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Quick Reserve

Technical and Procurement Service Design

Introduction

Through our Reserve Reform project, the ESO is updating the reserve products we procure to comply with the Clean Energy Package (to allow re-establishment of the benefits of firm markets) and to better meet system and statutory requirements. Quick Reserve (QR) is aimed primarily for reacting to pre-fault disturbances to restore the energy imbalance quickly and return the frequency close to 50.0 Hz and as such, it will replace the legacy Fast Reserve service. This minimises the duration of events outside of operational limits (the total duration of which should be < 15000 minutes per year) and those outside of 0.15 Hz (the point at which response requirements are calculated).

Following engagement with industry stakeholders we have now completed our proposed service and procurement design for the new Quick Reserve service ahead of formal EBR Article 18 consultation.

As previously communicated, a phased implementation plan is proposed in line with the delivery of our strategic IT platforms, with an accelerated BM only service at the end of summer 2024 (Phase 1) followed by the NBM service in summer 2025 (Phase 2).

This service design document contains both versions of the service: The Quick Reserve service for both BM and NBM and the accelerated Phase 1 version of Quick Reserve BM-only.

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Technical Design summary

Technical Design Element	Proposal
Direction	Positive and Negative
Minimum Contract Size	1 MW
Provider eligibility	NBM & BM Units with control/ system telephone during contracted windows **Phase 1: BM only**
Time to full delivery	1 minute from instruction
Minimum Activation Period	Not greater than 5 minutes
Maximum Recovery Period	Not greater than 3 minutes
Energy Requirement	The unit must be able to deliver the full contracted capacity per Service Window
Operational Metering	1 Hz for both BM and NBM units **Phase 1: BM only**
Dispatch mechanism	BOA for BM units OBP NBM dispatch instruction for NBM units **Phase 1: BM only**
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	1 Hz **Phase 1: 30 minutes using settlement operational data**
Performance Monitoring	Time to Full Delivery, Availability and Utilisation - Penalties for over (>120%) and under (95%) deliveries
Baselining	As per BM – Physical Notifications 24 hours in advance. Final Physical Notifications 60-mins ahead of contracted Settlement Period. Both zero and non-zero baselines allowed.
Aggregation	Yes, per GSP group
Operational data requirements	BM units as per current BM operations NBM units to submit BM-like operational data
Ramp rates for baselines	Yes – Will be aligned with Dx services **Phase 1: No**
Passing through zero	Yes
Integer dispatch	No

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Procurement Design summary

Procurement Design Element	Proposal
Service Window	Flexible windows set in advance or 30-minute blocks. **Phase 1: 30-minute blocks**
Maximum Bid Size	300 MW
Frequency of Procurement	Daily – Firm procurement Within day – optional procurement **Phase 1: Daily – Firm procurement only**
Locationality	National
Auction Platform	EAC
Auction Timing	Results by D-1 09:00am **Phase 1: D-1 14:30**
Stacking & Splitting	Same MW cannot be sold twice. **Phase 1: Stacking only allowed between Positive and Negative QR**
Bid Sizing	1MW≥, integer bids
Linking of bids	By Service Window and Product (Positive and Negative only)
Bid Curtailment Rules	User defined
Payment Structure	Firm: Availability + Utilisation Optional: Utilisation only
Payment Mechanism	Availability: Pay-as-Clear Utilisation: Pay-as-Bid

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1. Technical Design

Negative Quick Reserve (NQR) and Positive Quick Reserve (PQR) form part of a suite of new Reserve products which ESO are developing to maintain the safe and secure operation of the network. Reserve is needed for frequency management when there is an imbalance between supply of energy and demand for energy. When instantaneous supply is not enough to meet the demand, the frequency falls; where supply outstrips demand, the frequency rises. Additional generation or demand is needed to re-establish this balance. Initially, this is provided by frequency response which initiates automatically according to system frequency. More information on our new Response services Dynamic Containment, Dynamic Moderation and Dynamic Regulation can be found on the ESO website. Reserve is then instructed to replace the energy delivered by frequency response in accordance with system requirements. For NQR, units are instructed to increase demand or decrease generation in full within 1 minute. The inverse is true for PQR. QR is open to any technology with the ability to provide a net change in demand/generation of at least 1.0 MW.

The key technical design features for Quick Reserve are:

- Minimum 1MW capacity of generation reduction/increase or demand reduction/increase from any technology. The unit can be single asset or an aggregated unit (aggregated at GSP group level) compromising more than one constituent asset.
- Quick Reserve units must be able to
    - Submit BM-like dynamic parameters, location, and prices (similar to the Balancing Code requirements). This is inclusive of both BM and NBM providers.
    - Achieve the full utilisation of the contracted capacity within the submitted data, if instructed.
    - Be able to achieve full delivery of contracted volume in 1 minute from instruction sending time or less. No maximum ramp rate limit is required.
    - Have Minimum Activation Periods not greater than 5 minutes and Maximum Recovery Period not longer than 3 minutes.
- Units can be aggregated at GSP Group level to meet the 1.0MW minimum participation threshold.
- To have a diverse locational spread and mitigate the impact of single unit failure, there will be a 300MW restriction on the maximum size a participating unit can bid up to.
- Contracts will be awarded upon acceptance of bids (Firm Service) in whole MWs (minimum 1MW) submitted into the daily auction.
- Providers contracted for the Firm Service will receive an availability payment (£/MW/hour) and a utilisation payment (£/MWh) when dispatched.
- Providers will be required to provide metering data with 1Hz granularity. This requirement will be extended to NBM providers to provide ESO with 1Hz operational metering in real time.
- All units need to provide ESO with dynamic parameters which are defined in BC 1.A.1.5. Dynamic Parameters and Physical Notifications are to be submitted 24 hours in advance, with final notifications 60-mins ahead of contracted Settlement Period at Settlement Period granularity, price bands and locations.
- Stacking with other active power ancillary services is not permitted under the Firm Service for the initial launch but will be kept under review.
- QR units will be performance monitored using 1sec performance metering data submitted after the contracted day to be evaluated on availability, time to full delivery and utilisation.

