

Slow Reserve Service and Procurement Design Proposal

Version 2.0 – May 2025

Through our Reserve Reform work, NESO is updating the Reserve products we procure to comply with the Clean Energy Package and to better meet system and statutory requirements. Slow Reserve (SR) is primarily aimed at reacting to post-fault disturbances to restore energy imbalances to $\pm 0.2\text{Hz}$ within 15 minutes of a loss event (generation or demand) and as such, will replace the legacy Short Term Operating Reserve (STOR) service.

Slow Reserve, consisting of Negative Slow Reserve (NSR) and Positive Slow Reserve (PSR), is the last in a suite of new Reserve products which NESO are developing to maintain the safe and secure operation of the network.

Following engagement with industry stakeholders in early 2025, we have now completed our proposed service and procurement design for the Slow Reserve service incorporating both BM (Balancing Mechanism) and non-BM (non-Balancing Mechanism) market participants. This document has been produced in support of the formal [EBR Article18 Consultation](#) for the introduction of the Slow Reserve service to provide industry with a detailed explanation on all aspects of the Technical and Procurement Design of the service and should be read in conjunction with the published Article 18 Consultation.

We shared version 1.0 of this document with industry as part of this initial engagement and as a consequence of feedback received and some further clarifications identified, we have made some changes that we would like to signpost to industry. These changes are all highlighted yellow within this document but we would like to draw your attention to the follow key changes;

- Maximum Recovery Time – refer to Recovery Period on page 13
- Maximum Ramp Rate – refer to Ramping Envelope on page 14

To align this document with the key terms used in the SR Service Terms we have made some changes to the references in this document.

Term	Definition
SR Contract(s)	Contract(s) for the delivery of Slow Reserve from an Auction Unit either formed through the daily auction (Firm Service) or upon utilisation by NESO of the Optional Service.
Contracted Service Period	An SR Window which is the subject of an SR Contract as procured through the daily auction (Firm Service).
SR Window(s)	Each consecutive thirty (30) minute period commencing at 23.00 hours. This is equivalent to each Settlement Period in an EFA day.
Service Window Block	SR Auction bids for a continuous period of not less than two (2) hours in duration comprising consecutive SR Windows with identical MW.

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1. Introduction

Reserve is needed for frequency management when there is an imbalance between supply and demand. 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 responds automatically based on system frequency. Reserve is then instructed to replace energy delivered by frequency response in accordance with system requirements.

Slow Reserve (SR) is primarily aimed at reacting to post-fault disturbances to restore energy imbalances to $\pm 0.2\text{Hz}$ of 50Hz within 15 minutes of a loss event (generation or demand). SR will allow NESO to better meet its system and statutory requirements following updates to the System Operator Guidelines (SOG) standard. For Negative Slow Reserve (NSR), units are instructed to increase demand or decrease generation in full within 15 minutes. The inverse is true for Positive Slow Reserve (PSR). SR is open to any technology with the ability to provide net change in demand/generation of at least 1MW.

Requirement	STOR	Slow Reserve
Direction	Positive only	Positive & Negative
SR Window (previously STOR Service Windows)	Seasonal variations, 2 windows a day, ~4 hours each. Must deliver for min 2 hours once instructed	Any 4 or more contiguous SR Windows. Unit must be able to deliver for all SR Windows
Operational day	05:00 – 05:00	23:00 – 23:00
Recovery Period	≤ 1200 minutes	≤ 60 minutes
Time to full delivery	≤ 20 minutes	≤ 15 minutes
Minimum Capacity	3MW	1MW
Baselining	From-zero	Non-zero baselines allowed
Payments	Availability + Utilisation	Availability + Utilisation
Metering	Every 60s (0.01667 Hz)	Every 15s (0.0667 Hz)
Aggregation	Allowed, nationally	Allowed, per GSP group
Procurement	Daily, D-1 with a further 400MW of legacy 'long-term' contracts	Daily, D-1

As already mentioned in the opening statement, Slow Reserve will ultimately replace the legacy Short Term Operating Reserve (STOR) service. Above is a table which highlights the key differences between these two services.

More information on our [Frequency Response](#) and [Reserve](#) services can be found on the NESO website.

2. Slow Reserve Transition Plan

The new Slow Reserve service will replace the legacy STOR service.

- As we progress with the implementation of Slow Reserve, we have set out the key principles for how we intend to transition away from the existing STOR service and into Slow Reserve.
- NESO believe all active STOR providers will be able to provide Slow Reserve, and we would expect all providers to transition over to the new service.
- Following feedback from industry, we have made the decision to adopt a 'Hard Stop' approach. This means STOR procurement will cease entirely at the point in which the full procurement of positive and negative Slow Reserve commences in October 2025.
- Current timeline (subject to change) as follows;
 - **13th October 2025** – final auction date to procure day-ahead STOR.
 - **14th October 2025** – final operational day for STOR including receipt of optional declarations.
 - **14th October 2025** – first auction day to procure firm day-ahead positive and negative Slow Reserve (co-optimised with other reserve services).
 - **15th October 2025** – first operational day for Slow Reserve.

We will shortly publish more information on the STOR to Slow Reserve transitioning plan.

3. Technical Design Summary

Technical Design Element	Proposal
Direction	Positive and Negative
Provider Eligibility	NBM & BM units with control/system telephony during contracted periods
Time to full delivery	Up to 15 minutes from instruction receipt
Minimum Activation Period	Not greater than 30 minutes
Maximum Recovery Period	Not greater than 60 minutes
Energy Requirement	The unit must be able to deliver the full contracted capacity
Operational Metering	0.0667 Hz / once per 15s for both BM and NBM units
Dispatch mechanism	BOA for BM units OBP dispatch instruction for non-BM units
Notice to Start Ramping	Up to 14 minutes
Time to accept instruction	Up to 2 minutes
Ramp rates	Max ramp rate of 100% contracted capacity per minute. For max instantaneous ramp rates, unit cannot deliver >50% contracted capacity in any 30s ramping period – see Ramp Rate section for more details
Performance Metering	0.0667 Hz / once per 15s for both BM and NBM units
Performance Monitoring	Time to Full Delivery, Availability, Ramp Rates and Utilisation – Penalties for over (>120%) and under (<95%) delivery
Baselining	All providers must submit a nomination baseline, equivalent to the BM Physical Notification, with Final Physical Notifications by gate closure. Both zero and non-zero baselines allowed
Aggregation	Yes, per GSP group
Operational data requirements	BM units as per current BM operations. Non-BM units to submit relevant operational data
Ramp rates for baselines	Aligned with Dynamic Response – no limit proposed
Passing through zero	Allowed

