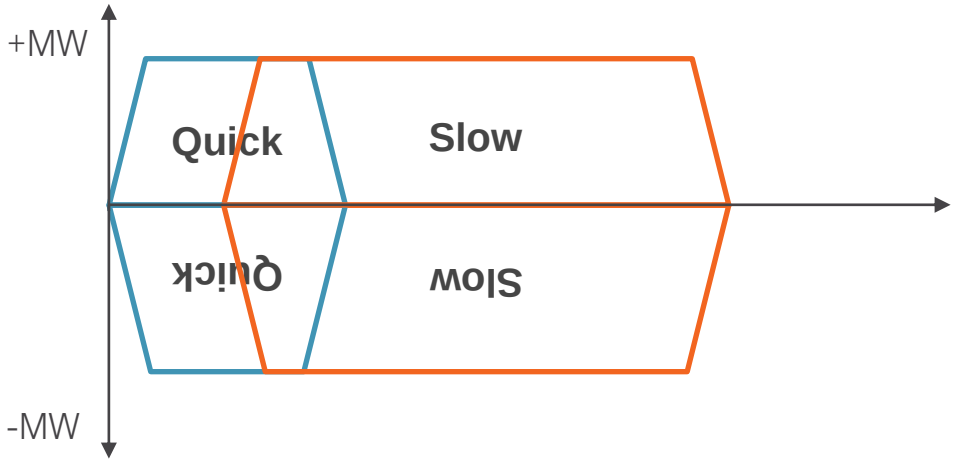
ESO Reserve Reform
Quick Reserve
Service Design for Phase 1

For webinar 1 February 2024

ESO

Proposed new reserve products



Quick Reserve

Full output within 1 minute from instruction.

Up to 5-minute minimum activation time

Up to 3-minutes recovery period

Slow Reserve

Full output within 15 minutes

Up to 30-minute minimum activation time

120-minute maximum activation time

Quick Reserve – Proposed Technical & Procurement Service Design (Phase 1)

Technical Design Element	Quick Reserve Proposal
Direction	Positive and Negative
Minimum Contract Size	1 MW
Time to full delivery	1 minutes from instruction
Minimum Activation Period	Not greater than 5 minutes
Maximum Recovery Period	3 minutes
Energy Requirement	Unit must be able to deliver the full contracted capacity per Service Window
Operational Metering	1 Hz
Dispatch mechanism	**BOAs via EDL/EDT or wider access equivalent and control/system telephony as alternative dispatch solution during contracted windows**
Notice to Start Ramping	**0 minutes**
Ramp rates	No maximum ramp up or ramp down rates Minimum ramp-up and ramp-down rate to be in line with Time to Full Delivery.
Performance Metering	**30 minutes using settlement operational data**
Performance Monitoring	Time to Full Delivery, Availability and Utilisation - Penalties for over (>120%) and under (95%) delivery
Baselining	As per BM – Physical Notifications 24 hours in advance, final at 60 mins ahead of Settlement Period. Both zero and non-zero baselines
Aggregation	Yes, per GSP group
Passing through zero	Yes

Procurement Design Element	Quick Reserve Proposal
Service Window	**30 minutes blocks**
Maximum Bid Size	300 MW
Frequency of Procurement	Daily – Firm procurement Within day – optional procurement
Locationality	National
Auction Platform	EAC
Auction Timing	Results by D-1 14:30
Stacking & Splitting	Same MW cannot be sold twice For a given Service Window, splitting only allowed between Positive & Negative QR Stacking with CM, stability and voltage services
Bid Sizing	Above or equal 1MW
Linking of bids	Yes, by Service Window and Product (Positive QR and Negative QR only)
Bid Curtailment Rules	User defined
Payment Structure	Firm: Availability + Utilisation Optional: Utilisation only
Payment Mechanism	Availability: Pay-as-Clear Utilisation: Pay-as-Bid through BOAs

