

## Implementation Guide for market participants - for the common Nordic mFRR energy activation market

Nordic webinar

January 2021

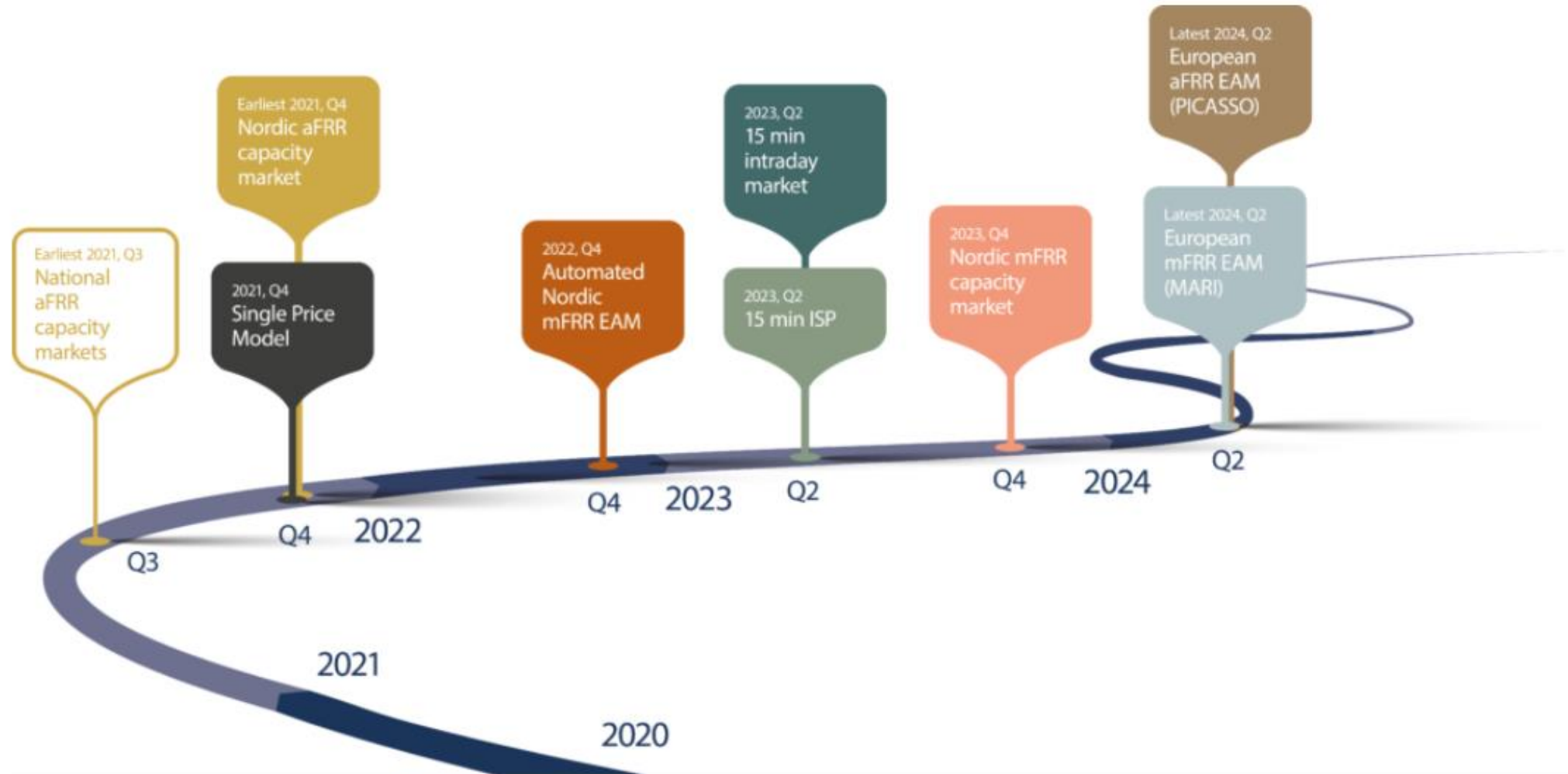
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# Agenda

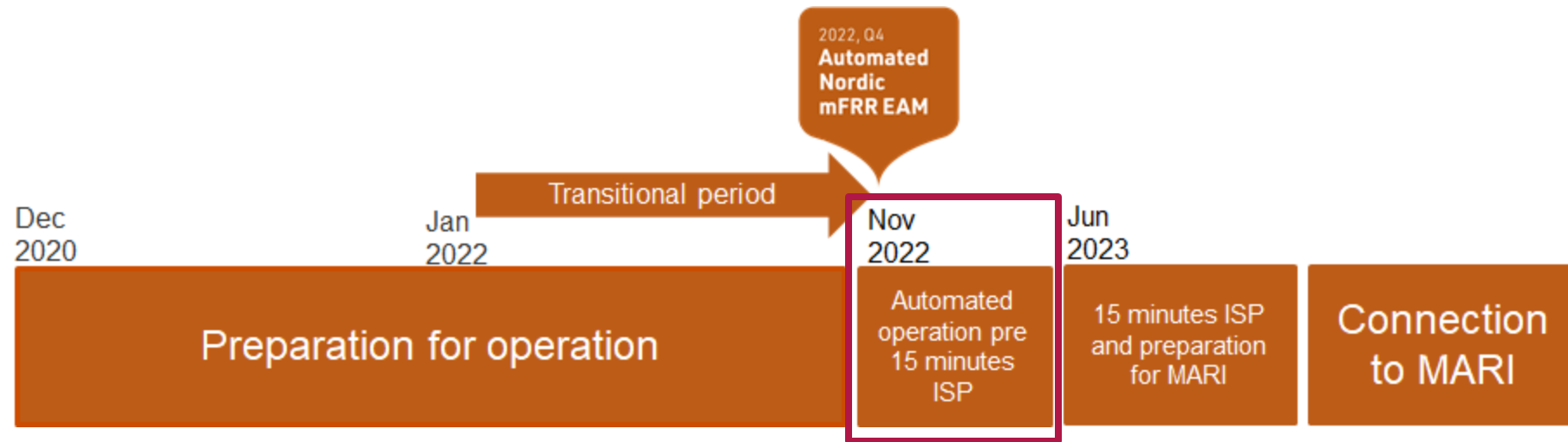
1. Welcome and practical information, *Erika Zvingilaite (Energinet)*
2. Introduction, *Roger Skoglund (Statnett)*
  - a. NBM Roadmap
  - b. mFRR energy activation market project timeline
3. mFRR energy standard product and market process, *Jesper Marklund (Svenska Kraftnät)*
4. System context diagram, *Anders Naville Gisnås (Statnett)*
5. Submit bid process, *Anders Naville Gisnås (Statnett)*
6. Activate bid process, *Anders Naville Gisnås (Statnett)*
7. Implementation plan, *representatives of four Nordic TSOs*
8. Final remarks and thank you!

