the direction (no combination of upward and downward bids in 1 group)

Example 2 : Exclusive groups Congestion bids

- Energy Storage in discharge mode offering 50MW of incremental flexibility
- Cost-reflective prices depending on activation duration (e.g. because long activation duration could imply next charging during peak hours)
- The Scheduling Agent might create two bids to offer the same flexibility at two different (cost-reflective) prices for two different max activation times.
- He therefore needs to use one exclusive group to mention that only one of these bids can be selected for activation

Delivery point(s)	PGM 1

Bid ID = 001

Direction	Positive (incremental bid)
(max) Bid volume	50 MW
Minimum bid volume	0 MW
Bid price CONG	37,00 € / MWh
Maximum activation time	100 min
Exclusive group ID	PGM 1 group

Bid ID = 002

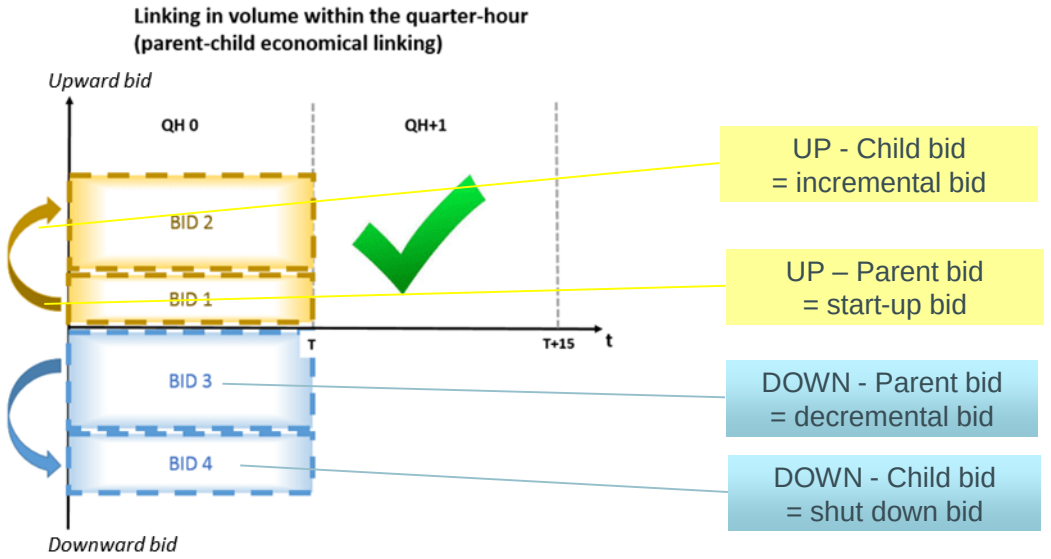
Direction	Positive (incremental bid)
(max) Bid volume	50 MW
Minimum bid volume	0 MW
Bid price CONG	120,00 € / MWh
Maximum activation time	360 min
Exclusive group ID	PGM 1 group

Child bids

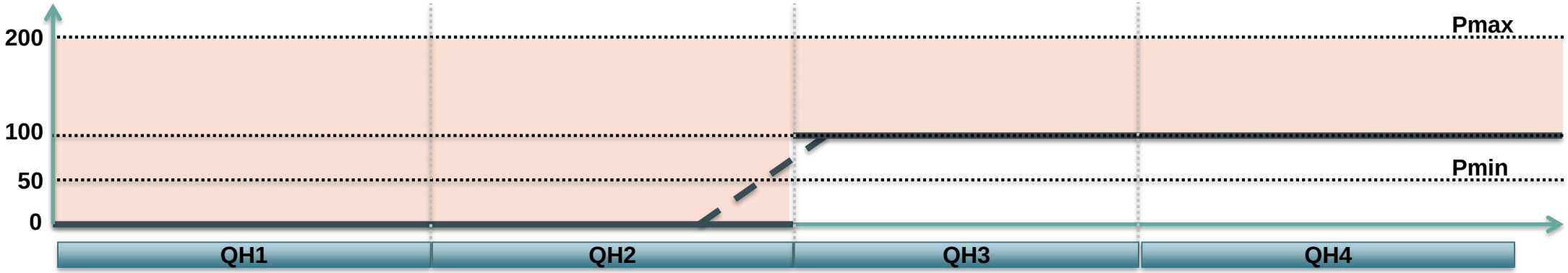
Parent/child bid pairs	The child bid can only be activated if the parent bid is activated as well during that quarter-hour. Bid property to indicate in the child bid: refer to the ID of the parent bid

Rules:

- A child bid can only refer to one parent bid.
- A bid cannot be a child bid as well as a parent bid.

