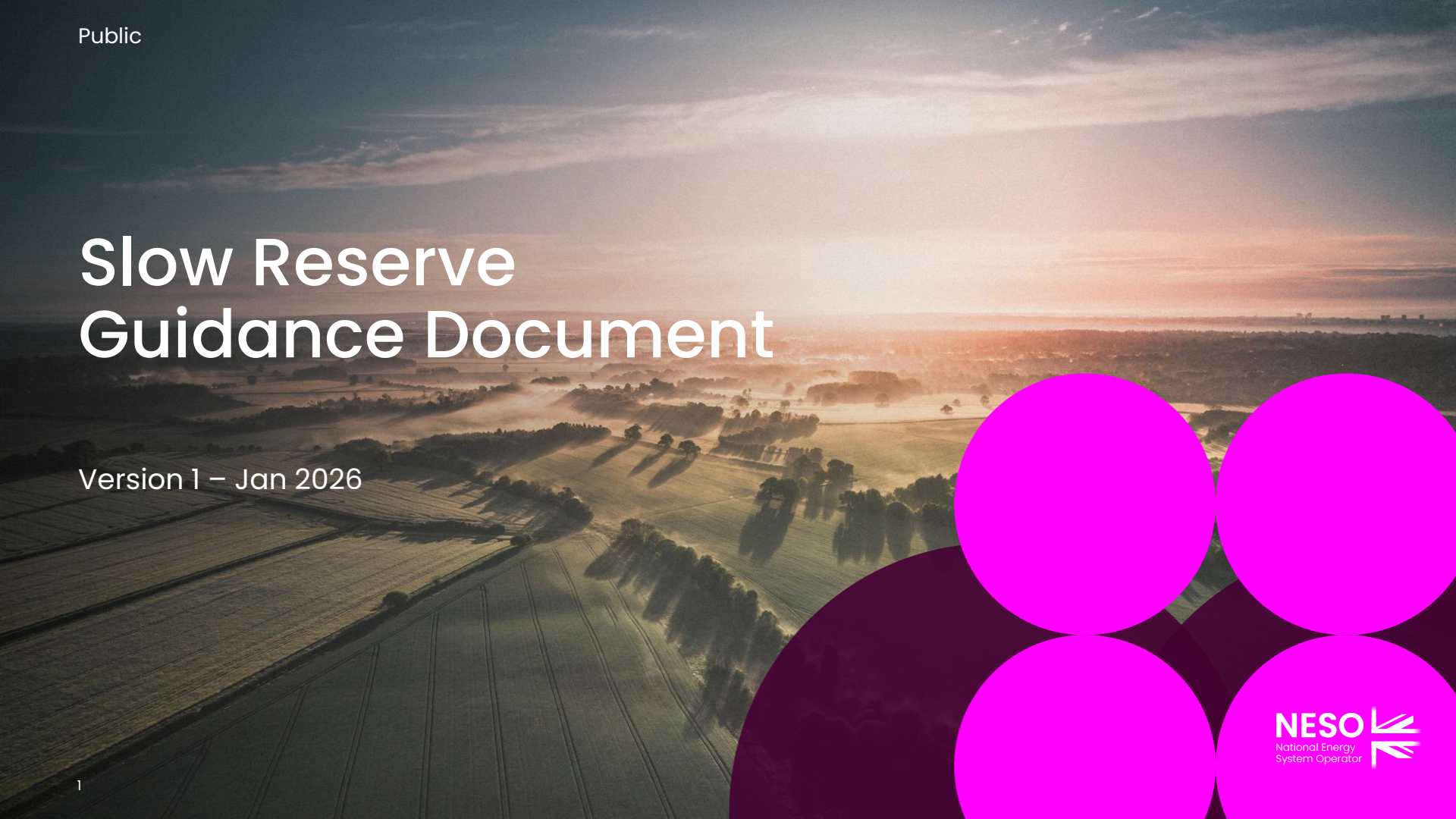
Public

Slow Reserve Guidance Document

Version 1 – Jan 2026



NESO
National Energy System Operator

Version History

Version	Added Information	Date Published
V1	N/A	January 2026

Contents

Slow Reserve Summary

The information in this guidance is tailored to support Slow Reserve providers during SR service delivery. This guidance is therefore intended for service providers with access to the Balancing Mechanism or OBP non-BM systems.

This document complements the service's contractual documents: the Service Terms, Procurement Rules and Balancing Services Glossary as were approved by Ofgem and published on the Slow Reserve webpage. In the event of any conflict or inconsistency between this document and the contractual documents, the latter shall prevail.

Slow Reserve (SR) is part of our new suite of Reserve products. The SR market will allow us to procure access to post-fault upwards (headroom) and downwards (footroom) flexibility through two new balancing services: Positive Slow Reserve and Negative Slow Reserve. This capacity can then be manually dispatched by NESO control room engineers in real time.

The SR service will allow NESO to better meet its system and statutory requirements following updates to the System Operator Guidelines (SOGL) standard, which state that the system frequency must be returned to ±0.2Hz within 15 minutes of a loss event.

Please note this document does not include information about legacy reserve services, Short Term Operating Reserve (STOR) or Optional Fast Reserve, which will ultimately be replaced by new Reserve services and phased out. Information about STOR and Optional Fast Reserve can be found on the NESO website.

Slow Reserve will typically be dispatched during post-fault system operation scenarios. SR units can be dispatched to correct for large energy imbalances, such as interconnector trips or other large demand or generation losses.

SR documents include Service Terms, which describe the technical specification for the provision of SR, and Procurement Rules, which describe the eligibility rules for participation in the services and explain how the SR market will function.

This guidance is published to support the onboarding to the SR service by our providers. It is designed to give additional information on the rules and recommendations regarding the delivery of these services, along with relevant use cases.

This document will be updated regularly.

NESO
National Energy System Operator

Public

Service Specification

NESO
National Energy System Operator

Technical Parameters

Technical Design Element	Detail
Direction	Positive and Negative
Minimum Contract Size	1 MW
Provider eligibility	Non-BM & BM units with control/system telephony during contracted windows
Time to full delivery	Up to 15 minutes
Minimum Activation Period	Up to 30 minutes
Maximum Recovery Period	Up to 60 minutes
Energy Requirement	The unit must be able to deliver the full contracted capacity per SR Window
Operational Metering	0.0667 Hz / once per 15s for both BM and non-BM units, up to 5s latency
Dispatch mechanism	BOAs for BM units. OBP dispatch instruction for non-BM units **Note: Volumes associated with prices must be sufficient to dispatch Contracted MW, and Excessive Utilisation Prices may lead to penalties**

Technical Parameters (cont'd)

Technical Design Element	Detail
Notice to Start Ramping	Up to 14 minutes
Time to accept instruction	Up to 2 minutes
Ramp rates	Notice period > 10 mins: Max ramp rate of 100% contracted capacity per minute. Unit cannot deliver >50% contracted capacity in any 30s ramping period. Notice period ≤ 10 mins: No maximum ramp rate limit. Minimum ramp-up and ramp-down rate to be in line with Time to Full Delivery.
Performance Metering	0.0667Hz / once per 15s for both BM and non-BM units
Performance Monitoring	Time to Full Delivery, Availability, Ramp Rates and Utilisation – Payment Penalties for over (>120%) and under (<95%) delivery
Baselining	All providers are expected to provide nomination baselines, equivalent to the BM Physical Notification, with Final Physical Notifications 60-mins ahead of contracted Settlement Period. Both zero and non-zero baselines allowed.
Aggregation	Allowed, per GSP group
Operational data requirements	BM units as per current BM operations. Non-BM units to submit availability declarations (including price and MW).
Passing through zero	Allowed
Cross-overs	Units are expected to be available for instruction into a subsequent settlement period (including where non-contracted) up to its Minimum Activation Period

Public

Joining the Service

NESO
National Energy System Operator

User Journey

Acronyms:
- **DEP** – Digital Engagement Platform,
- **EAC** – Enduring Auction Capability,
- **OBP** – Open Balancing Programme,
- **STAR** – Settlement and Revenue (System)

Stage	Explore	Onboarding	Participate	Contract Management	Schedule & Dispatch	Review	Payment
User Journey	Gather data and information Build business case Understand codes, markets and connections Understand Service Parameters	User, company, unit asset registration**, NBM MPAN registration (NESO + Elexon)** Pre-qualification Agent set up Systems testing OBP, Performance metering API submission Contract Accession Asset / Unit versioning User Management	Tender Submission Action Submission Co-optimisation	Contracts awards and status Manage contracts	Availability management Instructions	Data submission / collection	Performance monitoring Settlement Penalties Disputes Financial position
NESO Systems	DEP NESO Website	SMP	EAC SMP	SMP Data Portal	OBP/BM	DEP SMP	STAR, SMP

Public

First Time User Registration

If you and your organisation are new to NESO and the SMP Portal, you must register directly via the portal using the following instructions.

The user should visit and bookmark the following link: https://portal.nationalenergyso.com/smp/s/login/

As a first-time user you will need to click the "Register New Account" button. Users will be navigated to the first 'screen' to capture Registration.

Registering New Primary User

In order to access the SMP Portal, it is expected that upon initial registration the main or 'primary' contact (user) at your organisation/company will undertake the registration steps.

Registration involves submitting one's contact details and their organisation/company details. The successive order is contact details followed by company details.

When entering email addresses or telephone numbers, standardised formats are expected, if a User/Contact does not submit field values compatible with the expected format then the field will be flagged in a red border with a prompt instruction. For example, if an email address has been submitted with the incorrect format.

Once all of the fields have been completed on the User/Contact section, the "Next" button will no longer be shaded grey, instead it will be converted into a blue 'button', allowing you to proceed to the next step.

Registering the Primary User's Company

The 'Register new Account' stage involves two pathways depending on the Company Status. If the User/Contact's organisation is a UK Limited Company, user selects the first checkbox. If the User/Contact's organisation is a non-UK company, then the user selects the second checkbox.

Once the option is selected, the user clicks on the "Next" Button.

Registering a UK Company

The User/Contact will be prompted to search for the Company Name and the Company Registration Number.

For Company Name – the user will be expected to enter the name, which will trigger a lookup search/listing of similar names for the user to choose from.

For Company Registration Number – the user will be expected to enter the exact reference number, which will trigger a lookup search/listing for the user to select and confirm.

Please note that only valid and accurate Registration Numbers will be accepted and appear in the search exercise. If your Company is a UK Limited Company and the search listing is unsuccessful, you will need to reach out to your NESO Account Manager by email

Once a match has been found, the User/Contact must select the "Submit" button to proceed to the next step.

If the search result is incorrect or the User/Contact wishes to undertake a new search, then they are expected to click on the "Remove Company" link to refresh the search functionality.

Once the search result is correct, then the User/Contact selects the "Submit" button on the bottom right-hand corner of the screen.

For more information on this process, or for information on registering a non-UK company click here.

For technical support please contact: commercial.operation@neso.energy

NESO
National Energy System Operator

Unit and Asset Registration

Once you have registered as a user on SMP, you can begin creating your units and assets you wish to prequalify for Slow Reserve.

In order to do so, you should enter your SMP account via the following link: https://portal.nationalenergyso.com/smp/s/login/

If you are a first-time user, please follow the guidance on the prior slide to register yourself/your company.

If not, or you have already completed first time user registration, you can proceed to register your Units and Assets in SMP and pre-qualify them for Slow Reserve (Positive and/or Negative).

For users who already have Assets and Units in SMP, for other services (i.e, DC/DM/DR, Balancing Reserve), that you wish to pre-qualify for Slow Reserve, you can move ahead to **Pre-qualifying Units for Slow Reserve.**

Registering New Assets and Units

You can register new Assets and Units on the SMP portal, by following the instructions in the demo video linked here: Creating Assets and Units in SMP or by following the instructions in **Section 4 and 5** of the SMP External User Guide

This process is the same as for any other services you have pre-qualified for in SMP; such as DC, DM, DR, Quick Reserve and Balancing Reserve.

Prequalifying Units for Slow Reserve

In order to prequalify your units for Positive or Negative Slow Reserve, you should have created your Assets and Units, and linked them together (As per the prior video and section 6 of the User Guide). You can then proceed to pre-qualification, by following the instructions in the demo video linked here (ensure you have selected the relevant Slow Reserve service): Prequalifying Units for Balancing Services

Or by following the instructions in **Section 7** of the SMP External User Guide

Once you have submitted your unit/s for pre-qualification, they will be reviewed by the NESO team. We will check that: a signed Form B has been provided, as well as that the Unit information is correct and meets the service parameters. If all of this is true, your unit will be approved and is ready to take part in Slow Reserve. **Please note** that all company information must match what is listed on Companies House

For technical support, and SMP queries, please contact: commercial.operation@neso.energy

A failure to submit valid MPAN information will result in pre-qualification approval being delayed/withdrawn.

Public

Service Go-live only:
Linked Windows and Max. Utilisation Period

NESO
National Energy System Operator

Linked Windows and MUP

NESO will be linking certain contiguous SR Windows for Positive Slow Reserve (PSR) only through the procurement process for an initial transitional period from Slow Reserve service go-live.

There will be three separately procured linked SR Window periods for each operational day during the transition period, as follows.

- A morning window which will run from 06:00 to 10:30
- A midday window which will run from 10:30 to 15:00
- An evening window which will run from 15:00 to 21.00

To minimise the impact on market participants during the transition period, we intend to relax the SR service obligation that SR units must be capable of delivering energy (if instructed) continuously for the entire Contracted Service Period. Instead, we will allow SR units to cease delivery when they reach their declared Maximum Utilisation Period (MUP).

For further information on these transition period requirements, please see the Slow Reserve Transition Plan, and Linked Window Recording and Slide Pack.

Public

Auctions & Auction Platform

NESO
National Energy System Operator

Order Submission Process

The following section will give a step-by-step guide to submitting orders on EAC. If you and your organisation are new to NESO and have yet to register to SMP, then it is required that you register there first. All participants must then be registered as a user for EAC, even after registering units on SMP.

After registering for EAC and logging in with 2-factor authentication, the first step is to select the auction that you would like to bid into. All auctions with gates open can be found under the 'Auctions' tab.

After you have selected the auction that you would like to bid into, you will need to select the unit you would like to use from the drop-down menu.

Following this, you will start to build and add your baskets (defined by 30 minutes service windows). You will give your basket a name and a family name if these are looped baskets and add in the relevant information such as price volume and any child order or substitutable child orders as required.

Once all of the relevant information has been added the bid can be submitted.