# NBM roadmap – updated

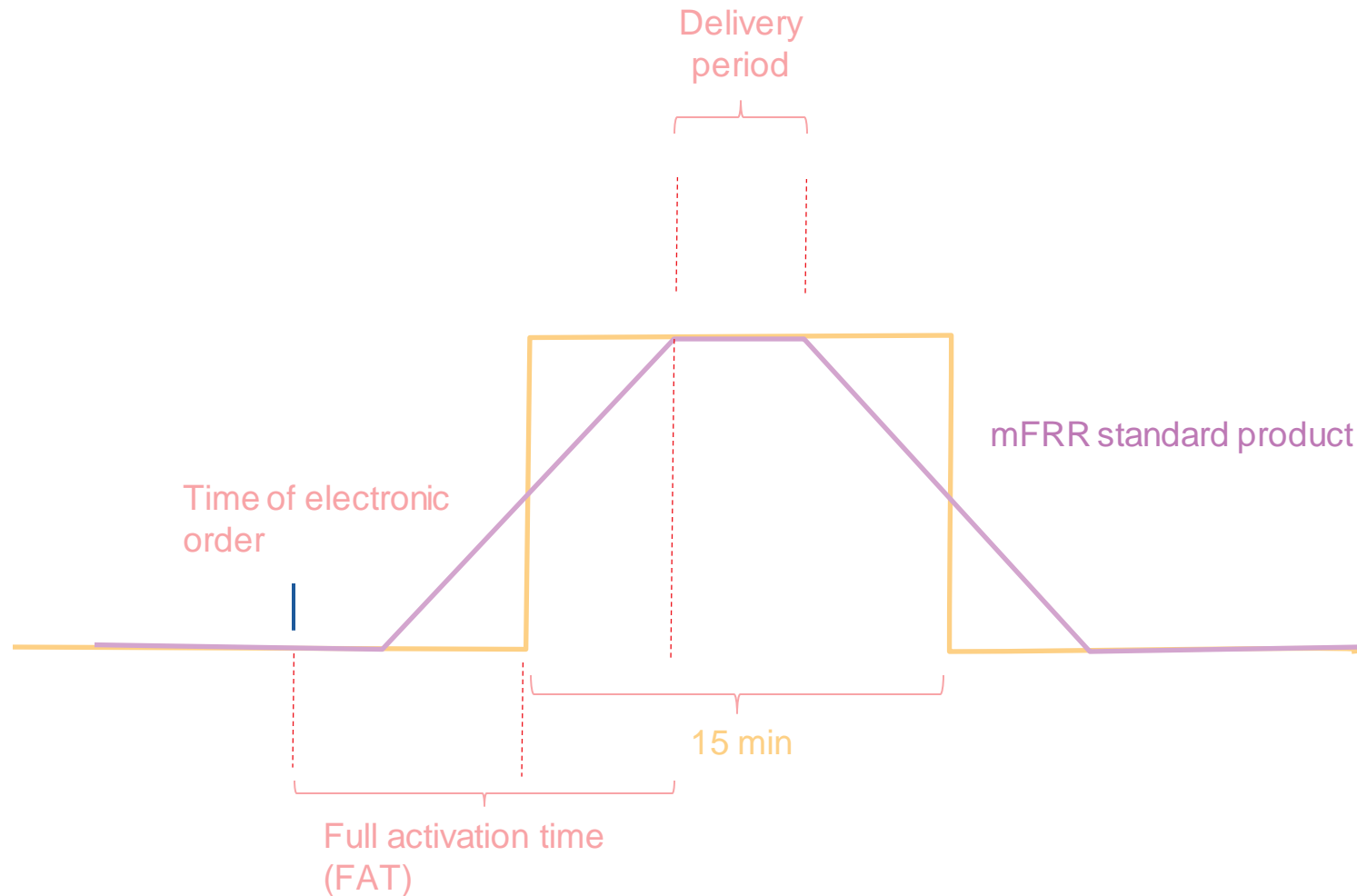
## Roadmap December 2020



## mFRR Energy Activation market – timeline

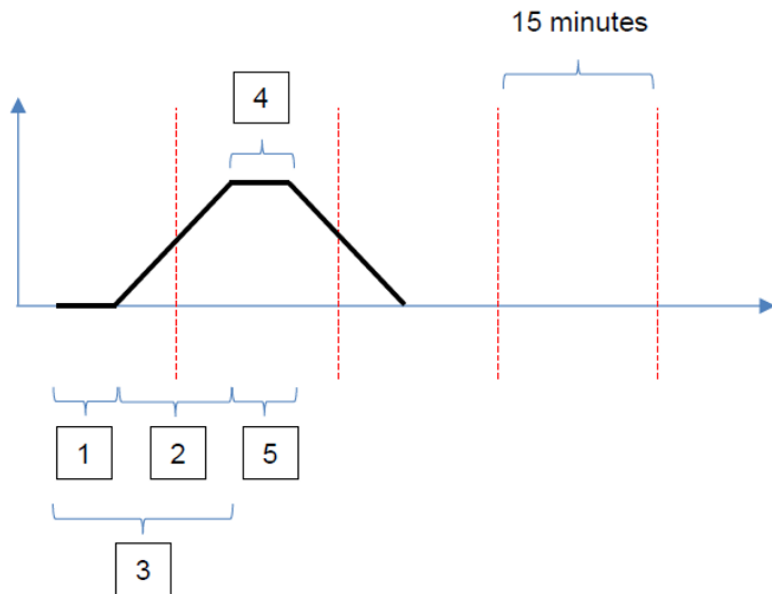


# Standard mFRR energy product

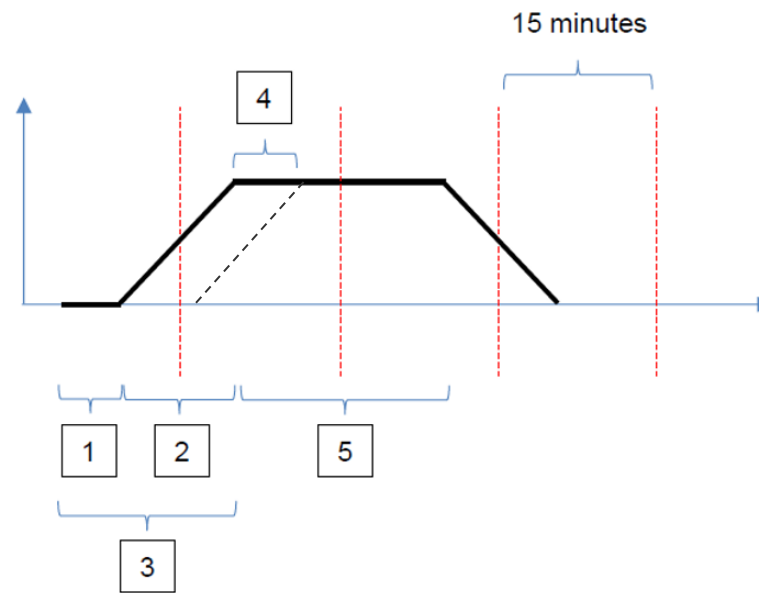


# Standard product: scheduled- and direct- activation

## Scheduled activation



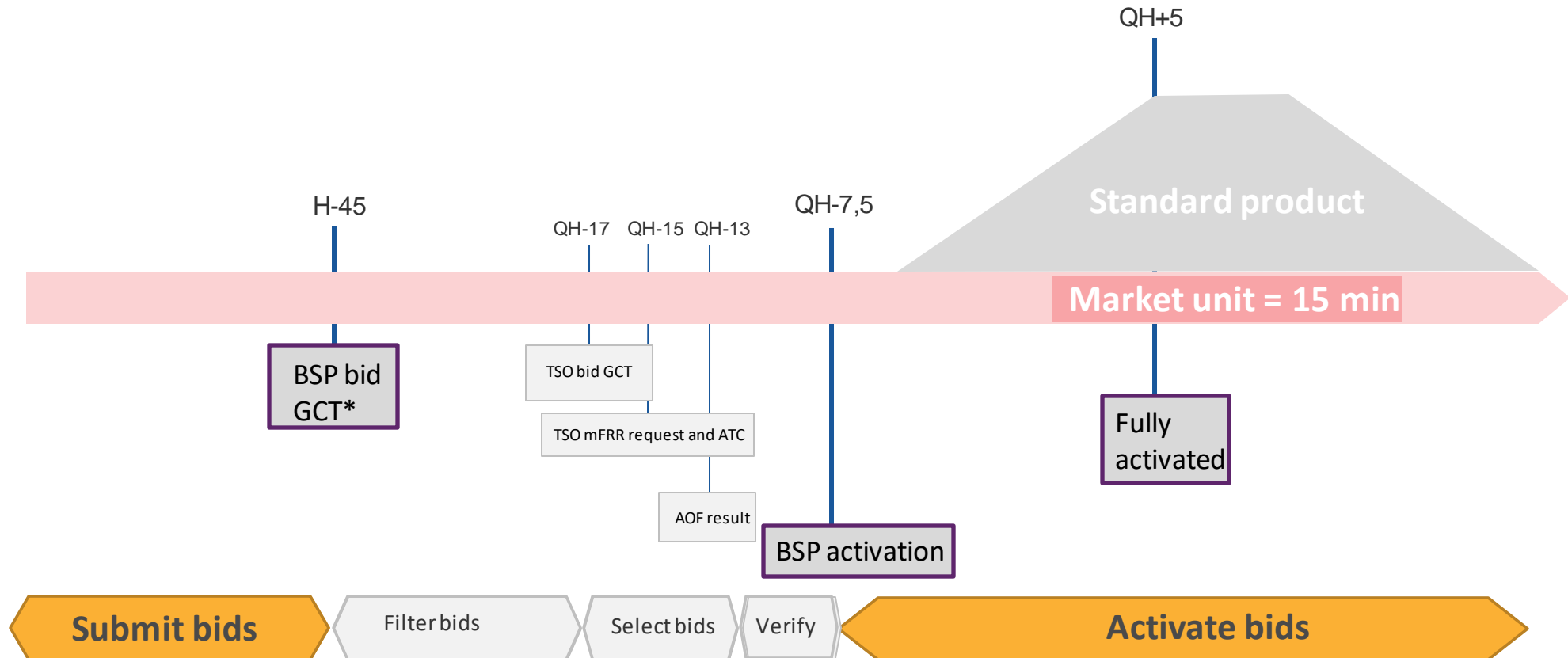
## Example of the longest direct activation