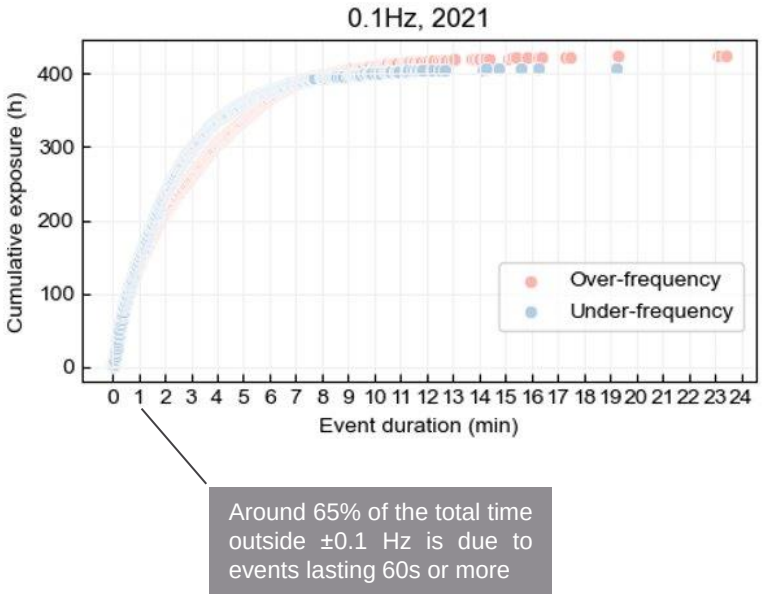
Key Design Elements

Technical Design	Provider's Eligibility	• The unit being able to meet specific technical requirements.
	Delivery Specifications	• Including Time to Full Delivery, Minimum Activation Period, Recovery Period and Ramping Envelope.
	Dispatch Mechanism	• Platform to send and receive instructions.
	Baselining & Energy Requirements	• A forward view of the asset's output which aids system planning and for Reserve, allows ESO to monitor the performance of service delivery
	Aggregation & Metering	• Rules around aggregation of units and frequency of metering data points for operational and purposes.
	Performance Monitoring	• Acceptable dispatch envelope including ramping up and ramping down acceptable envelopes, and penalties for poor performance.
Procurement Design	Service Windows	• Period of time that providers must have their energy available to deliver the Reserve service.
	Auction Timings	• The time at which ESO will procure the Reserve services at designed auction platform.
	Assessment Principles	• Rules how the auction would be cleared and how the units will be awarded the contract.
	Payment Mechanism	• Methodology to pay providers for availability and/or utilisation.
	Revenue Stacking	• Rules around procuring other services in the same service window from the same unit.
	Locationality	• Principles behind locational assessment and how the location of the units would be included in the auction clearing assessment.

Time to full delivery

Quick Reserve: Up to 1 minute

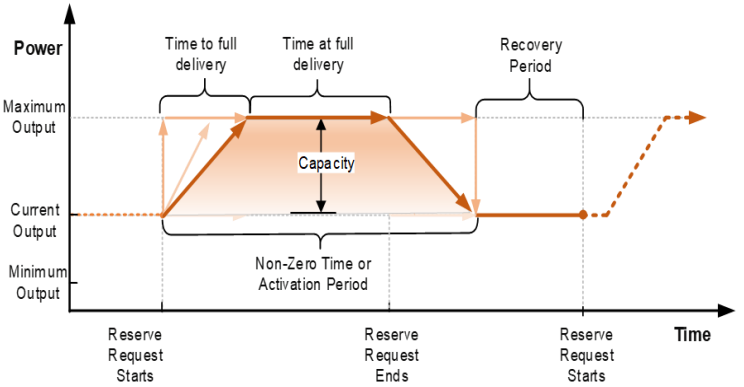
- This parameter is driven by analysis on historic frequency data which shows that a time to full delivery of 1 min or less would:
  - Reduce exposure to deviations of ±0.1 Hz from around 8% of the time to around 3.3% of the time.
  - In absolute terms, this means frequency could be outside ±0.1Hz for around 290 hours per year instead of around 700 hours per year.
- It will be subject to performance monitoring based on notice to start ramping (Notice to Offer or Notice to Bid) and ramping rates submitted as Dynamic Parameter for Phase 1 only.
- We expect units to set notice to start ramping (Notice to Offer or Notice to Bid and Notice to Deviate from Zero if applicable) to 0 minutes to ensure Time to Full Delivery parameter is less than 1 minutes