After the auction, results can be found in the results tab for your relevant unit, and results will be published on the Data Portal for all units.

Please note that bids can also be submitted via API, to obtain API credentials please contact NESO.

NESO
National Energy System Operator

EAC Market Design and Clearing Algorithm

Single market for response and reserve	Frequency Response services (Dynamic Containment, Dynamic Moderation, Dynamic Regulation) and the new Reserve services (Balancing Reserve, Quick Reserve, Slow Reserve) are procured simultaneously in a single, pay-as-clear auction
Co-optimisation	The auction clearing algorithm is able to select between alternative provider offers and alternate NESO requirements to better optimise the overall market clearing
EAC clearing algorithm	Our strategic partner, N-SIDE, is developing a new, bespoke market clearing algorithm to enable the new market features
Overholding	The auction clearing algorithm may clear a quantity of service in excess of NESO requirements if this better optimises the market

Auction Overview

Design	Co-optimised Response and Reserve Auction

Services Auctioned	• The EAC Auction is used for the clearing of capacity (availability) for the following services:
	  • **Frequency Response Services:** Dynamic Containment (DC), Dynamic Moderation (DM), and Dynamic Regulation (DR).
	  • **Reserve Services:** Quick Reserve (QR), Balancing Reserve (BR) and Slow Reserve (SR)
	• For every service, there are 2 product directions.
	  • **For Response** these are Low (L) and High (H) products (resulting in product codes DRL and DRH, DML and DMH, DCL and DCH).
	  • **For Reserve** these Positive (P) and Negative (N) Products (resulting in product codes PBR, PQR, PSR and NBR, NQR, NSR).

Auction Frequency	• DC, DM, DR, BR, QR, SR will be procured in a single, simultaneous **day-ahead auction** held daily at 14:00.
Auction Design	• **Auction type:** Closed double-sided auction. • **Objective function:** Maximisation of social welfare. • **Pricing:** Uniform clearing price per product for each service window. • **Locational granularity:** GB synchronous area. • **Overholding** allowed (cleared quantity may exceed NESO bid quantity). • **Procurement:** Capacity (MW).

Note: For more information, please see EAC Market Design Report and EAC Market Design Explainer.

NESO National Energy System Operator

Auction Overview

Design	Co-optimised Response & Reserve Auction		
	Response	QR	SR
Auction Timing			
Gate Opening		08:00 BST / GMT D-15	
Gate Closure		14:00 BST / GMT D-1	
Publication of Results on UI		By 14:30 BST / GMT D-1	
Publication of Results on Data Portal		By 15:00 BST / GMT D-1	
Sell Order Design			
Number of Baskets per Unit per EFA day	25	100	100
Number of Parent Orders per Basket	Must be 1	Must be 1	Must be 1
Number of Child Orders per Basket	No more than 10	No more than 10	No more than 10
Number of Substitutable Child Orders per Basket	No more than 10	No more than 10	No more than 10
Technical Parameters			
Technical Minimum Prices (£/MW/h)	-20	0	0
Technical Maximum Prices (£/MW/h)	999.99	999.99	999.99
Minimum Contract Size (MW)	1	1	1

Note: "D" stands for "delivery date". For more information, please see EAC Market Design Report and EAC Market Design Explainer.

NESO National Energy System Operator

Volume Requirement

The requirement will be published on the Data Portal in the future which will specify what Positive and Negative Slow Reserve volumes we are aiming to procure.

For the initial Day 1 launch of Slow Reserve, the expected total volume requirements are 1,800MW for the positive side and 1,800MW for the negative side.

Please note that the MW requirement may be subject to change following a review of system operating conditions. Any adjustments will be communicated before Slow Reserve goes live.

NESO
National Energy System Operator

Public

Service Stacking

NESO
National Energy System Operator

Co-delivery

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

Note: Positive and Negative is not considered the same MW.

Co-delivery Rules

- Slow Reserve **cannot** be co-delivered with:
  - any other frequency management Ancillary Service e.g. Reserve (including Balancing Reserve) or any Dynamic Frequency Response.
- Slow Reserve **can** be co-delivered with:
  - the Capacity Market (CM), the BM, and Voltage and Stability services).
- Where a CM Notice (CMN) is issued, these providers should continue to make headroom available to us as per any active Slow 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, Slow Reserve has been added to the list of Relevant Balancing Services.

Note: Positive and Negative is **not** considered the same MW. Therefore, where 100% of a unit's capacity can be awarded a contract in opposite directions for the same service window, this is not considered stacking or co-delivery.

NESO
National Energy System Operator

Splitting

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

Note: Positive and Negative is not considered the same MW.

Splitting Rules

- Slow Reserve **can** only be Split with the same Reserve service, but in the opposite direction. Therefore;
  - Positive Slow Reserve can be split with Negative Slow Reserve.
  - For example, a unit with 10MW of headroom and footroom may be awarded a 10MW contract in both directions.
- Slow Reserve cannot be Split with any other Ancillary Service at launch.
- Slow Reserve can be split with the BM, Voltage and Stability services.

The Slow Reserve auction is going to be co-optimised with the Dynamic Response auction (EAC auction) and therefore providers may offer Slow Reserve, Quick Reserve and Dynamic Response products during the same time periods, however they must not be in the same Sell Order or Basket and must always meet the terms of the relevant services.

Note: Positive and Negative is **not** considered the same MW. Therefore, where 100% of a unit's capacity can be awarded a contract in opposite directions for the same service window, this is not considered stacking or co-delivery.

NESO
National Energy System Operator

Splitting Matrix

Splitting with Response

- Splitting is allowed between any frequency response products (i.e., any combination of DCL, DCH, DML, DMH, DRL, and DRH).

Splitting within Reserve

- Splitting is allowed between Balancing Reserve products (PBR and NBR), between Quick Reserve products (PQR and NQR), and between Slow Reserve products (PSR and NSR).
- However, splitting is not currently allowed between different Reserve products.

Splitting Reserve with Response

- There is work underway to understand the end-to-end requirement for Stacking across Reserve and Response Balancing Services. As part of this work and our continued reform of Balancing Services, we will keep all service parameters under review.

Allowed	Not allowed
Not applicable	Under review

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												
		DCH												
	DM	DML												
		DMH												
	DR	DRL												
		DRH												
Reserve	BR	PBR												
		NBR												
	QR	PQR												
		NQR												
	SR	PSR												
		NSR												

Public

Operational Data

NESO
National Energy System Operator

Pre-gate Closure Data – BM Units

Contracted BM Slow Reserve (SR) providers are to submit BM data to NESO via EDL/EDT. This data should be submitted in accordance with the Grid Code (in particular BC1 & BC2).

NESO engineers repeatedly calculate the expected operating margin between 24 hours and 4 hours ahead of real time. The introduction of Slow Reserve means that some contracted reserve volume is known at 14:00 the Day Ahead of delivery and therefore these contracted volumes will be included in the engineer's margin assessments.

To help us to ensure the margin assessments are as accurate as possible, we would appreciate contracted BM units submitting Day Ahead Submissions even when not mandated to do so by the Grid Code.

Data should then be revised if new information becomes available to the BM Participant.

Failure to submit any data required for the determination of contract compliance will result in payment being with-held.

Relevant Data for Slow Reserve:

- Maximum Export Limit (MEL)
- Maximum Import Limit (MIL)
- Stable Export Limit (SEL)
- Stable Import Limit (SIL)
- Run-up Rate
- Run-down Rate
- Minimum Non-Zero Time (MNZT)
- Minimum Zero Time (MZT)
- Bid/Offer pairs
- Notice to Offer (NTO)
- Notice to Bid (NTB)
- Notice to Deviate from Zero (NDZ)
- FPN
- BO Pair Price/Volumes data

Pre-gate Closure Data – non-BM Units

Contracted non-BM Slow Reserve (SR) providers need to submit data to NESO via OBP. This data should be submitted ahead of gate closure (i.e., 1 hour ahead of the relevant Settlement Period).

NESO engineers repeatedly calculate the expected operating margin between 24 hours and 4 hours ahead of real time. The introduction of non-BM Slow Reserve means that some non-BM contracted reserve volume is known at Day Ahead of delivery and therefore these contracted volumes will be included in the engineer's margin assessments.

To help NESO ensure margin assessments are as accurate as possible, contracted non-BM providers should submit PN declarations within 2 hours of contract award.

Data should then be revised once new information becomes available to the non-BM Participant up to 1 hour before the relevant Settlement Period (i.e., Gate Closure), where the PN becomes a Final Physical Notification.

Relevant Data for Slow Reserve:

- Availability (Price and MWs).
- Note: Post gate declarations can be made to notify unavailability
- Physical Notifications

BM Participants - Operational Data Submissions

- The Grid Code, within Section BC1 lays out the option for Balancing Mechanism participating Units (BMUs) to provide NESO with indicative Physical Notifications (PNs) and import and export limits (MELs/MILs) well in advance of real time.
- Large and Medium Power Stations and all BMUs which are Transmission connected are **required** to submit their indicative PNs at 11:00 hours each day for every Settlement Period of the following Operational Day (which begins at 05:00 the following morning).
- NESO's scheduling teams use this data within their margin assessments to inform strategic decisions.
- Slow Reserve contracted units know their contract award outcomes by ~14:30 for delivery in the majority of the next Operational Day. Their PNs, MELs, and MILs should be reviewed and, if necessary, revised, as soon as reasonably practical after formation of a SR contract (and in any event by no later than gate closure).
- This will help us to conduct efficient scheduling and allow the Slow Reserve market deliver the most value.

SR Service Terms

5.3 To facilitate the issue by **NESO** of **Bid-Offer Acceptance(s)** in respect of an **SR Unit** and **Contracted Service Period**, and subject always to paragraph 5.10, and so as to constitute a **Mandatory Availability Declaration**, the **Service Provider** shall, in respect of that **SR Unit** and **Contracted Service Period**:-

5.3.1 as soon as reasonably practicable after formation of the relevant **SR Contract** (and in any event by no later than **Gate Closure**), submit to **NESO** a **Final Physical Notification** and **Bid-Offer Data**; and

5.3.2 submit and maintain at all times **Dynamic Parameters** and other **BM Unit Data**,

in each case meeting the requirements (as applicable) of paragraphs 5.4 to 5.9 inclusive, so as to facilitate sufficient footroom and/or headroom to enable delivery of **Slow Reserve** when instructed, and submitted in accordance with the **Grid Code**.

BC1

Physical Notifications, being the data listed in **BC1** Appendix 1 under that heading, are required by **The Company** at 11:00 hours each day for each **Settlement Period** of the next following **Operational Day**, in respect of;

(1) **BM Units**:

(i) with a **Demand Capacity** with a magnitude of 50MW or more in **NGET's Transmission Area** or 10MW or more in **SHETL's Transmission Area** or 30MW or more in **SPT's Transmission Area**; or

(ii) comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** in each case at **Large Power Stations**, **Medium Power Stations** and **Small Power Stations** where such **Small Power Stations** are directly connected to the **Transmission System**; or

(iii) where the **BM Participant** chooses to submit **Bid-Offer Data** in accordance with BC1.4.2(d) for **BM Units** not falling within (i) or (ii) above,

Non-BM Participants - Operational Data Submissions

- The SR Service Terms lay out the requirement for non-Balancing Mechanism participating Units (non-BMUs) to provide NESO with indicative Baselines (equivalent to Physical Notifications in the BM) in advance of real time.
- All non-BMUs are **required** to submit their indicative PNs (by no later than 2 hours following publication of auction results) for every Settlement Period of the following Service Day (which begins at 23:00 the same evening).
- NESO's scheduling teams use this data within their margin assessments to inform strategic decisions.
- Slow Reserve contracted units know their contract award outcomes by ~14:30 for delivery in the next Service Day. Their Baselines should regularly be reviewed and, if necessary, revised, as soon as reasonably practical after formation of a SR contract (and in any event by no later than gate closure).
- This will help us to conduct efficient scheduling and allow the Slow Reserve market deliver the most value.

SR Service Terms

6.3 To facilitate the issue by **NESO** of an **Instruction** in respect of a **Contracted Service Period**, and subject always to paragraph 6.5 and the requirements set out in paragraph 20, the **Service Provider** shall confirm the technical and commercial parameters comprising its **SR Contract** (including its ability to operate in accordance with each of the **SR Service Parameters**) by submitting to **NESO**, in respect of the relevant **SR Unit** and so as to constitute a **Mandatory Availability Declaration**, by no later than sixty (60) minutes prior to the start of that **Contracted Service Period**, a **Non-BM Data Submission** specifying, for that **Contracted Service Period**:-

(a) the **SR Unit** ID;

(b) the MW available in that **Contracted Service Period**, which must be equal to the **Contracted Quantity**;

(c) a single **SR Utilisation Price** (where the applicable pound and pence figures shall each be an integer) which:-

(i) shall apply throughout that **Contracted Service Period** and also to any subsequent period described in paragraph 10.9 unless the **Service Provider** (at its discretion) specifies in the **Non-BM Data Submission** a separate **SR Utilisation Price** (which must for the avoidance of doubt not be accompanied by a zero (0) MW availability) to apply for energy delivered as **Slow Reserve** in that period; and

(ii) need not be the same as that specified for other **Contracted Service Periods** in that **Service Day**.

For any **Mandatory Availability Declaration** to be valid, the **Service Provider** must have submitted a valid **Operational Baseline** in accordance with paragraphs 20.1 and 20.2.

Energy Limited Assets

NESO has already published guidance on the submission of MEL/MIL parameters for BM participants. Please read this guidance note from December 2023 to learn more.

An update with the 30-minute rule was published in February 2024.

Battery Energy Storage Systems (BESS) and Pumped Storage have energy limitations based on the storage capacity of their equipment.

BESS can participate in the SR auctions but are expected to be able to manage their state of energy to be able to deliver the full contracted quantity for the duration of the SR service window.

Extract from the SR service terms:

9.3 For the avoidance of doubt, each **SR Unit** shall be capable of delivering the full **Contracted Quantity** for the duration of the **Contracted Service Period** and the associated potential **Cross-Over Period**.

