

EBGL Article 26: Proposal for Defining and Using Specific Products

Executive summary

This proposal sets out our requirement to maintain GB specific reserve products, along with supporting justification. The products that we propose to maintain are:

- Short Term Operating Reserve (STOR)
- Balancing Mechanism (BM) activations for the purposes of energy balancing.

The reasons that these products remain vital to our Balancing Strategy are set out in detail below. The introduction of the Replacement Reserves (RR) product (via project TERRE) will mean that National Grid Electricity System Operator (NGESO) have another extremely useful tool for providing an increase or reduction in energy when its needed, and we expect it to contribute to lower balancing costs. We will always look to procure balancing energy from the LIBRA platform where it is economic to do so. However, as the RR market will be an auction format, it cannot be guaranteed that we will be successful in securing all the required volume. So, it's important that we still have other tools available for us in these situations. NGESO will be required to submit needs into the LIBRA platform 45 minutes ahead of real time. It is possible for system conditions and requirements to change within 45 minutes, and so we will still require other products with shorter lead times to ensure that we can respond to all situations. Furthermore, the complexities of the GB electricity network mean that we always need to be aware of locational constraints when balancing supply with demand. Volume that we have access to via our existing products will continue to be important to ensure that we do not risk the operational security of the system.

The Electricity Balancing Guideline (EBGL) requires this proposal to be re-visited at least every two years. Through the Future of Balancing Services work, NGESO are conducting a review of all products and services to ensure that they are fit for purpose for the future. This includes a reform of reserve services. Our commitment to the implementation of the European Standard Products is a key programme which will allow us to achieve this. We will be ensuring that the European standard products and our new national products fit well together, and that the standard products are the first tools used where possible. These changes, along with the introduction of project MARI, will be reflected in the next iteration of this proposal two years from now.

Purpose of this Proposal

Article 26.1 of the Electricity Balancing Guideline (EBGL) states:

“Following the approval of the implementation frameworks for the European platforms pursuant to Articles 19, 20 and 21, each TSO may develop a proposal for defining and using specific products for balancing and balancing energy capacity.”

This proposal covers GB Balancing services and products equivalent to Replacement Reserves, which NGENSO requires to maintain following the implementation of the Replacement Reserves platform (LIBRA). These products are:

- Short Term Operating Reserve (STOR)
- Balancing Mechanism activations for the purposes of energy balancing

More information on the mapping of GB products to European standard products can be found [here](#).

Article 26.1 of the EBGL requires that the following information is included as part of this proposal:

- a) a definition of specific products and of the time period in which they will be used;
- b) a demonstration that standard products are not sufficient to ensure operational security and to maintain the system balance efficiently or a demonstration that some balancing resources cannot participate in the balancing market through standard products;
- c) a description of measures proposed to minimise the use of specific products subject to economic efficiency;
- d) where applicable, the rules for converting the balancing energy bids from specific products into balancing energy bids from standard products;
- e) where applicable, the information on the process for the conversion of balancing energy bids from specific products into balancing energy bids from standard products and the information on which common merit order list the conversion will take place;
- f) a demonstration that the specific products do not create significant inefficiencies and distortions in the balancing market within and outside the scheduling area.

NGESO do not intend to convert specific products into standard products, and as a result points d) and e) are not applicable and not included in this proposal.

26.1.a) a definition of specific products and of the time period in which they will be used

Reserve Services definition

NGESO need access to sources of extra additional or reduced power in the form of increased generation /demand reduction or decreased generation/ demand increase. This enables us to manage differences between electricity supply and demand on Britain's transmission system. These additional power sources available to us are called 'reserve services'. There are a range of services with different characteristics which fall into the Reserves category. The two services which are categorised as Replacement Reserves products are Short Term Operating Reserve (STOR) and Balancing Mechanism (BM) activations for energy balancing purposes.

STOR

As National Grid Electricity System Operator, we hold an Operating Reserve Requirement (ORR) from 4 hours ahead of time to real time, to take account of demand forecast errors, plant losses and market imbalance. The ORR is met by headroom on market synchronised machines, additional actions taken by NGENSO via the Balancing Mechanism (BM) and contracted reserve products. STOR is a contracted reserve product and as such STOR tenders can make up a finite proportion of the ORR. The amount of contracted STOR required is determined by the size of the ORR which changes due to forecast market length, market provided headroom, volume of intermittent generation and demand forecast errors. The proportion of the ORR met by STOR is determined by considering the technical system requirements and the forecast cost of alternatives versus the cost of the tendered STOR units.