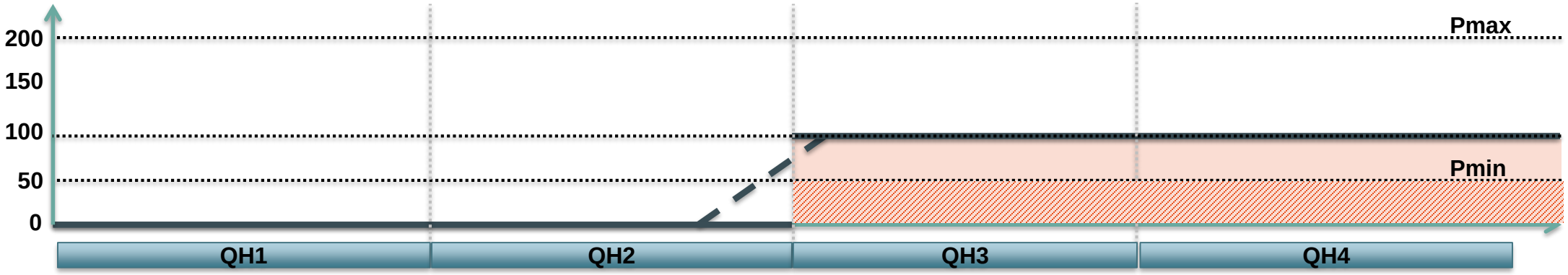


Example 1 (context see earlier): Parent/child as alternative for start-up



	Delivery point(s)	PGM 1	PGM 1	PGM 1	PGM 1
Parent Bid ID = 001	Direction	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)
	(max) Bid volume	50 MW	50 MW	100 MW	100 MW
	Minimum bid volume	50 MW	50 MW	0 MW	0 MW
	Bid price	270,00 € / MWh	270,00 € / MWh	270,00 € / MWh	270,00 € / MWh
Child Bid	Direction	Positive (incremental bid)	Positive (incremental bid)	/	/
	(max) Bid volume	150 MW	150 MW	/	/
	Minimum bid volume	0 MW	0 MW	/	/
	Bid price	270,00 € / MWh	270,00 € / MWh	/	/
→	Parent bid ID:	001	001	/	/

Example 1 (context see earlier): Parent/child as alternative for shut-down



	Delivery point(s)	/	/	PGM 1	PGM 1
Parent Bid ID = 001	**Direction**	/	/	Negative (decremental bid)	Negative (decremental bid)
	(max) Bid volume	/	/	50 MW	50 MW
	Minimum bid volume	/	/	0 MW	0 MW
	Bid price	/	/	270,00 € / MWh	270,00 € / MWh
Child Bid	**Direction**	/	/	Negative (decremental bid)	Negative (decremental bid)
	(max) Bid volume	/	/	50 MW	50 MW
	Minimum bid volume	/	/	50 MW	50 MW
	Bid price	/	/	270,00 € / MWh	270,00 € / MWh
→	**Parent bid ID:**	/	/	001	001

Example 3 : Parent/child as alternative for start-up Congestion bid

- PGM with installed capacity of 200MW
- No PU detail required for outage planning & scheduling
- Single-unit energy bids for congestion and for mFRR

- Assume: PGM not foreseen to be in operation on day D
- Assume: PGM with slow start-up but fully coordinable above Pmin
- Therefore only congestion bid, no energy bid for mFRR

⇒ Parent/child property can be used to make distinction between:

- Parent = Indivisible start-up bid with slower ramp rate and higher cost (fixed cost + variable activation cost)
- Child = further incremental margin at faster ramp rate and lower cost (only variable activation cost)