9.4 In the event that, in respect of any **Contracted Service Period**:-

(a) where a **Bid-Offer Acceptance** is issued during that **Contracted Service Period**, the **SR Unit** fails to increase and/or reduce its **Output** or **Demand** (as the case may be) by at least ninety-five (95)% of that **Bid-Offer Acceptance** as measured from the point that the **Response Time** expires;

(b) the volume in MWh of **Slow Reserve** provided by the **Service Provider** in accordance with one or a series of contiguous **Bid-Offer Acceptance(s)** issued in accordance with paragraph 6.12 is less than ninety-five (95)% of the volume in MWh of energy instructed to be delivered in accordance with such **Bid-Offer Acceptance(s)** in any one of those **Bid-Offer Acceptance(s)**;

(c) the volume in MWh of **Slow Reserve** provided by the **Service Provider** in accordance with one or a series of contiguous **Bid-Offer Acceptance(s)** issued in accordance with paragraph 8.2 exceeds one hundred and twenty (120)% of the volume in MWh of energy instructed to be delivered in accordance with such **Bid-Offer Acceptance(s)** in any one of those **Bid-Offer Acceptance(s)**;

(d) the **SR Unit** fails to provide **Slow Reserve** in accordance with the **Bid-Offer Acceptance** continuously at a level of at least ninety-five (95)% of the MW instructed to be delivered in accordance with that **Bid-Offer Acceptance**;

(e) the **SR Unit** fails to provide **Slow Reserve** in accordance with the **Bid-Offer Acceptance** continuously at a level not in excess of one hundred and twenty (120)% of the MW instructed to be delivered in accordance with that **Bid-Offer Acceptance**; or

(f) a **Bid-Offer Acceptance** is rejected by the **Service Provider** (other than in accordance with **Grid Code** BC2.7.3(b) and whether for reasons of safety or otherwise),

then no **SR Availability Payment** shall fall due with respect to that **Contracted Service Period**.

Data and Transparency

Registered Service Providers are required to submit Operational Data as outlined in the Service Terms.

NESO requires Performance data to be submitted by all SR providers. **A failure to submit this data will result in payments being withheld.**

Performance Monitoring data is to be submitted to NESO by no later than 24 hours following the end of the relevant Service Day:

Metering is positive for export, and negative for import.

Details of the SR auction results including a breakdown of each Sell Order, NESO's Buy Order and results summaries will be available on the data portal by 14:30 every afternoon.

Publication of unit availability, dispatch, and baseline data can be found via ELEXON's website for BM units. For non-BM units, availability, dispatch, and baseline data can be found on the following NESO data portal pages:

- non-BM Reserve Instructions
- non-BM Mandatory Availability Declarations
- Non-BM Baselines (FPNs)

Public

Metering & Heartbeat

NESO
National Energy System Operator

Operational Metering

All providers must submit Operational metering at a 0.0667Hz / once per 15s granularity, with a latency of no more than 5 seconds.

NESO's '**Operational Metering'** document describes the operational metering architecture NESO has in place to enable the connection **for non-transmission connected BM & Non-BM Participants**' to NESO's Systems and facilitate participation in the GB Balancing Mechanism and other Balancing Services.

There are three routes for providing operational metering to the balancing systems.

- Connect to an existing GB Transmission Owner's Real-time Telemetry Unit (RTU).
- Install a new RTU and provide dedicated telecommunication signals to that location.
- Connect to the SCADA Data Concentrator host.

View the Operational Metering documentation under the **'IT integration'** section of the Slow Reserve webpage.

BM Providers may also submit their Operational Metering through the existing BM Fixed Line.

NESO
National Energy System Operator

Performance Metering

All files must be submitted at a 0.0667Hz / once per 15s granularity by no later than one calendar day (24 hours) after the end of the Service Day on which SR was provided for the purposes of monitoring and metering of the Service Provider's provision of Slow Reserve.

All providers (**both BM and non-BM**) are required to submit data to NESO for post-event performance monitoring. This data is required by NESO to validate the performance where units are dispatched to deliver an instruction for the SR Contract and Optional Slow Reserve services.

The detailed specification for the submission of this Performance Metering requirement can be found under the **'IT integration'** section of the Slow Reserve webpage.

Where a SR Contract is held:

Service Providers are required to submit (via the agreed IT interface) a Performance Metering file for all contracted SR Windows in the Service Day and for any SR Window where a Crossover occurs (including the 1st SR Window of the following Service Day if applicable).

For the Optional service:

Service Providers are required to submit (via the agreed IT interface) Performance Metering file for all SR Windows where the Optional Service is utilised and for any SR Window where a Crossover occurs (including the 1st SR Window of the following Service Day if applicable).

Where, due to a fault, the service providers Performance Metering file is unavailable for submission by the agreed IT interface, the Service Provider can agree with NESO to submit alternative Performance Metering data by not later than five calendar days after the Service Day on which SR was provided.

Heartbeat
(Connection Indicator)

The ‘Heartbeat’ also referred to as the ‘Connection Indicator’ is used to ensure that NESO control-room has a live connection to each SR unit and that its operational and remains dispatchable.

For BM

The Connection Indicator refers to the handshake between NESO systems and control point systems to establish a connection exists and a unit is operational. Further handshakes also confirm the link is operational and exchanged whenever a message is sent.

The Connection Indicator is via EDL and part of the business-as-usual operations for BM participation.

For further details around EDL connection and interface, please refer to the OBP documentation under the **‘IT integration’** section of the Slow Reserve webpage.

For non-BM

For non-BM providers we have added the requirement into the service terms in order to mirror the existing BM EDL requirement to ensure we have visibility that a non-BM unit will be able to receive and respond to a message (instruction/cease).

Details of this requirement are set out in the OBP web service specification, please refer to the OBP documentation under the **‘IT integration’** section of the Slow Reserve webpage.

NESO
National Energy System Operator

Public

Performance Monitoring

NESO
National Energy System Operator

Public

Performance Monitoring

This section provides information on the application of the performance monitoring methodology for Slow Reserve. The unit participating in the service will be subject to performance monitoring on Time to Full Delivery, Ramp Rates, Availability, and Utilisation.

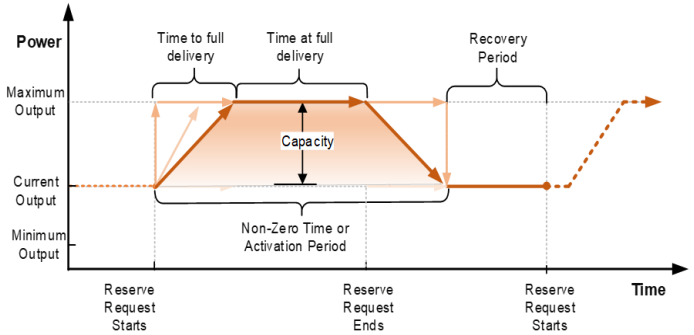
In the event of any conflict or inconsistency between this document and the Service Terms, the latter shall prevail.

Note: For the purpose of delivery assessment, ramping periods are computed based on ramp rates (submitted or derived).

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

A contracted unit must be capable of being dispatched during all contracted service windows in accordance with the following rules:

- being dispatched from any prevailing Stable Export Limit or Stable Import Limit (which for the avoidance of doubt may be 0MW) or from any other higher level of Output or Demand
- being dispatched for a single or multiple consecutive periods each of not more than 30 minutes in duration (representing the max minimum activation period) which for these purposes include all Ramping
- being capable of dispatch for the full length of all contracts
- being capable of dispatch no more than 60 minutes after the end of delivery of a previous instruction (Recovery Period)
- being capable of not exceeding ramp rates of 100% contracted capacity per minute and, for non-linear ramping, 50% of the contracted capacity in any 30-second period for units with a > 10-minute notice period



NESO
National Energy System Operator

Public

Performance Monitoring BM

Availability (EoD code "AVAL")

A contracted unit should be able to demonstrate 100% of contracted Positive Slow Reserve (headroom) and/or Negative Slow Reserve (footroom).

Failure to demonstrate the contracted availability will trigger an Event of Default (EoD).

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all the relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

Positive Slow Reserve

For a generator (or a unit with only positive output):

MEL – FPN ≥ Contracted Quantity AND FPN ≥ 0

Plus also check that

If FPN<SEL then SEL ≤ Contracted Quantity

For a supplier (or a unit with only negative output):

SIL – FPN ≥ Contracted Quantity AND FPN < 0

For the avoidance of doubt, and if not already indicated, a unit must make available the contracted MWs for the required service(s) within the specified Service 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:

- Available capacity ≥ contracted SR volume
- Minimum instructible volume ≤contracted SR volume

For a "through-zero" unit:

1. If FPN ≥ 0 then (MEL-FPN) ≥ Contracted Quantity
2. If FPN < 0 and SEL and SIL = 0 then (MEL-FPN) ≥ Contracted Quantity
3. If FPN < 0, and SEL and SIL ≠ 0 then if (MEL-FPN) ≥ Contracted Quantity And (SEL-FPN) ≤ Contracted Quantity then (MEL-FPN) ≥ Contracted Quantity else
4. (SIL-FPN) ≥ Contracted Quantity

Also check that If FPN ≥ 0 and FPN < SEL then SEL ≤ Contracted Quantity

For a Power Park Module powered by an Intermittent Power Source:

PA-FPN ≥ Contracted Quantity

NESO
National Energy System Operator

Performance Monitoring BM

Availability (EoD code "AVAL")

A contracted unit should be able to demonstrate 100% of contracted Positive Slow Reserve (headroom) and/or Negative Slow Reserve (footroom).

Failure to demonstrate the contracted availability will trigger an Event of Default (EoD).

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all the relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

Negative Slow Reserve

For a generator (or a unit with only positive output):

FPN – SEL ≥ Contracted Quantity AND FPN 0

For a supplier (or a unit with only negative output):

FPN – MIL ≥ Contracted Quantity AND FPN ≤ 0

For the avoidance of doubt, and if not already indicated, a unit must make available the contracted MWs for the required service(s) within the specified Service 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:

- Available capacity ≥ contracted SR volume
- Minimum instructible volume ≤ contracted SR volume

For a "through-zero" unit:

1. If FPN ≥ 0 AND SEL and SIL = 0 then (FPN-MIL) ≥ Contracted Quantity
2. If FPN > 0 and SEL and SIL ≠ 0 then If (FPN-SIL) ≤ Contracted Quantity then (FPN-MIL) ≥ Contracted Quantity else (FPN-SEL) ≥ Contracted Quantity
3. If FPN ≤ 0 (FPN-MIL) ≥ Contracted Quantity

For a Power Park Module powered by an Intermittent Power Source:

FPN – PA ≥ Contracted Quantity

NESO
National Energy System Operator

Public

Performance Monitoring NBM

Availability (EoD code "ADEC")

A contracted unit should be able to demonstrate 100% of contracted Positive Slow Reserve (headroom) and/or Negative Slow Reserve (footroom).

Failure to demonstrate the contracted availability will trigger an Event of Default (EoD).

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all the relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

Slow Reserve NBM

Availability check is not relevant for NBM units, therefore, confirmation that the Headroom (for Positive reserve services) & Footroom (for Negative reserve services) is there for a settlement period is done monitoring the availability declarations history.

For an NBM unit to be deemed available, the declaration at gate closure for the service must be:

Declared MW = Contracted MW

And the declaration throughout the SP must be:

Declared MW = Contracted MW

Note 1: Gate closure is 60 minutes prior to the start of the settlement period

Note 2: The check is undertaken at the start of each settlement period, and throughout the settlement period

Note 3: If a units declared MW ≠ Contracted MW, it would fail Availability checks but will remain available to NESO for dispatch

For the avoidance of doubt, and if not already indicated, a unit must make available the contracted MWs for the required service(s) within the specified Service 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.

NESO
National Energy System Operator

Public

Performance Monitoring BM

Response Time (EoD code "RESP")

A contracted unit must be capable of achieving the full contracted capacity within the Response Time of 15 minutes, which is inclusive of Notice to Offer (NTO) or Notice to Bid (NTB) and NDZ (Notice To Deviate from Zero) time parameters.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

Positive Service Time to Full delivery calculations

$$\textbf{Response Time [minutes]} = \textbf{Notice Period} + \textbf{Time to Ramp Up}$$

The time to ramp up will be determined from the ramp rates and elbow points submitted. Please note however that the computations below are based on a single ramp rate.

Positive Slow Reserve examples for units with single ramp rates for export and Import

For a generator (or a unit with only positive output):

$$\text{Response Time [minutes]} = \text{Notice Period} + \frac{\text{Contracted capacity [MW]}}{\text{Run up rate export } [\frac{\text{MW}}{\text{minute}}]}$$

For a supplier (or a unit with only negative output):

$$\text{Response Time [minutes]} = \text{Notice Period} + \frac{\text{Contracted capacity [MW]}}{\text{Run up rate import } [\frac{\text{MW}}{\text{minute}}]}$$

For a bi-directional unit:

$$(\text{if FPN} \geq 0)\ \text{Response Time [minutes]} = \text{Notice Period} + \frac{\text{Contracted capacity [MW]}}{\text{Run up rate export } [\frac{\text{MW}}{\text{minute}}]}$$

$$(\text{if FPN} < 0)$$

$$\text{Response Time [minutes]} = \text{Notice Period} + \frac{\text{Min (Contracted capacity [MW], (SIL} - \text{FPN))}}{\text{Run up rate import } [\frac{\text{MW}}{\text{minute}}]} + \frac{\text{Max(0, (Contracted MW} - \text{Min(Contracted capacity [MW], (SIL} - \text{FPN))}}{\text{Run up rate export } [\frac{\text{MW}}{\text{minute}}]}$$

NESO
National Energy System Operator

Public

Performance Monitoring BM

Response Time (EoD code "RESP")

A contracted unit must be capable of achieving the full contracted capacity within the Response Time of 15 minutes, which is inclusive of Notice to Offer (NTO) or Notice to Bid (NTB) and NDZ (Notice To Deviate from Zero) time parameters.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

Negative Service Time to Full delivery calculations

$$\textbf{Response Time [minutes]} = \textbf{Notice Period} + \textbf{Time to Ramp Down}$$

The time to ramp up will be determined from the ramp rates and elbow points submitted. Please note however that the computations below are based on a single ramp rate

Negative Slow Reserve examples for units with single ramp rates for export and Import

For a generator (or a unit with only positive output):

$$\text{Response Time [minutes]} = \text{Notice Period} + \frac{\text{Contracted capacity [MW]}}{\text{Run down rate export } [\frac{\text{MW}}{\text{minute}}]}$$

For a supplier (or a unit with only negative output):

$$\text{Response Time [minutes]} = \text{Notice Period} + \frac{\text{Contracted capacity [MW]}}{\text{Run down rate import } [\frac{\text{MW}}{\text{minute}}]}$$

For a bi-directional unit:

$$(\text{if FPN} \leq 0)\ \text{Response Time [minutes]} = \text{Notice Period} + \frac{\text{Contracted capacity [MW]}}{\text{Run down rate export } [\frac{\text{MW}}{\text{minute}}]}$$

$$(\text{if FPN} > 0)$$

$$\text{Response Time [minutes]} = \text{Notice Period} + \frac{\text{Min (Contracted capacity [MW], (FPN} - \text{SEL))}}{\text{Run down rate export } [\frac{\text{MW}}{\text{minute}}]} + \frac{\text{Max}(0, (\text{Contracted MW } - \text{Min}(\text{Contracted capacity [MW]}, (\text{FPN} - \text{SEL}))}{\text{Run down rate export } [\frac{\text{MW}}{\text{minute}}]}$$

NESO
National Energy System Operator

Public

Performance Monitoring NBM

Response Time (EoD code "RESP")

A contracted unit must be capable of achieving the full contracted capacity within the Time to Full Delivery of 15 minutes, which is inclusive of Notice to Start (NTS).