STOR can be provided by BM and non-BM participants via a flexible or committed service. For the committed service, a provider must be available for all contracted availability windows. For the flexible service, providers can specify how many hours they wish to make the service available, and when the service is offered. Flexible service providers will be committed to provide the service at the week ahead stage.

Please note, additional information is included in the Flexible column only where it differs from the committed product.

| Characteristics | Committed STOR | Flexible STOR |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Mode of activation | Manual, Directly Activated (DEF) | - |
| Preparation Period | BSPs must acknowledge instruction within 5 minutes | - |
| Full Activation Time | 0 - 240 minutes, defined by BSP | - |
| Deactivation period | Cease time defined BSP | - |
| Minimum Quantity | 3 MW | - |
| Maximum Quantity | None | - |
| Minimum duration of delivery period | Minimum non-zero time defined by BSP | - |
| Maximum duration of delivery period | Defined by BSP | - |
| Location | Non-locational, but constraints are taken into account upon activation | - |
| Validity Period | <p>BM – Within the STOR availability windows if declared as available. No option to offer STOR outside availability windows</p> <p>Non-BM – Within the STOR availability windows if declared as</p> | <p>Non-BM – Within the STOR availability windows if declared as available. Outside availability window if offered by the BSP</p> |

| | | |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | available. Outside availability windows if offered by the BSP | |
| Minimum duration between the end of deactivation period and the following activation | Defined by the BSP | - |
| Divisibility | Bids are not divisible | - |
| Price of bid | defined by BSP via competitive tender Non-BM - Optional Utilisation Price - defined by BSP via competitive tender – paid when instructed in periods outside availability windows (Pay as bid) | - |
| Availability price | defined by BSP via competitive tender | defined by BSP via competitive tender - during accepted availability windows |
| Timeframe resolution | Can instruct STOR down to minute resolution | - |
| Gate Closure time | BM & Non-BM – GC for declaration is 10:00 on Tuesday for following week (05:00 Monday) Subsequent redeclarations can be for both an increase or decrease in availability. i.e. up to contracted MW or down to 0, not in between | Non-BM – GC for declaration is 10:00 on Friday for following week (05:00 Monday) Subsequent redeclarations can be for both an increase or decrease in availability. i.e. up to contracted MW or down to 0, not in between |

Balancing Mechanism Activations for Energy Balancing

NGESO use the Balancing Mechanism (BM) to balance electricity supply and demand close to real time and to manage system and locational constraints. Where National Grid predicts that there will be a discrepancy between the amount of electricity produced and that which will be in demand during a certain time period, they may accept a ‘bid’ or ‘offer’ to either increase or decrease generation (or consumption). The balancing mechanism is used to balance supply and demand in each half hour trading period of every day. It is used to meet a range of system requirements, and one of these is Energy Balancing.

Following other, longer term market timeframes, Market Participants are able to offer their remaining flexibility into the Balancing Mechanism for NGESO to utilise. Participants submit their dynamic parameters, available volume and prices, and NGESO can then activate volume according to these dynamic parameters, on a pay as bid basis.

| Standard Characteristics | BM Activations |
|---------------------------|----------------------------|
| Mode of activation | Manual, Directly activated |

| | |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Preparation Period | Defined by BSP |
| Full Activation Time | Defined by BSP |
| Deactivation period | Defined by BSP |
| Minimum Quantity | 1MW |
| Maximum Quantity | None |
| Minimum duration of delivery period | Defined by BSP |
| Maximum duration of delivery period | Defined by BSP |
| Location | Non-locational, but constraints are taken into account upon activation and location is known |
| Validity Period | Defined by BSP, set on a per settlement period basis |
| Minimum duration between the end of deactivation period and the following activation | Defined by BSP |
| Divisibility | Bids and offers are divisible |
| Price of bid | Defined by BSP - Pay as bid merit order list |
| Timeframe resolution | instruction down to the minute, defined by system needs |
| Gate Closure time | 60 minutes before real-time |

26.1.b) a demonstration that standard products are not sufficient to ensure operational security and to maintain the system balance efficiently or a demonstration that some balancing resources cannot participate in the balancing market through standard products

When considering why standard products are not sufficient to ensure operational security and maintain system balance efficiently, it is important to note the unique position of the GB electricity network in comparison to the rest of Europe. GB is an island with a finite amount of (unsynchronised) interconnectivity with the continent. The GB network is its own synchronous area, and this combined with the increased role of renewable generation in the energy mix means that Rate of Change of Frequency (RoCoF) is a prevalent issue. Continental European TSOs do not experience this issue on the same scale because of being part of one synchronous area, with a more stable frequency as a result. Traditional generation which has previously provided inertia is in decline. In fact, we have recently experienced a full two weeks without any coal generation. So, the difference between generation and actual volumes has more of an impact. It is important that we have specific products available, with faster activation times, to provide sufficient levels of reserve in these circumstances.