For Phase 1 the key differences of the technical design are:

- **Participate through Balancing Mechanism Systems (EDL/EDT and SORT).**
- **QR units will be performance monitored using average 30-minute settlement metering data from Elexon to be evaluated on availability, time to full delivery and utilisation.**

Provider eligibility

To participate in the Quick Reserve market, providers must:

1) be a BM unit; or NBM unit.
2) have control telephony for the entire duration of contracted service windows, which could be Control Telephone or System Telephone as per Grid Code definitions. NBM?
3) be capable of providing 1MW or more of reserve volume in line with the service design. Bids must be made in integer MWs.

Both Balancing Mechanism (BM) and non-BM participants with a connection to either the electricity transmission or distribution network will be eligible to provide QR.

The requirement to have telephone control comes from the need to dispatch units by phone during planned or unplanned outages of the system.

The requirement to provide integer bids of reserve volume is because our dispatch systems are not set up to instruct decimal volumes.

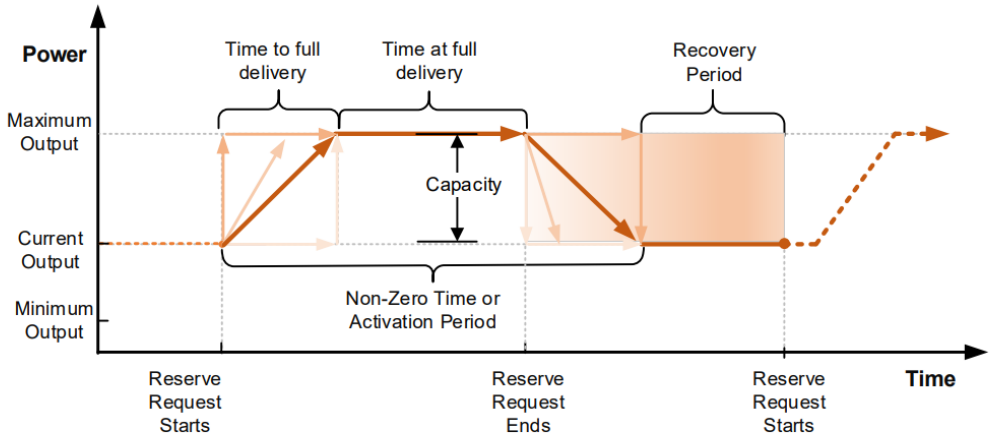
For Phase 1, the key differences of the technical design are:

1) **Participate through Balancing Mechanism Systems (EDL/EDT and SORT).**
2) **have control telephony for the entire duration of contracted service windows, which could be Control Telephony or System Telephony as per Grid Code definitions.**

Service Utilisation & Dispatch Mechanism

Utilisation for BM units 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 telephone instruction if required.

NBM providers will be dispatched via new Open Balancing Platform (OBP) system and should be BM-like dispatch using Bid and Offer like instructions.



For Phase 1 Quick Reserve, BM units will be utilised 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.

Notice to Start Ramping

Units participating in Quick Reserve, both Positive and Negative, should have set their Notice to Start Ramping to 0 minutes to allow units to meet time to full delivery of 1 minute from the instruction being sent.

Time to Full Delivery

The time to full delivery is recommended to be 60 seconds or less. A full analysis outlining the reasoning for the value assigned to this parameter can be found here.

This recommendation rests on two separate analyses:

- an evaluation of historic frequency deviations: A time to full delivery of 60 s or less would assist in reducing the exposure to deviations of ±0.1 Hz from around 8% of the time to around 3.3% of the time (a reduction of 4.7%). This implies a drop from 700 to 290 hours per year (net reduction of around 410 hours).
- a characterisation of the capabilities of existing units: Most of the hydro pump storage (PS) units (89%) can achieve full output within 60 seconds from instruction. In terms of capacity (MW), around 90% of the PS installed capacity can deliver full output within 60 seconds from instruction (or around of 3,050MW). It is estimated that around 30% of the non-BM fast reserve capacity (close to 320 MW) can achieve the 1-minute time to full delivery.