Note: Currently ramp rates are derived but in the future they will be submitted as part of NBM pre-qualification.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

Positive Slow Reserve

Units calculated Response Time <= Contracted Response Time,

Where Positive service utilises a Run-Up Rate

Negative Slow Reserve

Units calculated Response Time <= Contracted Response Time

Where Negative service utilises a Run-Down Rate

NESO
National Energy System Operator

Public

Performance Monitoring BM

Utilisation (EoD code "CDEL")

The unit must deliver within the acceptable ramping envelope, and the Notice period plus time to ramp must be no greater than 15 minutes.

Under-delivery below 95% and over-delivery above 120% output will mean availability payments for the relevant service window will be withheld.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

The utilisation calculations

For all units

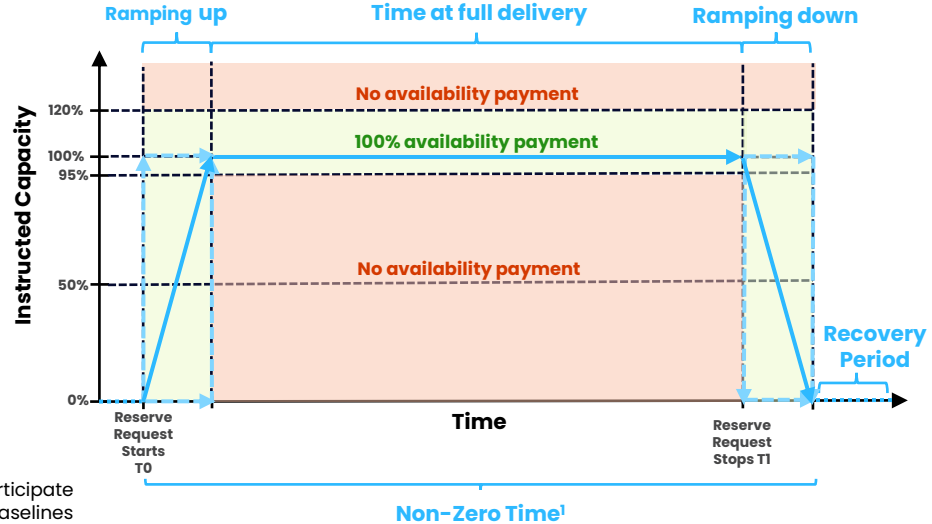
- **PSR:** Expected Volume = Positive net BOA volume (MWh)
- **NSR:** Expected Volume= Negative net BOA volume (MWh)

The check

For all units:

- (Settlement metering – Baseload) ≥ (Expected Volume * 95%)
- (Settlement metering – Baseload) ≤ (Expected Volume * 120%)

Baseload = Profiled FPN data adjusted for Response delivery.



[1] SR units can participate from non-zero baselines

Public

Performance Monitoring NBM

Utilisation (EoD code "CDEL")

The unit must deliver within the acceptable ramping envelope, and the Notice period plus time to ramp must be no greater than 15 minutes.

The calculation of ramping and non-ramping periods will be based on actual ramp rates submitted or derived from pre-qualification data.

Under-delivery below 95% and over-delivery above 120% output will mean availability payments for the relevant service window will be withheld.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

For all units

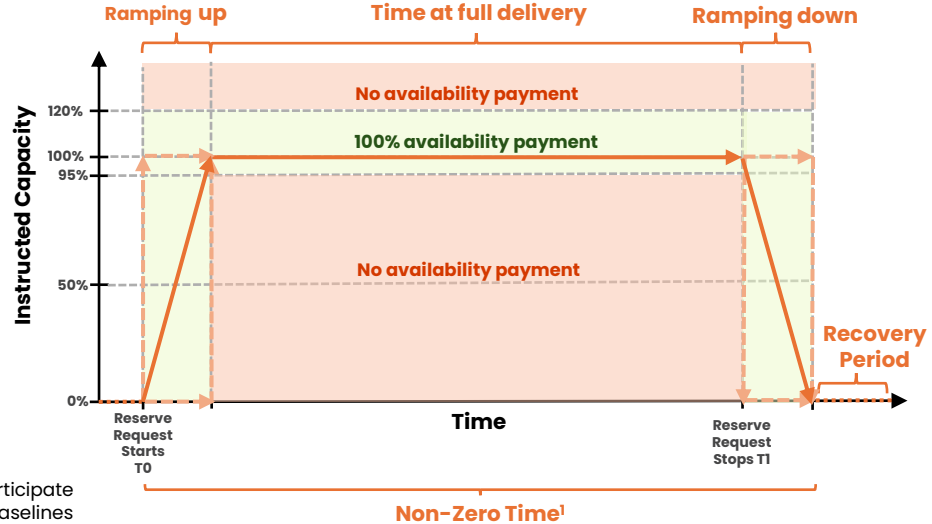
- Volumes are computed per instruction per second and aggregated per settlement period into Ramping and Non-Ramping Periods.
- **PSR:** the provider ramps up to deliver and ramps down to cease delivery
- **NSR:** the provider ramps down to deliver and ramps up to cease delivery

The check

For all units:

- (Settlement metering – Baseload) ≥ (Expected Volume * 95%)
- (Settlement metering – Baseload) ≤ (Expected Volume * 120%)

Baseload = profiled FPN data adjusted for Response delivery.



[1] SR units can participate from non-zero baselines

Performance Monitoring BM

Service delivers in Contracted Response Time (EoD code "CRSP")

The unit must deliver against the Instructed Megawatts within the time to full delivery.

When unit DOES NOT deliver between 95% and 120% of its expected MW at the expiry time of the Ramp period then the CRSP failure will be generated.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The check

The system processes the check at the start time of the first BOA in a contiguous BOA period + Contracted Response Time – Notice period*.

The Check:

[(Metered MW - Baseload MW) / Expected MW] * 100

should be between Under Delivery % and Over Delivery %

where Expected MW are positive for a positive reserve service, and negative for a Negative reserve service:

i.e., ≤95% and ≤120%

* For SR, Notice period = ≤14 minutes

Performance Monitoring NBM

Service delivers in Contracted Response Time (EoD code "CRSP")

The unit must deliver against the Instructed Megawatts within the contracted response time.

When unit DOES NOT deliver between 95% and 120% of its expected MW at the expiry time of the Ramp period then the CRSP failure will be generated.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The check

As instructions can be issued with a deferred start, the check is undertaken at the instruction Start Date time (start ramp date/time) + Contracted Response less NTS.

At the expiry of the Ramp Period:

[(Metered MW - Baseload MW) / Expected MW] * 100

should be between Under Delivery % and Over Delivery %

where Expected MW are positive for a positive reserve service, and negative for a Negative reserve service:

i.e., ≤95% and ≤120%

Note: NTS and ramp rates are computed at the point the pre-qual data was uploaded

Performance Monitoring BM

Activation Period (EoD code "MNZT")

A contracted unit must be capable of being dispatched during contracted service windows in accordance with the following rules:

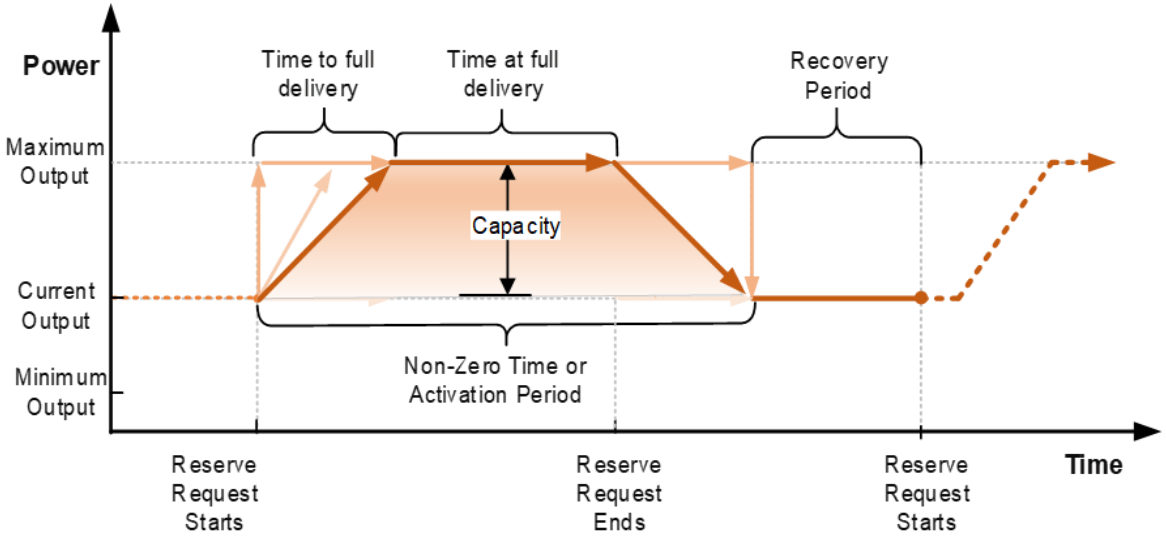
- Being dispatched for a single or multiple consecutive periods each of not more than 30 minutes in duration (representing the max minimum activation period) which for these purposes include all Ramping

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

The check – Minimum Activation Period (MNZT): 0 - 30 mins

Where a unit's min activation period is ≤ 30 mins, the unit will pass the check, and an AVAIL payment will be made



Note: SR units can participate from non-zero baselines

Performance Monitoring NBM

Activation Period (EoD code "MNZT")

A contracted unit must be capable of being dispatched during contracted service windows in accordance with the following rules:

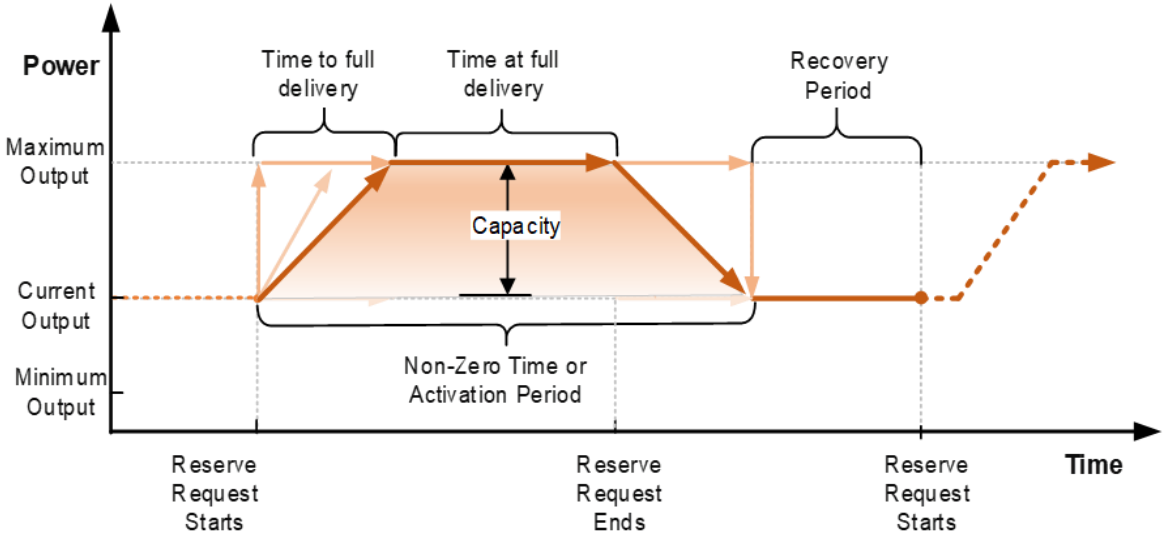
- Being dispatched for a single or multiple consecutive periods each of not more than 30 minutes in duration (representing the max minimum activation period) which for these purposes include all Ramping

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

The check – Minimum Activation Period (MNZT): 0 - 30 mins

Where a unit's min activation period is ≤ 30 mins, the unit will pass the check, and an AVAIL payment will be made



Note: SR units can participate from non-zero baselines

Performance Monitoring BM

Recovery Period (EoD code "MZT")

A contracted unit must be capable of being dispatched during contracted service windows in accordance with the following rules:

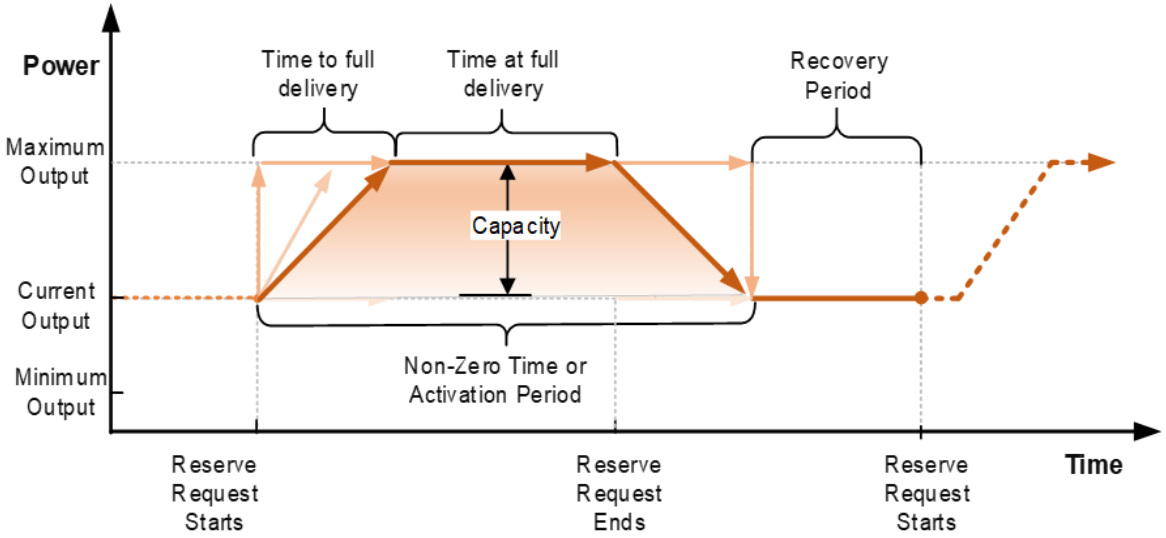
- Being capable of dispatch no more than 60 minutes after the end of delivery of a previous instruction (Recovery Period).