4. Procurement Design Summary

Procurement Design Element	Proposal
Firm Requirement	Minimum 2-hours (4 contiguous SR Windows)
Maximum Bid Size	N/A
Frequency of Procurement	Daily (day-head) – SR Contract firm procurement. Within day – optional procurement (non-BM only).
Locationality	National
Auction Platform	EAC
Auction Timing	Auction close by D-1, 14:00 (co-optimised)
Stacking & Splitting	Same MW cannot be sold twice. Please refer to Revenue Stacking section for more details
Bid Sizing	≥1MW, integer bids
Linking of bids	Allowed by service and Product (Positive/Negative only)
Bid Curtailment Rules	User defined
Payment Structure	Firm: Availability + Utilisation Optional (non-BM only): Utilisation only
Payment Mechanism	Availability: Pay-as-Clear Utilisation: Pay-as-Bid

5. Technical Design

The key technical design features for Slow Reserve are:

- The service is open to BM (Balancing Mechanism) and non-BM (non-Balancing Mechanism) market participants.
- SR units must have a minimum 1MW capacity of generation reduction/increase or demand reduction/increase from any technology. The unit can be a single asset or an aggregated unit (at GSP group level) comprising more than one constituent asset. BSC aggregation rules apply for BM units.
- All Slow Reserve units must be able to;
 - Submit relevant service parameters, location, and prices (similar to the Balancing Code requirements).
 - Achieve full delivery of contracted capacity within submitted data, if instructed.
 - Achieve full delivery of contracted volume in 15 minutes from instruction receipt or less, including notice time. Ramp rate limits apply.
 - Units with a >10-minute notice period must restrict ramp-up and ramp-down delivery rates to 100% contracted capacity per minute. For instantaneous ramping (for units that cannot ramp linearly), the ramp cannot exceed >50% contracted capacity in any 30-second period. There are no restrictions on ramp-up and ramp-down rates for units with a ≤10-minute notice period.
 - Have the Minimum Activation Period not greater than 30 minutes and Maximum Recovery Period not greater than 60 minutes.
 - Submit Physical Notifications and Operational Metering appropriately.
- Units can be aggregated at GSP Group level to meet the 1.0MW minimum participation threshold, with location submitted during pre-qualification.
- There is no restriction on the maximum size a participating unit can bid up to. Contracts will be awarded upon acceptance of bids (SR Contracts) in whole MWs (minimum 1MW) submitted into the daily auction.
- Providers with a SR Contract will receive an availability payment (£/MW/hour) for the Firm Service and a utilisation payment (£/MWh) if dispatched, subject to Availability and Utilisation checks.
- Providers must deliver metering data with a minimum granularity of no less than once every 15s at a latency of no more than 5s. This is inclusive of BM and NBM providers. Providers may submit at a higher granularity (i.e., 1Hz) should they wish.

- BM units need to provide NESO with dynamic parameters as defined in BC 1.A.1.5. Dynamic Parameters and Physical Notifications are to be submitted 24 hours in advance, with Final Physical Notifications by gate closure and relevant price bands.
- Non-BM units must submit all relevant non-BM service parameters during all contracted windows along with Physical Notifications submitted at day-ahead, with final notifications 60-minutes ahead of gate closure and relevant pricing. For crossover purposes, non-BM units must also submit Availability, Final Physical Notifications, and relevant pricing post-contracted/optional windows for control room visibility and performance monitoring purposes.
- Stacking with other active power ancillary services will be limited for initial launch, however, co-delivery with the Capacity market and Balancing Mechanism are allowed. Units may also only split their Slow Reserve capacity with opposite Slow Reserve (e.g., Positive with Negative), Voltage and Stability services along with the Balancing Mechanism. Please see Revenue Stacking section below for NESO's revised stacking definitions and further information.
- NBM providers will have their energy position corrected through the ABSVD process.
- SR units will be performance monitored using performance metering data, at 0.0667 Hz/once per 15s, submitted after the contracted day to be evaluated on availability, ramp rates, time to full delivery and utilisation. If stacking with any other ancillary services or markets, then the more granular metering is applicable and should be submitted to NESO.
- SR providers have up to 2 minutes to signal to NESO that they have received and accept the SR instruction. Time to Full Delivery is inclusive of these 2 minutes.

Provider Eligibility

To participate in the Slow Reserve market, providers must:

- be a BM unit; or NBM unit.
- have control telephony for the entire duration of a Contracted service period, which could be Control Telephony or System Telephony as per Grid Code definitions. For non-BM this will require an operational telephone so that NESO can contact the non-BM unit to allow for dispatch during planned or unplanned outages of the OBP system interface. The requirement to have telephone control comes from the need to dispatch units by phone during planned or unplanned outages of the EDT/EDL system (or wider access equivalent) or OBP system.
- be capable of providing 1MW or more of reserve volume in line with the service design. Bids must be made in integer MWs.

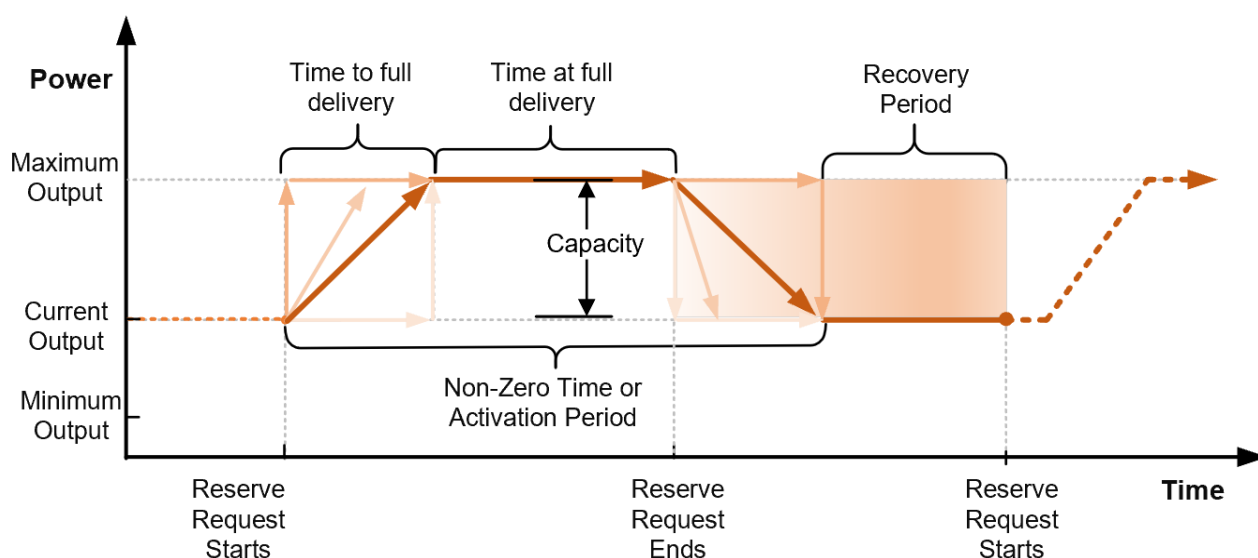
- Complete the Slow Reserve pre-qualification registration process through our Single Market Platform (SMP).
- Non-BM providers will be required to complete onboarding to the Open Balancing Platform (OBP) as part of pre-qualification.