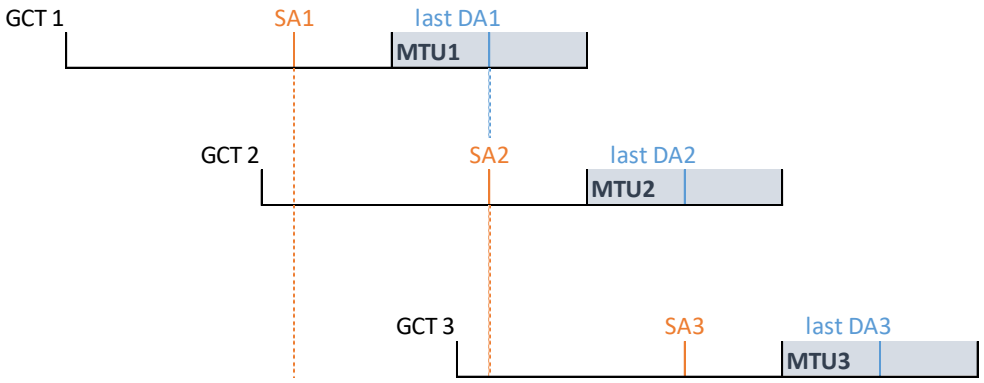
	Delivery point(s)	PGM 1
Parent Bid ID = 001	**Direction**	Positive (incremental bid)
	(max) Bid volume	50 MW
	Minimum bid volume	50 MW
	Bid price CONG	520,00 € / MWh
	Activation delay	4 min/MW
Child Bid	**Direction**	Positive (incremental bid)
	(max) Bid volume	150 MW
	Minimum bid volume	0 MW
	Bid price CONG	134,00 € / MWh
	Activation delay	0,11 min/MW
	Parent bid ID:	001

Technical linking

Technical link	Technical links should be used to avoid that the underlying asset is requested to perform technically unfeasible activations. **Options related to activation type:** - If the bid was activated in quarter-hour t, it cannot be activated in quarter-hour t+1 - If the bid was activated in quarter-hour t, it cannot be activated in quarter-hour t+2 **Options related to direction:** - If the bid was activated upward/downward in quarter-hour t, it cannot be activated downward/upward in quarter-hour t+1 (for mFRR the link can be specified for scheduled and/or direct activation)

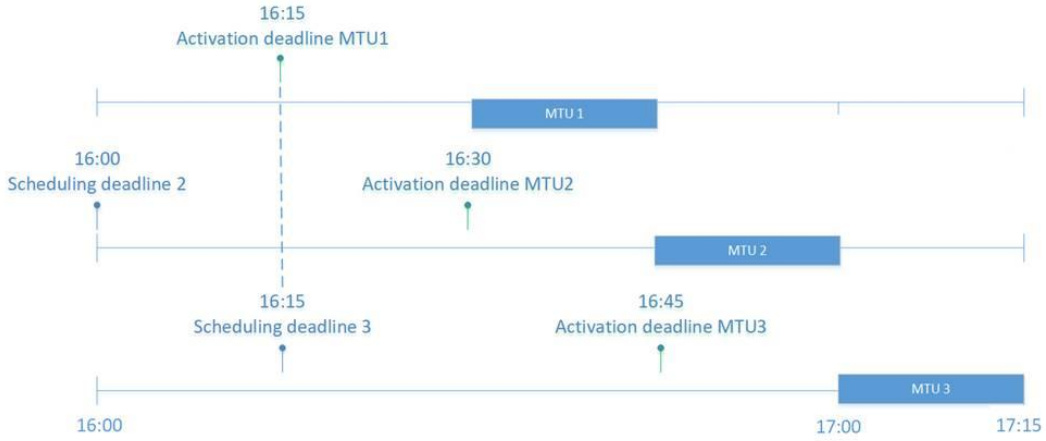
Reason for technical links across quarter-hours for mFRR:

- For **mFRR energy bids**, at gate closure time for qh3 the BSP does not know whether the volume will have been activated in qh1 or qh2 (timings for scheduled activation for qh2 and for direct activations for qh1 and qh2 are after the GCT for qh3).



Reason for technical links across quarter-hours for congestion:

- For **congestion bids**, in case of consistent activation deadlines throughout the day, the Scheduling Agent does not know before the scheduling deadline of qh3 whether the volume will have been activated in qh1 or qh2.