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

The check – Recovery Period (MZT): 0 - 60 mins

Where a unit's recovery period ≤ 60 mins, the unit will pass the check, and an AVAIL payment will be made



Note: SR units can participate from non-zero baselines

Performance Monitoring NBM

Recovery Period (EoD code "MZT")

A contracted unit must be capable of being dispatched during contracted service windows in accordance with the following rules:

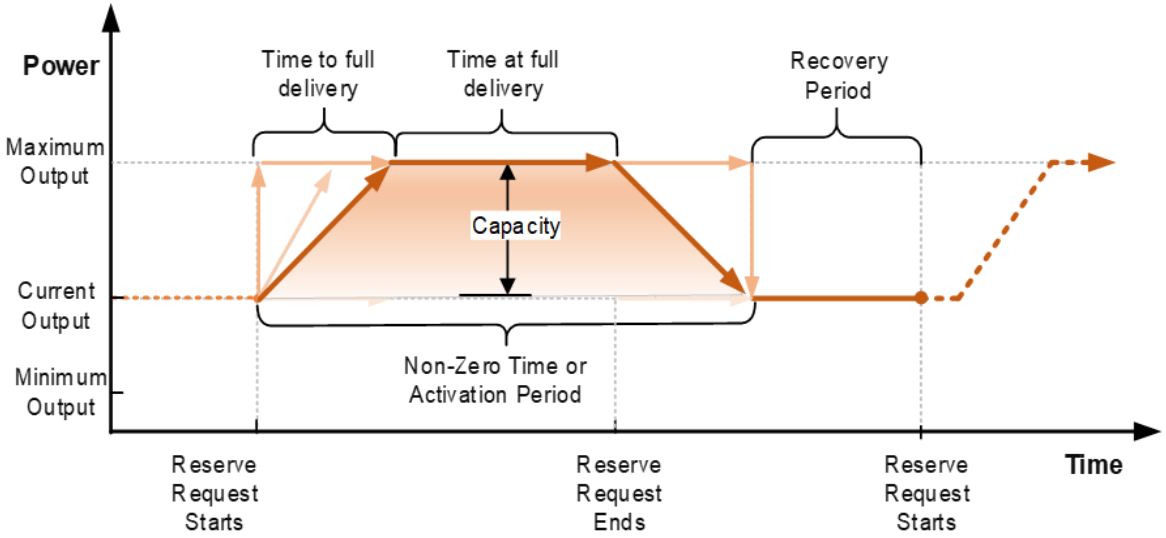
- Being capable of dispatch no more than 60 minutes after the end of delivery of a previous instruction (Recovery Period).

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

The check – Recovery Period: 0 - 60 mins

Where a unit's recovery period ≤ 60 mins, the unit will pass the check, and an AVAIL payment will be made



Note: SR units can participate from non-zero baselines

Performance Monitoring BM

Available Dispatch Volume (EoD code “VOL” or "IBOD")

It must be possible to dispatch the contracted MWs.

Where this is not possible because the Bid-Offer Price submission does not have a MW level >= Contracted MW then an “VOL” failure will be recorded for Invalid Bid-Offer Data.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The Check

- Where a unit is contracted for Positive Quick Reserve, the BO_LEVEL MW will be summed for all positive BO Pairs (1 to 5) to ensure that the resultant volume >= Contracted MW.

- Where a unit is contracted for Negative Quick Reserve, the BO_LEVEL MW will be summed for all negative BO Pairs (-1 to -5), to ensure that the absolute (resultant volume) >= Contracted MW.

Any failures will result in the following:

- EoD code VOL will be recorded, and NO availability payment will be made.

NESO
National Energy System Operator

Performance Monitoring NBM

Available Dispatch Volume (EoD code “VOL” or "IBOD")

It must be possible to dispatch the contracted MWs.

Where this is not possible because the unit has not submitted a price against a MW value that is greater or equal to the Contracted MW then an “VOL” failure will be recorded.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The Check

- Where a unit is contracted for Slow Reserve, the unit will be checked to ensure the MWs provided in the “Avail at GC File” (which also contains prices) = Contracted MW

Any failures will result in the following:

- EoD code VOL will be recorded, and NO availability payment will be made.

NESO
National Energy System Operator

Performance Monitoring BM

Submitted Ramp (EoD code "SRMP")

Delivery Ramp (EoD code "DRMP")

A contracted unit must be capable of ramping during contracted service windows in accordance with the rules set out below:

Where notice period > 10 minutes:

- Ramping no more than 100% contracted capacity per minute
- For any instantaneous ramping, units cannot deliver more than 50% contracted capacity in any 30-second period

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, MZT – Minimum Zero Time, MNZT- Minimum Non-Zero Time, Ramp Rates, SIL – Stable Import Limit, NTO – Notice to Offer, NTB – Notice to Bid, NDZ - Notice to Deviate from Zero, BOA - Bid Offer Acceptance,

The check – Maximum Ramp Rates

Where a unit's notice period > 10 mins

- The maximum ramp rate limit is set at ≤100% contracted capacity per minute.
- For instantaneous ramping (i.e., units than cannot ramp linearly), the unit cannot deliver more than 50% of the contracted capacity in any 30-second period.

This is monitored in two separate checks:

- 1. The Maximum submitted (or derived) Ramp rates MW/min <= Contracted MW for each settlement.
    - 1.1 f this is not the case then a "SRMP" EoD will be reported , and no payment will be made for the Settlement Period.
- 2. During service Utilisation; The MW delivered must be <= Expected MW as monitored for each 15 seconds during the contracted ramp period = Contracted Response Time less Notice Period.
    - 2.1 f this is not the case then a "DRMP" EoD will be reported , and no payment will be made for the Settlement Period.

Where a unit's notice period ≤ 10 mins, there is no maximum ramp rate limit.

Note: SR units can participate from non-zero baselines

Public

Performance Monitoring NBM

Submitted Ramp (EoD code "SRMP")

Delivery Ramp (EoD code "DRMP")

A contracted unit must be capable of ramping during contracted service windows in accordance with the rules set out below:

Where notice period > 10 minutes:

- Ramping no more than 100% contracted capacity per minute
- For any instantaneous ramping, units cannot deliver more than 50% contracted capacity in any 30-second period

The check – Maximum Ramp Rates

Where a unit's notice period > 10 mins:

- The maximum ramp rate limit is set at ≤100% contracted capacity per minute.
- For instantaneous ramping (i.e., units than cannot ramp linearly), the unit cannot deliver more than 50% of the contracted capacity in any 30-second period.

This is monitored in two separate checks:

- 1. Ramp rates MW/min (submitted or derived) <= Contracted MW for each settlement.
    - 1.1 If this is not the case then a "SRMP" EoD will be reported , and no payment will be made for the Settlement Period.
- 2. During service Utilisation; The MW delivered must be <= Expected MW as monitored for each 15 seconds during the contracted ramp period = Contracted Response Time less Notice Period.
    - 2.1 If this is not the case then a "DRMP" EoD will be reported , and no payment will be made for the Settlement Period

Where a unit's notice period ≤ 10 mins, there is no maximum ramp rate limit.

Note: SR units can participate from non-zero baselines

Performance Monitoring BM

Performance Metering Data (EoD code “DATA”)

The provision of PN (Physical Notification) data and Performance Settlement Period is a pre-requisite to assessing the availability and delivery of the service.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The checks – Performance Metering and PN Data

When a unit fails to supply either:

a) PN data, or
b) Metering Data

Then the unit will be subject to a "DATA" event of default and an ‘Availability Failure’ flag will be set to "Y“, resulting in no availability payment made for the Settlement period.

Performance Monitoring NBM

Performance Metering Data (EoD code “DATA”)

The provision of PN (Physical Notification) data and Performance Settlement Period is a pre-requisite to assessing the availability and delivery of the service.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The checks – Performance Metering and PN Data

When a unit fails to supply either:

a) PN data, or
b) Metering Data

Then the unit will be subject to a "DATA" event of default and an ‘Availability Failure’ flag will be set to "Y“, resulting in no availability payment made for the Settlement period.

Performance Monitoring BM

Cease Time
(EoD code "CEAS")

Submitted ramp rates are checked to ensure that a unit is capable of ceasing the provision of the service within the cease time specified in the service terms.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The check – Cease Time

If a units' calculated cease ramping time (based on the tendered MW and Ramp Rate) is > 15 minutes, then:

- the unit will be subject to a "CEAS" event of default and an 'Availability Failure' flag will be set to "Y", resulting in no availability payment made for the Settlement period.

Note: The unit is required to cease service provision within 15 minutes

Note: SR units can participate from non-zero baselines

Performance Monitoring NBM

Cease Time
(EoD code "CEAS")

Submitted ramp rates are checked to ensure that a unit is capable of ceasing the provision of the service within the cease time specified in the service terms.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The check – Cease Time

If a units' calculated cease ramping time (based on the tendered MW and Ramp Rate) is > 15 minutes, then:

- the unit will be subject to a "CEAS" event of default and an 'Availability Failure' flag will be set to "Y", resulting in no availability payment made for the Settlement period.

Note: The unit is required to cease service provision within 15 minutes

Note: SR units can participate from non-zero baselines

Performance Monitoring BM

Crossover Check (EoD code "COVR")

Verification that contracted units could deliver the service, if instructed, at the end of the Settlement Period as per service terms and Crossover Rules.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The check – Crossover Check

1. The provider must maintain its contracted Headroom or Footroom check (for a PSR or NSR service) into the following settlement period for the duration of the cross over period. For example; if a unit was contracted for 25 MW PSR from 18:00 – 18:30, and the cross over period was 3 minutes; then the units' headroom must be at least 25MW for the period 18:30 – 18:33 or it will be subject to a COVR Failure.

2. The provider must be capable of being dispatched up to its contracted MW during a cross over period.
To validate this, in the settlement period following a contracted settlement period MW are totalled and compared to the requirement:
(a) For a PSR service positive BO pair BO_LEVEL are totalled,.
(b) For a NSR negative BO Pairs Absolute BO_LEVEL MW are totalled.

Example: A unit is contracted for 25 MW PSR from 18:00–18:30, and has a cross over period of 3 minutes.
It has submitted 2 positive BO pairs for 18:30 – 19:00; BO pair 1 with a BO_LEVEL of 20 MW and BO Pair 2 with a BO_LEVEL of 3

In this case the unit can be dispatched only for 23MW (20 +3) during the cross over period, and as this is less that the contracted PSR of 25MW in the previous SP there is a COVR failure.

Performance Monitoring NBM

Crossover Check (EoD code "COVR")

Verification that contracted units could deliver the service, if instructed, at the end of the Settlement Period as per service terms and Crossover Rules.

When a reserve unit triggers an EOD, it will forfeit Availability Payment for all relevant Committed Windows.

The check – Crossover Check

For the cross over period, a NBM provider:

(a) Must submit an FPN

(b) If a price is submitted for the tendered service, then the associated MW <>0. **Note:** If no price is submitted then this check passes, or if a price is submitted and the MW is not zero, then this check passes

(c) Must not have a declaration =0. (Note: A null value i.e. no value , or a non-zero value is acceptable)

If any one of the above fails Then COVR failure will be generated, AVAL flag will be set to "0" and no Availability payment will be made

Performance Monitoring BM

Stacking - Splitting (EoD code "SPLT")

Splitting **is not allowed between the same polarity** Reserve products, i.e., PSR & PBR

Positive contracted units can ONLY be split with the following services:

- Slow Reserve negative

Negative contracted units can ONLY be split with the following services:

- Slow Reserve positive

The Check

- Where a unit is contracted for Slow Reserve Positive and Slow Reserve Negative
- Units will pass and Availability payment will be made

- Any failures will result in the following:
- EoD code SPLT will be recorded, and NO availability payment will be made.

NESO
National Energy System Operator

Performance Monitoring NBM

Stacking - Splitting (EoD code "SPLT")

Splitting **is not allowed between the same polarity** Reserve products, i.e., PSR & PBR

Positive contracted units can ONLY be split with the following services:

- Slow Reserve negative

Negative contracted units can ONLY be split with the following services:

- Slow Reserve positive

The Check

- Where a unit is contracted for Slow Reserve Positive and Slow Reserve Negative
- Units will pass and Availability payment will be made

- Any failures will result in the following:
- EoD code SPLT will be recorded, and NO availability payment will be made.

NESO
National Energy System Operator

Performance Monitoring

Excessive pricing

NESO has implemented the Excessive Pricing Service Term clause, drawing on insights gained from other Balancing Services. It seeks to ensure that SR units remain available through contracted periods and do not intentionally deter NESO from dispatch by submitting excessively high or low pricing.

BM- Balancing Mechanism; NBM- Non Balancing Mechanism;

SP- Settlement period

The formula

For the purpose of monitoring, our tool considers a BM/NBM unit bid/offer price submitted is excessively high/low when compared to the calculated statistical threshold value for the relevant fuel category in a particular settlement period.