1. Preparation period
2. Ramping period
3. FAT – full activation time
4. Minimum duration of delivery period (5 min)
5. Maximum duration of delivery period:
  - a) 5 min in scheduled activation
  - b) 20 min in direct activation

# Overall mFRR EAM market process

Automated Operation pre 15 minutes ISP



\* For all four quarters in the next hour

# Stepwise implementation of the new market process

	Today	Automated operation, pre 15-min ISP	After 15 min ISP but before connection to MARI	When connecting to MARI
<b>BSP GCT (BEGCT bids)</b>	<b>H-45</b>	<b>H-45*</b>	<b>QH-25</b>	<b>QH-25</b>
TSO GCT	H-45	QH-17	QH-12	QH-12
TSO mFRR request	NA	QH-15	QH-10	QH-10
AOF run	NA	QH-15	QH-10	QH-10
AOF results	NA	QH-13	QH-8	QH-8
<b>Activation orders are sent to BSPs</b>	<b>NA</b>	<b>QH-7.5</b>	<b>QH-7.5</b>	<b>QH-7.5</b>
<b>Full Activation Time, FAT (minutes)</b>	<b>15</b>	<b>15</b>	<b>12.5</b>	<b>12.5</b>

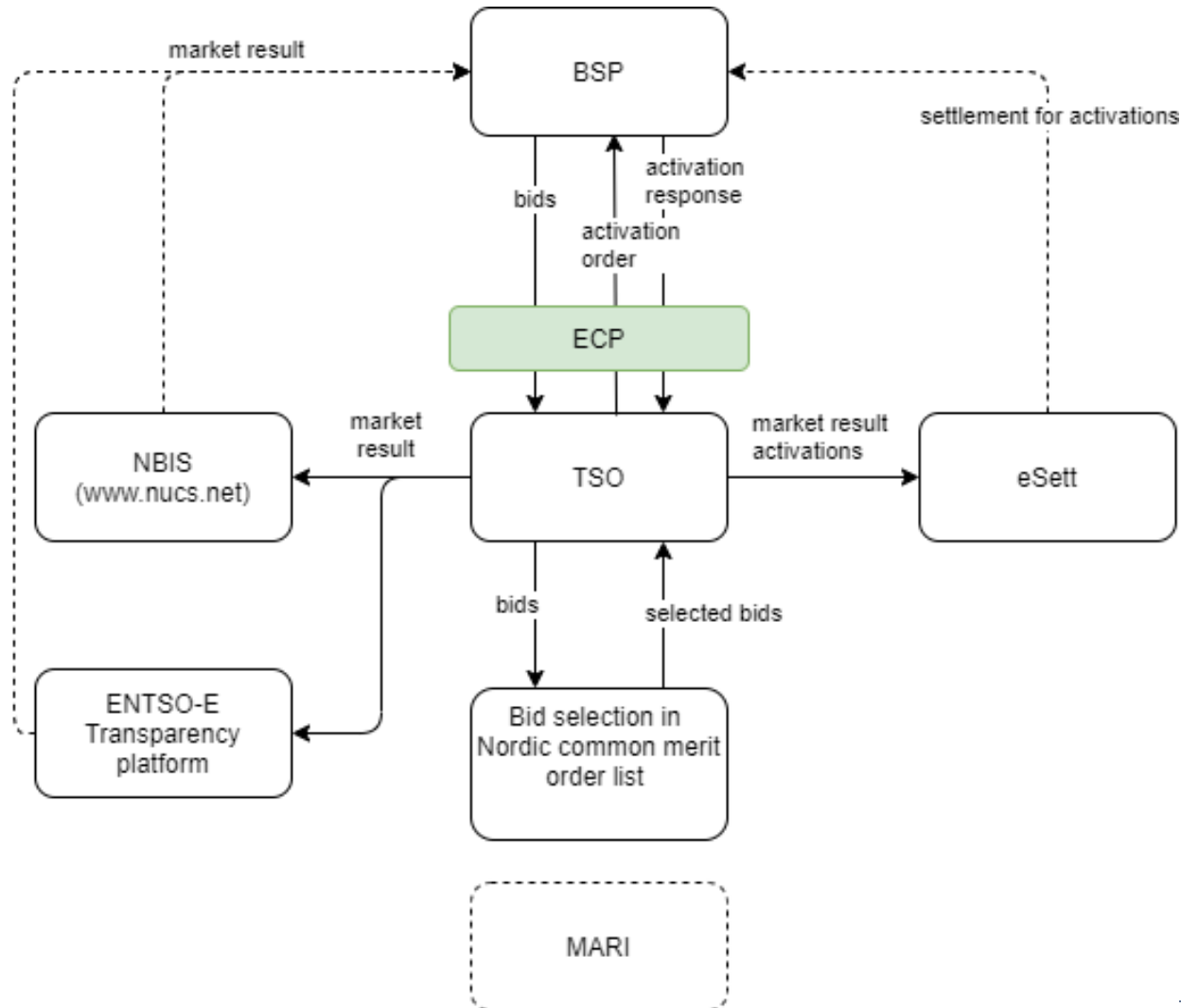
\* For all four quarters in the next hour



# Submitting bids – main bid characteristics

	Today	Automated operation, pre 15 min ISP	After 15 min ISP but before connection to MARI	When connecting to MARI
Currency	EUR and local currency	EUR	EUR	EUR
Maximum/minimum price (EUR/MWh)	5000/no minimum price	5000/no minimum price	5000/no minimum price	99 999/-99 999
Price granularity (EUR)	0.01 or 0.5	0.01 or 0.5 <sup>1</sup>	0.01	0.01
<b>Minimum bid size (MW)</b>	<b>5 or 10</b>	<b>1 or 10</b>	<b>1</b>	<b>1</b>
Maximum bid size (MW)	none or 50	9 999 (technical limit)	9 999 (technical limit)	9 999 (technical limit)
Bid granularity (MW)	1	1	1	1
Activation granularity (MW)	1	1 or 0.1 <sup>4</sup>	1	1
<b>BSP bid time resolution for price and volume (minutes).</b>	<b>60 and 15</b>	<b>15 and 60</b>	<b>15</b>	<b>15</b>
<b>Marginal price resolution (minutes)</b>	<b>60</b>	<b>60</b>	<b>15</b>	<b>15</b>

# The system context diagram



- Communication channels
  - ECP
  - CIM messages
  - National web user interface
- Additional integrations:
  - Reporting on bid availability and bid activation
  - Country specific integrations: E.g. SCADA notification of orders

