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Requests for a derogation under Article 6(14) from the requirements under Article 6(2) of the recast Electricity Regulation in respect of a new product called Dynamic Containment (DC)

Dear Alastair,

Please consider this letter as a formal derogation request in accordance with Articles 6(14) of Regulation (EU) 2019/943 relating to the pre-determination of the price of balancing energy under Article 6(2).

The following references are relevant for the purposes of this request.

1. The requirement at Article 6(2) of the recast Electricity Regulation states "*The price of balancing energy shall not be pre-determined in contracts for balancing capacity. Procurement processes shall be transparent in accordance with Article 40(4) of Directive (EU) 2019/944, while protecting the confidentiality of commercially sensitive information."*

2. Paragraph 1 at Article 6(14) of the recast Electricity Regulation gives a context to the derogation and states that where "*Transmission system operators may, where standard balancing products are not sufficient to ensure operational security or where some balancing resources cannot participate in the balancing market through standard balancing products, propose, and the regulatory authorities may approve, derogations from paragraphs 2 and 4 for specific balancing products which are activated locally without exchanging them with other transmission system operators."*

3. Paragraph 2 of Article 6(14) provides further detail of the requirements that a derogation must include: ***"****a description of measures proposed to minimise the use of specific products, subject to economic efficiency, a demonstration that the specific products do not create significant inefficiencies and distortions in the balancing market either inside or outside the scheduling area, as well as, where applicable, the rules and information for the process for converting the balancing energy bids from specific balancing products into balancing energy bids from standard balancing products."*

Dynamic Containment has been developed in line with other consulted-upon and approved European Frequency Containment Reserve (FCR) products where balancing energy is not priced but is used. This is an established precedent as per: https://www.emissions-euets.com/internal-electricity-market-glossary/793-frequency-containment-reserve

Across Europe, the non-payment of balancing energy, or setting the price to zero, for an FCR product is the norm[1]. The reasons for this are:

1) The utilisation of balancing energy is very small for FCR products (discussed later in this letter)

[1] *"In most cases the activation of FCR is not remunerated, only its reservation is paid (Introduction to network tariffs and network codes for consumers, prosumers and energy communities"*, Technical Report, Leonardo Meeus, Tim Schittekatte, European University Institute, Badia Fiesolana, July 2018, p. 31)

2) Generally, for FCR products, when balancing energy is used, it is used both negatively and positively resulting in no payment – whilst dynamic containment is a low frequency product only, it is envisaged that at some point in the future, it will be developed to provide high frequency as well

Dynamic Containment does not include a mechanism for the payment of balancing energy and this has been interpreted by Ofgem as meaning that the price for energy is fixed at zero at the time the contract is let. With this interpretation, the view is that Dynamic Containment is not in line with A6(2).

At this point in time, and for the reasons described below, we are requesting a derogation for Dynamic Containment under Article 6(14) from the requirements of Article 6(2).

We will first show why setting the price of balancing energy to zero is justified for Dynamic Containment.

Then, as required under paragraph 1 of Article 6(14) we will show why Dynamic Containment is required for operational security.

Finally, we will answer the specific points raised in paragraph 2 of Article 6(14).