Both BM and non-BM participants with a connection to either the electricity transmission or distribution network will be eligible to provide Slow Reserve.

Service Utilisation & Dispatch Mechanism

Utilisation for BM units is 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 OBP system instructions. Instructions may be sent in advance, with effective date-times for action. A provider's control point will need to receive these instructions and only action at the specified effective date-time points.



Time to Full Delivery

The time to full delivery is recommended to be 15 minutes or less, inclusive of any notice to start ramping, i.e., NDZ and/or NTO/NTB or equivalent, and time to accept instruction. That is to say, the unit must be capable of reaching its full contracted output within 15 minutes of instruction receipt.

Notice to Start Ramping

Units participating in Slow Reserve, both positive and negative, should have a Notice to Start Ramping of no longer than 14 minutes from instruction receipt. This includes, where applicable, a unit's NTO, NTB, NDZ, and Time to Accept Instruction, or equivalent for NBM.

Time to Accept Instruction

NESO requires that all units must send an acceptance of a Slow Reserve instruction within 2 minutes of receipt. This is to indicate to NESO that the unit plans to ramp to the instructed volume within the required 15 minutes. A unit's Time to Full Delivery is inclusive of this time to accept requirement.

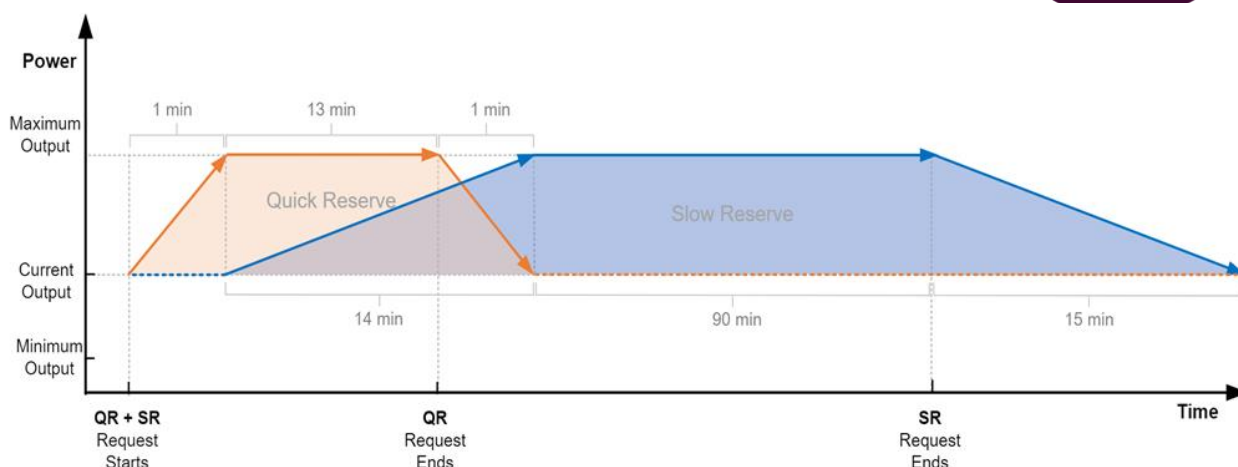
Cease Time

The cease time is defined as the converse of Time to Full Delivery. That is, the time a unit takes for a unit to ramp down from a Slow Reserve request ending to its FPN. As can be seen in the infographics above and below, the non-zero delivery envelope is a symmetric trapezium, meaning the ramp up and ramp down times are the same. A unit therefore has up to 15-minutes from a Cease Instruction start time to return to its PN and includes all notice periods, as outlined in the Time to Full Delivery requirement above.

Minimum Activation Period

Minimum Activation Period (MAP) is defined as the minimum duration for which an instruction can be issued, and it is specified by providers. Slow Reserve providers will be able to specify a MAP of between 1 and 30 minutes inclusive, which means that NESO can only issue an instruction for a minimum of between 1 and 30 minutes for that unit. This will facilitate enough flexibility in dispatching and ceasing units to respond to operability challenges while giving providers certainty about the minimum time that they can be dispatched. A typical usage of Slow Reserve is illustrated below.

As also outlined in the infographic above, a unit's MAP is inclusive of any ramping.



Energy Requirements

Participating Slow Reserve units must be able to deliver the full contracted MW capacity for the entire Contracted Service Period. A participating SR unit must therefore be capable of delivering the service for any length of time between its defined MAP and the full offered Contracted Service Period. Providers can offer capacity into the SR service via the day-ahead auction for as long as they wish, provided it is for a minimum of 4 (four) contiguous SR Windows (Service Window Block, and such that delivery can be sustained for the entire offered duration. Providers may also offer optional SR capacity within-day for any relevant SR Window with no minimum duration requirement.

Recovery Period

We propose a maximum Recovery Period for positive and negative Slow Reserve of up to 60-minutes. This means that an asset has 60-minutes to return to availability before NESO can send another dispatch instruction. This decision has been made based on the following:

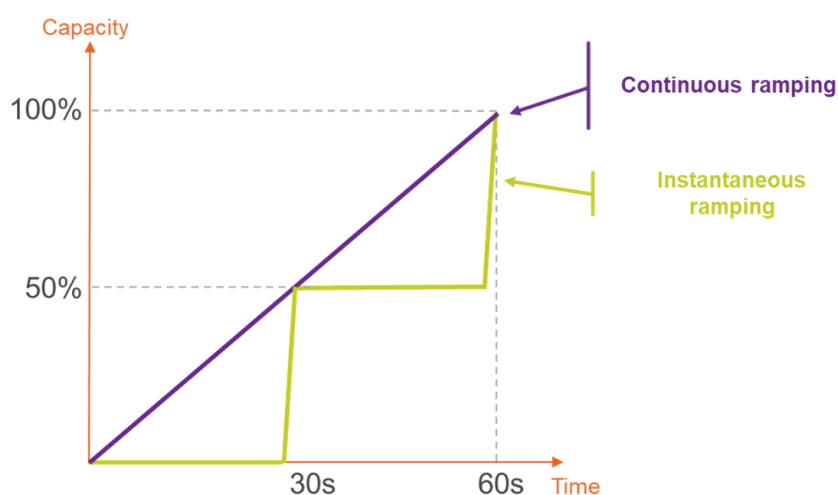
- NESO market analysis suggests no active participants are excluded with a 60-minute Recovery Period requirement.
- Industry feedback from our informal consultation suggested this requirement was revised from 30-minutes to 60-minutes, with no other challenges received.
- A maximum Recovery Period allows NESO control-room to effectively secure the system within gate closure timeframes.
- A 60-minute Recovery Period acts as an anti-gaming measure, ensuring providers cannot exploit Availability Payments via extended Recovery Periods.