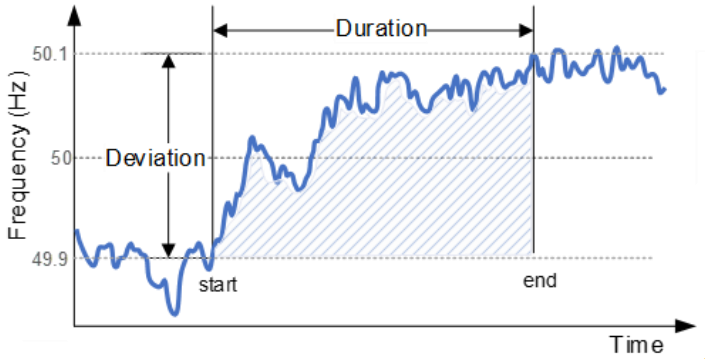


Minimum Activation Periods

Quick Reserve: Up to 5 mins

- Definition: the minimum duration for which an instruction can be issued, as specified by providers.
- This will facilitate enough flexibility in dispatching and ceasing units to respond to the operability challenges while giving providers certainty about the minimum time that they can be dispatched.
- Based on analysis of historic frequency data, Minimum Activation Period up to 5 minutes has the potential to shorten the duration of 80% of ±0.1 Hz swings. Only around 20% of ±0.1 Hz swings (~330 per year) are less than 5 minutes.
- This parameter should be submitted during pre-qualification stage on the Single Market Platform and during contracted hours, the unit is expected to use Dynamic Parameters like a Minimum Non-Zero Time to reflect this parameter.

