nationalgridESO

Explanatory Document

Purpose of this document

This document provides the background information on the underlying principles within the Pricing Proposal (PP). We recommend reading this document alongside the PP.

Context

The CEP came into force in January 2020, and there have been on-going conversations with OFGEM since then regarding the applicability of the Article 6(4) to the different Balancing products in GB.

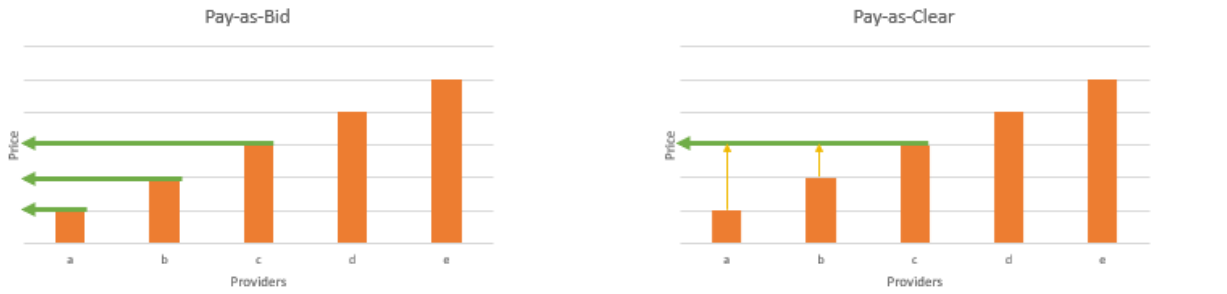
The original interpretation of Article 6(4) was that only products that had been deemed specific through an EBGL Article 26 process were under the obligation to be PAC (unless derogated from the requirements). As such STOR and the BM were approved to remain PAB as they were designated as specific in line with the implementation framework for TERRE.

All other Balancing products were deemed out of scope as they were not due to become specific until MARI was implemented, or there were no standard products to align them to (e.g. Frequency Response products). However, due to the changes following approval of Statutory Instrument 2020 No. 1006[1], all GB Balancing products are now deemed to be specific and as such should be PAC unless covered by a derogation or a PP.

Under the retained legislation it is possible to derogate separately for each Balancing product, or develop a PP. The intention of the PP is to develop a transparent methodology for how future Balancing products are developed and account for legacy products that are non-compliant to the requirements of Article 6(4). This will avoid the need for multiple derogations for legacy products that would be needed if the PP was not created.

Pay as Bid vs Pay as Cleared

What is the difference between Pay as Bid vs Pay as Cleared?



Participants receive the price that they provide to the market. The product is purchased in the "merit order" in that the cheapest (compliant) products are taken first. Each party receives their own price, so the total cost is the sum of each party's volume multiplied by their bid price.

All participants receive the price of the most expensive item procured. The products are still purchased in merit order, but the most expensive item sets the price for all providers. The total cost is therefore the volume procured multiplied by the most expensive accepted product. All providers receive the market's marginal cost.

Figure 1: Difference between Pay as Bid vs Pay as Cleared, ESO Webinar, 7 September 2021

[1] STATUTORY INSTRUMENTS 2020 No .1006 – The approval of this statutory instrument retained the CEP into GB law.

Generally accepted economic theory suggests that in a competitive market, a PAB market and a PAC market should produce similar results for the following reasons:

• Under a PAB auction there is an incentive to bid at the price of the most expensive offer that is expected to be accepted – hence there is an incentive for providers to potentially bid above their short-run marginal cost. This maximises the money a party will receive, but if a party bids too high they will be 'out of merit' and so not accepted.

• In a PAC market, participants are automatically awarded the most expensive offer accepted, so there is an incentive to bid only at your short-run marginal cost, and participants will be paid the market clearing price. You bid enough to cover your costs, and the market determines if there is a need for surplus profit valuing the contribution of your product to the market.