As a suite of standard products, RR, Manual Frequency Restoration Reserves (mFRR) and Automatic Frequency Restoration Reserves (aFRR) provide solutions with a range of activation times, from 30 minutes as the slowest (RR) down to 4 seconds as the quickest (aFRR).

However, aFRR is an automatic product and only TSOs which operate using an Automatic Generator Control (AGC) system are able to implement this product.

In the most recent Cost Benefit Analysis, which assessed whether AGC should be implemented in GB, NGENSO concluded that the costs would outweigh the benefits. Reasons for this include the large cost of implementing systems - both NGENSO and market participants', and the fact that although AGC would reduce frequency deviation, there would be no benefit in costs resulting from this. As a result, NGENSO will not be implementing AGC or the aFRR product, and this means that gaps remain which will need to be filled by specific products that can be activated and deliver energy faster than mFRR (15 minutes) and RR (45 minutes). An updated Cost Benefit Analysis is due to be conducted this year to re-validate this decision, as required by Article 145.2 of the System Operator Guideline (SOGI).

The activation of these products is often only for short periods, and the BM is required to replace the energy that is provided by these services when they are no longer available / when it's cheaper to do so.

Another thing which separates the GB electricity transmission network from the European network is the number and complexity of locational constraints, where the transmission system is unable to transmit power to the location of demand, due to congestion at one or more parts of the transmission network. There are various things that can cause a transmission constraint, and the status of these can often change quickly in the event of a system fault or an unplanned generation or transmission outage. The complexities of our system mean that we always need to be aware of locational constraints when balancing the system, and this requirement continues to be very important. The LIBRA platform will allow us to restrict any bids which would exacerbate these constraints before they are submitted to the algorithm, meaning that they will not be activated. Aside from this, the algorithm will not process locational information and we will not know the location of activated volume until minutes before they are delivering volume. The control room will need to forward provider's bids to the platform along with any restrictions at least 45 minutes before real time, and the conditions can very easily change once they have been submitted. For this reason, the volume that we have access to via the Balancing Mechanism (for which we have locational information) will continue to be important, to ensure that we do not risk the operational security of the system.

The Full Activation Time of the RR product is 30 minutes, which means that successful providers will have 30 minutes notice before they need to deliver the required volume. The System Operator will need to submit what is required from the platform 45 minutes ahead of real time. Given this long lead time, a lot can change between entering the TSO requirements and the volume being delivered and our requirements may not remain the same. In the 45 minutes between the moment when NGENSO submits a 'need' to the central LIBRA platform and the moment that energy is delivered there can be a significant change to the overall system energy balance. Examples of this might include the instantaneous failure of a large generator; a significant deviation in intermittent generation output (wind/solar) or unforeseen changes in overall demand. It is for these reasons that most of our purely energy balancing actions (via BM, FR & STOR) are taken with only a 15-minute lead-time. Therefore, it is important to have products available with shorter lead times (for example STOR, BM or Fast Reserve) available to respond to changes in system requirements at shorter notice. Without the ability to react quickly to events on the network we would not be able to operate the system securely.

Use of the BM for balancing purposes will be important in ensuring that the LIBRA platform can be utilised whilst ensuring that operation security is not compromised. As agreed under Grid Code modification [GC0097](#), NGENSO will need to maintain the ability to issue BM instructions in parallel with the RR process. In some situations, NGENSO may also need to use the BM in order to unwind RR activations if a system event requires it, if for example LIBRA activates a unit in the opposite direction to BM actions. More information on how these scenarios will be dealt with can be found in sections [13-15 of the GC0097 Workgroup Report](#).

It is important to note that RR is not a guaranteed product and BSPs are not obliged to participate in the market. As described earlier in this document, NGENSO hold an Operating Reserve Requirement (ORR) from 4 hours ahead of real-time to take account of demand forecast errors, plant losses and market imbalances. Due to the fact that RR volume is uncertain, and it cannot be guaranteed that we will fill our needs, we cannot rely on it to make up the ORR. Furthermore, System needs will be submitted to the platform 45 minutes ahead of real-time, and we will know at approximately 35 minutes ahead of real-time whether these needs have been filled. LIBRA will allow TSOs to put limit prices on the needs entered to ensure that the actions taken are the most economic, and again this could also mean that an alternative available is cheaper and the volume is not guaranteed to be delivered by LIBRA. For these reasons, we need other products available to us in the event that we are not successful in securing the required volume. STOR allows us to guarantee access to volume in specific windows where we know we may encounter issues. The TERRE implementation Framework states that TSOs should not submit inelastic needs greater than the bid volume received from BSPs locally. This further reinforces the need for access to balancing volume through other services.