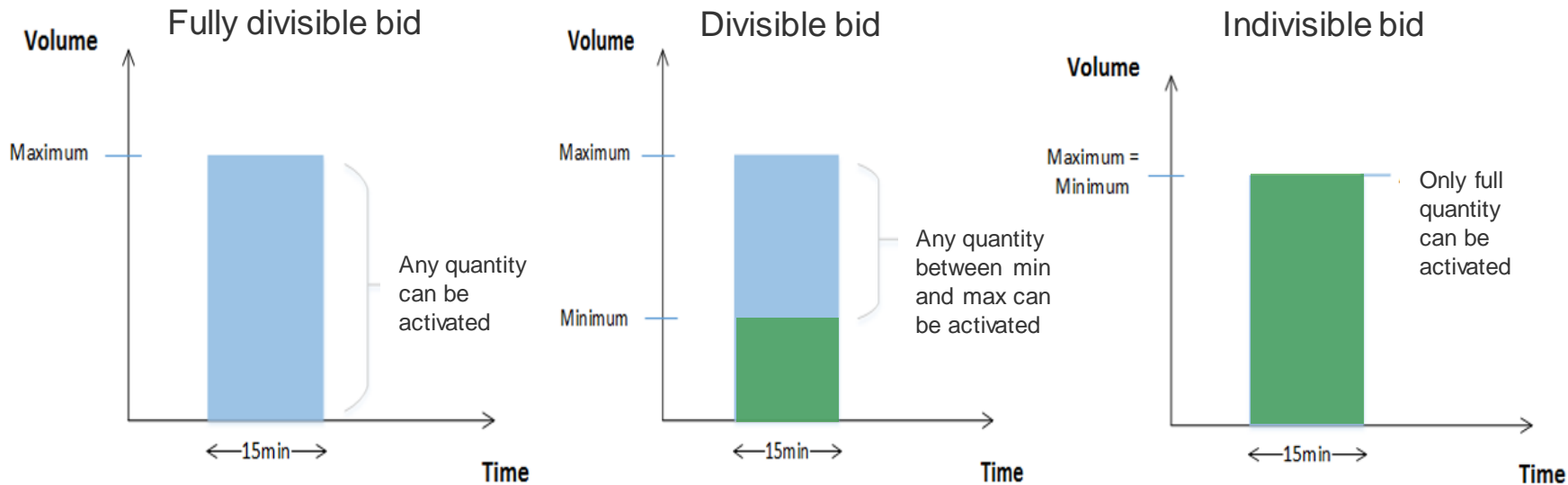
# Submitting bids – new common Nordic bid attributes

	Bid attribute	Description
<b>Simple bids</b> One bid, one price	Minimum offered volume	Can be applied to set a minimum volume to be activated even though the bid is divisible.
	Indivisible Bids	Bid which cannot be activated partially.
<b>Complex bids</b> Combination of simple bids	Exclusive Group Order	Group of bids where solely one of the bids can be activated.
	Multipart (Parent/child)	Group of bids that must be activated in strict price order, from less expensive to more expensive.
<b>Bids linked in time</b> Between consecutive quarter hours	Technical linking	Linking of bids in subsequent quarter hours to indicate same underlying asset.
	Conditional linking	Linking of bids in two or three subsequent quarter hours to consider the activation outcome in preceding quarter hours QH-1 and/or QH-2.
<b>Activation type</b>	Direct	Bid is available for direct activation.

**Nationally there might be additional bid attributes. This will be discussed in national meetings.**

# Simple bids

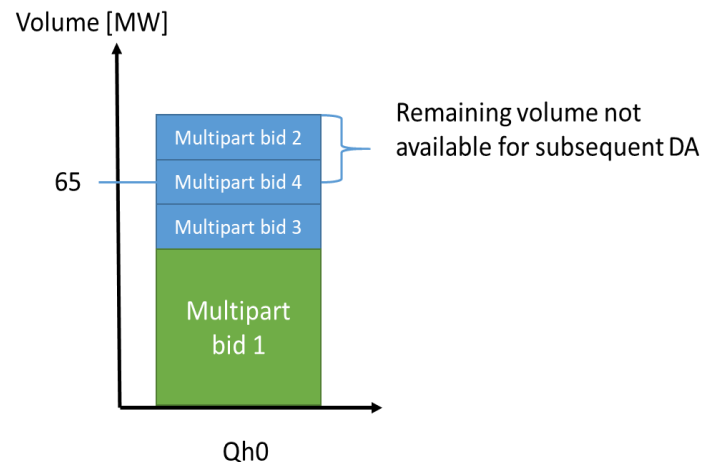
- Valid for one quarter hour
- One quantity and price
- Unique bid ID, use UUID (universally unique identifier)
- Divisibility:



# Complex bids

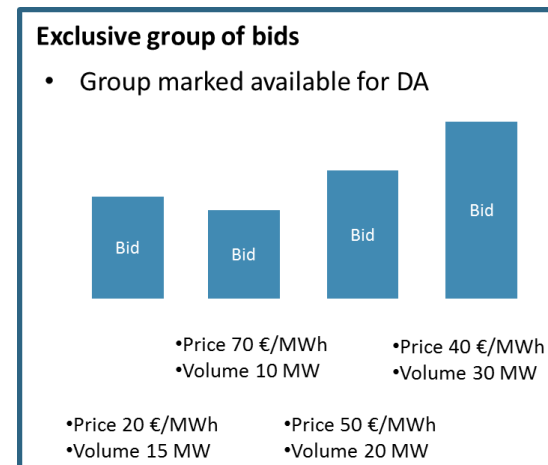
## Multipart bid – activated in strict price order

- All bid components must have
  - Same *multipartBidsIdentification*
  - Same direction and activation type
  - Different prices
  - And belong to the same quarter hour



## Exclusive group of bids – only one bid can be activated

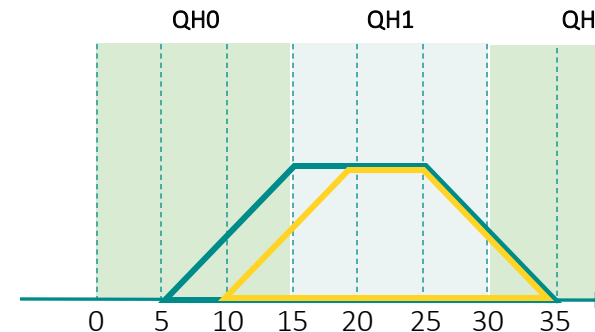
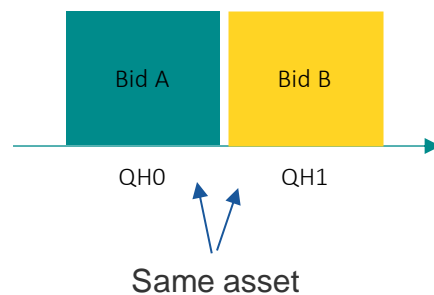
- All bid components must have
  - Same *exclusiveBidsIdentification*
  - Same activation type
  - And belong to the same quarter hour



Example use-  
case: model  
start-up costs

# Need for linking of bids in time – direct activation

- Direct activations last until the end of the next quarter hour.
- To avoid double activation it is necessary to link bids for which the underlying asset is the same.



Bid A is direct activated in QH0 and will extend into QH1. Consequently bid B will not be available.

# Technical linking

## - linking between market periods

- Indicate that bids in consecutive quarter hours belong to the same underlying asset
- The bid selection algorithm will not activate a bid if it has technical link with a direct activated bid in the preceding quarter hour
- Allowed for both simple and complex bids
- A common *linkedBidsIdentification* is used to link the bids

*Example of linking of two simple bids:*

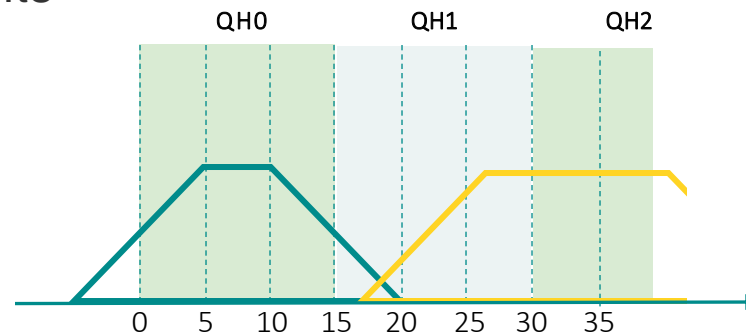
	QH-1	QH0
Bid ID	1	2
<b>linkedBidsIdentification</b>	<b>xx</b>	<b>xx</b>