In this sense, a PAC market discovers the marginal cost of the Balancing Energy based on a merit order of individual short-run marginal costs and pays it to everyone.

In a PAB auction providers should say how much they are willing to accept, but there is an incentive to try and hit the marginal cost to maximise your profit.

These conclusions are predicated on assumptions about the market structures being sufficiently competitive. Drawing from generally accepted economic theory, there are three key market criteria derived from elements of the model of perfect competition:

i) There is a homogenous product;

ii) There are sufficient levels of competition i.e. a large number of providers, with no party exercising market power; and

iii) There is perfect information about the market available to the parties

In a PAC market, it is expected that these conditions have to be present for the market to be more economically efficient that PAB.

The electricity market previously operated on a PAC basis prior to NETA[2]. It was decided to move to a PAB basis on the justification that PAB could provide better economic signals, and that "when markets are broadly competitive, System Marginal Price and PAB produce similar results, but that when market power is evident, PAB can have advantages"[3]. NETA also realised wholesale price reductions of 20-25%[4]. As markets began to develop, it was evident that European Markets prefer a PAC mechanism, as illustrated by products such as MARI and Project TERRE, where the product is more homogenous, and more information is available to the multiple participants. There are also arguments to be made that PAC can lead to more efficient dispatch, and encourages smaller players within the market to participate, as the highest offer in the bid curve is accepted and paid to all participants, resulting in more commercially advantageous conditions for smaller parties, when compared to the PAB market.

For the purposes of the PP, we have attempted to define the market conditions criteria as per the below table.

Criteria	Definition
Homogenous	• The product cannot be distinguished from the same product offered by different providers by the consumer (TSO).
All Information	• As much information as possible for the market in which the product is available is correct, transparent and available to all parties.
Competition	• The market in which the product is in has competition and is not distorted by a single or dominant participant

Consistent with our approach to this proposal, we are being guided by these market conditions which suggest that PAC is only capable of producing better results than PAB when the above criteria are in place. The

[2] The New Electricity Trading Arrangements, Ofgem/DTI Conclusions Document, October 1999, p91
[3] Ibid
[4] Ofgem review of NETA and the impact on smaller generators, October 2001 – (p1) https://archive.uea.ac.uk/~e680/energy/energy_links/electricity/neta_review_aug2001.pdf

criteria, definitions and quantifications of each are available in Section 2 of the PP. We received constructive feedback from industry participants on the criteria (available to view in the Feedback Summary document), and this consultation seeks to work with industry to agree the quantifications for each measure so that they are fit for purpose.

Why are the parameters set out in the measures for homogeneity not limited to a certain number?

We are not limiting parameters as it may be possible in the future for other parameters to become more pertinent in helping to decide whether a product is homogenous or not.

Why is Pay as Bid more economically efficient in the current market?

PAB is more economically efficient for many GB specific products as the outlined market conditions are not met. This is particularly pertinent for longstanding products within the GB Market. In 2019, as part of a derogation against Article 6(4) of the Clean Energy Package for BM and STOR, the ESO provided evidence to Ofgem that PAB should be retained for these products as it would be the most economic mechanism for each product. Please see below examples.

1. Balancing Mechanism

The ESO applied the three listed criteria to the Balancing Mechanism and found that it was not homogenous due to the fact it provided energy for both constraint and system management, that it was not possible to take the cheapest energy options on the system at any given time due to system configuration, and that there were different technical attributes for different Balancing Energy products (e.g longevity of energy, speed of response). The BM market was found to be sometimes competitive (the average (mean) value of the HHI is 2680. The median value was 2376, meaning that the market was moderately to highly concentrated), but there was evidence of periods in which the Balancing Mechanism was not competitive. It was also found that some larger players were impacting price - which also detracted from the competitiveness and homogeneity of the market as these large players would have a distortive impact on the market. In addition, it was found that market parties did not have the requisite level of information, as they do not know how much energy is required for a settlement period in advance, nor for what purpose. Furthermore, there was not enough information in the post event to classify as perfect information. Using historic data, NGESO showed that a move to PAC would result in higher cost of around £48M per annum. The BM fell short against all three criteria, as such the ESO successfully illustrated that Pay as Bid was the more suitable and efficient mechanism.