Ramping Envelope

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

- For those units with a Notice to Start Ramping period of >10 minutes, the maximum ramp rate limit is set at $\leq 100\%$ contracted capacity per minute. For instantaneous ramping (for units that cannot ramp up linearly), the unit cannot deliver more than 50% of the contracted capacity in any 30-second period.
- For those units with a Notice to Start Ramping period of ≤ 10 minutes, there is no maximum ramp rate limit.
- The minimum ramp rate is directly set from the time to full delivery – a unit may not deliver at a rate of less than 100% per 15 minutes. This applies to both ramp-up and ramp-down periods.
- The unit may start delivery immediately after accepting a dispatch instruction.

An example of a maximum acceptable ramping envelope for units with a Notice to Start ramping period of > 10 minutes – ramping to or from instruction – is presented in the figure below. The maximum ramping from the instruction is proposed to have the identical envelope in the opposite direction.



Ramp rates for baselines for energy limited assets

Slow Reserve ramp rates for baselines have been aligned with the Dynamic Response services which state a Maximum Ramp Rate of 5% of the contracted MW/minute. This alignment ensures a consistent and manageable approach to ramp rates across services, promoting system stability and operational efficiency. Ramp rates for baselines

are therefore not required for Slow Reserve until such time as these requirements are updated for the Dynamic Response services, should they be required in the future.

Following extensive review of ramp rates within response services, including modelling, review of historical provider behaviour, and stakeholder engagement, to consider the system security impact of changing or removing the ramp rate restriction. It was concluded that the benefits of removing the Maximum Ramp Rate likely outweighed the cost associated with additional actions to protect against herded energy recovery

We understand this requirement represented a pain point for frequency response participants, imposing an opportunity cost through constraining chances for wholesale market participation and more efficient state of energy management. We recognised this cost may have driven higher prices, ultimately causing costs to be passed on to energy consumers.

The Maximum Ramp Rate was therefore proposed to protect against effects of herded energy recovery and Service Terms previously required units to recover their state of energy if they do not have enough energy (or capacity to import energy). Following a large high/low frequency event where units charge/export (respectively) to deliver response, many or all units may be required to recover energy at the same time. The Maximum Ramp Rate was to protect against the cumulative effect of such behaviour.

The Maximum Ramp Rate limited the rate of change of power for energy limited assets as shown by Performance Baselines.

Operational Dataset Requirements

BM units are required to submit operational data in accordance with current BM obligations.

Non-BM units must submit relevant service parameters either at pre-qualification or via availability declarations.

Proposed non-BM data requirements to include:

- Available MW and Utilisation Price
- PN values

For the avoidance of doubt, additional parameters captured at pre-qualification will also be used as part of the operational dataset.

Operational Metering

The operational metering requirement for Slow Reserve is set at a minimum once per 15s (0.0667 Hz), with a latency no greater than 5 seconds. This not only aligns with the “slow” nature of the service but is also crucial for accurately monitoring the most onerous requirement- the maximum allowable ramp rate, which must not exceed 50% of the total contracted volume over any 30s period¹. To accurately monitor this requirement, NESO will require 2x samples per 30s period, which equates to once every 15s.

This requirement also aligns with the Time to Full Delivery (TTFD) standards for NESO’s newly introduced Quick and Slow Reserve services. The Quick Reserve service requires metering every 1-second at minimum, reflecting a 1-minute TTFD. The Slow Reserve service proposes metering every 15 seconds at minimum, reflecting a 15-minute TTFD.

A 5s latency is required for situational awareness. NESO must be able to correlate the output of a unit (in relation to an instruction) to any change in frequency. As the Slow Reserve service is open to many technology types – some very fast-acting and/or very large – then it is essential that the aggregated operational metering feed to NESO is accurate and best reflects a unit’s immediate output.

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 the new OBP system.

We recognise that some non-BM technologies, such as demand-side flexibility, aggregators of smaller assets, etc, may wish to discuss how this data should be presented to NESO. Please reach out to us via the below address and we will be happy to arrange a 1-2-1: futureofbalancingservices@nationalgrideso.com

Physical Notifications (Operational Baselines)

Physical Notifications are defined in the Grid Code as a forecast or an indication of the generation or demand levels a unit expects to operate at during specific periods. Physical notifications are required by NESO for real-time operational awareness, margin assessments and during the settlements process.

¹ This maximum ramp rate requirement only applies to units with a notice period of >10 minutes

All providers will be expected to provide Physical Notifications. This is a forward-looking view of asset output and is locked in for the forthcoming two settlement periods at Gate Closure. This provides operational visibility to the control room and acts as a datum against which performance can be monitored by Settlements.

- BM units are already required to submit Physical Notifications per requirements in the Grid Code. No additional requirement for the Slow Reserve service.
- Where An SR Contract is awarded, NBM units should provide Physical Notifications for the entire service delivery day (23:00 to 23:00) within which the SR Contract/s is held and should be submitted as soon as reasonably practical but, in any case, no later than 2 hours following the publication of the SR auction results.
- For crossover purposes, all units must also submit a Physical Notification for one SR Window after their SR Contract/Optional SR Window within the operational day.

For all contracted periods, non-BM units will be expected to provide a Final Physical Notification 60 minutes ahead of each of their SR Contract/Optional SR Windows. Both zero and non-zero baselines are allowed for all providers.

We recognise that some non-BM technology types, such as demand-side flexibility, aggregators of smaller assets, etc, may wish to discuss how this data should be derived and/or presented to NESO. Please reach out to us via the below address and we will be happy to arrange a 1-2-1: futureofbalancingservices@nationalgrideso.com

Performance Metering

All providers (BM and NBM) must submit data to NESO for real-time availability and post-event performance monitoring. This is required to ensure operational security of the network and through monthly settlement processes to validate performance where units are dispatched to deliver instructions for their SR Contracts (Firm/Optional). Data will be required for each SR Contract and the following SR Window. For the Optional Service, data will be required for each SR Window in which a unit was subject to an Instruction and the following SR Window if it includes a Cross-Over Period.

Performance Monitoring

Service Availability

We will monitor the availability of units in order to confirm that they are holding sufficient headroom/foot-room and can therefore deliver their contracted MW if instructed.

Through the monthly settlement process, NESO will evaluate the conditions below for each SR Contract, individually. Failure to deliver at 100% of contracted availability will forfeit Availability Payment for all the relevant SR Contracts.