The Price Threshold Formula we apply (which NESO reserves the right to review periodically) is as follows:

- The BM/NBM Bid Price Threshold Formula is:

= Median BM Bid (for the relevant SP and unit fuel category) - 3 * the Standard Deviation (for the relevant SP and unit fuel category)

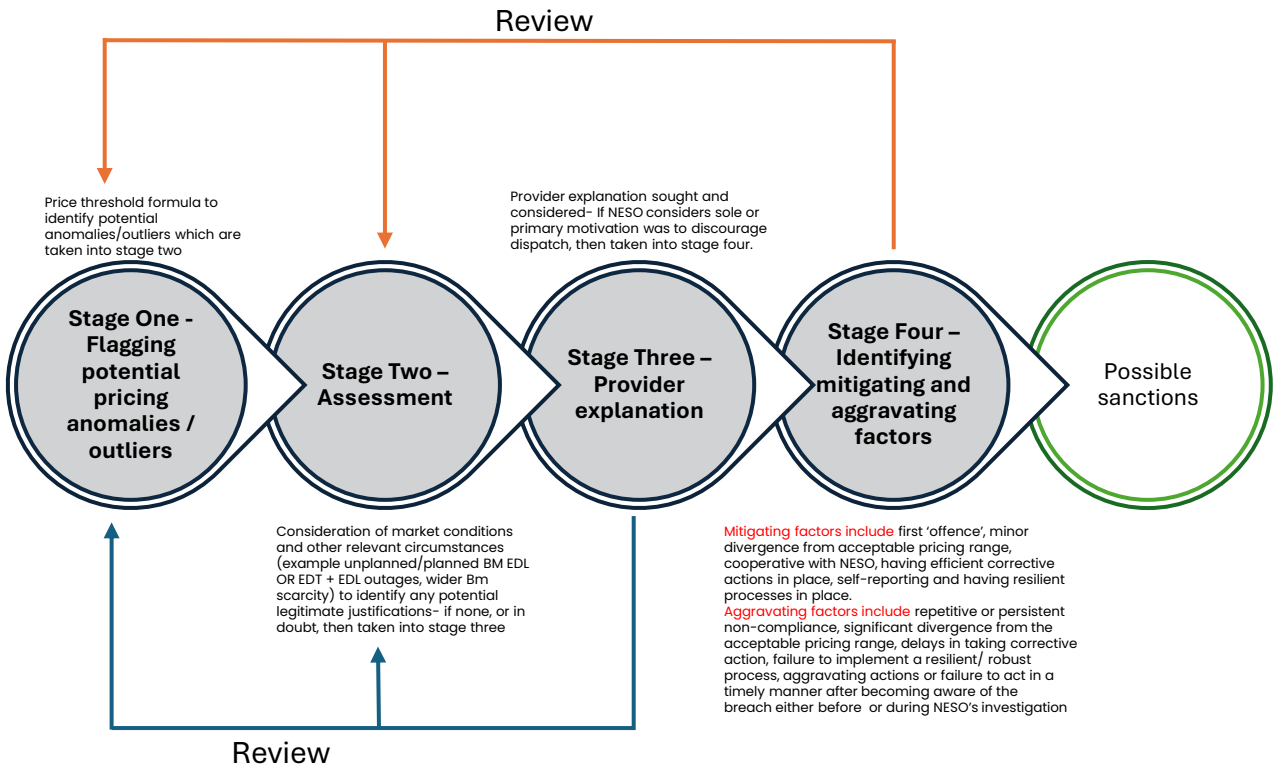
- The BM/NBM Offer price Threshold Formula is,

= Median BM Offer Price (for the relevant SP and unit fuel category) + 3 * the Standard Deviation (for the relevant SP and unit fuel category)

Note: These formulas are used to define the thresholds that help NESO assess whether the BM/NBM Bid Price or BM/NBM Offer Price may be excessively high or excessively low, pursuant to Paragraph 5.12 of the SR Service Terms.

NESO
National Energy System Operator

“Excessive Pricing” – Process flow



Possible sanctions

- No action
- No availability fee for affected service window
- Refer to Ofgem (via Market Monitoring team)

If same or similar facts in preceding 90 days (same or different asset), then also:

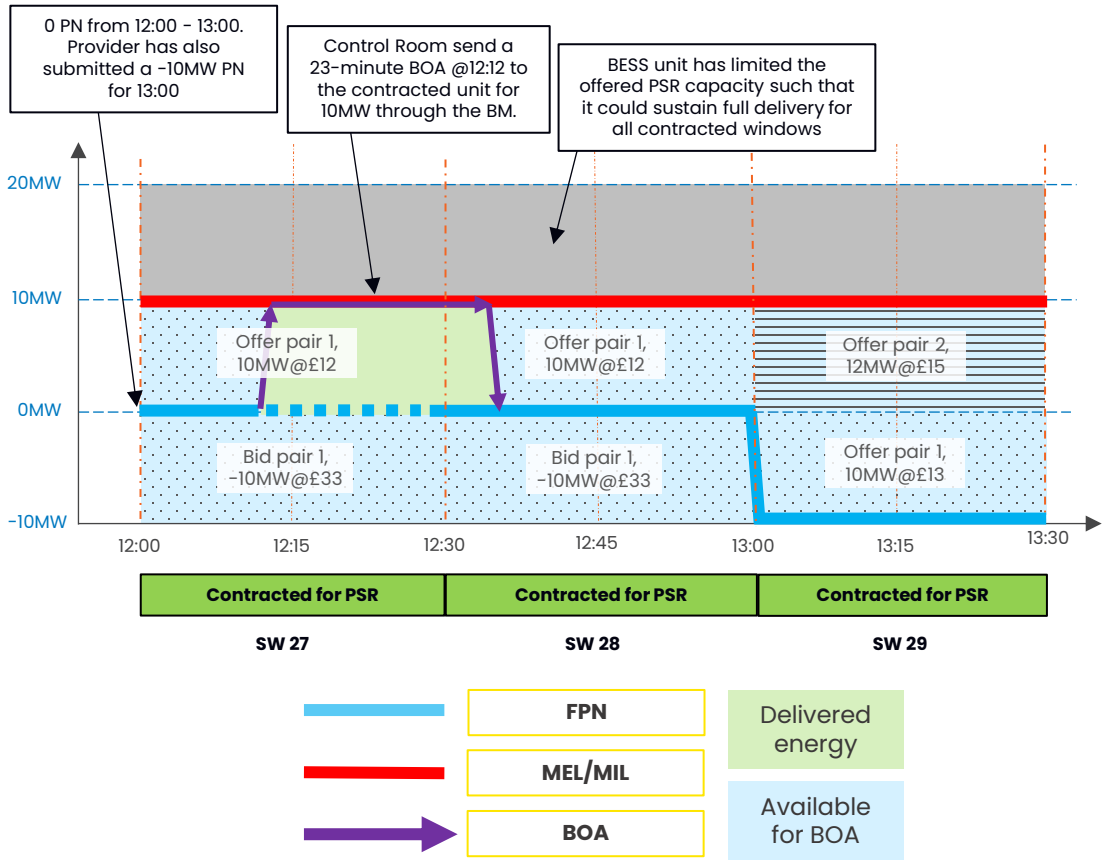
- Deregister relevant asset on SMP from affected service
- Deregister provider on SMP from affected service
- Deregister provider on SMP for all services

NESO
National Energy System Operator

Detailed example 1: Managing State of Energy

Unit characteristics

- The BESS has a max generation capacity (GC) of 20MW.
- The unit has submitted a linear run-up rate of 10MW/minute.
- The unit does not have any response contracts.
- The unit is contracted for 10MW of Positive Slow Reserve in Service Windows 27-30.
- The unit submitted a Recovery Period (MZT) = 0 mins.
- The unit submitted NTO/NTB = 0 mins.
- **At 12:00 the unit has 10MWh of stored energy available for discharge.**
- Settlement metering for SW27 (12:00 – 12:30) = 2.917MWh
- Settlement metering for SW28 (12:30 – 13:00) = 0.750MWh



Note: BOA timings include ramps. Prices are purely fictional.

NESO National Energy System Operator

Detailed example 1: Managing State of Energy

Unit characteristics

- The BESS has a max generation capacity (GC) of 20MW.
- The unit has submitted a linear run-up rate of 10MW/minute.
- The unit does not have any response contracts.
- The unit is contracted for 10MW of Positive Slow Reserve in Service Windows 27-30.
- The unit submitted a Recovery Period (MZT) = 0 mins.
- The unit submitted NTO/NTB = 0 mins.
- **At 12:00 the unit has 10MWh of stored energy available for discharge.**
- Settlement metering for SW27 (12:00 – 12:30) = 2.917MWh
- Settlement metering for SW28 (12:30 – 13:00) = 0.750MWh

Performance check (PSR)

SW27 - 30

Availability
→ MEL – FPN ≥ 10MW
→ (10 – 0) ≥ 10
→ **CORRECT**

Recovery Period
→ 0 ≤ 60
→ **CORRECT**

Time to full delivery
→ Contracted quantity / Run up Rate + NTO ≤ 15 minutes
→ (10 / 10) + 0 ≤ 15
→ 1 ≤ 15
→ **CORRECT**

Ramp rates
→ NTO/NTB ≤ 10 mins
→ **No Ramp check required**

SW27

Utilisation
→ Settlement metering - FPN volume ≥ Expected delivery * 95% &
→ Settlement metering - FPN volume ≤ Expected delivery * 120%
→ 2.917 – 0 ≥ 2.917 * 0.95 **AND** 2.917 – 0 ≤ 2.917 * 1.2
→ 2.917 ≥ 2.771 **AND** 2.917 ≤ 3.500
→ **CORRECT**

SW28

Utilisation
→ Settlement metering - FPN volume ≥ Expected delivery * 95% &
→ Settlement metering - FPN volume ≤ Expected delivery * 120%
→ 0.750 – 0 ≥ 0.750 * 0.95 **AND** 0.750 – 0 ≤ 0.750 * 1.2
→ 0.750 ≥ 0.713 **AND** 0.750 ≤ 0.900
→ **CORRECT**

Payment (PSR)

Availability
The clearing price for SW27-30 in the DA PSR auction was £19/MW/hour **for a BO Level of 10.**
For each contracted window, the provider expects to be paid (£19*10)/2 = £95.00

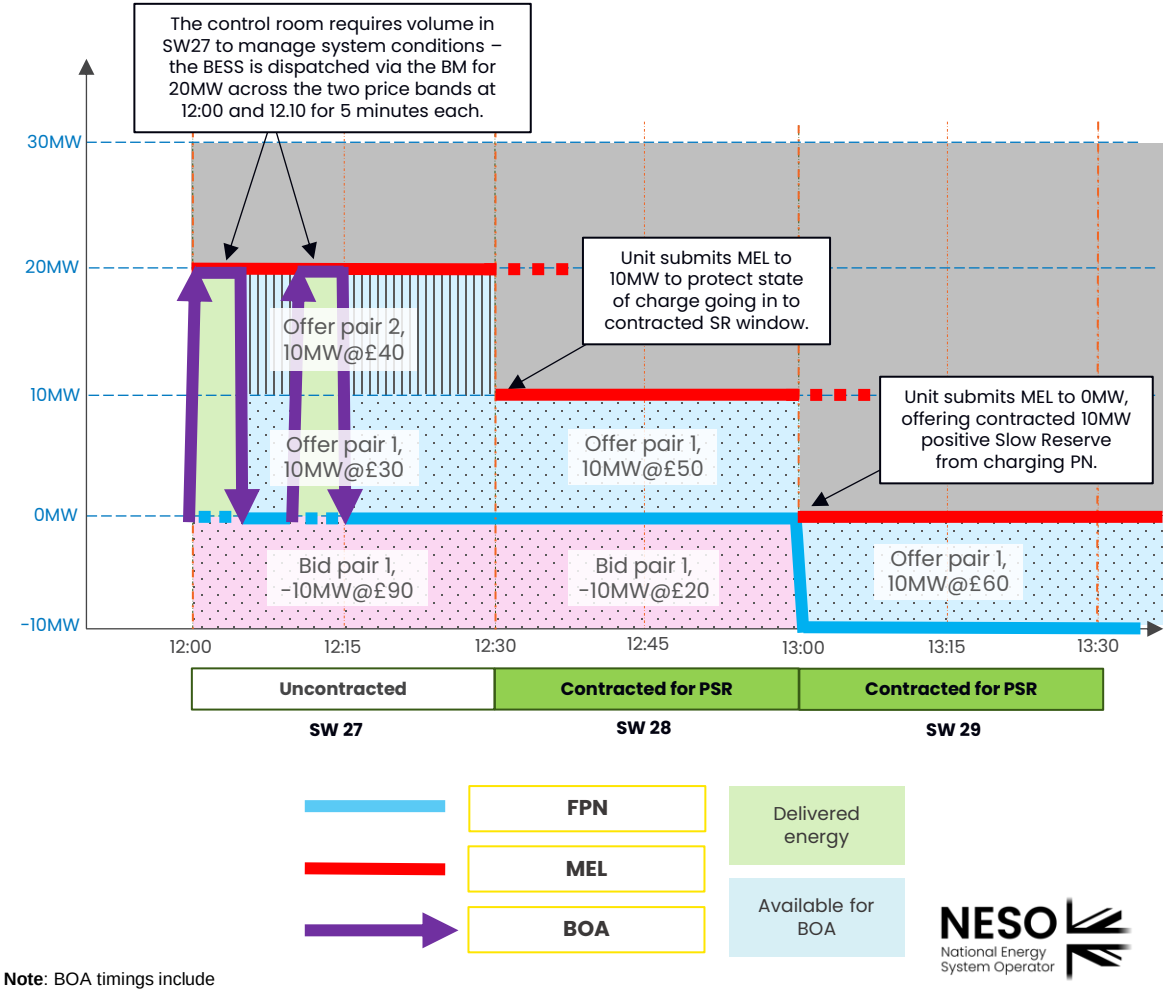
Utilisation – BOAs are settled by Elexon

NESO
National Energy System Operator

Detailed example 2a: Using price bands to manage state of energy (30-minute MEL)

Unit characteristics

- The BESS has a max generation capacity (GC) of 30MW.
- The unit has submitted a run up rate of 30MW/minute.
- The unit does not have any response contracts.
- The unit is contracted for 10MW of Positive Slow Reserve in SR Service Window 28-31.
- The unit submitted a Recovery Period (MZT) = 0 minutes.
- The unit submitted NTO/NTB = 0 mins.
- **At 12:00 the unit has 15MWh of stored energy available for discharge.**
- Settlement metering for SW27 (12:00 – 12:30) = 2.888MWh
- Settlement metering for SW28 (12:30 – 13:00) = 0MWh



Note: BOA timings include ramps. Prices are purely fictional.

