

Dynamic Containment Participation Guidance Document

Introduction

This guidance document should be read in conjunction with the following documentation which is available on the NGESO website:

- Form A (Provider Registration)
- Form B (Dynamic Containment)
- Form C (Dynamic Containment)
- Dynamic Containment Service Terms
- Dynamic Containment General Terms and Conditions
- Dynamic Containment Glossary of Terms
- Dynamic Containment Tender Rules
- Dynamic Containment Testing Documents
 - DC Testing Guidelines
 - DC Testing Analysis Tool – user guide
 - DC Testing Analysis Tool

Version	Effective Date	Change	Page
Consultation Draft			

Version x

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Overview of Dynamic Containment Requirements

This document provides an overview of the Dynamic Containment (DC) service and information designed to assist those who wish to become service providers.

Service Parameters

The parameters are described more fully in the Tender Rules and the Service Terms, but the key elements of the DC service are:

- Designed to help contain both upwards and downward frequency excursions
- Automatic activation, from either generation or demand, or energy limited (e.g. battery) assets
- Operational baselines to be notified in advance of real time
- Min 1MW and (at least initially) max 50MW of response capacity
- Tenders may only be submitted in whole MWs.
- Service delivery to be across a full EFA Day, with payment for service availability (£/MW/h)
- No settlement of energy delivered
- Procured separately for low and high frequency DC
- BM or Non-BM Participating assets
- Energy limited assets to comply with “state of energy” management rules
- Aggregation possible where assets behind same GSP (transitional arrangements in place for GSP Group)
- Service providers to have the necessary data transfer capabilities to provide both operational and performance data

Transitional arrangements are in place for soft launch, which are outlined at the end of this document.

Registration

For a participant to register as a potential provider of DC, it must become a Registered Service Provider and accede to the DC contract documentation.

Once registration is complete, a Registered Service Provider may then submit assets under its operation or control for registration with NGENSO as Eligible Assets. Once validated, Eligible Assets may be allocated by the Registered Service Provider to Response Units, which can be tendered into the procurement DC process.

This section outlines the registration process and associated timings. Whilst it is important that participants allow sufficient time to register and prepare for participation, given the limited time now available ahead of the first delivery day NGENSO will endeavor to allow participants some flexibility on timescales in relation to this initial period of delivery where practicable.

Submitting Forms A & B

To become a Registered Service Provider for DC, a participant must submit fully complete and correct Forms A & B to commercial.operation@nationalgrideso.com.

Forms A and B templates are published alongside this document and word versions can be requested from your account manager or contact the above email account prior to any formal submission.

For parties who wish to register on behalf of multiple SPVs (special purpose vehicles), the “related entities” sections of Forms A & B can be used.

Receiving Form C

Form C is completed by NGENSO, and provides confirmation that the participant is now considered a Registered Service Provider for DC. This is not indicative of any commitment on the part of NGENSO to procure or pay for DC.

Once in receipt of Form C, a Registered Service Provider is entitled to register Eligible Assets under its operation or control, and to allocate those Eligible Assets to Response Units, in accordance with the process described below, following which Response Units may then be tendered for DC service delivery.

Timelines Forms A, B & C

Activity	Provider	NGESO
Submission Form A & B	3 business days prior to submission of first tender submission.	N/A
Form B Validation	N/A	Up to 3 business days to assess and issue Form C or request further clarifications

Registering Eligible Assets & Allocation to Response Units

Registered Service Providers must register their Eligible Assets with NGESO using the “DC Provider Data Template” that is published alongside this document. This template contains all the necessary information for NGESO to validate the eligibility of assets for participation in the DC service.

The Provider Data Template must be submitted, fully complete and correct, by email to commercial.operation@nationalgrideso.com.

It must be accompanied by a testing approval report in relation to any new assets, completed by an Independent Technical Expert (ITE), as described in the Testing section which follows.

Once registered, an Eligible Asset may be allocated to a Response Unit. This process is also completed through the DC Provider Data Template. Please note, a single Eligible Asset must still be allocated to a Response Unit to participate.