2. STOR

The ESO applied the same three criteria to STOR. Whilst it concluded that STOR was a more homogenous product than the BM, it was noted that STOR also had some heterogenous aspects, arising from how the product is deployed. In terms of competition, STOR was found to draw its participants from a wider range when compared to the BM, with 86% of STOR energy volumes being drawn from non-BM providers. There were certain settlement periods where STOR measured 10,000 on the HHI index (periods where only one provider was used), but likewise, there were a number of periods which scored as low as 918, where multiple providers were used. The ESO concluded that given STOR is procured through a tender and that as a reserve product the volume can vary significantly, that there is sufficient evidence that is it relatively competitive. Available Information was also assessed, but whilst the ESO noted that there was a significant amount of information available post event, the pre-event market information was not at the same level. In conclusion, additional costs to the consumer of £14m per annum would be realised if STOR were to move to PAC.

Conclusion for BM & STOR

Both BM and STOR show that moving from PAB to PAC may be more expensive at this time, due to the market conditions not being met.

The ESO is aware that any market conditions can change. This is particularly pertinent for newly developed products, so that the payment mechanism for a product can be developed to provide the most economic

outcome, at that particular point in time. This is something we are consulting on, please see the section on new products within this document, and question 6 of the consultation.

Scope of the Pricing Proposal

Article 6(4) of the Clean Energy Package (CEP) obliges TSOs to settle Balancing Energy (utilisation) on a PAC basis for Standard and Specific Balancing products. As part of this consultation, we have listened to feedback from industry and produced the below table to outline which products are in scope, which are out of scope and what their current/planned payment mechanism will be.

Please note that under this Proposal, all legacy products will remain on a PAB Basis, until such time as they are amended or replaced. This will be explained in more detail within the Assessment section of this document.

Product Type	Legacy or new?	In Scope?	Current or Planned Payment Mechanism	Subject to reassessment?
BM BOA	Legacy	In Scope - legacy	Pay as Bid	No
STOR	Legacy	In Scope - legacy	Pay as Clear (Availability) Pay as Bid (Utilisation)	No
Fast Reserve	Legacy	In Scope - legacy	Pay as Bid	No
Negative Slow Reserve (NSR)	New	In Scope	Pay as Clear (Availability) Pay as Bid (Utilisation)	Yes
Positive Slow Reserve (PSR)	New	In Scope	Pay as Clear (Availability) Pay as Bid (Utilisation)	Yes
Negative Quick Reserve (NQR)	New	In Scope	Pay as Clear (Availability) Pay as Bid (Utilisation)	Yes
Positive Quick Reserve (PQR)	New	In Scope	Pay as Clear (Availability) Pay as Bid (Utilisation)	Yes
Nuclear Deload	Legacy	In Scope (Instructed by BM) - legacy	Pay as Bid	No
Super SEL	N/A	In Scope (Instructed by BM)	Pay as Bid	No
Dynamic Containment	Legacy	Out of Scope - FCR	Pay as Clear (Availability) No utilisation payment – therefore meets criteria of Pay as Clear	No
Dynamic Moderation	New	Out of Scope - FCR	Pay as Clear (Availability)	No