*Example of linking of three exclusive group bids (exclusive groups):*

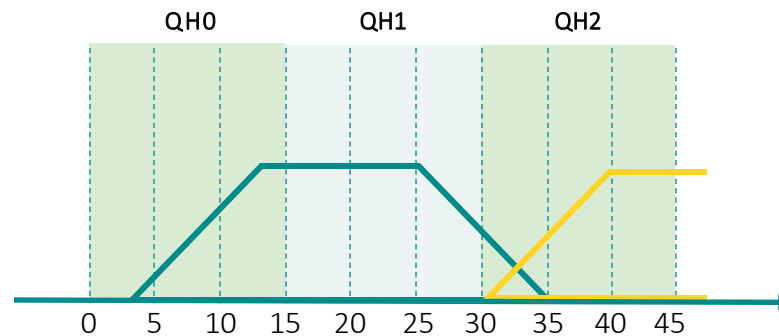
	QH-1	QH0	QH+1
Bid ID	1	3	5
exclusiveBidsIdentification	aa	bb	cc
<b>linkedBidsIdentification</b>	<b>xx</b>	<b>xx</b>	<b>xx</b>
Bid ID	2	4	6
exclusiveBidsIdentification	aa	bb	cc
<b>linkedBidsIdentification</b>	<b>xx</b>	<b>xx</b>	<b>xx</b>

# Further needs for linking - ramping constraints

Direct activation in next quarter hour may conflict with ramping constraints



Bid A is scheduled activated in QH0. The ramp down extends into QH1. Direct activation of Bid B requires the underlying asset to ramp up while ramping down.

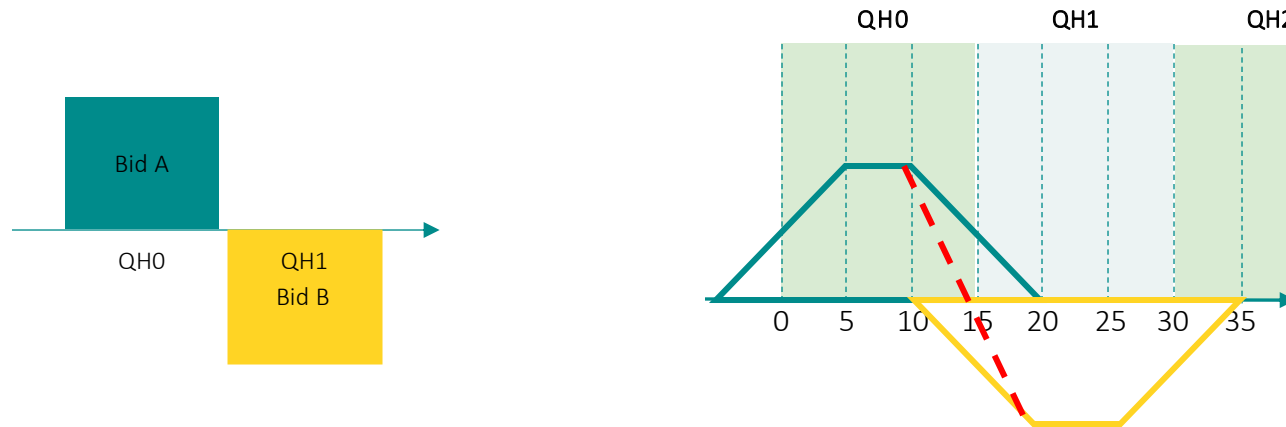


Bid A is direct activated in QH0. The ramp down extends into QH2. Direct activation of Bid B requires the underlying asset to ramp up while ramping down.



# Further needs for linking due to ramping constraints

Activation in opposite direction in next quarter hour

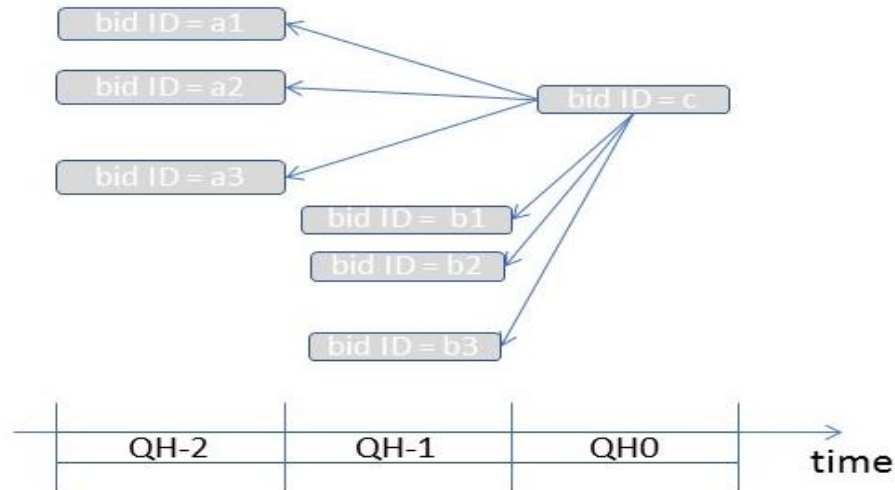


The ramp from upward X MW to down ward -X MW requires twice the ramping speed as required for Bid A and Bid B. If the underlying asset is not able to fullfill the faster ramping curve, conditional linking should be used.

# Conditional linking

## - linking between quarter hours with conditions

- Allowed only for simple bids
- A simple bid can be linked to up to six bids in the two previous quarter hours



For each link one of the following conditions may specify that the bid is not available when:

- Bid in previous MTU was activated
- Bid in previous MTU was subject to SA
- Bid in previous MTU was subject to DA
- Bid in previous MTU was not activated

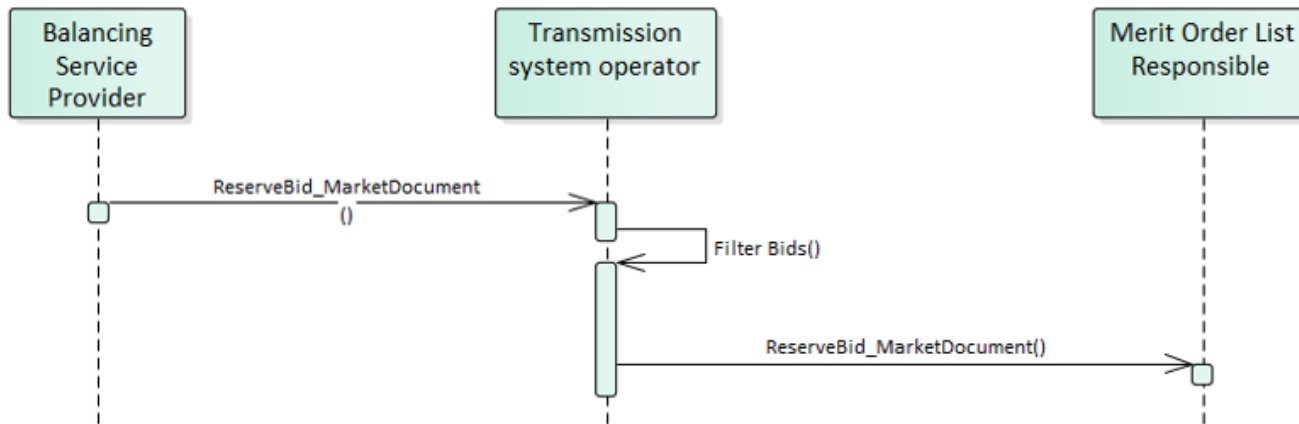
Or the bid is not available for direct activation when:

- Bid in previous MTU was subject to SA
- Bid in previous MTU was subject to DA

Example use-cases for conditional linking:

- handle ramping constraints
- model start-up costs
- model changing hydro situations

# Sequence diagram for bidding



- Merit Order List Responsible can be Nordic AOF or TSO, later it will be European AOF (MARI)
- Acknowledgement messages are not shown