Every Response Unit registered onto NGESO’s system must have at least one Eligible Asset allocated to it, in order to be capable of tendering for DC. A Response Unit can only have allocated to it multiple Eligible Assets if they are all located within the same Grid Supply Point, except where transitional arrangements apply.

Initial registrations must be completed in line with the timings outlined below:

Activity	Provider	NGESO
Initial Registration of Eligible Assets	13 calendar days before any intended allocation activity	Deemed accepted upon submission, subject to errors and/or incomplete data
Allocation of Eligible Assets to Response Units	Allocation can only occur on a weekly basis and must be sent to NGESO in the “market window” on a Tuesday via the DC Provider Data Template	Deemed accepted upon submission, subject to errors and/or incomplete data

If Registered Service Providers wish to change the registration and/or allocation of Eligible Assets to Response Units, this must be done by submitting an updated DC Provider Data Template, in line with the timelines outlined above.

All relevant asset and participant details will be captured through the DC Provider Data Template.

NGESO reserves the right to inform Registered Service Providers in writing (via email) that an Eligible Asset has been de-registered (in accordance with the Tender Rules).

Tender Submissions

Once Eligible Assets are registered and allocated to Response Units, a Registered Service Provider may participate in the DC tender process.

A Registered Service Provider may tender its Response Units for DC service delivery by submitting the required tender parameters to NGESO using the DC Tender template published alongside this document.

All tenders must be submitted on Tuesday each week, in the stipulated “market window”, which is 07.00 hours to 10.00 hours each Business Day. A tender can be for any of the seven service (EFA) days commencing at 23.00 hours on that Tuesday evening, and whilst a tender may be submitted in respect of any Response Unit for more than one of those service days, multiple tenders may not be submitted in respect of any Response Unit for the same service day.

As NGESO transitions to daily procurement, we have introduced the ability for Registered Service Providers to update their weekly tendered prices, and withdraw participation. This can only be done by revisions to the prevailing Tuesday tender submission, to be made in market windows on business days only. A Registered Service Provider may not, however, revise its Tuesday tender submission to include a new tender for a service day which was not previously included

Each Tuesday tender submission, and any revisions to it, shall reflect and be consistent with the Eligible Asset and Response Unit registration details shown on the prevailing Provider Data Template

Incomplete/inaccurate or modified submission structures will be rejected. Further details on the timing and content of tenders are contained in the Tender Rules.

DC Provider Data Template

This document is the file which should be submitted by Registered DC Participants to contain all relevant information regarding Eligible Assets and to make any allocations to Response Units.

The file must be submitted to XXXXXX@nationalgrideso.com and no other ESO email account. File naming format conventions must follow the guidance outlined in the Instructions page of this document.

DC Tender Template

This document is the file which is required to be submitted in order to submit a tender to provide the DC service. In order to participate, as mentioned above a Registered DC Participant must submit this file during the Tuesday market window. Failure to do so will mean a party must wait until the following week to participate.

Following submission, a Registered DC Participant then has the ability to resubmit pricing or withdraw tenders on a daily basis (excluding weekends and Bank Holidays). This must be via an updated submission of the original DC Tender template and be submitted within the market window of that business day.

Parties must ensure the instructions in the document are followed as failure to do so may result in the submission being rejected by NGESO.

The file must be submitted to XXXXXX@nationalgrideso.com and no other NGESO email account. File naming format must follow the guidance outlined in the Instructions page of this document.

Testing

All assets seeking to participate in DC as Eligible Assets will be required to pass testing prior to registration. Aligned with our other frequency products, testing will be the responsibility of the Registered Service Provider and should be undertaken/verified by an Independent Technical Expert (ITE). Registered Service Providers should refer to the accompanying document DC Testing Guidelines, DC Testing Analysis Tool User Guide & DC Testing Analysis Tool for all relevant testing information. Testing will be required at 20Hz.

NGESO will require an ITE approval report as part of any Eligible Asset registration. Note assets cannot be registered without this information. Report shall be deemed accepted by NGESO once submitted. However should any queries be raised the Eligible Asset shall not be able to participate until any queries have been satisfied.

Settlement

DC will be settled against an availability service fee (£/MW/h) which is submitted by the Registered Service Provider as part of its tender submission. For further information regarding how payment is calculated, and payment terms, please refer to the Service Terms and the General Terms & Conditions.