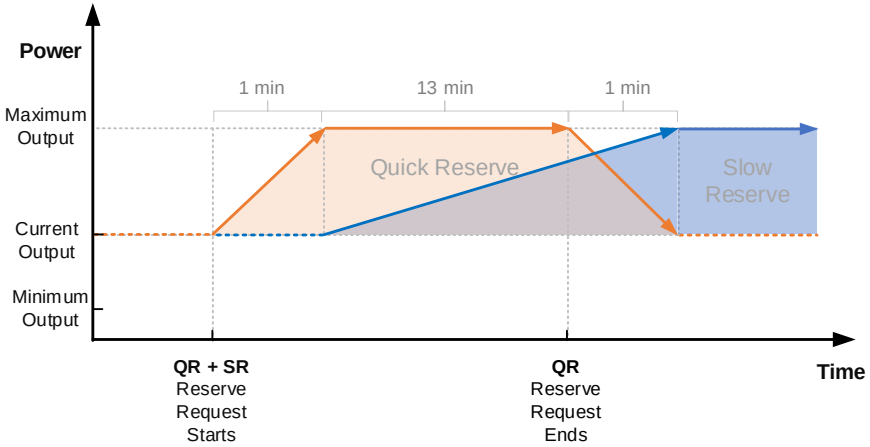




Maximum Activation Periods

Quick Reserve: Not less than 15 mins

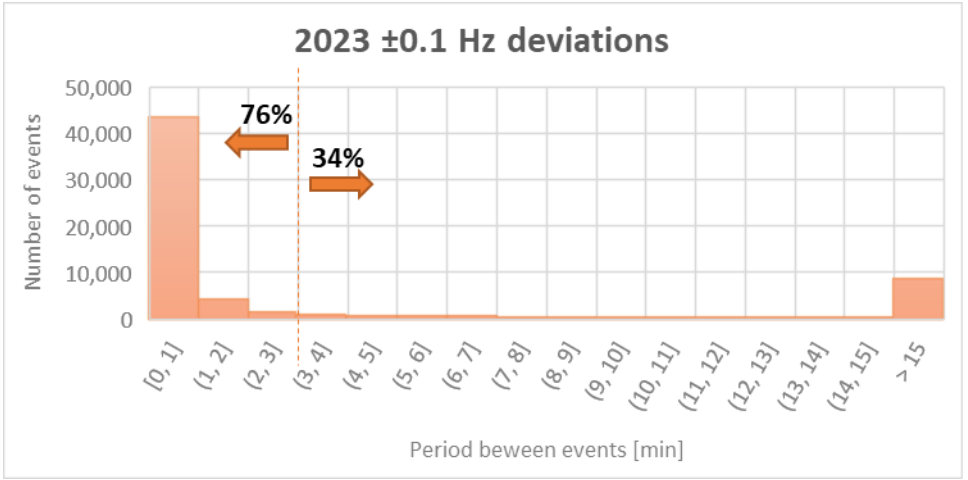
- Initially, ESO proposed Maximum Activation Periods to be specified by providers and to be at least 15 minutes. This will allow sufficient time for a transition between Quick and Slow Reserve.
- However, currently within BM system we do not have a dynamic parameter, which can reflect Maximum Activation Period in the operational timescales.
- Due to this IT limitation, ESO proposes to withdraw Maximum Activation Period from the technical Service Design requirements.
- In the Phase 1, we expect that activation periods will not be limited by the Energy Requirement for this service and that instructions will be in line with general approach for managing time-limited BOAs without a specific parameter.
- As we continue to work closely with Balancing Programme, in Phase 2 of Quick Reserve, we expect to use new Dynamic Parameters to reflect this requirement in the future (please refer to GC0166).



Recovery Time

Quick Reserve: Maximum of 3 mins

- Definition: the maximum time for which a unit is allowed to recover and return to availability following an instruction, as specified by providers.
- ESO's original position was for 1 minute.
- However, based on industry feedback this parameter was updated to 3 minutes to represent a good compromise between unit's ability to deliver and historic system needs.
- For historic system needs, we looked at the interval between frequency events of different magnitudes, e.g. ±0.1 Hz, ±0.15 Hz (see figure on the right).
- This parameter should be submitted during pre-qualification stage on the Single Market Platform and during contracted hours, the unit is expected to use Dynamic Parameters like Minimum Zero Time to reflect this parameter.



Dispatch mechanism

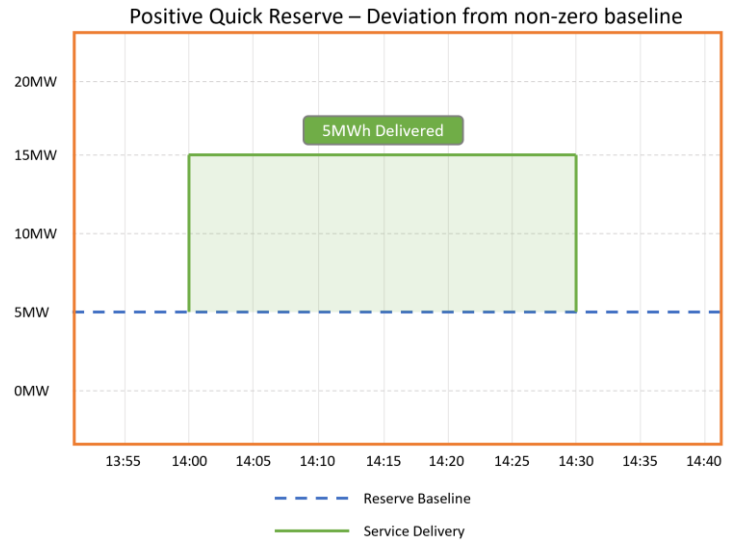
Quick Reserve: BOAs via EDL/EDT or wider access equivalent and control/system telephony as alternative dispatch solution during contracted windows

- Utilisation will be in line with normal Balancing Mechanism operation in accordance with BC2 via Bid-Offer Acceptances.
- Dispatch instructions to BM providers will be by way of Bid-Offer Acceptances (BOAs) via EDT/EDL or wider access equivalent or telephone instruction if required during contracted windows.
- The minimum bid size for this service is 1MW.
- Submission of availability parameters and dispatch instructions will be through the EDT/EDL interface (and wider access equivalent), which practically means participants will need to go through the BM registration process & follow BM operational requirements in order to be able to access these systems.

Baselining

Quick Reserve: As per BM - 60-minutes nomination baseline & 24hr PNs in advanced. Allowed zero or non-zero baselines.