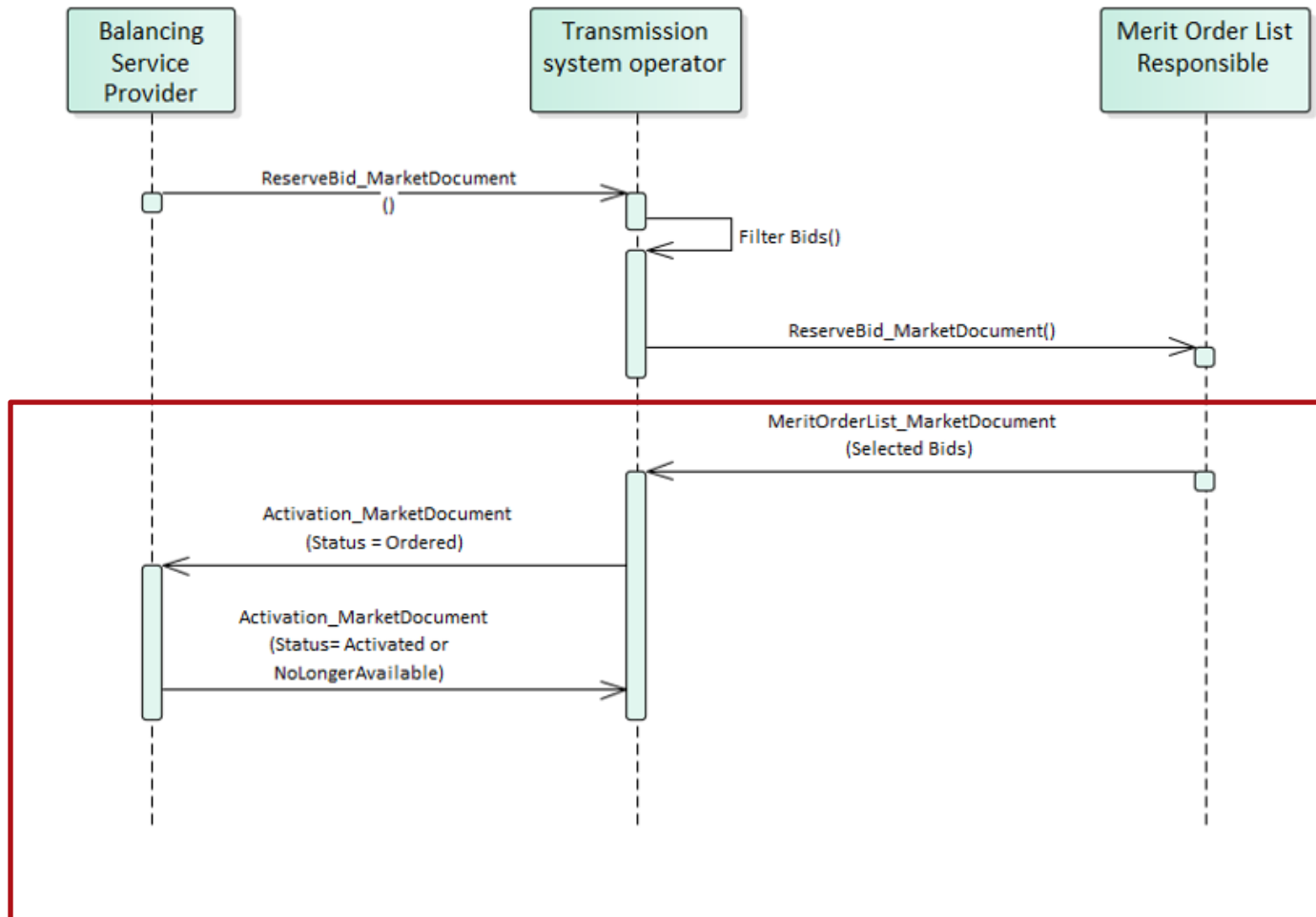
# Submitting bids – cancel or update bids before

- Until bidding gate closure bids can be submitted, updated or cancelled
- A bid can be updated by sending the new bid information with the same bid identification
- A bid can be cancelled by sending updated bid information with quantity = 0
- Only the bids to be updated need to be included in the document
- The BSP should be careful with the integrity of links when updating bids

## Bid availability

- If the BSP is not able to activate bids or receive activation order, the bids must be cancelled before bidding gate closure
- In the exceptional case where bids become unavailable for activation by the BSP after gate closure, the BSP must inform the TSO by phone
- The TSO can also mark bids unavailable for activation e.g. due to local congestions
- The TSO will send a report to the BSP on bids that have been marked unavailable including the reason
  - Specification for implementation of the report will be provided in a later version of the implementation guide

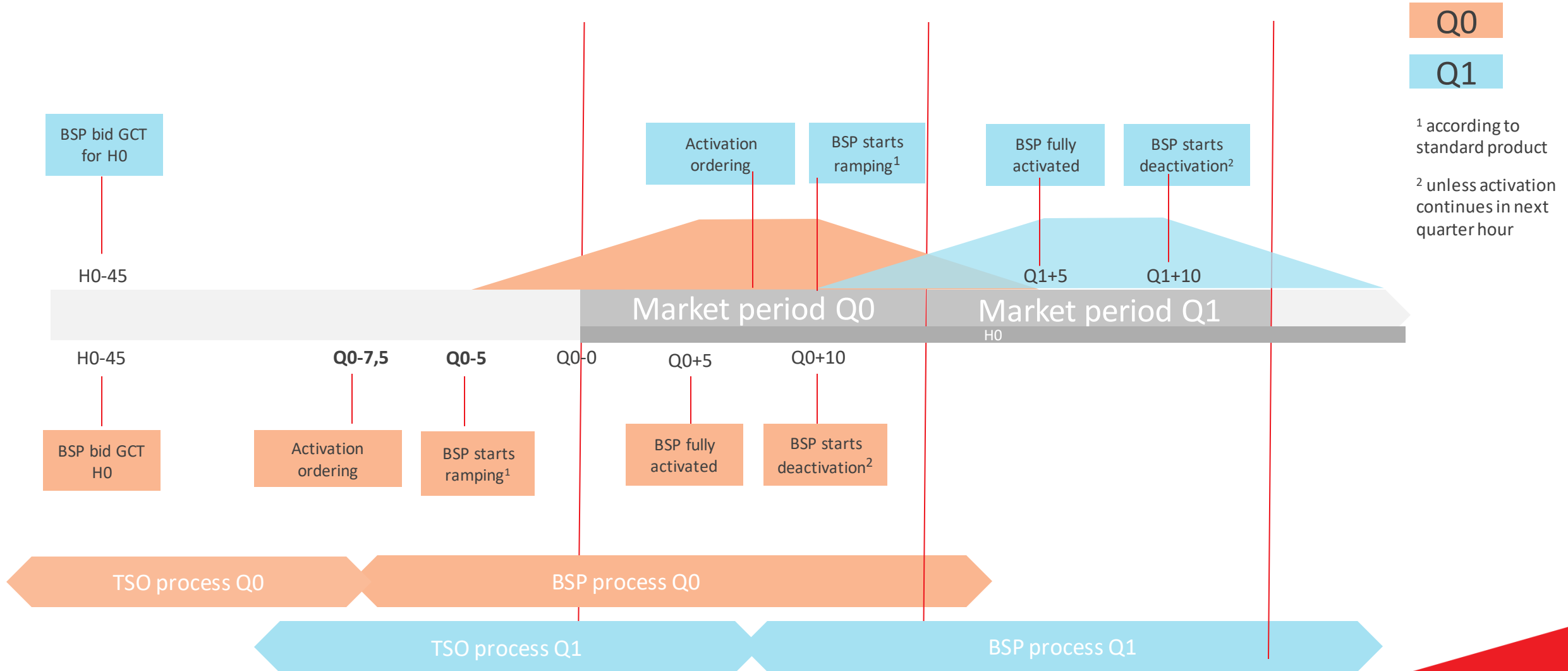
# Sequence diagram for activation ordering



- Merit Order List Responsible can be Nordic AOF or TSO, later it will be European AOF (MARI)
- Acknowledgement messages are not shown