NGESO shall apply DC energy volumes within Applicable Balancing Services Volume Data (ABSVD) for BM units only, and it is the responsibility of each Registered Service Provider to ensure that the relevant BM Unit Lead Party has made the appropriate election.

In addition, where it has not already done so, each Registered Service Provider must ensure that it has completed the necessary vendor setup forms that are outlined on our Settlement webpage to be set up as a vendor on NGESO's systems. These should be submitted as soon as possible so that we make payments in a timely manner in accordance with the General Terms & Conditions.

Performance Monitoring

NGESO will conduct regular performance monitoring of the DC service. Please refer to the Service Terms regarding consequences of non-delivery and unavailability, which will impact on the level of availability service fee payments. NGESO will be seeking to increase performance transparency to industry for the DC service and publish summary reports on the quality of service delivery.

Baselines

An important component of DC service delivery is submission of operational baselines, required from all Registered Service Providers. Registered Service Providers with non-BM participating Response Units should make themselves familiar with these operational baseline rules, which have been developed to be aligned and consistent with those in place for BM Units (i.e. Physical Notifications), in the interests of fairness and transparency.

See also Transitional Arrangements section below.

State of Energy (SoE) Management

NGESO requires that delivery of DC is continuous over the service day. The state of energy rules and the baseline rules have been designed to underpin this requirement.

DC does not permit the management of SoE via delivery deviation within an 'envelope'. This 'charging in the dead band' has been shown to be damaging to frequency quality, and whilst manageable with limited volumes of Enhanced Frequency Response, is not possible for the larger volumes of DC and subsequent response products.

The solution to SoE management for DC is to require energy limited units to:

1. Begin the service delivery day with a level of stored energy adequate for its contracted response quantity.
2. Review the level of stored energy at the start of each settlement period during that service delivery day, looking at the net energy delivery in the previous settlement period.
3. Aim to return the stored energy level to an appropriate level by the submission (and following) of operational baselines. This means charging or discharging by following a baseline.

Example:

Contracted quantity: 50MW of DC low (i.e. low frequency response only)

Minimum energy requirement: 12.5MWh - calculated as 15 minutes at full power: $(15/60) \times 50 = 12.5\text{MWh}$

Minimum energy recovery requirement: 2.5MWh per SP - calculated as 3 minutes at full power: $(3/60) \times 50 = 2.5\text{MWh}$