Detailed example 2a: Using price bands to manage state of energy (30-minute MEL)

Unit characteristics

- The BESS has a max generation capacity (GC) of 30MW.
- The unit has submitted a run up rate of 30MW/minute.
- The unit does not have any response contracts.
- The unit is contracted for 10MW of Positive Slow Reserve in SR Service Window 28-31.
- The unit submitted a Recovery Period (MZT) = 0 minutes.
- The unit submitted NTO/NTB = 0 mins.
- **At 12:00 the unit has 15MWh of stored energy available for discharge.**
- Settlement metering for SW27 (12:00 – 12:30) = 2.888MWh
- Settlement metering for SW28 (12:30 – 13:00) = 0MWh

Performance check (PSR) SW28:

Availability
→ MEL – FPN ≥ 10MW
→ (10 – 0) ≥ 10
→ **CORRECT**

Recovery Period
→ 0 ≤ 60
→ **CORRECT**

Utilisation
→ Settlement metering - FPN volume ≥ Expected delivery * 95% &
→ Settlement metering - FPN volume ≤ Expected delivery * 120%
→ *0 BOA volume* → **PSR NOT CHECKED**

Time to full delivery
→ Contracted quantity / Run up Rate + NTO ≤ 15 minutes
→ (10 / 30) + 0 ≤ 15
→ 0.33 ≤ 15
→ **CORRECT**

Assumed also complied with MNZT, Bid-Offer and Cease time Checks

Performance check (PSR) SW29:

Availability
→ MEL – FPN ≥ 10MW
→ (0 – (-10)) ≥ 10
→ **CORRECT**

Recovery Period
→ 0 ≤ 60
→ **CORRECT**

Utilisation
→ Settlement metering - FPN volume ≥ Expected delivery * 95% &
→ Settlement metering - FPN volume ≤ Expected delivery * 120%
→ *0 BOA volume* → **PSR NOT CHECKED**

Time to full delivery
→ Contracted quantity / Run up Rate + NTO ≤ 15 minutes
→ (10 / 30) + 0 ≤ 15
→ 0.33 ≤ 15
→ **CORRECT**

Assumed also complied with MNZT, Bid-Offer and Cease time Checks

Payment (PSR)

Availability
The clearing price for SP26/SW28 - SP29/SW31 in the DA SR auction was £5/MW/hour. For each of the contracted windows, the provider expects to be paid (£5*10)/2 = £50.00.

Utilisation – BOAs are settled by Elexon

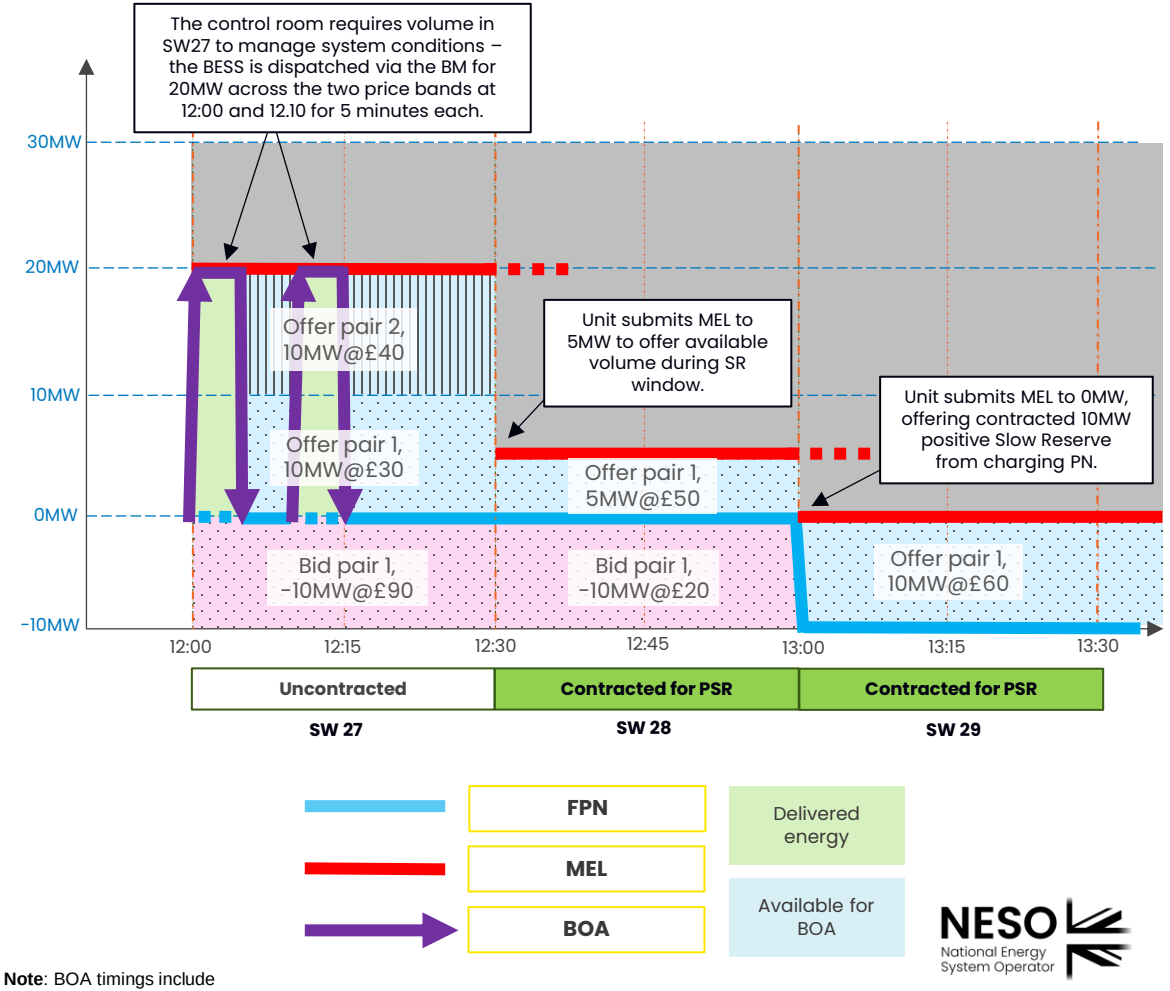
Total Revenue from NESO for SW 28-31
Availability → £200.00

NESO
National Energy System Operator

Detailed example 2b: Using price bands to manage state of energy (30-minute MEL)

Unit characteristics

- The BESS has a max generation capacity (GC) of 30MW.
- The unit has submitted a run up rate of 30MW/minute.
- The unit does not have any response contracts.
- The unit is contracted for 10MW of Positive Slow Reserve in SR Service Window 28-31.
- The unit submitted a Recovery Period (MZT) = 0 minutes.
- The unit submitted NTO/NTB = 0 mins.
- **At 12:00 the unit has 5MWh of stored energy available for discharge.**
- Settlement metering for SW27 (12:00 – 12:30) = 2.888MWh
- Settlement metering for SW28 (12:30 – 13:00) = 0MWh



Note: BOA timings include ramps. Prices are purely fictional.

Detailed example 2b: Using price bands to manage state of energy (30-minute MEL)

Unit characteristics

- The BESS has a max generation capacity (GC) of 30MW.
- The unit has submitted a run up rate of 30MW/minute.
- The unit does not have any response contracts.
- The unit is contracted for 10MW of Positive Slow Reserve in SR Service Window 28-31.
- The unit submitted a Recovery Period (MZT) = 0 minutes.
- The unit submitted NTO/NTB = 0 mins.
- **At 12:00 the unit has 5MWh of stored energy available for discharge.**
- Settlement metering for SW27 (12:00 – 12:30) = 2.888MWh
- Settlement metering for SW28 (12:30 – 13:00) = 0MWh

Performance check (PSR) SW28:

Availability
→ MEL – FPN ≥ 10MW
→ (5 – 0) ≥ 10
→ **FAILED**

Recovery Period
→ 0 ≤ 60
→ **CORRECT**

Utilisation
→ Settlement metering - FPN volume ≥ Expected delivery * 95% &
→ Settlement metering - FPN volume ≤ Expected delivery * 120%
→ *0 BOA volume* → **PSR NOT CHECKED**

Time to full delivery
→ Contracted quantity / Run up Rate + NTO ≤ 15 minutes
→ (10 / 30) + 0 ≤ 15
→ 0.33 ≤ 15
→ **CORRECT**

Assumed also complied with MNZT, Bid-Offer and Cease time Checks

Performance check (PSR) SW29-31:

Same as example 2a

Note: We consider SW28 failure "commercial unavailability" as the unit was dispatched by NESO through a BOA during an uncontracted Settlement Period which led to its energy limitations (see 8.1 in the SR service terms). The unit did not maintain its state of charge correctly ahead of a contracted Reserve service. Therefore, the unit is at risk of being levied a cost of reimbursement for replacing the reserve volume which has been exhausted.

Payment (PSR)

Availability
The clearing price for SP26/SW28 - SP29/SW31 in the DA SR auction was £5/MW/hour. For each of the contracted windows, the provider expects to be paid (£5*10)/2 = £50.00.

Utilisation – BOAs are settled by Elexon

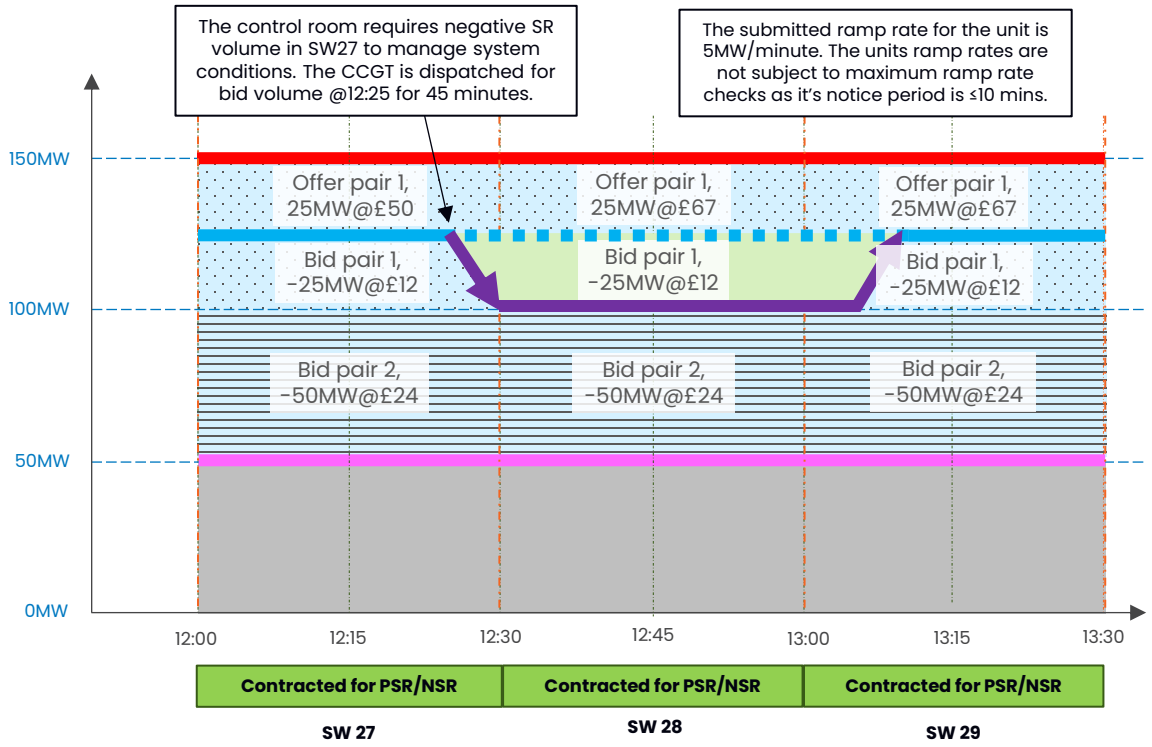
Total Revenue from NESO for SW 28-31
Availability → £150.00
Note: (SW28 failed, SW29-31 passed)

NESO
National Energy System Operator

Detailed example 3: Headroom and Footroom checks

Unit characteristics

- This CCGT unit has a max generation capacity of 150MW and a SEL of 50MW.
- The unit has submitted a run-up and run-down rate of 5MW/minute.
- The unit is contracted for 25MW of PSR and 25MW of NSR in SR Service Windows 20 - 34.
- The unit submitted a Recovery Period (MZT) = 2 minutes.
- The unit submitted NTO/NTB = 0 mins.
- Settlement metering for SW27 (12:00 – 12:30) = 61.458MWh
- Settlement metering for SW28 (12:30 – 13:00) = 50.000MWh
- Settlement metering for SW29 (13:00 – 13:30) = 59.375MWh



Note: BOA timings include ramps. Prices are purely fictional.

NESO National Energy System Operator

Detailed example 3: Headroom and Footroom checks

Unit characteristics

- This CCGT unit has a max generation capacity of 150MW and a SEL of 50MW.
- The unit has submitted a run-up and run-down rate of 5MW/minute.
- The unit is contracted for 25MW of PSR and 25MW of NSR in SR Service Windows 20 - 34.
- The unit submitted a Recovery Period (MZT) = 2 minutes.
- The unit submitted NTO/NTB = 0 mins.
- Settlement metering for SW27 (12:00 – 12:30) = 61.458MWh
- Settlement metering for SW28 (12:30 – 13:00) = 50.000MWh
- Settlement metering for SW29 (13:00 – 13:30) = 59.375MWh

Performance check (PSR & NSR) SW27-29:

Availability

→ MEL – FPN ≥ 25MW
→ (150 – 125) ≥ 25
→ **CORRECT**

FPN – SEL ≥ 25MW
(125 – 50) ≥ 75MW
CORRECT

Recovery Period

→ 2 ≤ 60
→ **CORRECT**

Time to full delivery

→ Contracted quantity / Run up Rate + NTO ≤ 15 minutes
→ (25 / 5) + 0 ≤ 15
→ 5 ≤ 15
→ **CORRECT**

Assumed also complied with MNZT, Bid-Offer and Cease time Checks

Utilisation (NSR) SW27

→ Settlement metering - FPN volume ≥ Expected delivery * 95% **AND**
→ Settlement metering - FPN volume ≤ Expected delivery * 120%
→ ABS(61.458 – 62.500) ≤ ABS(-1.042 * 0.95) **AND** ABS(61.458 – 62.500) ≥ ABS(-1.042 * 1.20)
→ 1.042 ≥ 0.99 **AND** 1.042 ≤ 1.25
→ **CORRECT**

Utilisation (NSR) SW28

→ ABS(50.000 – 62.500) ≤ ABS(-12.50 * 0.95) **AND** ABS(50.000 – 62.500) ≥ ABS(-12.50 * 1.20)
→ 12.5 ≥ 11.875 **AND** 12.5 ≤ 15.00
→ **CORRECT**

Utilisation (NSR) SW29

→ ABS(59.375 – 62.500) ≤ ABS(-3.125 * 0.95) **AND** ABS(59.375 – 62.500) ≥ ABS(-3.125 * 1.20)
→ 3.125 ≥ 2.969 **AND** 3.125 ≤ 3.75
→ **CORRECT**

Payment (PSR & NSR)

Availability
The clearing price for SW27-29 in the DA PSR and NSR auction was £6/MW/hour. The provider expects to be paid (£6*25)/2 * 2 = £300 per SW.