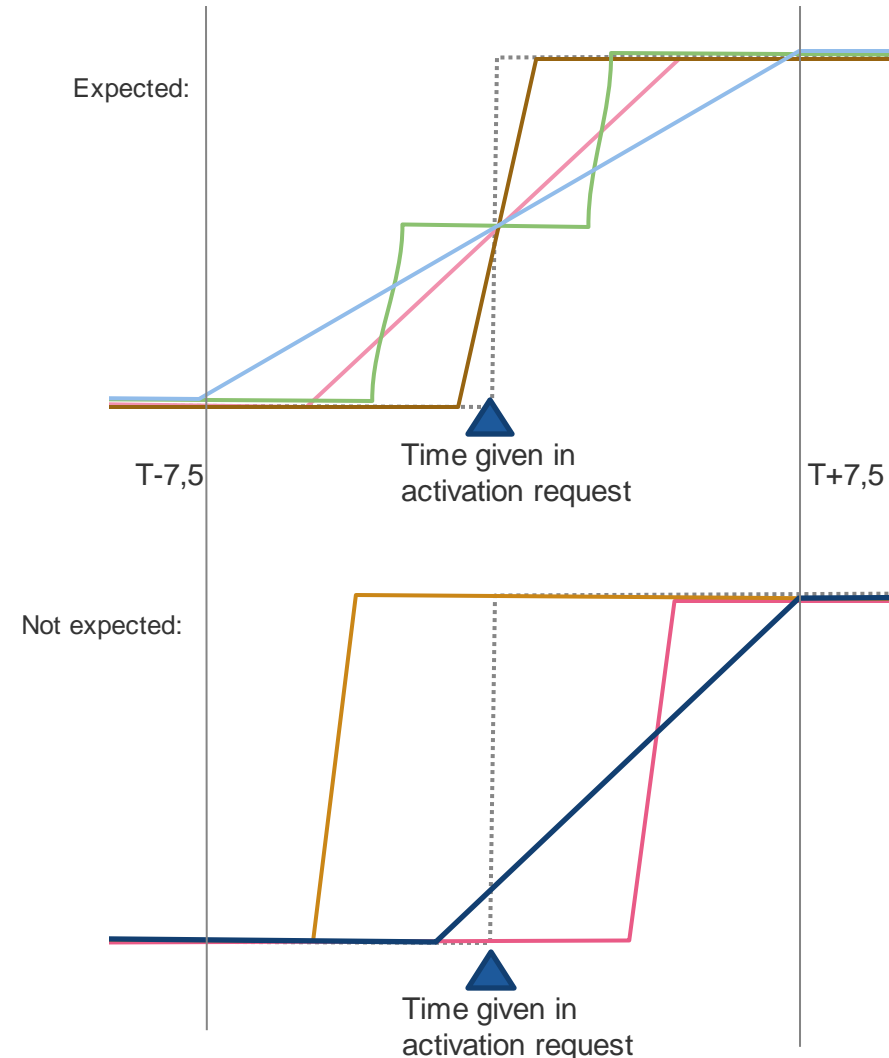
# Activation process

"Automated operation pre 15 min ISP"



# Activation – delivery shape

- The activation order will specify the start and stop for activation as the points in the middle of the expected ramp
- The expected delivery ramp is "symmetrical" ramping around the ordered start and stop time





# Activation process – need for high availability

- Activation process runs scheduled every 15 minutes + direct activations
- Little time for manual handling of activation, difficult to handle activation failures
- Need for high reliability and availability in the activation process (both TSO and BSP)
  - Automated processing (avoid manual errors and timeouts due to slow human response)
  - Monitoring
  - Redundancy, avoid single point of failure
  - Separate production and test environments
  - Avoid downtime for maintenance and upgrades (e.g. zero-downtime deployment architecture)

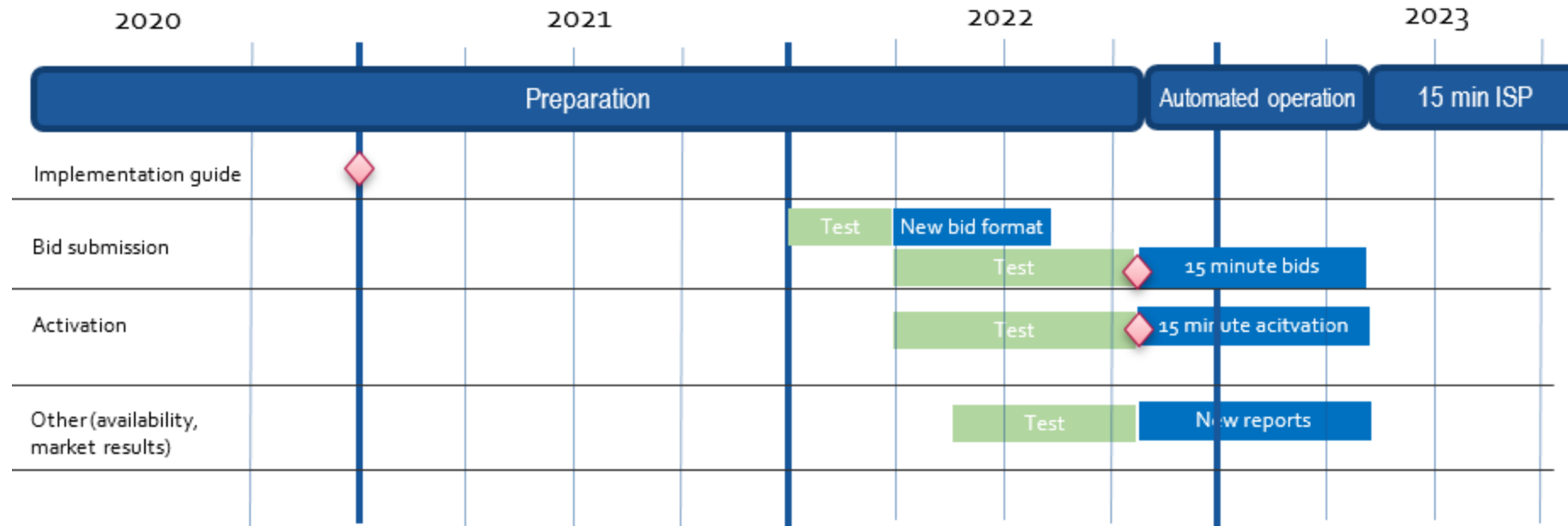
## Activation process – heartbeat

- The heartbeat enables to monitor and measure availability of the activation process and connection, both by the TSO and the BSP
- The heartbeat is an "empty" activation order that will be sent at least once every 15-minute period to BSPs who have placed bids
- The empty order will refer to a fixed dummy bid id and dummy resource and quantity will be 0
- The heartbeat orders should be processed the same way as real orders to detect issues in any of the parts of the activation process

# Reporting of market results and activations

- Market results will be published to the ENTSO-E transparency platform ([transparency.entsoe.eu](https://transparency.entsoe.eu)) and the Nordic transparency platform ([www.nucs.net](https://www.nucs.net))
- The TSOs will send a report of activated bids to each BSP after each Imbalance settlement period. Specification for this report will be provided in a later version of the implementation guide.