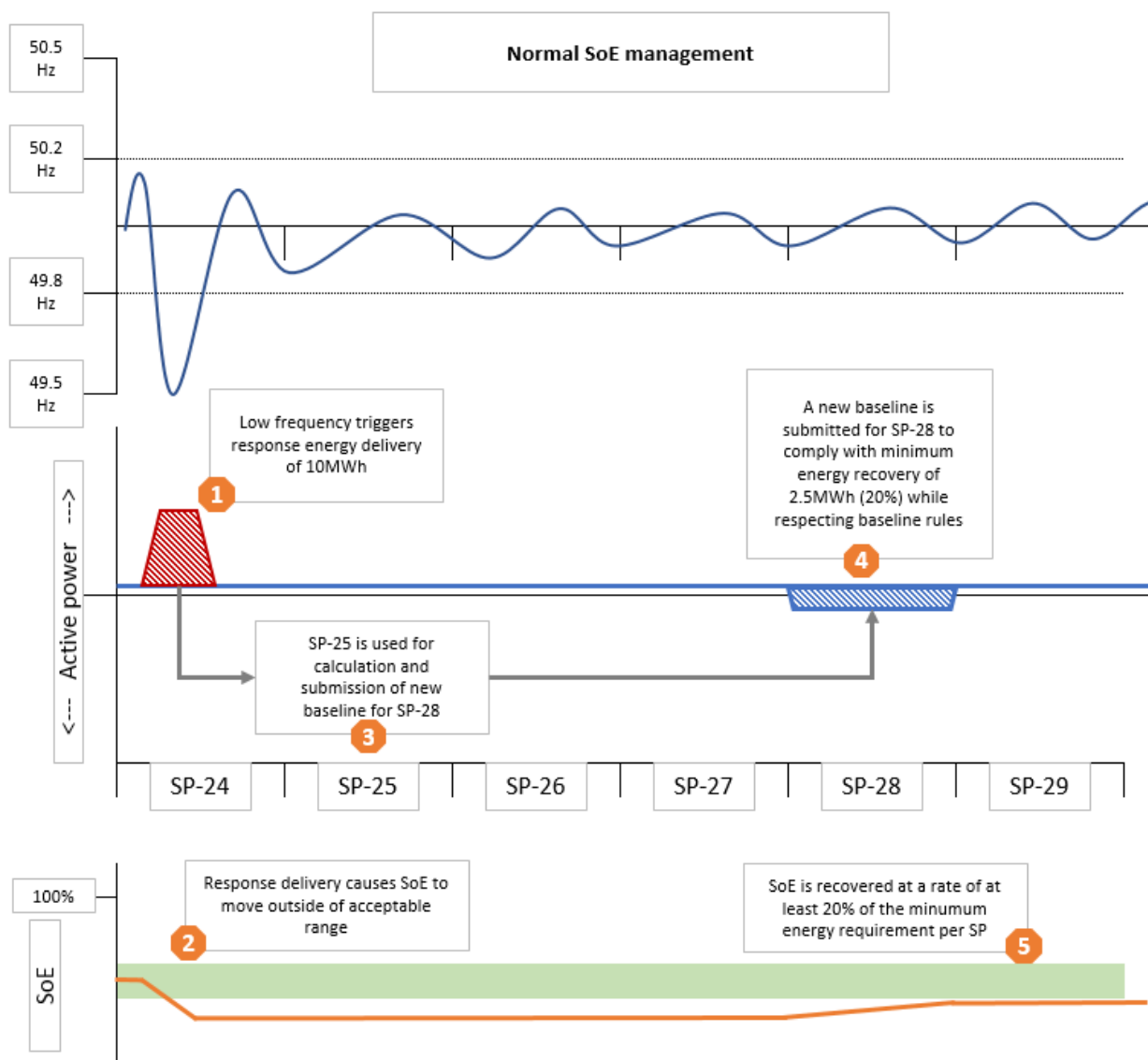
Based on the above parameters, the Registered Service Provider should therefore manage the SoE of its energy limited unit as follows:

1. Begin the service delivery day with the capability to deliver 12.5MWh of energy in the relevant direction – in this case, generation when frequency is low. Delivery might occur in a single event lasting 15 minutes at full power or

any number of shorter consecutive events (see Note 1 at the end of this section). The unit should not need to recharge or pause or cease delivery at any point before delivery of 12.5MWh of energy is complete.

2. At the start of each (and every) settlement period during that service delivery day, the Registered Service Provider should calculate the net energy delivery over the preceding settlement period. For example, if in SP24 the unit delivered 10MWh of energy as it responded to frequency, at the end of SP 24 / start of SP25 the stored energy is now 2.5MWh.
3. The Registered Service Provider should submit a baseline to replenish at least 2.5MWh so that stored energy can begin to return to minimum requirement. The baseline should not exceed a level at which the unit is unable to continue to provide DC whilst following the baseline.
 - a. The Registered Service Provider should create and submit this baseline before the end of SP25 so that it can take effect from SP28. It cannot take effect any earlier because there is a 1 hour gate before baselines can apply – this is the convention applied to physical notifications in the BM and needs to be mirrored by non-BM providers to ensure fairness across all market players.
 - b. The baseline should replenish at least 2.5MWh because this is the minimum energy recovery requirement calculated as 20% of the minimum energy requirement (equal to 3 minutes at full power: $(3/60) \times 50 = 2.5\text{MWh}$).

This is illustrated below:



If there is no further response delivered in SPs 25-31 (i.e. frequency stays in the dead band 50Hz +/- 0.015) then the stored energy will be 5MWh at the end of SP28, 7.5MWh at the end of SP29, 10MWh at the end of SP30 and completely restored to 12.5MWh at the end of SP31. At the end of every Settlement Period the Registered Service Provider assesses the level of stored energy and submits an appropriate baseline to recover that energy at a rate of at

least 20% per Settlement Period.