For Positive Reserve – BM

Provider Type	Conditions	% of availability payment received	K factor
Generator, Through-zero	$MEL - PN \geq (\text{Contracted Volume})$	100	1
Generator, From zero	$SEL \leq (\text{Contracted Volume})$	100	1
Through-zero (further)	$SIL - PN \geq (\text{Contracted Volume})$ or $SEL - PN \leq (\text{Contracted Volume})$	100	1
Supplier	$SIL - PN \geq (\text{Contracted Volume})$	100	1
Intermittent Generator	$PA - PN \geq (\text{Contracted Volume})$	100	1
Generator, Through Zero	$MEL - PN < (\text{Contracted Volume})$	0	0
Generator, From Zero	$SEL > (\text{Contracted Volume})$	0	0
Through-zero (further)	$SIL - PN < (\text{Contracted Volume})$ or $SEL - PN > (\text{Contracted Volume})$	0	0
Supplier	$SIL - PN < (\text{Contracted Volume})$	0	0
Intermittent Generator	$PA - PN < (\text{Contracted Volume})$	0	0

For Negative Reserve – BM

Provider Type	Conditions	% of availability payment received	K factor
Generator, Intermittent Generator	$PN - SEL \geq (\text{Contracted Volume})$	100	1
Supplier, Through-zero	$PN - MIL \geq (\text{Contracted Volume})$	100	1
Through-zero (further)	$PN - SEL \geq (\text{Contracted Volume})$ or $PN - SIL \leq (\text{Contracted Volume})$	100	1
Generator, Intermittent Generator	$PN - SEL < (\text{Contracted Volume})$	0	0
Supplier, Through-zero	$PN - MIL < (\text{Contracted Volume})$	0	0
Through-zero (further)	$PN - SEL < (\text{Contracted Volume})$ or $PN - SIL > (\text{Contracted Volume})$	0	0

For Positive & Negative Reserve – NBM

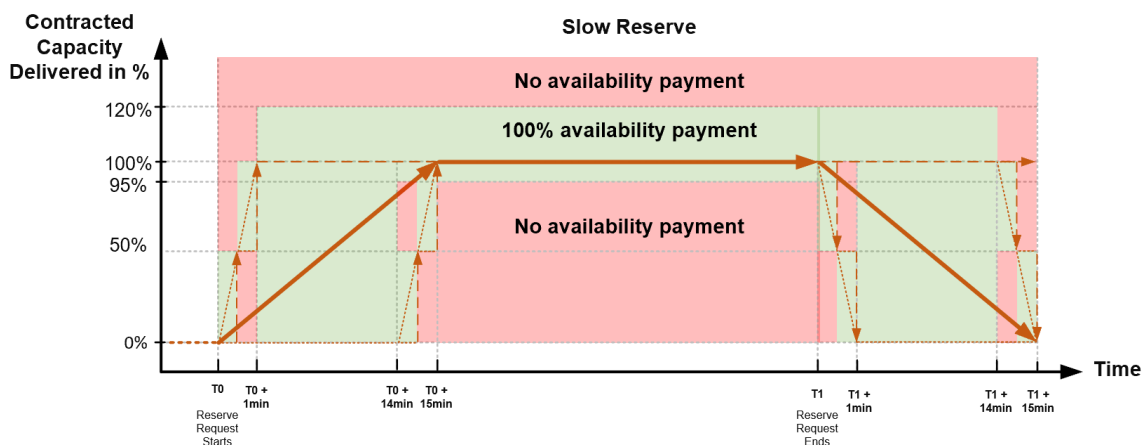
Provider Type	Conditions	% of availability payment received	K factor
Generator, Supplier, Intermittent Generator	(Available Volume) \geq (Contracted Volume)	100	1
Generator, Supplier, Intermittent Generator	(Available Volume) $<$ (Contracted Volume)	0	0

For the avoidance of doubt, and if not outlined in the tables above, a unit must make available the contracted MWs for the required service(s) within the specified SR Window(s), and NESO should not have to send an instruction greater than or less than a unit's contracted capacity due to a limitation of the unit. That is to say:

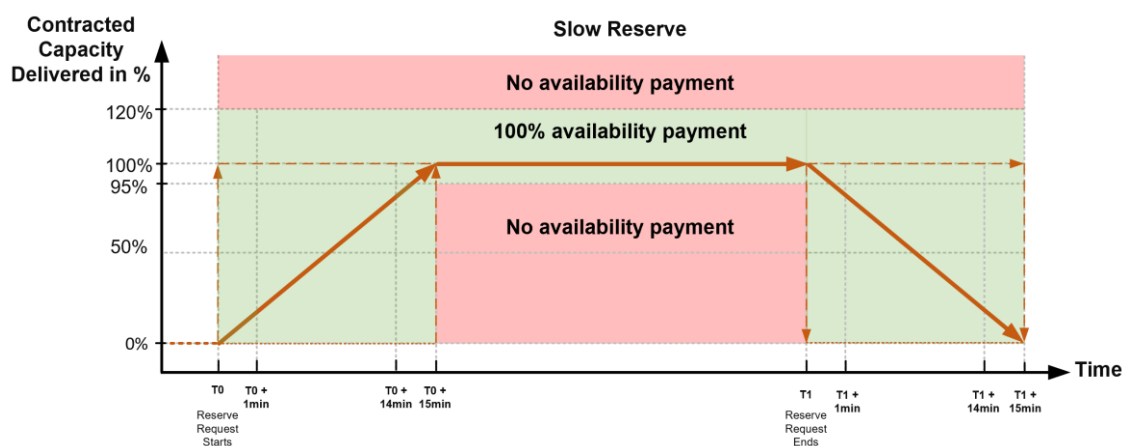
- The available capacity should be \geq the SR Contract volume.
- The minimum instructible capacity should be \leq the SR Contract volume.

Service Delivery

NESO will conduct performance monitoring of service delivery for all SR Contracts. 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 figure below presents the overall acceptable delivery envelope for the Slow Reserve service for units with a >10-minute notice period. Although ramping is depicted at the extremes of the ramping envelope, these restrictions apply to any relevant time within the delivery envelope.



For the avoidance of doubt, Slow Reserve units with a notice period ≤ 10 -minutes may deliver as below.



Under-delivery

Where a unit has a SR Contract, a minimum 95% of instructed 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 SR Contract(s) (Firm Service). Utilisation payments for SR Contracts and Optional Services (Non-BM only) will be made for energy delivered.

Over-delivery

Where a unit has an SR Contract, a maximum of 120% of instructed MWs can be delivered by the unit throughout the instructed period, delivery beyond 120% will result in availability payments being withheld for relevant SR Contract(s) (Firm Service).

Utilisation payments for SR Contracts and Optional Services (Non-BM only) will be made for energy delivered. .