Cease Time

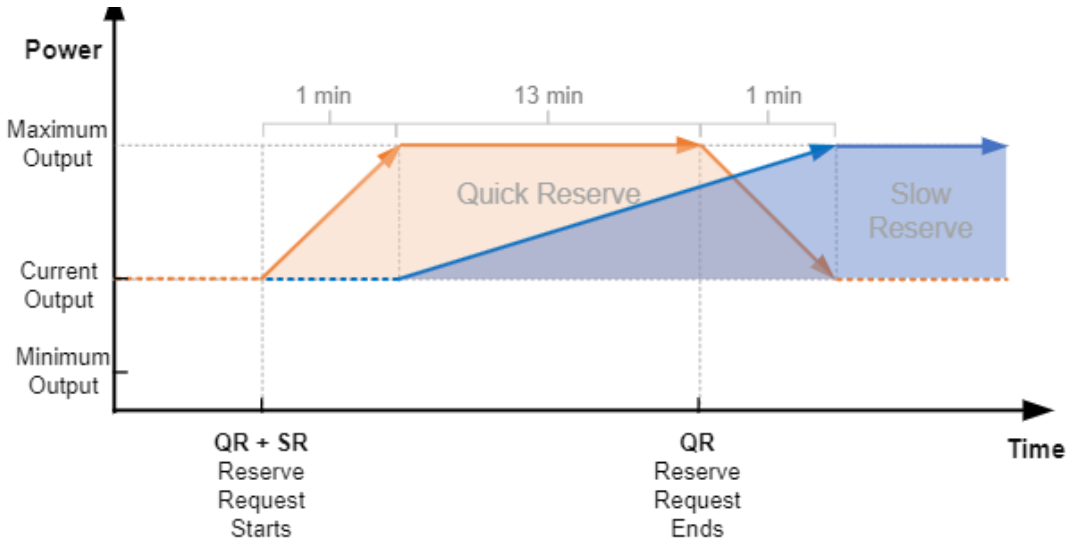
The cease time is defined as the reciprocal of time to full delivery; That is, the time a unit takes for a unit to ramp down from a Reserve request ending to its FPN. As can be seen in the infographic above, the non-zero delivery envelope is a symmetric trapezium, meaning the ramp up and ramp down times are the same. A unit can ramp up and ramp down however it sees fit, so long as it is bound within the defined activation envelope.

We are currently working with providers to assess if relaxing cease time requirements to 2 minutes, without increasing the minimum activation period, would increase participation without materially affecting flexibility.

Activation Periods

Minimum Activation Period is defined as the minimum duration for which an instruction can be issued, and it is specified by providers. Quick Reserve providers will be able to specify a Minimum Activation Period of between 1 and 5 minutes inclusive, which means that ESO can only issue an instruction for a minimum of between 1 and 5 minutes. 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. A typical usage of Quick Reserve is illustrated in the below figure.

Minimum Activation Period is inclusive of ramp to instruction, time at full delivery and ramp from instruction.



QR energy requirements state that a unit should be able to deliver the full contracted MW capacity for the contracted service window. A participating QR unit should therefore be capable of delivering the service for any length of time between its defined Minimum Activation Period and the full contracted 30-minute service window.

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Recovery Period

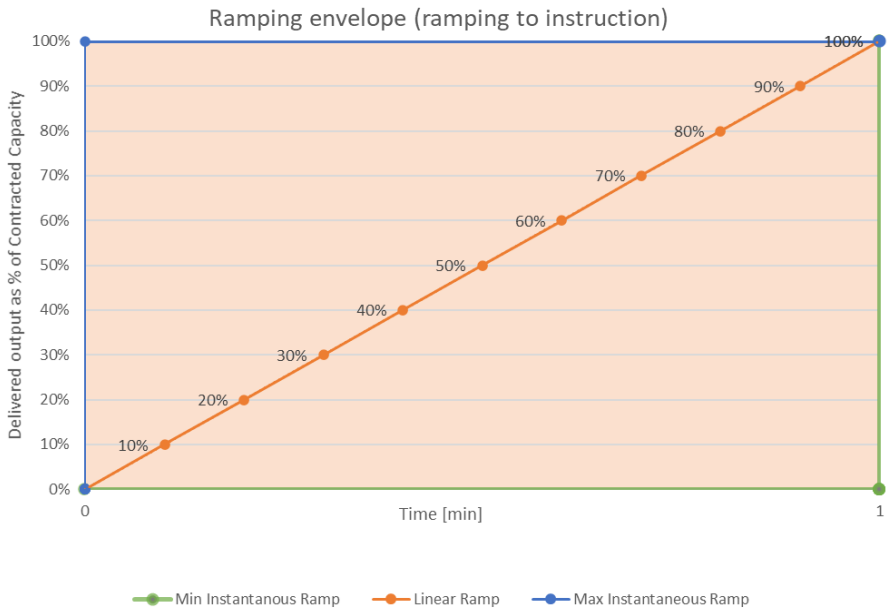
We propose a maximum Recovery Period for Positive and Negative Quick Reserve of up to 3 minutes. This means that an asset has 3 minutes to return to availability before the ESO can send another dispatch instruction.

Ramping Envelope

It is proposed that within the ramping to instruction and ramping from instruction ramp rates, participating units must deliver Quick Reserve subject to the following elements:

- No maximum ramp rate limit when ramping up or to instruction. The unit can ramp to and from instruction freely (continuously or instantaneously) with no maximum ramp rates.
- The minimum ramp up is directly set from the time to full delivery service design - the unit may not deliver at a rate less than 100% of contracted capacity per minute (minimum ramp rate). Similarly, the unit may not ramp from instruction with a rate smaller than 100% of contracted capacity per minute (minimum ramp rate).
- The unit may start delivery immediately after accepting a dispatch instruction.

Example of ramping envelope for ramping up or ramp to instruction is presented on figure below. Ramping from instruction is proposed to have identical envelope in an opposite direction.



For Phase 1, as instructions are sent on the full minute through current Balancing Mechanism (i.e., instructed at 12:05:07 but sent 12:06:00), the service will realistically have a Time to Full Delivery of up to 2 minutes from instruction. Instructions are sent in intervals of 1 minute; So, any instructions sent will have a linear 1-minute ramp up and ramp down profile. Providers are encouraged to deliver within 60s, with imbalance risk factored into their utilisation price.

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Ramp rates for baselines for energy limited assets.