Conditional linking

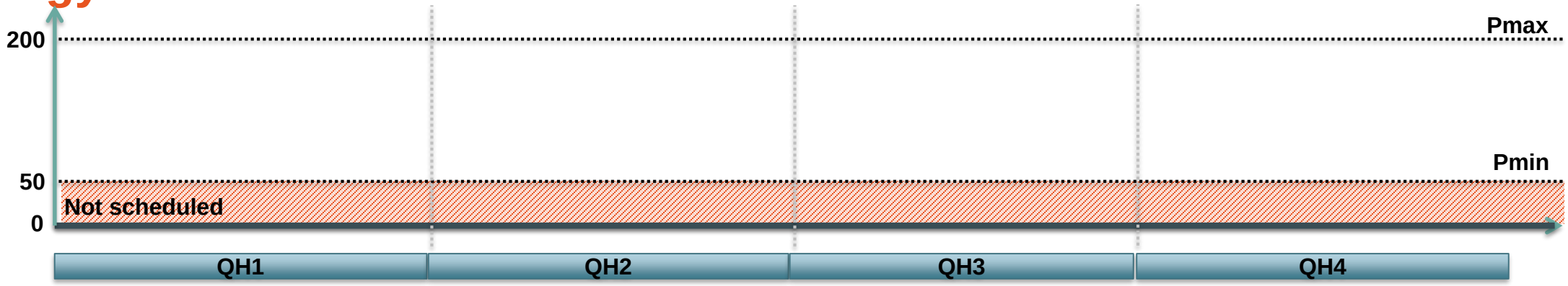
Conditional (economic) link	Conditional links should be used:
	- to avoid that the underlying asset is requested to perform activations that are not feasible due to economic constraints.
	- to allow the provider to align the bids with the correct cost structure of the underlying asset
	
	Options related to 1 bid (= same as technical link but for economic reasons)
	- If the bid was activated in quarter-hour t, it cannot be activated in quarter-hour t+1
	- If the bid was activated in quarter-hour t, it cannot be activated in quarter-hour t+2
	
	Options related to 2 bids:
	- If the bid A was activated in quarter-hour t:
	  - Bid A is <u>not</u> available for activation in quarter-hour t+1
	  - Bid B is available for activation in quarter-hour t+1
	
	- If the bid A was <u>not</u> activated in quarter-hour t:
	  - Bid A is available for activation in quarter-hour t+1
	  - Bid B is <u>not</u> available for activation in quarter-hour t+1
	
	(for mFRR the link can be specified for scheduled and/or direct activation)

Example 4: context

- PGM with installed capacity of 200MW
- No PU detail required for outage planning & scheduling
- Single-unit energy bids for mFRR

- Assume: unit not scheduled for the day (active power at 0MW)
- Starting the unit is possible, but this will have the following financial impact:
  - Fixed start-up costs
  - Variable activation costs

Example 4 – conditional link (start-up): mFRR energy bid



Direction	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)
(max) Bid volume	50 MW	50 MW	50 MW	50 MW
Minimum bid volume	50 MW	50 MW	50 MW	50 MW
Bid price CONG	520,00 € / MWh	520,00 € / MWh	520,00 € / MWh	520,00 € / MWh
Conditional link	/	If activated in qh-1, then not available.	If activated in qh-1, then not available. If activated in qh-2, then not available.	If activated in qh-1, then not available. If activated in qh-2, then not available.

Bid ID = 001 (start start-up)

Direction	/	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)
(max) Bid volume	/	50 MW	50 MW	50 MW
Minimum bid volume	/	50 MW	50 MW	50 MW
Bid price CONG	/	134,00 € / MWh	134,00 € / MWh	134,00 € / MWh
Conditional link	/	If bid **"001"** is not activated in **qh-1**, then not available.	If bid **"001"** is not activated in **qh-1**, then not available. If bid **"001"** is not activated in **qh-2**, then not available.	If bid **"001"** is not activated in **qh-1**, then not available. If bid **"001"** is not activated in **qh-2**, then not available.