For the avoidance of doubt, availability payments will be made when a unit delivers between 95% and 120% of its instructed MW volume. Where a unit delivers outside of these limits, the Availability Payment will be withheld for the relevant Settlement Period(s).

The ramp rate limit for units with a notice period of >10 minutes is set to no more than 100% contracted capacity per minute, with no single instantaneous ramp more than 50% of the contracted capacity in any 30-second period. In the first service delivery diagram above, this requirement is outlined at T0, T0+14, T1 and T1+14 but, in reality, applies to any viable point within the acceptable ramping envelope defined.

NESO will conduct regular performance monitoring of reserve units' service delivery over a greater period than the individual service day in order to establish overall delivery against the 95%-120% performance measure. There will be no further financial penalties associated with this monitoring, but to ensure that we do not award Slow Reserve contracts to Reserve units with continued poor performance, we will link the performance monitoring to the Reserve unit's prequalification status. Depending on the root cause, we would expect either a reproofing 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.

Providers who do not fulfil their SR Contract and do not provide the contracted capacity may be responsible for covering costs of alternative actions for replacing the missing volume.

BM providers will be penalised for over/under-delivery when utilised via the usual route of imbalance charges, giving a natural incentive for units to follow expected delivery profiles.

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

State of Energy Management

We are keen to ensure that any learning and industry feedback from other Balancing Services (such as Balancing Reserve), relating to certain behaviours from energy limited assets, are appropriately addressed for the Slow Reserve service.

Regardless of technology type, we expect all SR units to be capable of delivering the full contracted quantity for the duration of each SR Contract, whether Firm or Optional and that capability shall not impair any subsequent SR Contract.

Through our learning from other Balancing Services we have identified instances where some energy limited assets have had insufficient energy to honour their full contracted period and have maintained market positions (such as discharging PNs) and increased their Bid-Offer prices during contracted periods such that their high prices make the units unlikely to be selected as they are economically out of merit, but ensure they continue to receive the capacity Availability Payments.

We believe that withholding the Availability Payment does not provide a sufficient sanction to deter this behaviour. Therefore, for Slow Reserve, we are utilising terms, as seen in the Quick Reserve service, that deal with excessively high or excessively low Bid-Offer prices and provide NESO, at our discretion, with a range of enforceable sanctions.

In line with other Balancing Services, we will have provisions within the Service Terms to penalise units that pursue other commercial use of their assets, and renege on their Balancing Service contract consequently. We intend to introduce a similar method of recovering the cost of alternative action needed to be taken and, at our discretion, will treat instances of unavailability for a SR Contract, due to insufficient state of charge, as commercial unavailability and penalise with the cost of alternative action taken.

Crossovers

The unit must be able to continue delivering the dispatch instruction for the next SR Window following the end of the SR Contract or Optional SR Window. The maximum this could be is in line with the unit's defined Minimum Activation Period. [Please refer to the published Crossover documentation for further information.](#)

Aggregation

Aggregated units can participate in the Slow Reserve auction. The aggregation will be allowed up to GSP group.

6. Procurement Design

Firm Service

NESO will consider Slow Reserve volumes required for each Settlement Period in a service day (23:00 to 23:00) and this will be procured through the daily auction. Where there is a firm requirement in a Settlement Period, this will be defined by NESO and published on the NESO website. Providers will be able to bid in their SR units to the daily auction for a minimum of 4 (four) contiguous SR Windows (Service Window Block). Where there is a firm requirement and units are awarded SR Contracts for a Service Window Block via the daily auction, this will be known as the Firm Service with contracts awarded for each discrete SR Window. This commits the SR unit's availability for the full Contracted Service Period and the service provider will receive availability payments (pay-as-clear) for each SR Contract along with any relevant Utilisation Payments (pay-as-bid) if dispatched.

See also **Bid Submission** section below.

Optional Service

Where NESO do not specify a firm requirement for a Settlement Periods at day-ahead or the service provider has been unsuccessful in the daily auction, SR units will be able to submit utilisation-only bids for the Optional Service within-day for any relevant SR Window(s) with no minimum duration requirement. That is to say, valid Optional Availability declarations can be as short as one Settlement Period.

If SR units are dispatched under the Optional Service, service providers will receive a Utilisation Payment (pay-as-bid) only.

BM units should continue to offer reserve to NESO via the Balancing Mechanism and will be dispatched via Bid Offer Acceptances (BOAs).

Registration and Prequalification

In line with the implementation of our other Balancing Services, registration and pre-qualification for the new Slow Reserve services will be completed via NESO's Single Market Platform (SMP).

Maximum Bid Volume

There is no restriction on the maximum size a participating unit can bid up to.

Procurement Requirements

The indicative daily requirement for Positive and Negative Slow Reserve following the recent reserve requirement review is **1,800MW and 800MW respectively**. NESO will publish separate Market Information Reports on our website which will set out the volume of each Slow Reserve product we will look to procure (Firm Service) each day.

Daily Auctions

As per NESO's 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 Service requirement for Positive and Negative Slow Reserve Services.

Co-optimised Auction

We plan to procure Slow Reserve along with Quick Reserve, Balancing Reserve and the Dynamic Response services (DC, DM, DR) in a single, simultaneous, day-ahead, pay-as-clear auction with market welfare being maximised across all services.

Where a unit can provide both frequency response services, Quick Reserve and Slow Reserve services, a provider can make alternative offers to the auction. The clearing algorithm will allocate the unit's capacity to either Frequency Response, Quick Reserve or Slow Reserve to best optimise the market clearing. See [Enduring Auction Capability \(EAC\) Market Design Report](#) for additional information.

Auction Platform

Slow Reserve auctions will be held daily on our [EAC Platform](#).

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 NESO to activate its Business Contingency Plan (BCP) when auction process fails.

It is recommended to run the SR auction in the afternoon, together with the auctions for the Dynamic Response, Balancing Reserve and Quick Reserve products as a single, co-optimised auction. This will facilitate the co-optimisation across all Reserve and

Response products in the future. This decision follows industry feedback from separate BR, QR Phase 1 and SR (informal) consultations.