The Registered Service Provider can choose to recover the energy faster but must ensure any baseline complies with the maximum ramp-rate rule. In our example the maximum ramp rate is calculated as 5% of the contracted quantity, so 2.5MW/min.

The Registered Service Provider must also ensure that DC can be delivered at all moments during the service delivery day, including when ramping to or delivering against baselines for energy recovery (See Note 2 at the end of this section). This means a unit with name-plate capacity of 50MW cannot be contracted to deliver 50MW of DC – it must retain some headroom for energy recovery.

NGESO is not specifying how much headroom a unit must hold; that will depend on unit characteristics unknown to NGESO, e.g. cycle efficiency (See Note 3 at the end of this section). The Registered Service Provider can assess what quantity of DC a unit can provide whilst considering:

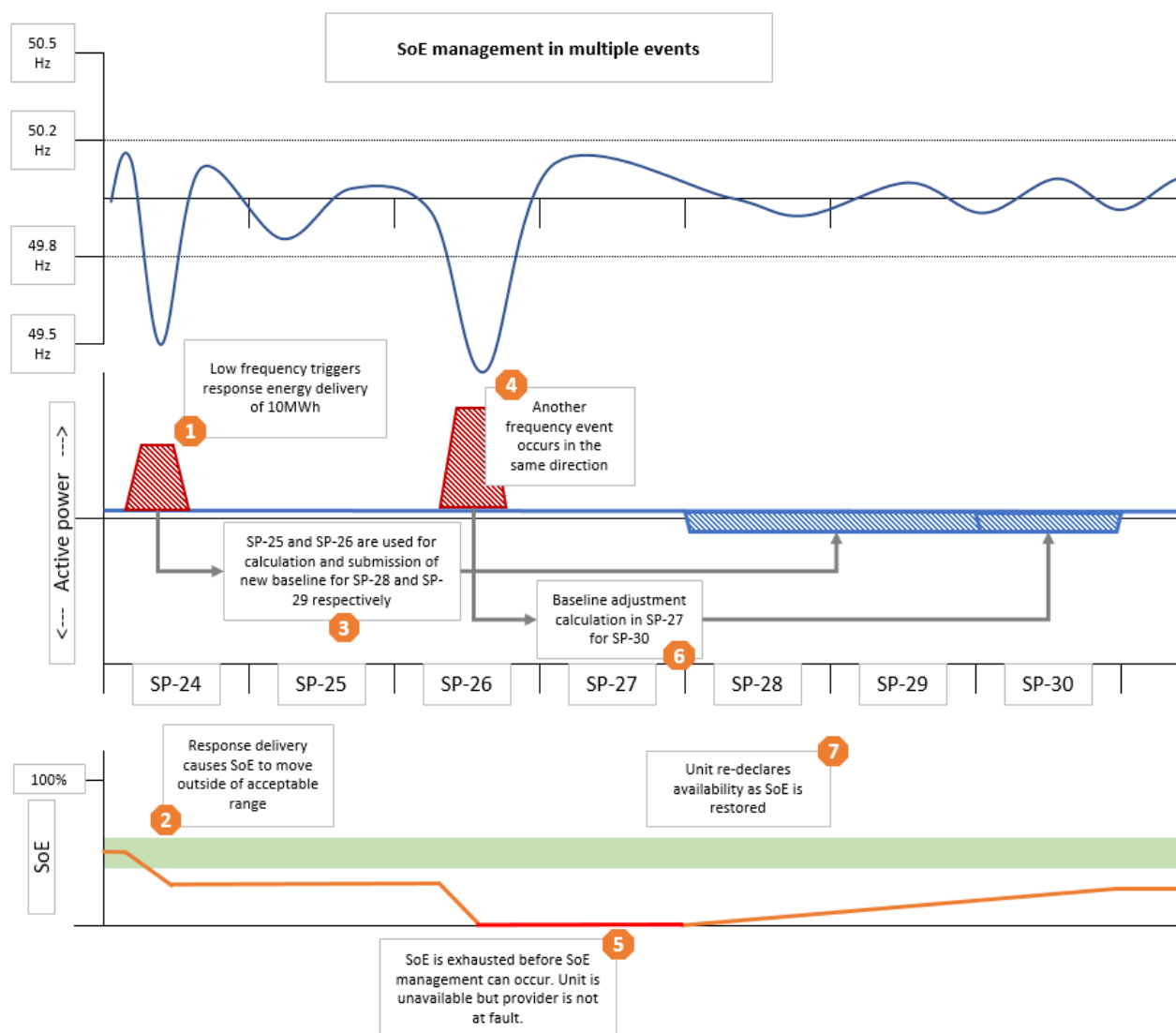
1. The requirement to recover at least 20% of the minimum energy requirement in a single Settlement Period.
2. The maximum ramp rate for all baselines submitted during the service delivery day.
3. The unit efficiency and other technical and commercial considerations.