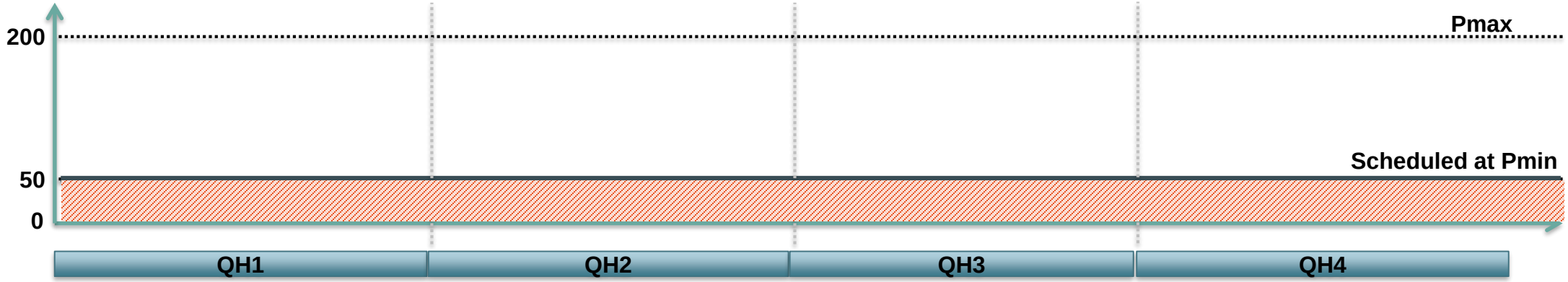
Bid ID = 002 (continued start-up)

Example 5: context

- PGM with installed capacity of 200MW
- No PU detail required for outage planning & scheduling
- Single-unit energy bids for congestion

- Assume: scheduled active power at Pmin = 50MW all day
- Shutting the unit down is possible, but this will have the following financial impact:
  - Avoided variable costs of 134 €/MWh (to be paid by the provider to Elia)
  - Added costs due to need of additional start-up (to be paid by Elia to the provider)

Example 5 – conditional link (shut-down): Congestion bid



Direction	Negative (decremental bid)	Negative (decremental bid)	Negative (decremental bid)	Negative (decremental bid)
(max) Bid volume	50 MW	50 MW	50 MW	50 MW
Minimum bid volume	50 MW	50 MW	50 MW	50 MW
Bid price CONG	- 386,00 € / MWh	- 386,00 € / MWh	- 386,00 € / MWh	- 386,00 € / MWh
Conditional link	/	If activated previously, then not available.	If activated previously, then not available.	If activated previously, then not available.

Bid ID = 001 (start shut-down)

Direction	/	Negative (decremental bid)	Negative (decremental bid)	Negative (decremental bid)
(max) Bid volume	/	50 MW	50 MW	50 MW
Minimum bid volume	/	50 MW	50 MW	50 MW
Bid price CONG	/	134,00 € / MWh	134,00 € / MWh	134,00 € / MWh
Conditional link	/	If bid **"001"** has not been activated previously, then not available.	If bid **"001"** has not been activated previously, then not available.	If bid **"001"** has not been activated previously, then not available.

Bid ID = 002 (continued shut-down)

Bid level for ‘single-unit bids’

Bid level question

Bid level question =
“Which delivery points do we allow in a ‘single-unit’ bid?”

Per energy bid per quarter-hour:

General - Simple bid properties
- Direction
- Bid price
- (Maximum) Bid volume
- Minimum Bid volume (= indicator of partial divisibility)
- List of delivery points (incl. EAN codes)

Additional mFRR properties

- Activation type (direct/scheduled)

General - Complex bid properties
- Exclusive Group ID
- Parent/child relation
- Conditional linking (economical link with activation during previous quarter-hour)
- Technical linking (link with activation during previous quarter-hour)

Additional congestion bid properties

Set by the Scheduling Agent
- Activation time
- Maximum activation time

Bid properties to reflect limited coordinability

Specific rules per product may apply for the use of simple and complex bid properties.

Recap on bid level: explicit bidding designs so far

Congestion bids (iCAROS)

- Overall unit-based bidding

Balancing energy bids (future aFRR/mFRR)

- Unit-based bidding in case of a MW schedule
- Portfolio bidding allowed for aggregating delivery points without a MW schedule

'Unit-based' bidding means:

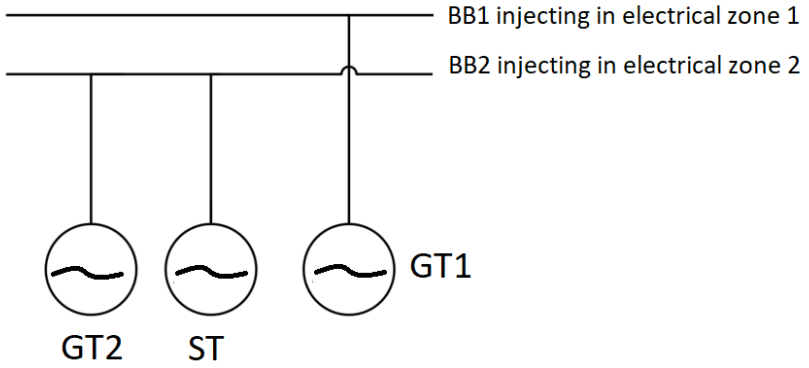
- At PGM level (if outage planning & scheduling is also on PGM level, in case no PU detail is needed)
- At PU level in case the PGM level is deemed insufficient for outage planning & scheduling