			No utilisation payment – therefore meets criteria of Pay as Clear	
Dynamic Regulation	New	Out of Scope - FCR	Pay as Clear (Availability) Utilisation - under discussion subject to outcome of 6(2) derogation	No
Firm Frequency Response (Primary and High)	Legacy	Out of Scope - FCR & legacy	Index Linked Payment	No
Mandatory Frequency Response (Primary and High)	Legacy	Out of Scope - FCR & legacy	Indexed Linked Payment	No
Firm Frequency Response (Secondary)	Legacy	In Scope - FRR & legacy	Index Linked Payment	No
Mandatory Frequency Response (Secondary)	Legacy	In Scope - FRR & legacy	Index Linked Payment	No
Enhanced Frequency Reserve	Legacy	Out of Scope - FCR & legacy	N/A	No
Pathfinder (Voltage, Stability, Constraint Management)	N/A	Out of Scope	N/A	N/A
Auction Trial	Legacy	Out of Scope - FCR	N/A	No
SpinGen	Legacy	Out of Scope (no longer procuring)	N/A	No
Fast Start/BM Start Up	Legacy	Out of Scope (no longer procuring)	Pay as Bid	No
Blackstart	N/A	Out of Scope (Non Frequency Ancillary Service)	N/A	N/A
Inertia Services	N/A	Out of Scope (Non Frequency Ancillary Service)	N/A	N/A
SO to SO trades	N/A	Out of Scope (Pre-Gate Closure, therefore not balancing)	N/A	N/A
SO to SO Misc	N/A	Out of Scope (Pre-Gate Closure, therefore not balancing)	N/A	N/A
Capacity Market	N/A	Out of Scope (Capacity Mechanism)	N/A	N/A

FCR Products

Within the PP, NGESO have drafted that where a standard product does not exist, the TSO may choose the most appropriate settlement mechanism (i.e. PAC or PAB or another). We believe that FCR products do not fall into scope of article 6(4) for a number of reasons:

1) Unlike RR and FRR products, there is no standard product that they align to.

2) We believe that the wording in the CEP was intended to align to the original EBGL process whereby PAC was stipulated for standard & specific RR and FRR products. Before leaving the EU, only products that aligned to TERRE (i.e. the BM & STOR) were designated as "Specific" through EBGL article 26. Products that aligned to MARI would have been through this process had we been allowed to continue to participate in this platform. Within the retained GB law, those articles have now been revoked and there is no longer a process for a Balancing product to be made Specific. However, retained law has maintained the Standard and Specific wording within the definitions and within article 6(4) only. Therefore, losing the important context setting articles within EBGL has led to some need for clarification; all Balancing products are now deemed specific within GB. Note that FCR was not included within the original (or retained) regulation, and therefore we believe this proposed drafting helps to clarify the intention for GB Balancing products.

3) The original ACER PP also excluded FCR products from the scope of the article.

4) Legacy FCR products are treated like all other balancing products and can remain as they are. New FCR products (such as Dynamic Containment/Moderation), do not have a utilisation price.

New Product Development

NGESO is currently developing new Balancing products that will support a zero carbon system through the Response and Reserve Reform. At the time of writing this document, the analysis shows that the new Reserve products do not meet the criteria for PAC to result in a more economic and efficient outcome. Therefore, the intention is to develop them to be PAB in the first instance and revisit the analysis periodically. This way, the most economically efficient payment mechanism can be selected, and this can be checked regularly to see if conditions have changed. Please see questions 6 and 7 of this consultation for a place to capture your views.

BM BOAs

The status of BM BOAs needs elaboration, given the complexity of the current electricity market and how BM BOAs are used. BM BOAs are a legacy product and will remain PAB, but they are also the means by which BMUs under the new reserve services will be instructed.

Example:

Currently, any instruction sent to a BMU to increase or decrease its MW output is done via a BM BOA[5]. To take the upcoming Positive Slow Reserve (PSR) service as an example: a BMU can tender for PSR in the day-ahead auction, and if successful they will be paid an availability payment (outside the scope of CEP 6.4), and will be held in reserve to ensure system security. If, during this period, an event happens – like IFA tripping due to a fire at the converter station – the BMU could be instructed to deliver additional energy, as per its PSR contract. However this instruction will be via a BM BOA.

Thus, if PSR met the economic criteria for PAC, there would be a question to answer: how should the BM BOA in the example be treated? Should it be classed as a BM BOA, and thus settled PAB, or should this be classed as PSR, and settled PAC?

