External

Slow Reserve: Pricing Proposal

Version 1.0 - May 2025

Summary

This proposal compares the service design for Slow Reserve against the criteria established in the GB Pricing Proposal v1.1 for Specific Balancing Products. It concludes that the availability portion of the service meets the requirements of homogeneity, full information and competition which would indicate the use of Marginal Pricing, but that the utilisation portion does not meet the required levels of homogeneity or competition and hence should not use Marginal Pricing.

Contents

Context

This pricing proposal is submitted under v1.1 of the GB Pricing Proposal (PP)[1], as approved by the Authority on 20th May 2022[2]. It has assessed the following high-level options for the availability and utilisation portions of Slow Reserve procurement:

Availability

Option	Notes
Pay-as-clear auction	This option is aligned with the intent of Article 6(4) of Regulation (EU) 2019/943 (the Clean Energy Package, or CEP) and allows us to leverage the existing

[1] GB Pricing Proposal v1.1

[2] Ofgem Decision Letter, (May 2022), Decision to approve proposal from the Electricity System Operator for an alternative pricing methodology for settlement of balancing energy for specific balancing products

	business processes and IT infrastructure created for procurement of the new response services (DM, DR and DC) followed by the new reserve products (QR and SR).
Zonal pay-as-clear auction	This option is also aligned with the CEP. It would require the development of new business processes and IT systems, adding an estimated two years to the service start date.
Pay-as-bid tenders	This is the legacy procurement option used for STOR and Fast Reserve. It is not aligned with CEP and would retain or reintroduce several manually-intensive business processes.

Utilisation

Option	Notes
Pay-as-clear dispatch	This option is aligned with the CEP. However, it would require the development of a new balancing market independent of the BM, an effort which was assessed in 2021 by the NESO as costing £~60 million and taking 3-5 years.
Pay-as-bid dispatch	This option is not aligned with the CEP but can be considered as per the GB Pricing Proposal v1.1. It would utilise both the existing BM market and systems along with non-BM market via OBP which will be fully operational by service go-live.

Pricing Proposal – Slow Reserve

Criteria	Assessment
Homogeneity	*Slow Reserve availability is mostly homogeneous.* Slow Reserve procurement seeks to create reserve capacity. The only factor which could lead to discrimination between providers is location, for example if a network constraint were so congested that reserve behind it were fully sterilised. Some potential Slow Reserve capacity (908 MW, or 16% (as a maximum) of the currently eligible market) is behind the B6 boundary, which is expected to continue to experience significant levels of congestion over the next 10 years[3]. This provides a strong argument for the development of a zonal pay-as-clear auction (NESO has already started work on a methodology for this, although it will take some time to develop). Given the timescales on the development of a zonal pay-as-clear auction, it is recommended to proceed with implementation of a national pay-as-clear

[3] Electricity Ten Year Statement (https://www.neso.energy/document/352001/download).

	auction in the interim, since this has minimal impact on NESO's existing systems and processes and will still result in a net benefit. *Slow Reserve utilisation is not homogeneous.* Optimal dispatch would consider the following factors *alongside* submitted utilisation prices when dispatching units to deliver Slow Reserve: • **Location** Units will not be dispatched if doing so would exacerbate an existing network constraint. As per the comments above, even if some units were procured behind an active constraint boundary, they could not then be dispatched (regardless of price) as this would render the power system insecure. • **Systems and tools available** In periods when there are IT system outages, dispatch decisions might need to be taken to accommodate an increased requirement for manual dispatch (e.g., telephone BOAs). • **Recovery time** By "recovery time" we mean the time which must elapse between the end of one instruction and the start of the next one. Following a loss event and subsequent Slow Reserve dispatch, units with a shorter recovery time will likely be ceased first as they are able to respond to any further events sooner. • **Non-BM vs BM** While, during design, effort has been made to align as far as practicable the non-BM and BM dispatch routes, there are still some differences which means that the two dispatch routes are not fully homogenous. These factors combined mean that the service will often have low levels of homogeneity in dispatch and thus pay-as-bid dispatch is clearly indicated.
Full Information	*Full information is available to support availability pricing decisions* NESO's daily reserve holding requirements (in MW, per service window) will be published ahead of the auction. The full auction results, which includes both accepted and rejected bids together with their volume and price, will be shared on the NESO Data Portal after assessment is completed. *Full information is not available to support dispatch pricing decisions in real time.* During real-time operation, utilisation pricing decisions cannot be informed by full information when a system disturbance happens (or actions are taken preventatively to manage an anticipated disturbance). Control room

<table>
<tr><td></td><td>engineers continuously assess changes in unit output needed and instruct the service manually for delivery (which means no clear utilisation requirements for SR can be defined and shared beforehand).