Ramp rate limits for baselines are required to smooth the impact of state charge management. The rules aim to balance the need of the ESO (visibility and control) with the needs of the providers (flexibility optionality). Therefore, the rules should:

- Give ESO confidence that coordinated charging/discharging can be managed with tools at its disposal.
- Allow providers (as much as possible) maximum flexibility to manage state of charge.
- Be transparent and as simple as possible.
- Relate to the quantity of service provided. More services = greater ramp rates to allow adequate state of charge management.

For units with a requirement to manage their state of energy:

- Ramp rates for baselines will be aligned with Dx services (DC, DM & DR). Requirement details will be made available once analysis on this parameter is concluded.
- This ramp rate restriction will apply to the entire service window period plus the preceding and following settlement period.
- For the two settlement periods on the boundary of a change in the value of contracted capacity, the maximum ramp rate will be the lowest of the calculated values.
- For providers offering asymmetrical volumes of Quick Reserve, the opposite contracted quantity is used to calculate the ramp rate limit. For example, a provider with 50 MW high and 10 MW low response would use the 50 MW value to calculate the ramp rate for discharging baselines and the 10 MW value for recharging baselines.

The proposed rules below are consistent with new response service suite: Dynamic Containment, Dynamic Moderation and Dynamic Regulation.

For Phase 1, there will be no Ramp Rates for baselines limitation as there is currently no methodology available to monitor either the change of Physical Notification or unit output. We are working closely with the Response Reform team to create a process for monitoring baseline changes. For Phase 1, we accept the risk of rapid charging and discharging of batteries participating in this service. As mitigation, Quick Reserve is a pre-fault service, so we do not expect large volumes to be dispatched at the same time, and the volumes procured and instructed will be relatively small. We therefore expect the effect of any synchronised behaviour to be minimal.

Operational Metering

In line with frequency response services and the Balancing Mechanism, all providers (BM and NBM) will be required to submit operational metering at a frequency of once per second (1 Hz) with a latency of no greater than five (5) seconds.

All operational metering, including active power and system frequency data, should be provided at an accuracy according to the relevant Code of Practice (e.g., 1.0% for assets >10MW & ≤100MVA).

BM providers should submit operational metering via the existing processes. Non-BM providers should submit operational metering via new OBP system.

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Performance Metering

All providers (both BM and NBM) will be required to submit data to ESO for real time monitoring of service availability and post-event performance monitoring. This data is required by ESO to ensure operational security of the network and to validate the performance where units are dispatched to deliver an instruction for the Firm and Optional Quick Reserve services. As the Settlements team are currently building their Performance Monitoring capability, the method of how to submit data at the end of operational day will be agreed later when more information is available.

For Phase 1, BM providers will not be required to submit any additional data for Performance Monitoring purposes as Settlements will utilise 30-minute average settlement metering data.

Performance Monitoring

Service Availability

It is recommended to monitor the availability of units in order to confirm that they are holding sufficient headroom/footroom and can deliver their contracted MW if instructed to. This monitoring can be regularly performed at various timeframes, from daily to monthly.

Settlements will evaluate the conditions below for each contracted window, individually. Failure to deliver at 100% of 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.

For Positive Quick Reserve

Provider Type	Conditions	% of availability payment received for that service window	K factor
Generator, Through-zero	MEL – PN ≥ (Contracted Volume)	100	1
Supplier	SIL – PN ≥ (Contracted Volume)	100	1
Power Park Module (PPM)	PA – PN ≥ (Contracted Volume)	100	1
Generator, Through Zero	MEL – PN < (Contracted Volume)	0	0
Supplier	SIL – PN < (Contracted Volume)	0	0
Power Park Module (PPM)	PA – PN < (Contracted Volume)	0	0

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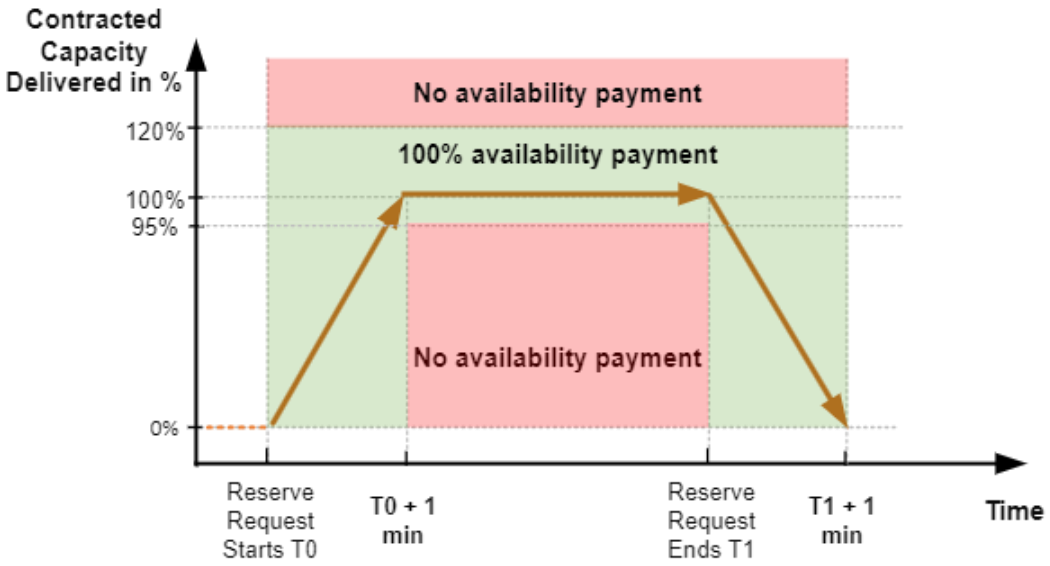
For Negative Reserve

Provider Type	Conditions	% of availability payment received for that service window	K factor
Generator, PPM	PN - SEL ≥ (Contracted Volume)	100	1
Supplier, Through-zero	PN – MIL ≥ (Contracted Volume)	100	1
Generator, PPM	PN - SEL< (Contracted Volume)	0	0
Supplier, Through-zero	PN – MIL < (Contracted Volume)	0	0

Service Delivery

ESO will conduct regular performance monitoring of service delivery. Consequences of non-delivery and unavailability will be set out in full in the Service Terms covering the Under-delivery and Over-delivery penalties. The illustration on figure below presents overall concept of penalties strategy for Quick Reserve service.