Existing production park:
+/- 10 cases
(CCGT/OCGT)

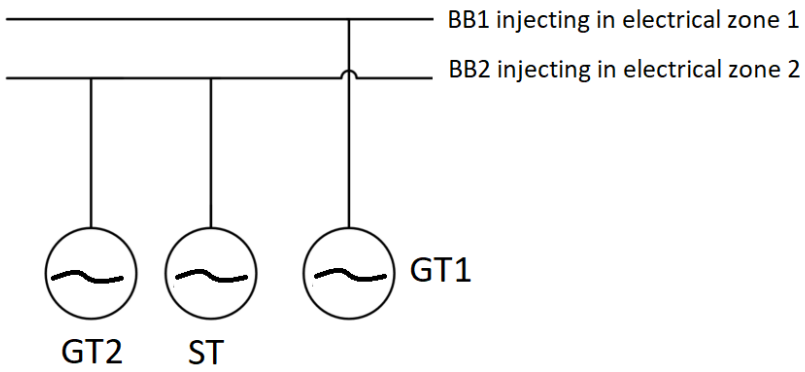
Question: In this case do we keep unit-based bidding at PU level? Or do we change the designs for explicit bids to PGM or config level?

Example 6: context

- PGM = gas-powered plant connected behind two connection points
  - PU-level outage planning and scheduling
  - The PGM can operate in different modes:
    - Half OCGT on GT1
    - Half OCGT on GT2
    - Half CCGT on GT1+ST
    - Half CCGT on GT2+ST
    - Half OCGT on GT1 + half CCGT on GT2+ST
    - Half CCGT on GT1+ST + half OCGT on GT2
    - Full OCGT (GT1 + GT2)
    - Full CCGT (GT1 + GT2 + ST)



Risks of PU-level bidding



PU bids
Bid 1 = GT1
Bid 2 = GT2
Bid 3 = ST

- Lack of view on the physical impact of activations:

  If the PGM is in CCGT mode and Elia activates the volume on GT1 or GT2, Elia is not aware that the active power of the ST will change as well.

- Risk of activations causing unforeseen and even unwanted impact

  The change of active power on the ST may create risks of grid security.

  e.g. GT1 activated upward for balancing, but congestion risk in electrical zone 2 blocking the ST from producing more

Possible solutions

Option 1: add bid property to group bids for “simultaneous activation”

⇒ Bid property not available for the European mFRR platform

Option 2: work with bid reflecting the operating mode instead of PU-level bids

⇒ Preferred option (see next slide)

Design change:
Configuration bids for balancing and congestion

Case: Structural data on the PGM indicates that the PGM can be operated in different modes (different configurations)

Balancing energy bids and congestion bids reflect the configuration/operating mode of the PGM

- The list of **delivery points** in the bid is limited to the **concerned PGM** or, if PU-level outage planning and scheduling, to the **PU** part of the concerned PGM (e.g., typically CCGT/OCGT)
- All **configurations** that are technically available for the concerned period **must be offered** via one or more energy bid(s).
- If several configurations are available for the same product for the same period: work with **“exclusive group” property** to avoid double activation.
- Additional info needed on **“distribution” key** in case of several PU in 1 config bid (typically GT/ST combinations).