The lack of clear volume signal means that providers cannot make meaningful decisions about whether to offer their energy in the balancing market as well as in the Slow Reserve market. This means that any implementation which requires providers of SR to exit the BM to provide SR will cause large distortions in the BM. This provides a strong indicator for using the existing (pay-as-bid) BM dispatch mechanism for dispatch of Slow Reserve, thus avoiding that distortion.</td></tr>
<tr><td>Competition</td><td>The market for Slow Reserve availability will be competitive.

An assessment of the Herfindahl Hirschman Index (HHI) for the Slow Reserve availability market was carried out for a standard winter day (see Appendix for full details), which yielded an HHI of 1437. A breakdown of the top 10 companies by expected market share is contained in the table below.

<table>
<tr><th>Rank</th><th>Company</th><th>Market Share %</th></tr>
<tr><td>1</td><td>UNIPER UK LIMITED</td><td>22.2%</td></tr>
<tr><td>2</td><td>SPALDING ENERGY EXPANSION LIMITED</td><td>19.9%</td></tr>
<tr><td>3</td><td>RIVER NENE POWER LIMITED</td><td>18.4%</td></tr>
<tr><td>4</td><td>AES Indian Queens Power Ltd</td><td>10.6%</td></tr>
<tr><td>5</td><td>RWE GENERATION UK PLC</td><td>5.4%</td></tr>
<tr><td>6</td><td>Enel X UK Limited</td><td>4.2%</td></tr>
<tr><td>7</td><td>Neas Energy Ltd</td><td>3.7%</td></tr>
<tr><td>8</td><td>SSEPG (Operations) Ltd</td><td>3.5%</td></tr>
<tr><td>9</td><td>GRIDBEYOND LIMITED</td><td>2.8%</td></tr>
<tr><td>10</td><td>DRAX POWER LIMITED</td><td>2.5%</td></tr>
</table>

The HHI, as shown above, is well within the range of acceptable values that makes Pay-As-Clear the recommended mechanism of choice for Availability payments.

The market for Slow Reserve utilisation will be highly competitive.

The market for Slow Reserve dispatch is dependent on the outcome of the availability auction. On days when the auction is won by a wide variety of providers, we would anticipate a good level of competition. With the above indicative market share percentages, no single market provider can have sole influence on the service, so the Slow Reserve market is therefore anticipated to be highly competitive.</td></tr>
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	In practice, the BM is also well positioned to be a natural competitor for Slow Reserve utilisation, provided the firm Slow Reserve units are dispatched from within the BM, or some comparable pay-as-bid dispatch mechanism.

Conclusion

Slow reserve availability can be procured as a homogeneous product, with full market transparency and robust competition. It is recommended to procure it via a daily pay-as-clear auction, with some consideration given to a future move to a zonal auction.

Slow reserve utilisation cannot be procured on a homogeneous basis, full transparency cannot be provided to the market ahead of time, and it cannot be made competitive if it is procured in isolation. It is therefore recommended to procure it via pay-as-bid dispatch.

If Pay-as-Clear is not the outcome, further detail is required.