Under-delivery

Where a unit is contracted for the Firm Service, a minimum of 95% of the contracted MW must be delivered by the relevant unit throughout the instructed period. Failure to deliver will result in availability payments being withheld for the relevant Service Window.

Utilisation payments for the Firm and Optional Services will be made for energy delivered.

Over-delivery

Payments for availability and utilisation will be capped at 100% of the contracted MW (Firm Service) or declared MW (Optional Service).

Where a unit delivers more than 20% above its contracted MW, availability payments will be withheld for the relevant Service Window.

For the avoidance of doubt, where a unit delivers between 95% and 120% contracted MW, availability and utilisation payments will be made but will be capped at 100% contracted MW.

In addition to the performance EOD penalties, ESO will conduct regular performance monitoring of the reserve units service delivery over a greater period than the individual service day in order to establish overall delivery against the 95% performance measure. There will be no further financial penalties associated with this performance monitoring, but in order to ensure that we do not award Quick Reserve contracts to reserve units with continued poor performance, we will link the performance monitoring to the reserve units prequalification status. Where a provider continues to deliver below their offered MW, we will ultimately seek to suspend the pre-qualification status of the Registered Service Provider or the relevant Eligible Assets. Depending on the root cause, we would expect either a reproving test or possibly revised base parameters (e.g. reduced maximum MW) before we would reconfirm pre-qualification status and access to the daily auction process.

Additionally, providers who do not fulfil their contract from the Day Ahead auction and do not provide the contracted headroom or footroom may be responsible to cover costs of alternative actions taken to replace the missing volume within real-time and BM.

Furthermore, the providers will be penalised for over-delivery and under-delivery when utilised via the usual route of imbalance charges, so there is a natural incentive for units to follow expected delivery profiles. There is also a BSC modification, P412, which is looking to address the inconsistency in applying imbalance to non-BM units.

ABSVD methodology will apply to both BM and non-BM providers for delivered energy volumes.

For Phase 1, the performance monitoring rules will remain the same but instead of checking correctness of data per 1-sec, Settlements will be using 30-minute average settlement data. The risk of using 30-minute averages is mostly in utilisation to accurately monitor each individual BOA delivery. Availability will be monitored using submitted PNs and MELs. For time to full delivery, we propose to use only ramp rates as submitted to SORT as "being capable to deliver within 1 minute" rather than from the moment when they were instructed.

Baselining

All providers will be expected to provide a nomination baseline, equivalent to the Physical Notification in the BM. This is a forward-looking view of asset output and is locked in for the forthcoming two settlement periods at Gate Closure.

- Both BM and NBM units should provide future looking data of their operational position, which should be submitted 24 hours in advanced to delivery.
- For crossover purposes, the unit should submit operational baselines for one Settlement Period after last Contracted Window in the operational day.

This provides operational visibility to the control room and acts as a datum against which performance can be monitored by Settlements.

For Phase 1, providers should follow standard Balancing Mechanism operating procedures.

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Energy Requirements

The unit must be able to deliver the full contracted capacity for the duration of the specified Service Window.

Cross-overs

The unit must be able to continue delivering the dispatch instruction for the next settlement period following the end of the contracted service window. The maximum this could be is in line with the unit's defined Minimum Activation Period.

For Phase 1, this will not be a requirement. Instead, the use of normal BM operations will facilitate the management of cross-overs past contracted windows.

Aggregation

Aggregated units can participate in the Quick Reserve auction. The aggregation will be allowed up to GSP group which it is in line with our Grid Code requirement for aggregated BMUs.

2. Procurement Design

Registration and Prequalification

In line with the implementation of our recent dynamic response products, registration and pre-qualification for the new Quick Reserve services will be completed via ESO's Single Market Platform (SMP), following these steps:

Step 1 – participant requests registration as a Registered Service Provider (and associated user IDs)

Step 2 – ESO validates registration and issues user IDs (entity is now a Registered Service Provider)

Step 3 - participant accedes to relevant contract documentation to facilitate Quick Reserve participation

Step 4 – participant submits one or more assets for pre-qualification as an Eligible Unit

Step 5 – ESO undertakes any necessary validation

Step 6 – participant allocates Eligible Assets to Quick Reserve Unit(s)

Step 7 – Non-BM providers will be required to establish and complete the 'end to end' testing of the required web-based solution for communications with ESO via new OBP NBM dispatch platform.

For the avoidance of doubt, BM Units follow the existing BM processes (no service-specific requirements)

Step 8 – ESO confirms completion of prequalification process and participants are assigned a login to the dedicated auction platform and can participate in Quick Reserve daily auctions

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Eligibility- Maximum Bid Volume

The maximum bid volume has been limited to 300 MW. This is so that a single instruction is limited to a maximum of 300 MW, which allows instruction of the unit within operational limits. We don't think this excludes any providers at present and is potentially future proofing us against larger batteries being connected, where there might also be the additional benefit of diversifying the contracts awarded and avoiding any single points of failure.