Example 6: configuration bids

FOR 1 QUARTER-HOUR:

	Config bid 1 Half OCGT on GT1	Config bid 2 Half CCGT on GT1 + ST	Config bid 3 Half OCGT on GT2	Config bid 4 Half CCGT on GT2 + ST
Delivery point(s)	GT1	GT1, ST	GT2	GT2, ST
Direction	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)
(max) Bid volume	150 MW	220 MW	150 MW	220 MW
Minimum bid volume	**50 MW**	**100 MW**	**50 MW**	**100 MW**
Bid price	520,00 € / MWh	700,00 € / MWh	520,00 € / MWh	700,00 € / MWh
Exclusive group ID	ID group I	ID group I	ID group II	ID group II
	Excl. group I To avoid that the volume on GT1 gets activated twice		Excl. group II To avoid that the volume on GT2 gets activated twice	

Activation of the full OCGT = activation of bids 1 and 3

Activation of the full CCGT = activation of bids 2 and 4

Activation of the half OCGT / half CCGT
= activation of bids 1 and 4
Or
= activation of bids 2 and 3

Example 6: configuration bids

FOR 1 QUARTER-HOUR:	**Config bid 1** **Half OCGT on GT1**	**Config bid 2** **Half CCGT on GT1 + ST**	**Config bid 3** **Half OCGT on GT2**	**Config bid 4** **Half CCGT on GT2 + ST**
Delivery point(s)	GT1	GT1, ST	GT2	GT2, ST
Direction	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)	Positive (incremental bid)
(max) Bid volume	150 MW	220 MW	150 MW	220 MW
Minimum bid volume	**50 MW**	**100 MW**	**50 MW**	**100 MW**
Bid price	520,00 € / MWh	700,00 € / MWh	520,00 € / MWh	700,00 € / MWh
Exclusive group ID	ID group I	ID group I	ID group II	ID group II

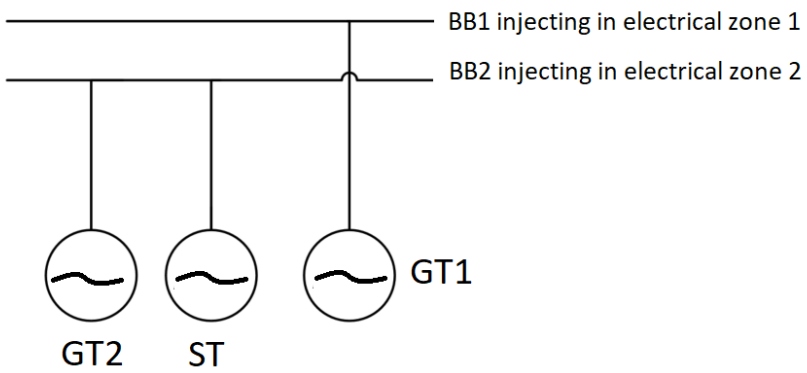
Depending on the situation:
- All config bids may be offered for the same quarter-hour for the same product
- Only part of the config bids are technically available (e.g. GT2 is in maintenance)
- All config bids are technically available but not for all products: for example
    - PGM is not in operation
    - both OCGT and CCGT start-ups are available for congestion bids (although with different activation delays)
    - only OCGT start-up is possible for mFRR

Need for a ‘distribution key’

FOR 1 QUARTER-HOUR:		**Config bid 2** **Half CCGT on GT1 + ST**		**Config bid 4** **Half CCGT on GT2 + ST**
Delivery point(s)	GT1	GT1, ST	GT2	GT2, ST
Direction	/	Positive (incremental bid)	/	Positive (incremental bid)
(max) Bid volume	/	140 MW	/	140 MW
Minimum bid volume	**/**	**0 MW**	**/**	**0 MW**
Bid price	/	80,00 € / MWh	/	80,00 € / MWh
Exclusive group ID	/	/	/	/

Example:

- All PU of the PGM are running at Pmin (CCGT mode)
- Incremental flexibility still available up to Pmax



Information needed on ratio between GT and ST

- Case 1: congestion bid needed on GT1 (because of problem CP1)

But this means that the bid « GT1 + ST » would be activated => how much of the bid volume do we need to activate to ensure that GT1 increases production with xxx MW?

- Case 2: due to congestion risks the increase on the ST is limited (medium CRI with MW cap). How much volume of the balancing bids « GT1+ ST » could we activate without increasing congestion risks?

Next steps

Follow-up and contact persons

Feedback, comments and suggestions on presented design for explicit bidding are kindly requested by sending it to Sofie.Vandenwaeyenberg@elia.be and Caroline.Bosschaerts@elia.be by 25 March 2020.

Follow-up:

- iCAROS: via next iCAROS taskforces (regarding phase 1: two additional task force meetings will be foreseen in 2020)
- mFRR/MARI: design review 2020

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Thank you.