We can continue our example by considering the more likely scenario of additional response delivery during periods 25-31. In the example below there is another significant event in SP26 which ultimately exhausts the stored energy before the unit has an opportunity to recover via a baseline.

At the start of SP25 and SP26 the Registered Service Provider calculates and submits new operational baselines for SP28 and SP29 respectively. These are each sized to replace at least 20% of the minimum energy requirement. However, during SP26 there is another event which fully depletes the stored energy:

1. The unit is now unavailable. There is no penalty or performance measurement applied to the unit because it has followed the SoE rules and always sought to recover energy at the first opportunity. The unit should re-declare as available when SoE is restored to the minimum energy requirement (12.5MWh) or the end of SP32 whichever occurs first.
2. At the start of SP27 the unit should continue the process of calculating stored energy (empty at the end of SP26) and submitting a baseline, in this case for SP30. As always, the baseline must comply with ramp-rate limits and must be sized to recover at least 20% of the energy recovery requirement.

This is illustrated below:



In the example above there will be a portion of non-delivery in SP26 when the energy is fully depleted but frequency is still in the delivery range ($<49.985\text{Hz}$). In cases where the SoE rules have been followed this non-delivery will not be subject to a performance penalty.

By this process of assessing the stored energy and submitting (and following) baselines the SoE can be managed to provide a high degree of certainty that energy limited units will always be able to respond adequately to frequency deviations.

Additional notes:

Note 1: For energy limited units, please take note that the energy requirement is defined in terms of MWh, not minutes. It can be calculated in terms of minutes at full power but should not be interpreted as 'maximum delivery time is 15 minutes'. Units are required to deliver at least the minimum energy requirement, this could be full power for 15 minutes but could also be 50% power for 30 minutes or 10% power for 150 minutes. There is no maximum delivery time unless/until the minimum energy requirement is fully delivered in net terms and/or the contracted MWh volume is less than 1MW (i.e. 1MW minimum contracted DC volume).

Note 2: For all Registered Service Providers, we will calculate your response delivery as a deviation from your submitted operational baseline. Therefore the ability to accurately follow a baseline is paramount. In the dead band ($\pm 0.015\text{Hz}$) the unit should be operating at its baseline – this may be 0MW or any other value, particularly if the unit is following a baseline to charge/discharge for SoE management purposes. The difference between a unit's baseline at its maximum capacity should be greater than or equal to the contracted quantity of DC, otherwise it would not be able to deliver on its obligation if frequency moved to $\pm 0.5\text{Hz}$.

Note 3: It is not possible or desirable for NGENSO to prescribe the maximum quantity of DC that an energy limited asset

can provide. We do not know the cycle efficiency (or how this might change over time) so we cannot prescribe how much headroom/foot room must be maintained to allow for adequate SoE management. We can only be sure that a xMW capacity unit can offer < xMW of DC.

Balancing Mechanism Interaction

NGESO anticipates that, as the DC service develops, Registered Service Providers and NGESO's control room may seek to utilise additional actions for volume from assets that has been held back from DC delivery. . Whilst NGESO's control room may not seek to utilise BOAs from the infancy of the service, Registered Service Providers with BM units that are participating in the Balancing Mechanism (BM) alongside providing DC should note the following.