Bid Submission

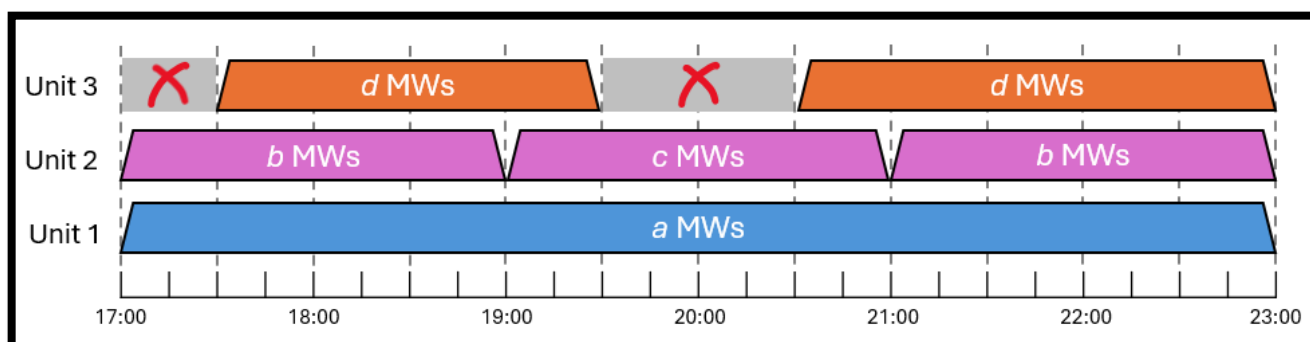
A Registered Service Provider can only participate in the daily auctions once they have completed pre-qualification. NESO will grant access to the Auction Platform and provide log-in details for the Registered Provider or their nominated Agent.

The Registered Service Provider will then be able to offer NESO its Unit(s) for the Positive/Negative Slow Reserve Firm Service on the EAC Auction Platform by submitting sell orders. For each product, a 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 minimum (MW) not exceeding the pre-qualified asset MW, will be done at bid submission stage.

Each Unit can bid for a minimum of 4 (four) or more consecutive SR Windows within an Operational Day (Service Window Block), starting from any applicable SR Window, as illustrated below. Here, the example shows 3 units contracted for Slow Reserve.

- Unit 1 is contracted for 1 continuous Service Window Block(17:00–23:00) for a MWs per Contracted Service Period.
- Unit 2 is contracted for 3 separate Service Window Blocks (17:00–19:00, 19:00–21:00 and 21:00–23:00) at b MWs, c MWs and back to b MWs, respectively.
- Unit 3 is contracted for 2 separate Service Window Blocks (17:30–19:30 and 20:30–23:00), with a period of un-availability between, for d MWs per Contracted Service Period.



So, in the example above, Unit 1 would have submitted a consistent bid across all SR Windows within the Service Window Block from 17:00–23:00. Units 2 and 3, on the other

hand, could submit different MWs for each different Service Window Block but must contain consistent MW per SR Window within each Service Window Block, as illustrated.

NESO submits daily buy-orders to the EAC platform which specify a max volume (MW) we are willing to buy at different price levels (£/MW/h) for each product and SR Window.

The auction platform will provide a rolling window function, meaning the auction gate will be open in advance such that orders can be submitted 14 days before each auction.

Sell-Orders can be submitted, reviewed, modified, or deleted before auction gate closure.

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 Market Design Report.

A buy curve (generated for each SR Window) will be applied to reflect that the volume NESO is willing to procure varies with price. The cost of taking alternative actions, offered by units of similar capability and services, 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.

Auction Results

Auction results can be accessed after each auction via the enduring auction platform nominally by 14:30 and NESO Data Portal by 14:45.

Linked Sell-Orders

Provider Bids (sell-orders) that are linked can only be accepted or rejected all together. There are two types of linking: link by time (i.e., SR Windows) and link by products.

Linking by SR Windows means participants can link bids across more than one SR 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 SR Windows. Or some providers with 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 Slow 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. Additionally, this will not breach Clean Energy Package Article 6.9 requirements, as NESO 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.

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 SR Window or product) will be permitted for Slow Reserve.

Linked Service Windows

Crossovers occur at Settlement Period boundaries and require significant consideration during real-time operations. They are routinely managed to maintain the frequency across Settlement Period boundaries, as otherwise we could see significant changes in output leading to a low or high frequency event, if large enough.

A key risk period for the SR service is during peak periods of demand where there are fewer alternatives available in the market. If we are using our pre-fault reserves to manage normal uncertainty, it could mean NESO have no other options available to help manage a crossover period in a fault situation. As a solution to effectively manage these high-risk periods, NESO are introducing Linked Service Windows. Such Linked Service Windows, issued by NESO, state that the submission and/or acceptance of a sell-order is conditional on the submission and/or acceptance of sell-orders of identical MW volume for each SR Window described in the Linked Service Window section. This ensures there are consistent units contracted across key crossover periods, allowing for their effective management of the risk posed. Such Linked Service Windows will be communicated appropriately with market participants ahead of the auction opening.

Slow Reserve is planned to go live with this functionality enabled. NESO will assess the requirement for Linked Service Windows over time and may introduce the requirement if we see a system security need whilst ensuring we give plenty of notice to industry.

Bid Curtailment Rules

The Slow Reserve requirement could change 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 SR to the NESO requirement which may change across the day and between SR Windows. NESO would allow SR providers to user-define the curtailability of the bid (i.e., the minimum capacity they are willing to accept).

Revenue Stacking

Stacking is the ability to use the same unit to provide different products simultaneously (i.e., in the same window), effectively allowing for multiple revenues from different markets with a single unit.

For clarity we are using the following definitions for Stacking;

Co-delivery

Definition: Being paid multiple revenues from the same asset, using the same capacity, in the same time period (in the same direction).

SR providers can Co-deliver their capacity with the Capacity Market (CM). Where a CM Notice (CMN) is issued, these providers should continue to make headroom available as per any active Slow Reserve commitments. To ensure providers are protected from penalties for breach of their CM agreement, should a System Stress Event occur following a CMN, SR has been added to the list of Relevant Balancing Services.

In some cases, it may also be appropriate for providers to Co-deliver SR with the BM.

Splitting

Definition: Being paid multiple revenues from the same asset, but with different capacity, in the same time period.

For a given SR Window, splitting is allowed between Positive and Negative SR as long as different capacity from the asset is used for each service. Splitting is also allowed with the BM as well as Voltage and Stability services. However, Splitting is not allowed between the same polarity Reserve products, i.e., PSR & PBR. Availability payments will be withheld for any units holding >1 Reserve service in the same direction for a given SR Window.

It is not the intention to prevent providers from co-delivering 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. in order to be able to deliver the service, they should not be paid for that service.

It is worth noting that the standard stacking or BM participation rules apply and need to be followed. That is, if a unit is stacking/splitting multiple services, then the data submitted to NESO must be that of the most granular service.

Future of Splitting with Slow Reserve

Whilst not possible for day-1 of Slow Reserve, NESO intend to broaden splitting capabilities with other services including Response, Balancing Reserve and Quick Reserve in the future, as per the following matrix.