There are market implications for both approaches.

Market implications for each approach

If BM BOAs are always settled PAB, the following is true:

- BMUs can only have their energy settled PAB

[5] For the purposes of this section we will ignore response arming instructions, as they do not, in and of themselves, change a BMU's MW output.

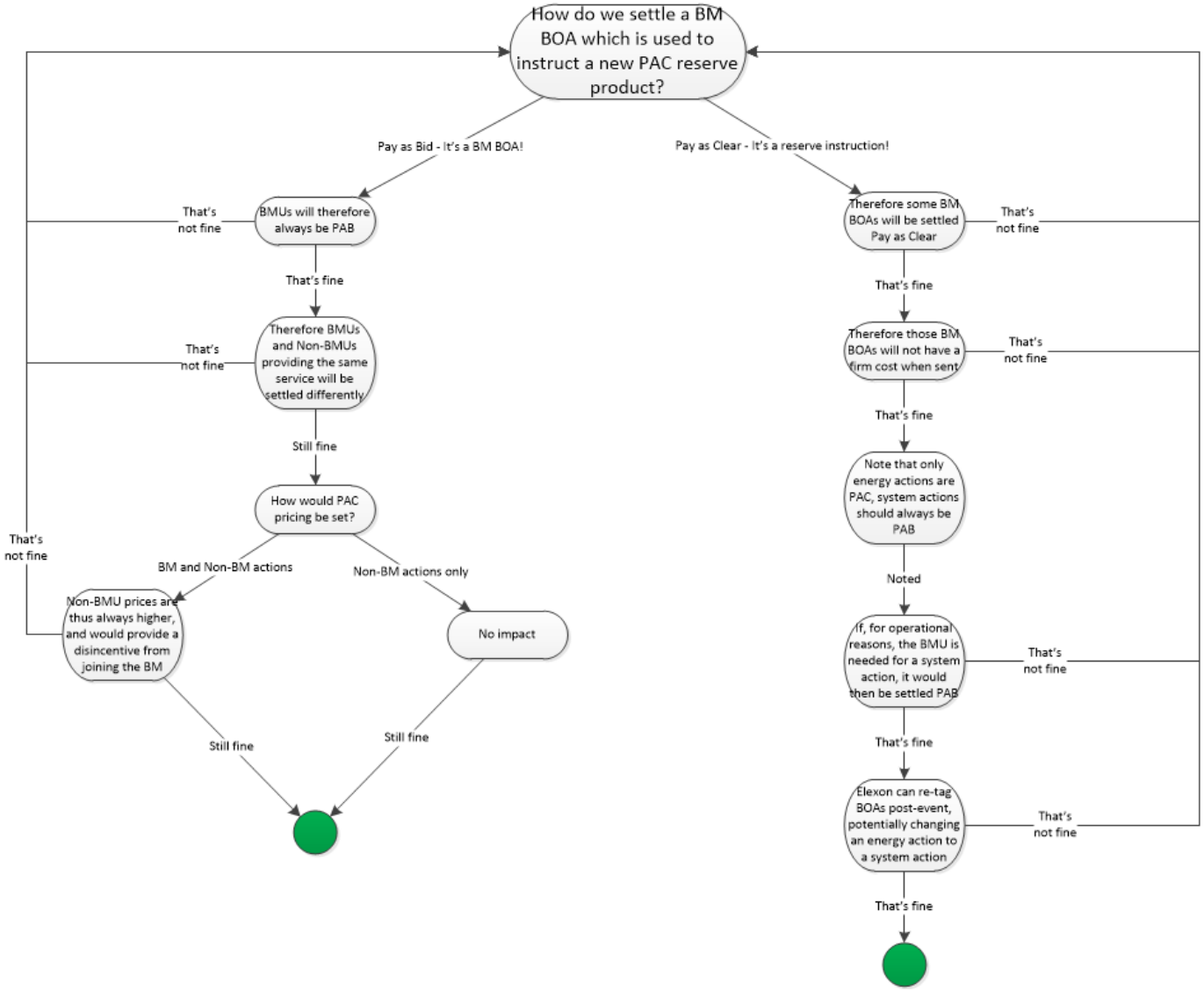
- Therefore, under this PP, BMUs and Non-BMUs providing the same service would sometimes be settled differently – for a PAC service, BMUs will continue to be settled PAB, whereas Non-BMUs will be settled PAC
- For a PAC service, would the price be set based on only the Non-BMU actions? Presumably so: otherwise, if it were based on the Non-BMU **and** the BMU actions, it would mean that it would always be more profitable to be a Non-BMU for the service in question, providing a disincentive for Non-BMUs to join the BM