- We require baselines for both operational and performance purposes. They provide visibility to our control room of expected asset output and help create a datum against which to monitor performance.
- All units are expected to provide Physical Notifications in advanced as per Balancing Mechanism requirements, which is starting from 24 hours in advanced for both Positive and Negative Quick Reserve products.
- We require the Final Physical Notification at 60 minutes before the contracted window.
- The service design proposal is that a unit can have zero or non-zero baseline.
- The PN can be in 1 minute granularity and can ramp within the 30 minute period to follow for example a wind or solar forecast.

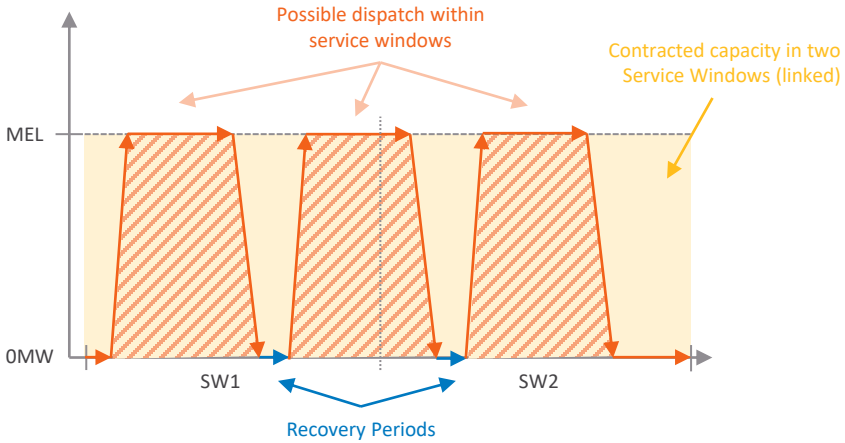


Energy Requirements

Quick Reserve: Unit must be able to deliver the full contracted capacity per Service Window

- Our principles for addressing the challenge of state of energy management for providers of reserve services are:
  - Providers must maintain service provision throughout the contracted service windows - provision and State of Energy management must occur simultaneously
  - Unavailability for commercial reasons will not be permitted, only for technical reasons (e.g. plant failure)

- To clarify, under Quick Reserve Phase 1 service design we expect all units to be able to deliver full contracted capacity for up to length of the service window (30 minutes).
- In the Phase 2 of Quick Reserve, we will be working on introducing new state of charge parameters according to outcomes from Working Group (GC0166).



Operational Metering

Quick Reserve: 1Hz

- All Quick Reserve units to have 1Hz (once per second) read frequency for both operational metering as per current Grid Code requirements.
- Operational metering frequency would align with the Balancing Mechanism. It is needed to aid control room visibility of units when dispatched and ramping. We are also developing new systems which will enhance forecasting capability, also improved by more granular metering data.

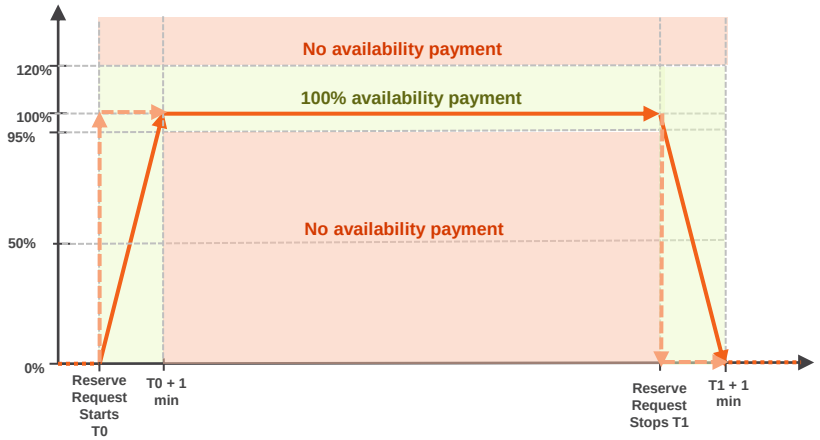
Per Grid Code:

ECC.6.5.6	Operational Metering
ECC.6.5.6.1	It is an essential requirement for **The Company** and **Network Operators** to have visibility of the real time output and status of indications of **User's Plant and Apparatus** so they can control the operation of the **System**.
ECC.6.5.6.2	**Type B**, **Type C** and **Type D Power Park Modules**, **HVDC Equipment**, **Network Operators** and **Non Embedded Customers** are required to be capable of exchanging operational metering data with **The Company** and **Relevant Transmission Licensees** (as applicable) with time stamping. Time stamping would generally be to a sampling rate of 1 second or better unless otherwise specified by **The Company** in the **Bilateral Agreement**.
ECC.6.5.6.3	**The Company** in coordination with the **Relevant Transmission Licensee** shall specify in the **Bilateral Agreement** the operational metering signals to be provided by the **EU Generator**, **HVDC System Owner**, **Network Operator** or **Non-Embedded Customer**. In the case of **Network Operators** and **Non-Embedded Customers**, detailed specifications relating to the operational metering standards at **EU Grid Supply Points** and the data required are published as **Electrical Standards** in the Annex to the **General Conditions**.

Performance Metering and Monitoring

Quick Reserve: Performance Monitoring checks on Availability, Utilisation & Time to Full Delivery

- ESO will conduct regular performance monitoring of service availability and delivery.
- **Availability:** The unit should be able to provide 100% of contracted headroom of footroom and failure to deliver the contracted availability will trigger an Event of Default (EOD). When a reserve unit triggers an EOD, it will forfeit Availability Payment for all the relevant Committed Windows. This will be measure using unit's Physical Notifications and Maximum Export/Import Limits.
- **Utilisation:** The unit must be within acceptable ramping envelope when ramping to and from the instructions. Under-delivery below 95% contracted capacity will mean availability payments for the relevant service window will be withheld. Utilisation payments will be made for all energy delivered. Over-delivery will be permitted up to 20% in addition to contracted capacity, however utilisation and availability payments will be capped at 100%. This will be measured using settlement metering.
- **Time to Full Delivery:** Unit must be able to delivered full contracted capacity within 1 minute. This will be measured using Notice to Offer/Bid and ramp rates submitted as Dynamic Parameters.



Aggregation

Quick Reserve: Yes, per GSP group

- As per Grid Code, providers are allowed to aggregate BM units, per GSP Group, to meet minimum contract size of 1 MW.
- GSP group approximately maps the geographical area covered by the DNO license areas. This level of locational granularity is not enough to ensure secure network planning and operation therefore the requirements above have been proposed.
- This is in line with the current suite of Dynamic Response services.

GSP Group	GSP Group Name
_A	Eastern
_B	East Midlands
_C	London
_D	Merseyside and North Wales
_E	Midlands
_F	Northern
_G	North Western
_H	Southern
_J	Southern Eastern
_K	South Wales
_L	South Western
_M	Yorkshire
_N	South Scotland
_P	North Scotland

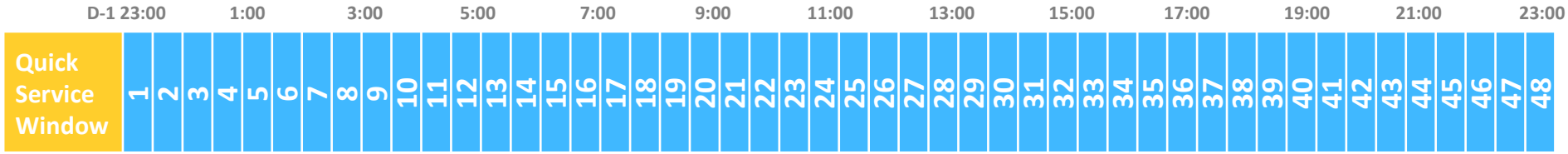
The 14 GSP Groups

Source: Elexon

Service Windows

Quick Reserve: 30 minutes or Settlement Periods

- Length of service window refers to the period of time that providers must have their energy available to deliver the service(s).
- *Initially*, we proposed 2-hour service window length for Quick Reserve.
- However, for simplification of design, we propose 30-minutes for this Service, covering 24-hours a day from D-1 23:00 till D-0 23:00.