# Energinet – implementation plan



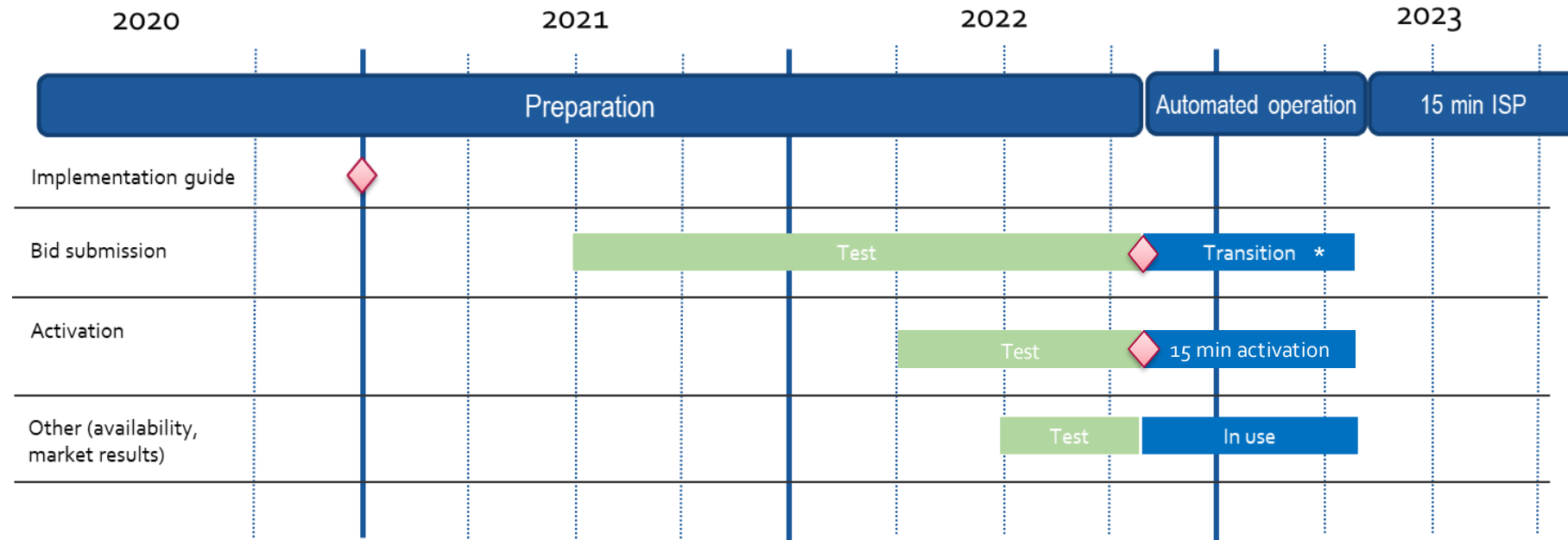
TSO contact information

[electricitymarket@energinet.dk](mailto:electricitymarket@energinet.dk)

Next step in Denmark

National webinar on mFRR EAM implementation guide January 21st 10.00 -12.00.

# Fingrid – implementation plan



\* During transition phase, both 15 min and 60 min bids are supported. Current message format can be used with 60 min bids. Activation is sent for each 15 min

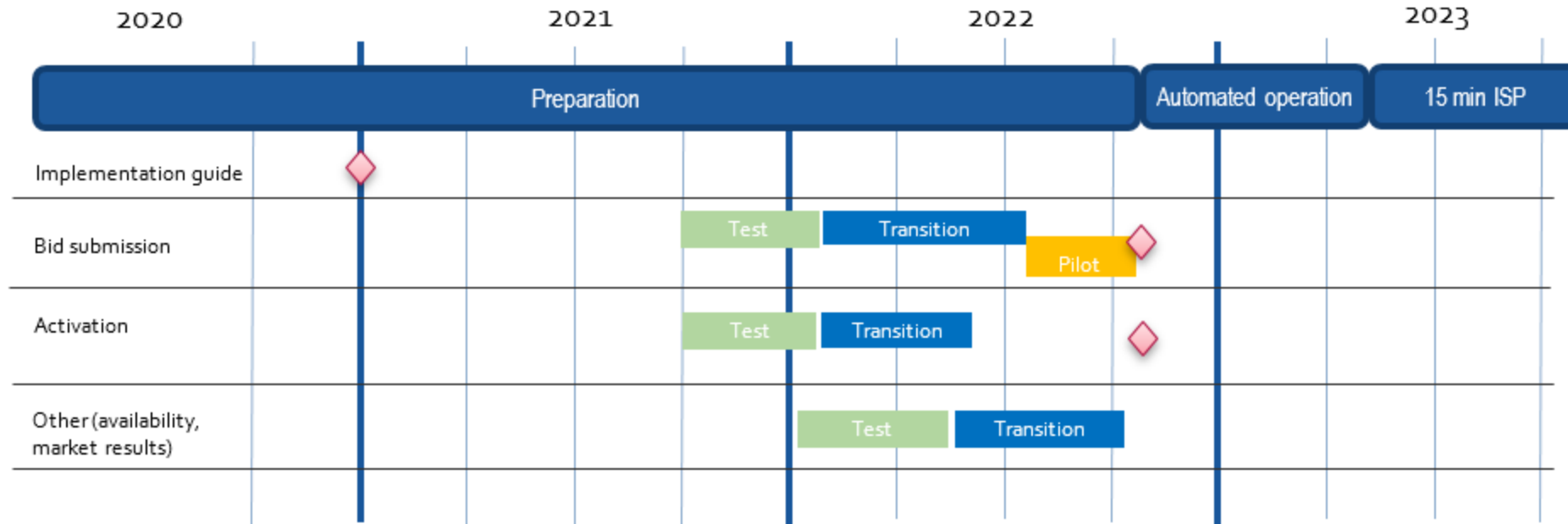
TSO contact information

[Reservit@fingrid.fi](mailto:Reservit@fingrid.fi)

Next step in Finland

National webinar on mFRR EAM implementation guide February 8th  
09.00 -11.00 EET.

# Statnett – implementation plan



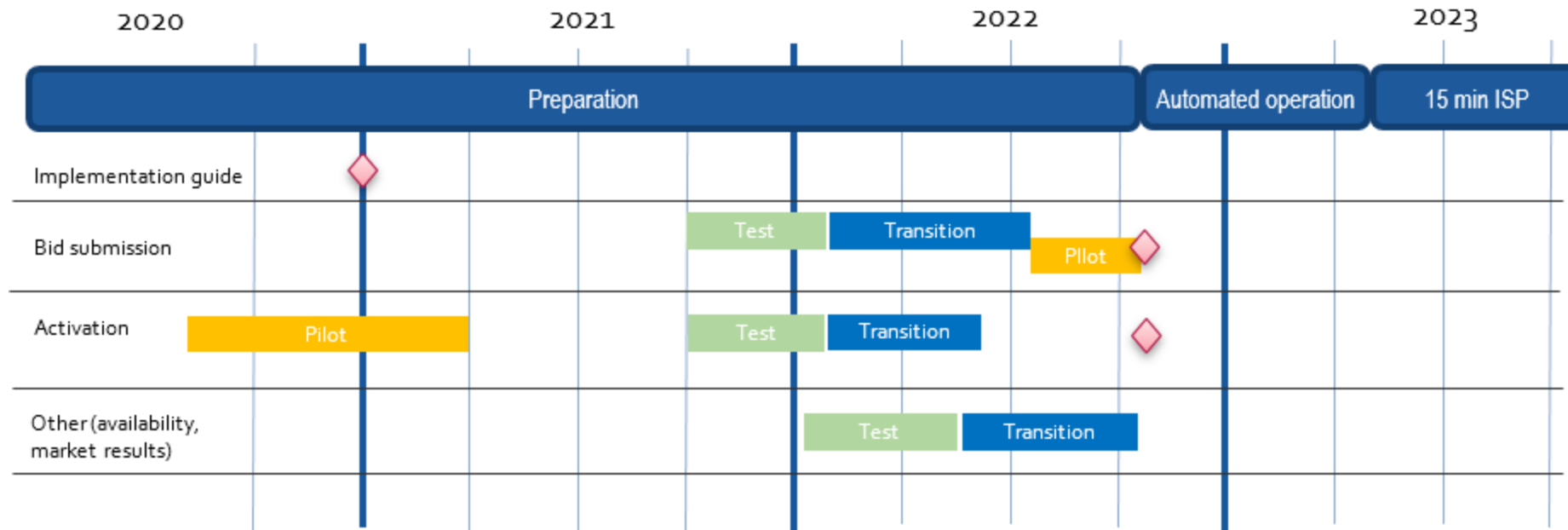
TSO contact information

[BSP@statnett.no](mailto:BSP@statnett.no)

Next step in Norway

National webinar, "ISB-meeting", on mFRR EAM implementation plan  
February 2nd 13.00 -15.00.

# Svenska kraftnät – implementation plan



TSO contact information

[mfr@svk.se](mailto:mfr@svk.se)

Next step in Sweden

National webinar (Förändringar på mFRR-marknaden)  
February 3rd 13.30-15.00

On the NBM programs homepage you will find:

- Webinar slides
- Answers to all the questions from today
- Webinar recording

[www.nordicbalancingmodel.net](http://www.nordicbalancingmodel.net)

Thank you for your attention!