Firm Service

Where there is a firm requirement in a Service Window, this will be defined by ESO and published on the ESO website. Where a service provider is contracted for a Service Window at day-ahead, this will be known as the Firm Service. Service Providers will be able to bid in their assets to the day-ahead auction for one or more Service Windows in an operational day and if successful, will be awarded a Firm Service contract for each discrete Service Window. This commits the asset to be available for the full duration of the contracted Service Window and Service Providers will be paid Availability Payments (pay-as-clear) over the duration of each contracted Service Window, and a Utilisation Payment (pay-as-bid) if dispatched.

Optional Service

Where ESO do not specify a firm requirement for a Service Window at day-ahead or the service provider has been unsuccessful in their bids at day-ahead, non-BM providers will be able to submit utilisation-only bids for the Optional Service within-day. If Service Providers are dispatched under the Optional Service, they will receive a Utilisation Payment (pay-as-bid) only.

BM providers should continue to offer reserve to ESO via the Balancing Mechanism and will be dispatched via Bid Offer Acceptances (BOAs). NBM providers can offer reserve to ESO via OBP platform.

For Phase 1: Optional Service only open to providers through the existing Balancing Mechanism systems.

Requirements

The daily requirement for Positive and Negative Quick Reserve are not yet defined. Once ready, ESO will publish separate Market Information Reports on our website which will set out the volume of each Quick Reserve product we will look to procure (Firm Service) each day.

Service Window

The length of the window refers to the period of time that providers must have their power available for instruction.

Longer windows generally lead to over-holding, as the ESO would need to procure the maximum requirement over the full window length. Moreover, longer windows present a challenge for Distributed Energy Resources (DERs), typically wind and PV plants, because of the inherent variability of the resource, and to energy-limited storage assets like batteries.

Shorter windows, on the other hand, lead to a higher number of transactions and associated costs, as well as the increasing number of window crossover occasions will make it more challenging for operational team to ensure no capacity is lost during these transitions.

To make a trade-off between these two aspects, procuring by settlement periods (30-minute windows) is recommended. These will be chosen to maximise participation, but also to reduce risks of service transition during periods of higher risk – e.g. Remembrance Day silence, exceptional sporting/national events etc.

However, it was recognised during workshops that Control Room should have flexibility in setting the length of service windows based on the demand shape and operational challenges. It is recommended to explore the idea of flexible service windows with auction providers as an ideal solution for Phase 2.

Daily Auctions

As per our obligations under the Clean Energy Package 6.9, we must aim to procure most or all balancing services no earlier than day-ahead. Daily day-ahead auctions will be running to procure our firm requirement for Positive and Negative Quick Reserve Services.

1. Requirements

The daily requirement for Positive and Negative Quick Reserve are not yet defined. To reflect this, ESO will publish separate Market Information Reports on our website which will set out the volume of each Quick Reserve product we will look to procure (Firm Service) each day.

2. Auction Platform

Quick Reserve auctions will be held on our new auction platform, the Enduring Auction Capability (EAC) project.

3. Auction Timing

The timing of the auction refers to how long the procurement of the product is made ahead of its delivery. The auction should take place as close to real time as possible to mitigate uncertainty but leave enough time buffer to allow ESO to activate its Business Contingency Plan (BCP) if the auction process fails.

For the enduring solution, it is recommended to explore the possibility to run QR auction in the morning, together with the auctions for the new Balancing Reserve product. This will facilitate the co-optimisation cross all Reserve products in the future. Our requirements for QR and BR can potentially be substituted.

For Phase 1: QR and DX services (i.e., DC, DM and DR) will be procured in a single co-optimised auction held at 2pm each day as per BP commitments and current EAC design.

4. Bid Submission

A Registered Service Provider can only participate in the daily auctions once they have completed pre-qualification. ESO will grant access to the Auction Platform and provide log-in details for the Registered Provider or their nominated Agent.

The Registered Service Provider will then be able to offer ESO its Unit(s) for the Positive/ Negative Quick Reserve Firm Service on Auction Platform by submitting sell orders. For each product, sell order will include the required bid parameters, such as the availability price (£/MW/h), the volume (MW), confirmation if the bid is curtailable (the minimum capacity they are willing to accept) and any other additional parameter(s) as may be specified in the relevant Auction Rules.

Bid validation, such as checking maximum (MW) not exceeding the pre-qualified asset MW, will be done at bid submission stage.

Each Unit can bid for one or more of the Service Windows within an Operational Day.

ESO submits buy order which specifies a maximum volume (MW) ESO willing to procure at different price levels (£/MWh) for each product and Service Window.

Similar to STOR or DC/DM/DR auctions, the auction platform will provide a Rolling Window function which means the auction gate will be open in advance such that orders can be submitted 14 days before each auction (timing to be confirmed).

Orders can be submitted, reviewed, modified, or deleted before action gate closing.

5. Assessment Principles

To secure the system economically, the clearing algorithm will aim to first maximise the Total Welfare, then minimise the overall procurement cost (when there is a choice of clearing prices), as set out in the EAC methodology.

A buy curve (generated for each auction or service window) will be applied to reflect that the volume ESO is willing to procure varies with price. The cost of taking alternative actions, such as Spin Gen service from DINO/ FFES/ CRUA, BOA dispatch batteries in BM, etc. will be taken into consideration when generating the buy curve.

All bids will be ranked in price ascending order against the buy curve to identify the marginal bid.

6. Auction Results

Auction results can be accessed after each auction via the enduring auction platform and ESO Data Portal. Exact timings will be confirmed and communicated in line with our auction platform development.