Splitting Matrix			Response						Reserve					
			DC		DM		DR		BR		QR		SR	
			DCL	DCH	DML	DMH	DRL	DRH	PBR	NBR	PQR	NQR	PSR	NSR
Response	DC	DCL	Not allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Allowed	Allowed
		DCH	Allowed	Not allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Allowed
	DM	DML	Allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Allowed	Allowed
		DMH	Allowed	Allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Allowed
	DR	DRL	Allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Allowed	Allowed
		DRH	Allowed	Allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Allowed
Reserve	BR	PBR	Not allowed	Allowed	Not allowed	Allowed	Not allowed	Allowed	Not applicable	Allowed	Not allowed	Allowed	Not allowed	Allowed
		NBR	Allowed	Not allowed	Allowed	Not allowed	Allowed	Not allowed	Allowed	Not applicable	Allowed	Not allowed	Allowed	Not allowed
	QR	PQR	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Not applicable	Allowed	Not allowed	Allowed
		NQR	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Not applicable	Allowed	Not allowed
	SR	PSR	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Not allowed	Allowed	Not applicable	Allowed
		NSR	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Not allowed	Allowed	Not allowed	Allowed	Not applicable

Allowed
Not applicable
Not allowed

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 units and not in respect to aggregated units.

Locational assessment would allow NESO to avoid contracting for reserve on units located behind an anticipated network constraint. This is not an approach that has been taken in any Balancing Services market to date.

Whilst work has commenced on Locational Procurement capability, we do not yet have further details or timescales to share with industry. Any future proposal would be subject to full industry consultation.

Active Network Management Schemes

Providers will need to confirm if their eligible assets have a condition in their DNO connection agreement whereby they are signed up to an Active Network management (ANM) Scheme / Flexibility Connection.

NESO has the right to not prequalify units where some/all of the assets are on ANM connections. However, we will consider this on a case-by-case basis and may (at our sole discretion) enable such participation if there is reasonable evidence to demonstrate that the asset has very high forecasted availability (for example as shown by Curtailment Assessment Reports from DNOs).

NESO shall continue to keep this under review and any changes to this position shall 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 as soon as reasonably practicable after contract award but in any event must be submitted no later than sixty (60) minutes prior to each SR 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) as soon as reasonably practical after contract award but in any event must be 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 NESO will make for the Slow Reserve services.

1. Availability Payments

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

2. Utilisation Payments

For each Slow Reserve instruction, non-BM providers will receive a payment for the energy instructed on a £/MWh basis if instructed to deliver the Firm service in a SR Window. Additionally, where NESO instructs an Optional Service from a Non-BM Unit which is declared available for the Service Window, then it will pay for the energy instructed 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 SR 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 settled by Elexon as part of the Balancing Mechanism. Non-BM providers will be settled by NESO.

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

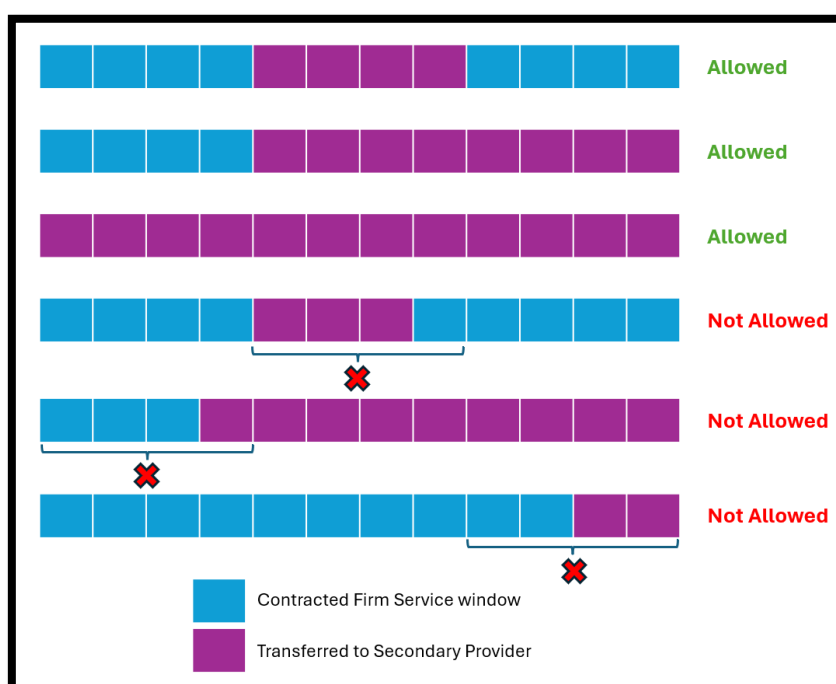
ABSVD

ABSVD will be applied in accordance with the published [ABSVD Methodology](#) for non-BM units. BM units will have their market position adjusted by the BSC approach used for BOAs in a similar way. To apply the methodology, non-BM units will need to submit the MSID pairs to allow the ABSVD to be assigned to the Balancing Responsible Party.

Transfer of Slow Reserve Contracts

The SR Service Terms will allow a Service Provider (Primary Service Provider) to transfer their SR contract to another unit prequalified for SR (either their own or another Service Provider (Secondary Service Provider)). In line with Quick Reserve, all applicable payments to be made direct to the Secondary Service Provider, where previously NESO made such payments direct to the Primary Service Provider. When the Primary Service Provider assigns a Slow Reserve Contract to the Secondary Service Provider, this effectively now means that a transfer is a full assignment, transferring all rights and obligations under the Service Terms of the SR Contract.

Any providers wishing to transfer firm contracts must ensure that the minimum requirement of a 2-hour contiguous firm commitment is satisfied both for the contracts being transferred to the Secondary Service Provider and also for any that remain with the Primary Service Provider. See below for example scenarios.



Appendix 1 – Dynamic Parameters as per Balancing Code BCI

Please refer to the [Balancing Code BCI](#) for full details.

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, indicate the notification time required for a BM Unit to start delivering Offers and Bids respectively from the time the Bid-Offer Acceptance is issued. In the case of a BM Unit comprising a Genset, NTO and NTB will be set to a max period of two minutes;
- Minimum Zero Time (MZT), being either the minimum time that an exporting BM Unit must operate at zero or be importing, before returning to exporting or the minimum time that an importing BM Unit 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.

Appendix 2 – Acronym Definitions

ABSVD	Applicable Balancing Services Volume Data
BMU	Balancing Mechanism Unit
BOA	Bid-Offer Acceptance
CM	Capacity Market
CMN	Capacity Market Notice
DER	Distributed Energy Resources
DNO	Distribution Network Operator
EAC	Enduring Auction Capability
EBR	Electricity Balancing Regulation
EDL / EDT	Electronic Dispatch Logger / Electronic Data Transfer
ENCC	Electricity National Control Centre
GSP	Grid Supply Point
NBM	Non-Balancing Mechanism
PN	Physical Notification
QR / NQR / PQR	Quick Reserve / Negative Quick Reserve / Positive Quick Reserve
SOC	State of Charge
SR / NSR / PSR	Slow Reserve / Negative Slow Reserve / Positive Slow Reserve
STOR	Short Term Operating Reserve