Where a Registered Service Provider has a BM unit participating in the BM whilst also providing DC, it is NGESO's expectation that the BM unit's dynamic data (MEL, SEL etc.), Physical Notification (PN) data and Bid Offer Data (BOD) should be such that the unit can receive and deliver any Bid-Offer Acceptance instruction (BOA) **whilst still being available and able to fulfill any contracted DC volumes** if required.

A situation is foreseen where a BM unit's data is such that a BOA is received by a Registered Service Provider but is rejected for reasons of State of Energy management i.e. the unit cannot comply with the BOA without impacting on the unit's ability to deliver the contracted DC quantity (MW) and volume (MWh) if required. In this situation, the Registered Service Provider must telephone NGESO's control room. NGESO's Control Room reserves the right to not accept this reason for BOA rejection and NGESO reserves the right to Force Log/Proxy Accept the BOA. This would result in the unit's rejection being ignored, meaning the BOA would stand and would be published to the BMRS and Elexon as if it had been accepted.

It follows that if a Registered Service Provider decides not to follow a BOA in preference to maintaining its ability to deliver DC, then it could face imbalance charges under the Balancing and Settlement Code; conversely, if the Registered Service Provider decides to enact the BOA so as not to appear out of balance with Elexon despite reducing its ability to deliver DC, it will face penalties from NGESO through reduction in service availability fees following DC performance monitoring.

NGESO would like to flag the importance of accurate data submissions in the BM when interacting with response services. NGESO anticipates that BOA interaction will develop over the course of the "soft launch" as both NGESO and industry familiarize themselves with the DC service.

Data

Registered Service Providers will be required to submit both Operational and Performance Data, as outlined in the Service Terms.

NGESO is using the Data Concentrator for Operational Data Submission and electronic transfer for the submission of Performance Data. These are alongside other existing BM systems such as EDL/EDT and the Wider Access API for Physical Notifications and other Dynamic Data submissions required under the Grid Code for BM units.

Transparency

NGESO will seek to publish data in line with our other balancing services in the Monthly Balancing Services Summary (MBSS). NGESO will also seek to provide a service specific report covering performance of the DC service and daily tender results. NGESO website shall be used for publishing documentation on the DC service.

Capacity Market

NGESO does not envisage that Dynamic Containment will be treated as a "Relevant Balancing Service" for the purpose of the Capacity Market Rules, and accordingly delivery of Dynamic Containment will not trigger any adjustment pursuant to those rules where an Eligible Asset is part of a CMU (as defined in the Electricity Capacity Market Regulations 2014 as amended).

Active Network Management Zones

Eligible Assets will not be registered by NGESO for participation in DC if they have a condition in their DNO connection agreement whereby they are signed up to an Active Network management (ANM) Scheme / Flexibility Connection. NGESO shall continue to keep this under review and any changes to this position shall be consulted accordingly.

Transitional Arrangements

This document and the associated documentation describe a new DC service which will initially be “soft launched”, whilst certain underlying systems and processes are fully developed. Initially, therefore, there are several transitional arrangements that shall apply which are not intended to feature as part of the DC service long term.

These transitional arrangements are described below, and they qualify and/or supplement the Tender Rules and Service Terms until further notice or as described below. Any changes as the DC service develops and evolves will be the subject of further NGESO consultation as appropriate.

All dates below apply from the first delivery date of DC.

- Subject to the tender limit below, and for a period of 6 months, NGESO will accept tenders from Registered Service Providers in respect of Response Units/Eligible Assets which:
 - do not have a live connection to the Data Concentrator for Operational Data Submission (meaning Operational Data submissions will not be required) upon condition that a connection is actively being progressed), or
 - are unable to submit 20Hz performance data, upon condition that a minimum of 10Hz performance data is provided (and in all other respects is in line with the Service Terms requirements),provided that, for any service day, NGESO will limit its acceptance of tenders from any such Response Units to a maximum of 300MW (across both combined).
- For a period of 6 months, NGESO will not register Eligible Assets with response capacity in excess of 50MW.
- For a period of 12 months, aggregation of Eligible Assets to a Response Unit shall be permitted at GSP Group level. Following this period, aggregation will be limited to Eligible Assets at GSP level only. NGESO will keep this under review through our regular industry communication channels and any modifications to this transitional arrangement will go through the necessary consultation.