Linking of Bids

Bids that are linked can only be accepted or rejected all together. There are two types of linking: link by time (i.e., service windows) and link by products.

Linking by service windows means participants can link their bids across more than one service window. Due to commercial reasons, for example SOC management, some participants may want to do this (i.e., submitting multiple-period orders) to avoid that their units are accepted for some non-adjacent windows. Or some providers who have high start-up costs may want to span this cost over longer delivery periods to make themselves more attractive in the market.

Linking by products means participants can link their bids across products (i.e., Positive and Negative Quick Reserve). Without this function, providers who prefer getting awarded in dual directions will offer each service at a higher price to make sure they would be happy if only one product is cleared. Currently C88 Loop Orders are used in our new Response products (DC/DM/DR) auctions. Based on participants feedback we got from DC market, providers appreciate the flexibility they have been given by this design. Additionally, this will not breach CEP 6.9 requirements, as ESO are running two separate markets: providers can submit different volume and price in each market; these two markets cleared separately with different volume and price; and two contracts are produced. Thus, no derogation will be needed.

Linking functions will be supported by Enduring Auction Capability. There is no strong reason for us to put additional restrictions (and therefore additional costs) on bid submission/ validation to stop participants submitting linked bids. Full flexibility will be given to all participants. We are expecting this will facilitate market participation and increase market efficiency.

Thus, linking bids (by service window or product) will be permitted for Quick Reserve.

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Bid Curtailment Rules

The Quick Reserve requirement could be changing considerably throughout the day. Given the design choice to allow participants to link their bids together across time it was important that there was still flexibility within the bidding structure to fit the supplied volume of QR to the ESO requirement which changes across the day and between half hours. ESO would allow QR providers to user-define the curtailibility of the bid (i.e., the minimum capacity they are willing to accept).

Stacking / Splitting

“Stacking” is defined as the ability of using the same MW to provide different products simultaneously (i.e., in the same service window), while “splitting” should be allowed in the enduring solution.

For Quick Reserve, one unit is allowed to bid the same capacity into both Positive and Negative Quick Reserve auctions. The same MW, however, cannot be sold twice.

Quick Reserve providers should be able to stack the service with active Capacity Market (CM) contracts and participate actively in the Balancing Mechanism (BM), accepting BOAs from the ESO control room. Were a CM Notice (CMN) is issued, these providers should continue to make headroom available to us as per any active Quick Reserve commitments. To ensure that providers are protected from penalties for breach of their CM agreement, should a System Stress Event occur following the CMN, the existing ESO owned process to add Quick Reserve to the list of Relevant Balancing Services should be followed. This process to add a service to this list typically takes around 2-3 months.

It is not the intention to prevent providers from stacking Reserve with non-active power services, such as SpinPump or SpinGen, as this would significantly reduce the availability of other assets. However, if a unit is required to be in SpinGen etc. to be able to deliver the service, they should not be paid for that service.

For Phase 1: Providers cannot split their capacity between the Quick Reserve market, Response markets or any other Reserve markets during the same service window. We will need to address the challenges it brings to performance monitoring and settlements. Further work also needs to be done to define which services a unit can be split across; For example, splitting Quick and Slow across the same unit will not be allowed as there is no way to differentiate the instruction in the BM and NBM OBP system. However, Providers are still able to stack between Capacity Market, Balancing Mechanism, Stability and Voltage Services.

Locationality

Throughout the development of this product design, the merits and costs of introducing some locational valuation to the assessment process for the product were considered. This would be in respect to the location of individual BMUs and not in respect to aggregated units.

Locational assessment would allow the ESO to avoid contracting for reserve on units located behind an anticipated network constraint by creating a reason to reject competitively priced units from the

price stack within Quick Reserve tenders due to their location. This is not an approach that has been taken in any balancing services market to date[1].

The recommendation in this product and service design is that the assessment methodology for the Quick Reserve (QR) market should assess price and include location-based assessment/screening.

For Phase 1: Due to the complexity of locational procurement, it will not be achievable within the accelerated delivery timeline. Phase 1 will only consider national procurement, meaning requirement setting and assessment will only be run at the national level.

Active Network Management Schemes

Eligible Assets will not normally be registered by ESO for participation in Quick Reserve if they have a condition in their DNO connection agreement whereby they are signed up to an Active Network management (ANM) Scheme / Flexibility Connection.

However, ESO will consider this on a case-by-case basis and may (at its sole discretion) enable such participation if there is reasonable evidence to demonstrate that the asset has very high forecasted availability (e.g., as shown by Curtailment Assessment Reports from DNOs). ESO shall continue to keep under review and any changes to this position will be consulted on accordingly.

Availability Declarations

Once a contract has been awarded for the Firm Service, or the Service Provider wishes to declare themselves available for the Optional Service, they will be required to submit an availability declaration for the relevant unit.

For Non-BM providers these (re)declarations will be submitted into the appropriate OBP route and must be submitted no later than ninety (90) minutes prior to each Quick Reserve Service Window.

Availability declarations must be submitted in accordance with the Service Terms and include;

- confirmation of MW available,
- a utilisation price (£/MWh)

For BM Service Providers, declarations must be made by way of Grid Code BM Unit Data submissions via EDL/EDT (or wider access equivalent), by no later than Gate Closure.

Declarations can be submitted ahead of time (either before, during or after auction/contract award) provided that the MW value in a Service Provider's contract (Firm Service) and availability declaration match. Where no (re)declaration has been submitted by the deadline, or the declared available MW value does not match the contracted MW, the unit will be assumed to be unavailable.