Overall Assessment	Pay-as-bid (for utilisation only)
Description of measure proposed to minimise the use of the Specific product subject to economic efficiency	NESO does not currently have access to standard products, so the implementation of the service will only interchange the use of one Specific product with another. To ensure Slow Reserve is dispatched in an economic manner, it will be dispatched in accordance with the Balancing Principles Statement[4], the agreed GB guidance for economic dispatch of a pay-as-bid Specific product, as updated from time to time in line with consultation and feedback from the Authority and other interested stakeholders.
A demonstration that the Specific balancing product does not create significant inefficiencies and distortions in the balancing market inside the scheduling area	The introduction of Slow Reserve procurement at day ahead of delivery will meet a need for access to an updated post-fault capacity that has previously been met by the legacy STOR service. Securing Slow Reserve procurement at day-ahead of delivery will introduce competition into utilisation pricing and thus prevent any distortions. The measures taken to ensure competition, as explained above, will prevent the evolution of any market distortion as a result of the new service.
A demonstration that the Specific balancing product does not create significant inefficiencies and distortions	There is no balancing product traded between the GB scheduling area and other scheduling areas which matches the timescales of Slow Reserve, so it is not possible for the Slow Reserve product to impact on other scheduling areas.

[4] The Balancing Principles Statement is published in accordance with Standard Condition C16 of National Grid Electricity System Operator Transmission Licence

in the balancing market outside the scheduling area	
Where applicable, the rules and information for the process for converting the balancing energy bids from Specific balancing product into balancing energy bids from standard balancing products. EU Regulation 2019/943	Not applicable to this Slow Reserve service as there are no standard products currently in operation in GB.

Appendix: Data Analysis

Defining cases

Slow Reserve requirement

The Slow Reserve requirement is derived based on the historical 2024 STOR utilisation data. To understand better the future Slow Reserve requirement trend, the historical STOR utilisation and service design criteria were extracted and further mapped to the new Slow Reserve service design (e.g. Time to Full Delivery = 15 mins, Recovery Period = 60 mins).

Figure 1 presents the average daily utilisation trend for the existing STOR expressed in terms of delivery percentage (%) and mapped into the future Slow Reserve service design. Figure 2 reflects the impact of Positive Slow Reserve Requirement (MW) considering the utilisation trend from Figure 1. In summary, the average MW availability remains mostly consistent, around 1,700-1,800MW for the positive Slow Reserve Requirement.

Based on the requirement findings, it is anticipated that the average daily buy-order-curve for the future Slow Reserve remains flat, and it would be identical to STOR's historical buy curve.

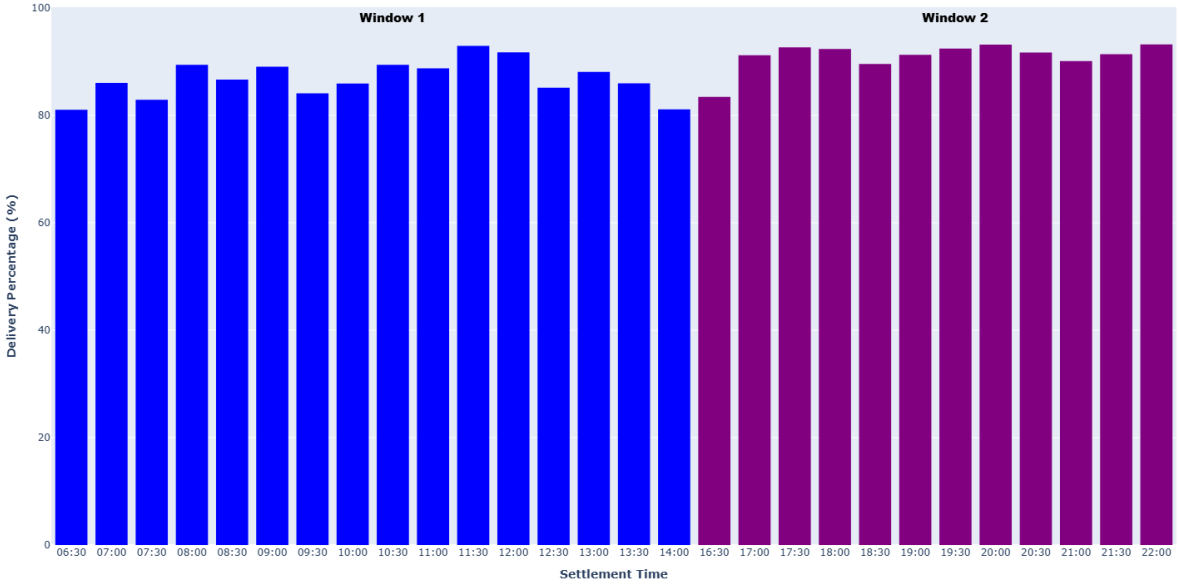

Figure 1: Average delivery percentage trend (%) for the future Slow Reserve.