Through LIBRA we will have access to energy with an activation period of 30 minutes. The mFRR product will provide us with balancing volume with an activation time of 12.5 minutes. There will be instances, when there is a system event, that volume is required in shorter timescales than this (sometimes required in seconds), and STOR will be needed in these circumstances. [Article 127 of the System Operator Guideline \(SOGL\)](#) sets out targets and requirements for restoring system frequency to within the specified limits. A suite of tools, some with faster response times than that of RR and mFRR, are required to achieve these standards.

26.1.C) a description of measures proposed to minimise the use of specific products subject to economic efficiency

Through the Future of Balancing Services work, NGENSO are conducting a review of all products and services to ensure that they are fit for purpose for the future. This includes a reform of reserve services, for which stakeholder feedback has told us that we need to create more standardised products with procurement moving closer to real time, whilst lowering barriers to entry for all technology types. Our commitment to the implementation of the European Standard Products is a key programme which will allow us to achieve this. We will be ensuring that the European standard products and our new national products fit well together, and that the standard products are the primary tools used where possible.

Replacement Reserves will form an important part of our balancing strategy. As NGENSO employ a proactive strategy, we can forecast imbalance and use RR in the first instance to meet this need. In terms of timelines, NGENSO will need to submit the imbalance need to the platform by 45 minutes ahead of real time, RR will be one of the first tools that is used to secure balancing volume, meaning that we will be endeavouring to procure as much as possible from LIBRA before using other services.

Nevertheless, volume from the LIBRA platform is not guaranteed and so we will still require to mitigate this risk using other products. Our ability to use RR in this manner is dependent on the accuracy and reliability of our energy forecasts. Better energy forecasts will allow us to submit more efficient volumes to LIBRA and do less residual balancing with our specific products.

TSOs will have the ability to price the imbalance needs submitted into LIBRA. This allows us to ensure that the actions we are taking are economic, an important aspect of our license condition (C16, paragraph 1). Therefore, we will price our imbalance needs in LIBRA according to the alternative volumes that we have available to us. We will always look to procure the volume from the LIBRA platform when economic to do so.

As well as this, as this new balancing tool is implemented we will be performing post-event analysis which will allow us to identify where our strategy for balancing can evolve and ensure optimal balancing of the system.

26.1.f) a demonstration that the specific products do not create significant inefficiencies and distortions in the balancing market within and outside the scheduling area.

These specific products will not cause distortions or inefficiencies for several reasons. Firstly, a robust pricing methodology will be employed to ensure that alternative products will only be used in the event that it is more economic and efficient to do so. It is important to note that for the majority of specific products, because of the unique characteristics of the GB transmission network, locational requirements need to be taken into account when balancing the system, and as a consequence the standard products cannot be used in an identical set of circumstances. Due to the different characteristics of standard and specific products, they will be used in different scenarios for different reasons, and so will not create distortions or inefficiencies.

The RR standard product is likely to be used for energy balancing; the minimization of imbalances between forecasted energy demand and supply on a national scale. The RR equivalent specific products are necessary to fulfil balancing needs where locational constraints also need to be considered. Locational constraints include; voltage management, import/export thermal constraints and managing the risk of certain losses. These specific products will be used for energy balancing where it is economic to do so and/or where standard products cannot control frequency to the standard required by our license conditions and the System and Quality of Supply Standards (SQSS). Due to the complex GB network, it is not possible to Balance the system completely independently from managing system constraints, and so there is a continued need for balancing products for which we have locational information. Specific products will

Finally, the implementation of the Replacement Reserves standard product has been designed to ensure that market participants have the ability to choose which products they provide to the Electricity System Operator. There are no restrictions in participation in Replacement Reserves (aside from the fact that you can only sell each MW of energy of volume once). This allows for revenue stacking so that BSPs can participate in multiple markets, and further minimizes potential inefficiencies in the Replacement Reserves product.

Conclusion

STOR and the BM remain vital parts of our energy balancing strategy. Without them we would not have sufficient tools to securely operate the transmission system. The introduction of project TERRE will mean that NGENSO will have access to a wider pool of liquidity and in many scenarios, provide us with the most economical solution for balancing requirements. However, RR has a relatively long activation time with an even longer lead time, and there is no guarantee that LIBRA will be able to satisfy all TSO needs. This, combined with the complexity of locational constraints on the GB system means that we will continue to need GB specific products as European standard products are introduced.