If BM BOAs are sometimes settled PAC, the following is true – noting first that as per legal text and definitions, only energy actions should be settled PAC, and that system actions should always be settled Pay as Bid (see below for more details):

- Some BM BOAs will need to be settled PAC – impacting Elexon processes and industry reporting
- The costs of PAC BM BOAs will only be known after the settlement period ends, thus meaning some BM BOA prices are non-firm when instructed
- If NGESO need to instruct a BMU for system reasons, it will be settled PAB even if it was under a reserve contract
- Elexon's retagging process can switch a BM BOA from System to Energy, changing its settlement approach, thus certainty is only gained after this retagging process

Under either option, market rules would need to be established to determine implementation detail – as one example, the expectations on how NGESO should continue to fulfil its obligations to balance in an economic and efficient manner, given some instruction costs are only known after the clearing period.

We would appreciate understanding your view on this point in your response to question 5.



Interaction with Standard Products

Standard Products are those which exist in the EU internal balancing market, which have been agreed by all TSOs to be used for balancing, and in other words, are harmonised across all states. Following GBs withdrawal from the European Union, all GB products are viewed as specific. This is defined in Article 2 (31) of EU Regulation 943/2019. Furthermore, the Trade and Co-operation Agreement (TCA) explicitly states that GB cannot participate in European Platforms i.e. TERRE & MARI.

Balancing products in GB are activated locally (i.e. cannot be used in European markets), and therefore there is no distortive impact on European standard products such as TERRE or MARI. These European standard products do have a PAC utilisation method. This is because they meet the market conditions set out earlier in the document.

Capacity vs. Utilisation

An important distinction to make when discussing CEP 6.4 is the difference between capacity payments (also known as availability payments or holding payments) and energy payments (also known as utilisation payments). **There are no obligations on how to settle capacity payments**, either in CEP 6.4 or elsewhere. **The CEP 6.4 obligations only apply to energy payments**, and so they are the focus of this proposal.

The market conditions for capacity for some products are present for PAC (STOR for example) to be the most efficient method. For example the amount of capacity needed can be calculated ahead of time, communicated to market, and can be used to inform a provider's tender decisions thus providing close to perfect information (as per the economic definitions).

System vs. Energy

As per the relevant legal text and definitions, the obligation to move to PAC only applies to energy actions. Elsewhere in retained CEP law, system actions are prevented from setting the clearing price, so must remain PAB.

Thus, for any service that meets the criteria to move to PAC, it is only energy actions under that service that must be settled PAC, with system actions still settled PAB. If the decision is taken that BMUs can only be settled PAB, then this point has minimal impact. However, if BM BOAs can be settled PAC (by participation in a PAC reserve service), there are further implications to consider:

- NGESO may opt, under emergency conditions, to use reserves to manage system issues, thus classifying the action as a system action as per CEP retained regulation – changing the settlement approach from PAC to PAB
- Elexon's retagging process changes some energy actions to system actions, thus post-event could change settlement approach from PAC to PAB

As such, BMUs would need to consider how to price themselves in such a market, given the underlying economic theory suggests that PAC and PAB normally lead to different pricing strategies.