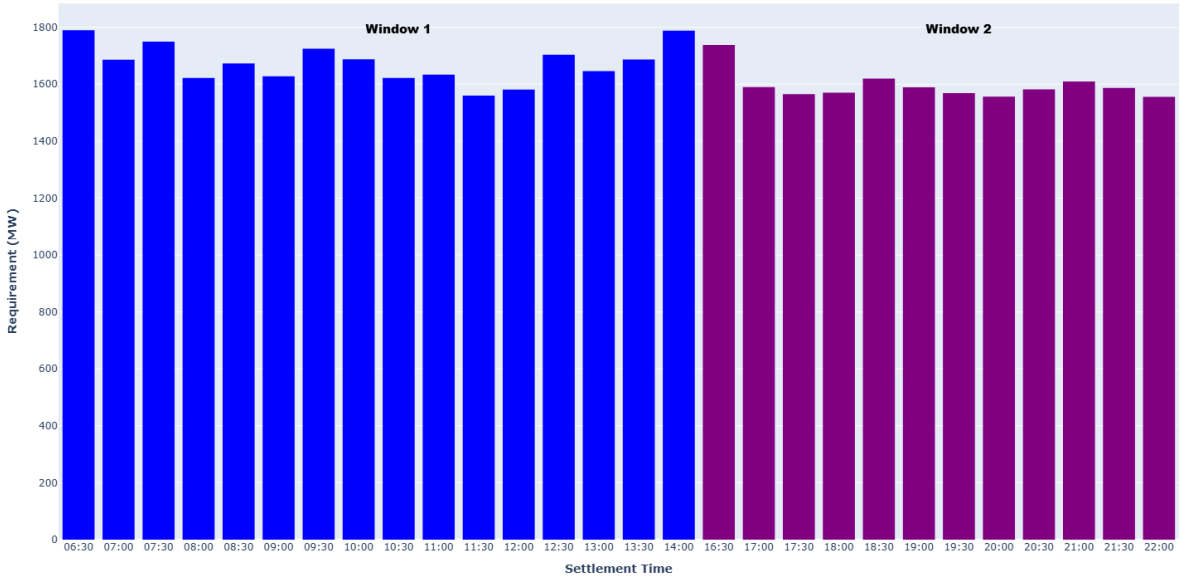

Figure 2: Average positive requirement trend (MW) for the future Slow Reserve.

Since there is no negative requirement for STOR, average daily buy-order-curve for the future Slow Reserve will remain flat. The buy-order would map with the negative requirement of -500MW for the GMT 2025/2026 and -800MW right after BST 2026 Clock change. This is due to the need for additional footroom required to cover BST period than GMT for operational margin purposes.

Case overview

Winter Base Case

It is important to understand possible levels of competition and market liquidity at key periods. The below case study is from February 2025.

Assumption	Points
Volume from participating units	• **Total capacity of 2.5GW** • **58 unique units / 43.5MW** average unit size • Maximum available STOR volume is **8.3GW**

Further information on asset participation for Potential Market Supply and Competition

Clearing data from February 2025 has been used for a typical scenario. Capacity taken from the data portal uses cleared capacity of a typical winter month. Some providers therefore may have been excluded if they did not participate in the market during that time.

The average availability of STOR volume for each day is around 1.6GW. There is also currently over 2.2GW of registered battery capacity in the BM alone, with a further 500MW+ NBM units that are also eligible for the Slow Reserve service but have not been considered.

The average availability for Pump Storage units for each day is around ~2GW, with a total capacity in the market of 2.9GW, which have again not been factored into the above analysis.

Although likely a low estimate, this analysis is still useful to use as a proxy for an average available volume per day. In most cases below, it can be seen that the typical 1700MW STOR buy-order has been fulfilled. Note, the graph below shows both the cleared auction volume (pink) and the additional long-term STOR contract volumes (blue) with a total average daily volume of 1.71GW, ~100% of the daily buy-order.