Unavailability for commercial or non-technical reasons is not permitted for the Firm Service.

Settlement and Pricing

There are two forms of payment that ESO will make for the Quick Reserve services.

[1] There are some restrictions on entering the daily STOR market for NBM units connected in Active Network Management (ANM) zones. These units are never allowed to prequalify to enter the STOR market rather than submitting bids and then being rejected due to their location.

ESO

1. Availability Payments

Where a Service Provider (BM and non-BM) secures a Firm Service contract, ESO will make an Availability Payment subject to the relevant market clearing price (£/MW/h) for the Service Window covered by the Firm Service contract. Availability payments are subject to performance monitoring.

2. Utilisation Payments

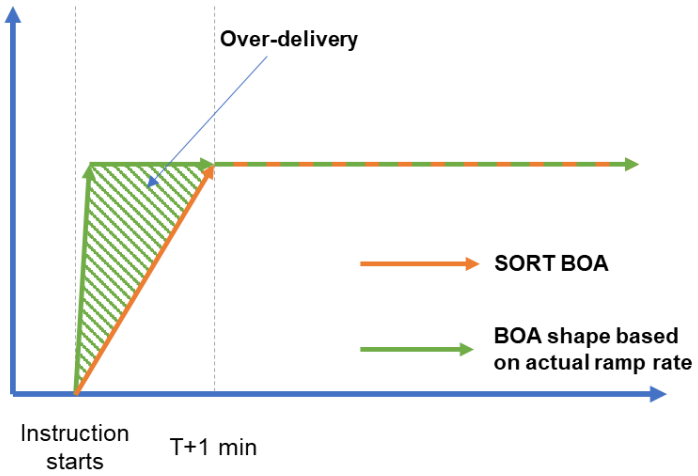
For each Quick Reserve instruction, non-BM providers will receive a payment for the energy delivered on a £/MWh basis if instructed to deliver the Firm service in a Service Window. Additionally, where ESO instructs an Optional Service from a Non-BM Unit which is declared available for the Service Window, then it will pay for the energy delivered on a £/MWh basis. All Utilisation Payments will be calculated using the Utilisation Price on a pay-as-bid basis submitted by the Service Provider for the relevant Service Window. Utilisation payments will include the energy delivered in ramping towards and ramping from the instructed MW level.

For BM providers, energy delivered will be paid for through the Balancing Mechanism. For NBM providers, energy delivered will be paid for through the OBP.

Availability payments and utilisation payments will be settled by ESO monthly, subject to deductions for service delivery failures following performance monitoring.

ABSVD

ESO shall apply delivered volumes within Applicable Balancing Services Volume Data (ABSVD) for both BM and non-BM units.



SORT dispatch rounds ramping periods to the nearest full minute. The ABSVD process could be applied for a vertical instruction when control room instructs these units with an instantaneous ramp rate (for example 999MW/min). Otherwise, batteries would be at risk of over-delivery through the performance monitoring and Elexon imbalance calculation processes. Providers are encouraged to use instantaneous ramping if possible, and any delivery outside of the BOA shape in SORT will be corrected using ABSVD and disregarded in Performance Monitoring. However, this requires the enhanced performance monitoring of Phase 2 as an enabler.

ESO

Appendix 1 Dynamic Parameters as per Balancing Code BC1

The Dynamic Parameters comprise:

- Up to three Run-Up Rate(s) and up to three Run-Down Rate(s), expressed in MW/minute and associated Run-Up Elbow(s) and Run-Down Elbow(s), expressed in MW for output and the same for input. It should be noted that Run-Up Rate(s) are applicable to a MW figure becoming more positive;
- Notice to Deviate from Zero (NDZ) output or input, being the notification time required for a BM Unit to start importing or exporting energy, from a zero Physical Notification level as a result of a Bid-Offer Acceptance, expressed in minutes;
- Notice to Deliver Offers (NTO) and Notice to Deliver Bids (NTB), expressed in minutes, indicating the notification time required for a BM Unit to start delivering Offers and Bids respectively from the time that the Bid-Offer Acceptance is issued. In the case of a BM Unit comprising a Genset, NTO and NTB will be set to a maximum period of two minutes;
- Minimum Zero Time (MZT), being either the minimum time that a BM Unit which has been exporting must operate at zero or be importing, before returning to exporting or the minimum time that a BM Unit which has been importing must operate at zero or be exporting before returning to importing, as a result of a Bid-Offer Acceptance, expressed in minutes;
- Minimum Non-Zero Time (MNZT), expressed in minutes, being the minimum time that a BM Unit can operate at a non-zero level as a result of a Bid-Offer Acceptance;
- Stable Export Limit (SEL) expressed in MW at the Grid Entry Point or Grid Supply Point, as appropriate, being the minimum value at which the BM Unit can, under stable conditions, export to the National Electricity Transmission System;
- Stable Import Limit (SIL) expressed in MW at the Grid Entry Point or Grid Supply Point, as appropriate, being the minimum value at which the BM Unit can, under stable conditions, import from the National Electricity Transmission System;
- Maximum Export Limit (MEL) expressed in a series of MW figures and associated times, making up a profile of the maximum level at which the BM Unit may be exporting (in MW) to the National Electricity Transmission System at the Grid Entry Point or Grid Supply Point or GSP Group, as appropriate.
- Maximum Import Limit (MIL) expressed in a series of MW figures and associated times, making up a profile of the maximum level at which the BM Unit may be importing (in MW) from the National Electricity Transmission System at the Grid Entry Point or Grid Supply Point or GSP Group, as appropriate.