Utilisation – BOAs are settled by Elexon

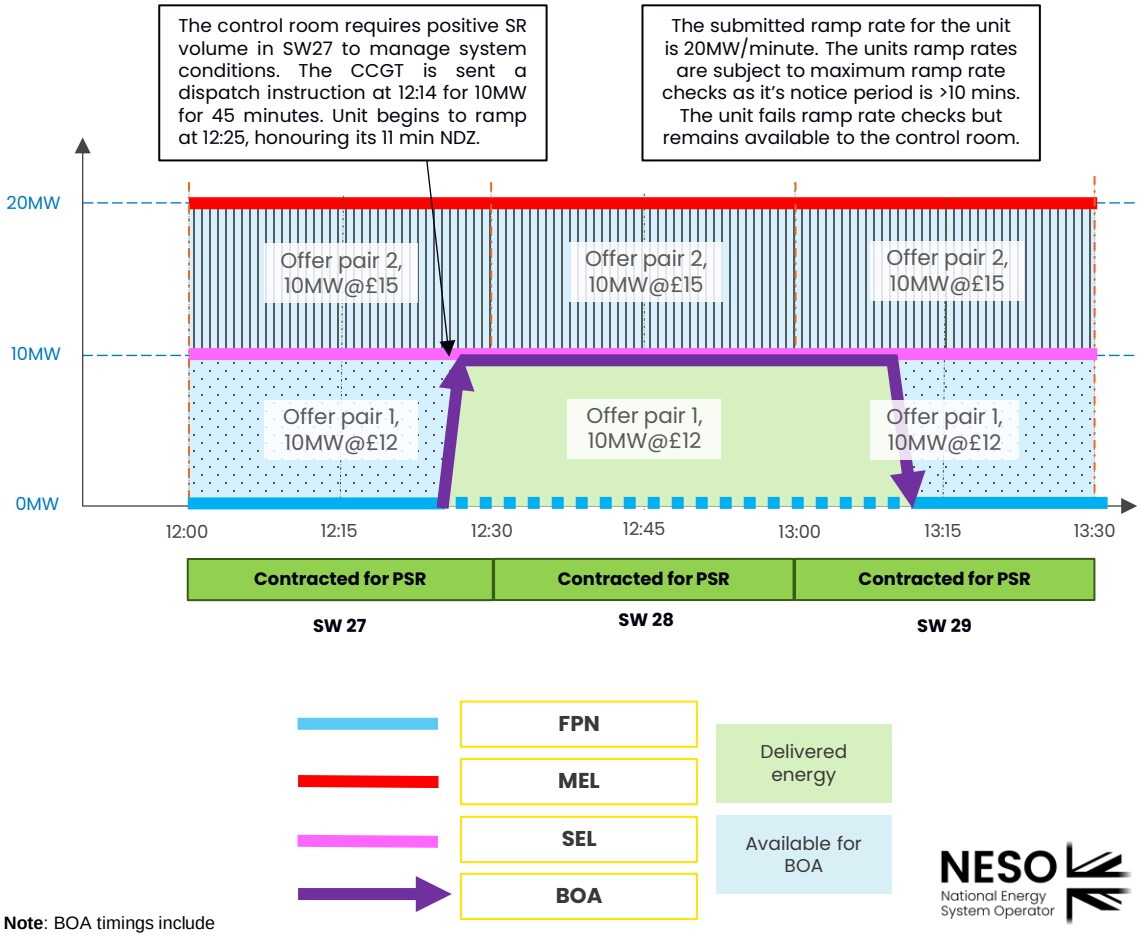
Total Revenue from NESO for SW27-29 Availability → £900.00

NESO
National Energy System Operator

Detailed example 4: Ramp rate checks

Unit characteristics

- This CCGT unit has a max generation capacity of 20MW and a SEL of 10MW.
- The unit has submitted a run-up and run-down rate of 20MW/minute for all SR Windows.
- The unit is contracted for 10MW of PSR SR Service Windows 20 - 34.
- The unit submitted a Recovery Period (MZT) = 30 minutes.
- The unit submitted an MNZT of 30 mins.
- The unit submitted an NDZ of 11 mins.
- Settlement metering for SW27 (12:00 – 12:30) = 0.792MWh
- Settlement metering for SW28 (12:30 – 13:00) = 5.000MWh
- Settlement metering for SW29 (13:00 – 13:30) = 1.625MWh



Note: BOA timings include ramps. Prices are purely fictional.

NESO National Energy System Operator

Detailed example 4: Ramp rate checks

Unit characteristics

- This CCGT unit has a max generation capacity of 20MW and a SEL of 10MW.
- The unit has submitted a run-up and run-down rate of 20MW/minute for all SR Windows.
- The unit is contracted for 10MW of PSR SR Service Windows 20 - 34.
- The unit submitted a Recovery Period (MZT) = 30 minutes.
- The unit submitted an MNZT of 30 mins.
- The unit submitted an NDZ of 11 mins.
- Settlement metering for SW27 (12:00 – 12:30) = 0.792MWh
- Settlement metering for SW28 (12:30 – 13:00) = 5.000MWh
- Settlement metering for SW29 (13:00 – 13:30) = 1.625MWh

Performance check (PSR) SW27-29:

Availability
→ MEL – FPN ≥ 10MW
→ (20 – 0) ≥ 10
→ **CORRECT**

Recovery Period
→ 30 ≤ 60
→ **CORRECT**

Time to full delivery
→ Contracted quantity / Run up Rate + NDZ ≤ 15 minutes
→ (10 / 20) + 11 ≤ 15
→ 11.5 ≤ 15
→ **CORRECT**

Ramp rate check (as NDZ > 10)
→ Ramp rate ≤ Contracted MW / min ***AND*** ≤ 50% Contracted MW per 30s period
→ 20 ≤ 10 **AND** 10MW per 30s period ≤ 5
→ **FAILED**

Assumed also complied with MNZT, Bid-Offer and Cease time Checks

Utilisation (NSR) SW27
→ Settlement metering - FPN volume ≥ Expected delivery * 95% **AND**
→ Settlement metering - FPN volume ≤ Expected delivery * 120%
→ 0.792 – 0.000 ≤ 0.792 * 0.950 **AND** 0.792 – 0.000 ≥ 0.792 * 1.200
→ 0.792 ≥ 0.753 **AND** 0.792 ≤ 0.950
→ **CORRECT**

Utilisation (NSR) SW28
→ 5.000 – 0.000 ≤ 5.000 * 0.950 **AND** 5.000 – 0.000 ≥ 5.000 * 1.200
→ 5.000 ≥ 4.75 **AND** 5.000 ≤ 6.250
→ **CORRECT**

Utilisation (NSR) SW29
→ 1.625 – 0.000 ≤ 1.625 * 0.950 **AND** 1.625 – 0.000 ≥ 1.625 * 1.200
→ 1.625 ≥ 1.544 **AND** 1.625 ≤ 1.950
→ **CORRECT**

Payment (PSR)

Availability
The clearing price for SW27-29 in the DA PSR auction was £6/MW/hour. The provider expects to be paid (£6*10)/2 = £30 per SW. However, the unit is subject to maximum ramp rate checks – as it's notice period > 10 mins – and failed.

Utilisation – BOAs are settled by Elexon

Total Revenue from NESO for SW27-29
Availability → £0.00

NESO
National Energy System Operator

Detailed example 5a : Excessive Pricing

Context

Provider **A** – BM Unit X wins a Slow Reserve Contract for the 08 Jan 2025
Settlement Period 33
BM Offer price: £400
Technology type: OCGT

Note: the provided example and values are purely illustrative and should not be considered factually accurate

NESO Assessment

Stages	Detail
Stage One - Flagging potential pricing anomalies / outliers	Price Threshold Formula results is £215.96 Offer price is greater than threshold, stage 2 assessment is required
Stage Two – Assessment	Consideration of market conditions and other relevant circumstances. Day Ahead Nordpool Price = £330.07 Average Intraday price = £977.92 Peak BM Price = £5,750 On the 8th January 2025, a day of tight margins. Average Intraday price was higher than the BM offer price of £400. Which can be understood as Provider A was pricing accordingly to market conditions. No further assessment is required.

Outcome → No action

NESO National Energy System Operator

Detailed example 5b : Excessive Pricing

Context

Provider **B** – BM Unit Y wins a Slow Reserve Contract for the 09 Jan 2025
Settlement Period 31
BM Offer price: £600
Technology type: OCGT

Note: the provided example and values are purely illustrative and should not be considered factually accurate

NESO Assessment

Stages	Detail
Stage One – Flagging potential pricing anomalies / outliers	Price Threshold Formula results is £414.44 Offer price is greater than threshold.
Stage Two – Assessment	Consideration of market conditions and other relevant circumstances. Day Ahead Nordpool Price = £104.42 Average Intraday price = £103.16 Peak BM Price = £144.9 Provider B offer pricing exceeded market prices. Non unplanned/planned EDL BM outages observed that could have impede provider to adjust MIL/MEL to reflect unavailability.
Stage Three – Provider explanation	Provider B declared that BM price was used to discourage BOA.
Stage Four – Identifying mitigating and aggravating factors	This was the first offence from Provider B and after becoming aware of the failure provider has put corrective action

Outcome → No availability fee for affected service window.

Incident recorded in case of further breaches

NESO National Energy System Operator

Public

Settlement

NESO
National Energy System Operator

Availability Payments

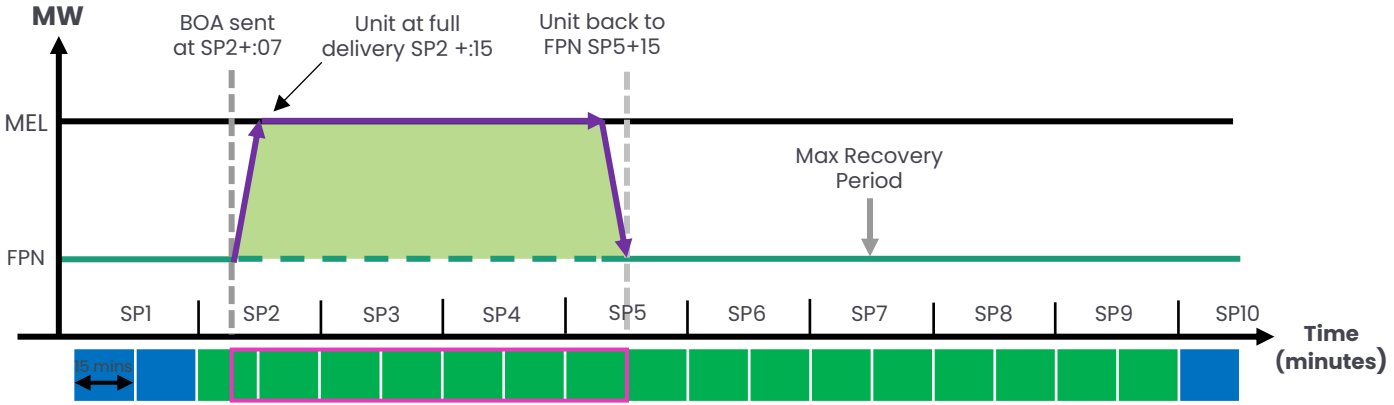
Availability Payments

- The day ahead SR auction is Pay-as-Clear.
- Forty-eight 30-minute service windows for both Positive Slow Reserve and Negative Slow Reserve, running 23:00-23:00 (UK local time).
- Market participants submit sell orders for SR (including availability prices and offered volumes) before 14:00 Gate Closure time.
- NESO submits a buy order which represents the willingness to pay for a given volume of firm SR volume.
- An auction is conducted by auction partners NSIDE using the EAC algorithm via a co-optimised auction for Balancing Reserve, Quick Reserve, Slow Reserve and Response run in the afternoon.
- A cohort of accepted sell orders and buy orders is determined to maximise market welfare.
- A clearing price is determined to maximise market welfare whilst minimising total cost of procurement.

All successful providers for each firm Service Window will be paid the clearing price for that Service Window (subject to contract compliance).

Detailed information about the day ahead auction can be found in this market explainer document.
https://www.neso.energy/document/277671/download

Utilisation Payments



Utilisation Payments (BM)

- Utilisation of SR is through bids and offers in the BM and applies to both firm and optional participants.
- Holding a SR contract is not a guarantee of dispatch – in some periods, reserve will not be required and/or the unit may not adequately meet the system need (e.g. we may not be able to dispatch units located behind constraints).
- Submitted dynamic parameters MEL, MIL, SEL, SIL , MNZT, MZT, NTO, NTB, NDZ, Run-up/Run-down rates, FPN, etc., should reflect contract terms.

Payments for BM utilisation are made from ELEXON via the usual BOA settlements processes.

Detailed information about trading charges here: Trading Charges - Elexon BSC

Utilisation Payments (NBM)

- Holding an SR contract is not a guarantee of dispatch – in some periods, reserve will not be required and/or the unit may not adequately meet the system need (e.g. we may not be able to dispatch units located behind constraints).
- Pre-qualification parameters should reflect the prevailing Service Terms published on the Slow Reserve webpage.
- Payments for utilisation are made from NESO via the usual settlements processes.
- Detailed information about trading charges here: Trading Charges - Elexon BSC
- Where a unit is instructed, Expected, Delivered and Capped Energy delivered MWh are computed for each second that metering data is required to be provided e.g. at 0,15.30,45 seconds.

Positive Service

Payment per second = Capped Energy Delivered (MWh) * Applicable Utilisation Price

Capped Energy Delivered for a Positive Service = Min(Delivered, Expected)

Negative Service

Payment per Second = - Capped Energy Delivered (MWh) * Applicable Utilisation Price

Capped Energy delivered for a negative service = Max(Delivered, Expected)

Note 1: If the utilisation occurs in a Firm Service Window, then this would be classified as Firm Service Delivery and will be stored against a different payment code to Optional Reserve service delivery.

Note 2: On the payment report; data is aggregated per settlement period, per instruction, with start and cease ramping periods separately reported.

Note 3: It is feasible for there to be multiple instructions in a settlement period.

Continuing the Conversation

Access our Slow Reserve documents, data and multimedia at the following links:
Slow Reserve

Email us with your views on this Guidance Document at: Box.FutureofBalancingServices@neso.energy and one of our team members will get in touch.

Write to us at:

NESO
Faraday House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

NESO
National Energy System Operator