Daily Auction

Quick Reserve: Firm procurement with results D-1 at 14:30

- Quick Reserve auction will be held on Enduring Auction Platform during the same time as Dynamic Reserve Services auction.
- It will be daily, firm procurement at day ahead & optional procurement within operational day.

Bid sizing

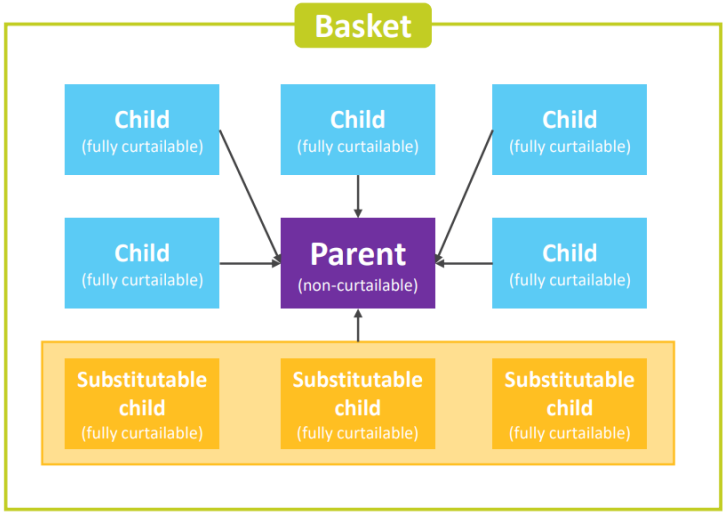
Quick Reserve: Above or equal 1MW up to 300MW maximum bid

Bid Size

- Bids for the QR service shall fall between 1 – 300 MW.

Bid Curtailment Rules

- Bid curtailment will follow Enduring Auction Capability rules
- Participants specify preferences in the market design by building sell orders in different ways
    - Non-curtailable Parent orders
    - Curtailable Child orders



Stacking & Splitting

Quick Reserve: Same MW cannot be sold twice

Splitting possibilities		Dynamic Containment		Dynamic Moderation		Dynamic Regulation		Slow Reserve		Quick Reserve	
		DCL	DCH	DML	DMH	DRL	DRH	PSR	NSR	PQR	NQR
Dynamic Containment	DCL	N/A	Yes	Yes	Yes	Yes	Yes	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1
	DCH	Yes	N/A	Yes	Yes	Yes	Yes	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1
Dynamic Moderation	DML	Yes	Yes	N/A	Yes	Yes	Yes	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1
	DMH	Yes	Yes	Yes	N/A	Yes	Yes	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1
Dynamic Regulation	DRL	Yes	Yes	Yes	Yes	N/A	Yes	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1
	DRH	Yes	Yes	Yes	Yes	Yes	N/A	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1
Slow Reserve	PSR	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	N/A	Yes	Not possible yet	Not possible yet
	NSR	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Yes	N/A	Not possible yet	Not possible yet
Quick Reserve	PQR	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	N/A	Yes
	NQR	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Not for Day 1	Yes	N/A

- For a given Service Window, splitting only allowed between Positive & Negative QR
- Stacking is allowed with Capacity Market, Balancing Mechanism, stability and voltage services.
- Further splitting with Dynamic Response services will be considered in Phase 2 of Quick Reserve.
- At the moment, stacking with other Reserve services is not allowed to limitation of dispatch mechanism.

Payment

Quick Reserve: Pay-as-Clear & Pay-as-Bid

- There are two forms of payment that ESO will make for the Quick Reserve services.
  - Availability to secure a contract for firm service: Pay-as-clear mechism
  - Utilisation for each dispatch in a contracted window: Pay-as-bid via BOAs

- ESO proposed payment structure for:
  - Firm Service :Availability + Utilisation
  - Optional Service: Utilisation only

Criteria	Availability	Utilisation
Homogeneity	✓	✗
Full Information	✓	✗
Competition	✓	✓
Proposed Payment Mechanism	**Pay-as-clear**	**Pay-as-bid**

- Pay-as-clear is not recommended to settle energy for new Reserve services because:
- Technical characteristics (e.g. location) important for ESO despatch and constraint management
- Demand curve is unknown
- Thus, the “Homogeneity” and “full information” criteria haven’t been met