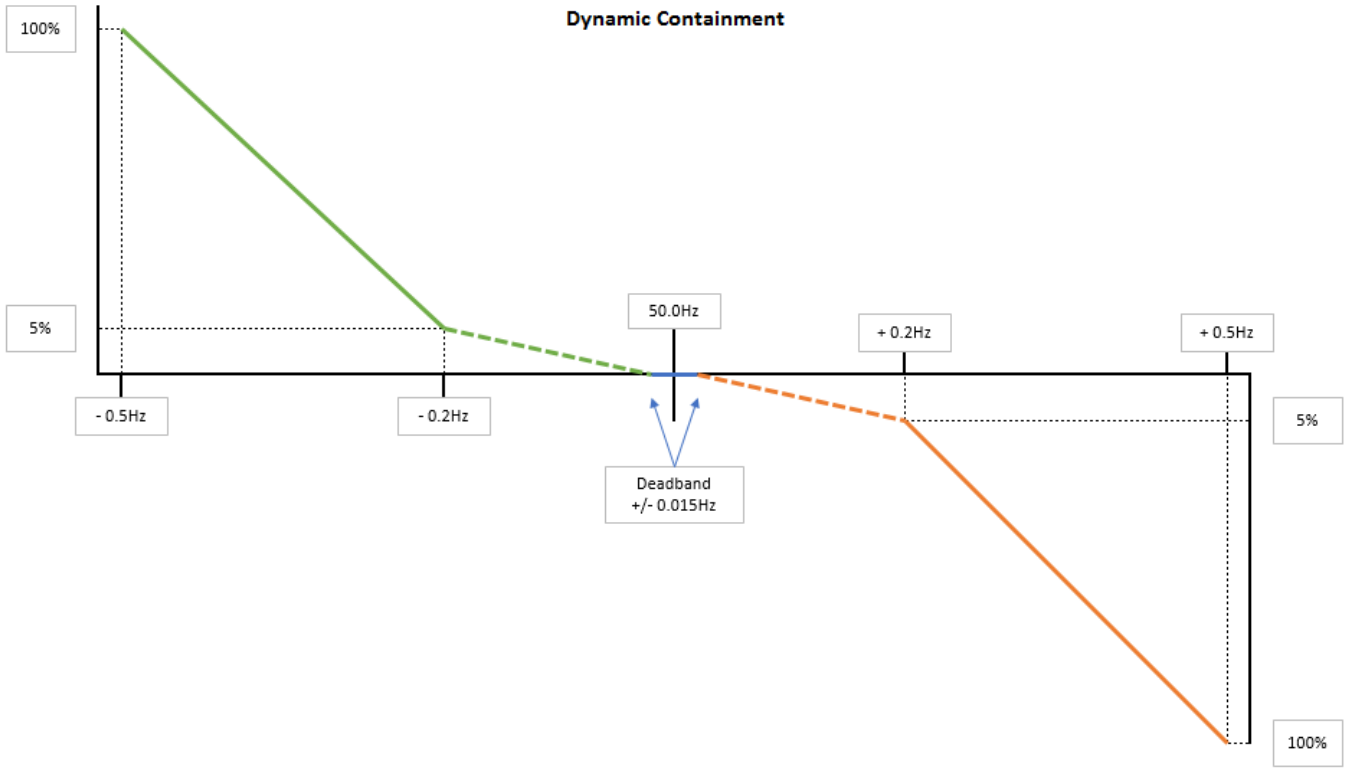
Why setting the price to zero for balancing energy is justified for Dynamic Containment

As already mentioned, this approach is the norm in Europe for FCR products because of the small amount of balancing energy used.

We do not believe that payment for balancing energy would give any significant economic signals to providers, who we expect will price their product based on the much more significant availability payment.

Dynamic Containment has been developed to meet the need to contain frequency within statutory limits (+/- 0.5Hz) for a range of loss sizes. Significant activation starts at the edge of “operational limits” (+/- 0.2 Hz) and full delivery is achieved at statutory limits (+/- 0.5 Hz) within 1s. Within operational limits the maximum delivery is 5% and can be zero.

This figure shows how Dynamic Containment will provide energy based on frequency deviations.



Although Dynamic Containment will be available at all times its actual utilisation is expected to be very low. Delivered energy volumes will be up to 90% lower than the existing firm frequency response service. Frequency should only be in the full delivery range (that is > 0.2Hz away from 50Hz) **less than 0.1% of the time**.

Within operational limits the maximum power is 5% (up to a frequency deviation of 0.2Hz). However, control engineers will keep frequency closer to 50Hz so that energy within operational limits will be a low value. The following table shows frequency performance in recent years.

	2014	2015	2016	2017	2018
Mean	49.999722	49.9997371	49.9997574	49.9997397	49.9995403
Standard deviation	0.054	0.054	0.055	0.060	0.066

If we consider a unit offering 100MW of Dynamic Containment, and we assume the contract is asymmetric (the unit offers either Low Frequency or High Frequency but not both) the following is the percentage of time it would be producing power according the historic statistics given above for 2017.

Expected power output from a unit offering 100MW of DC	Percentage of time in this state
0MW (no power output)	59.9%
Between 0MW and 2.5MW	36.5%
Between 2.5MW and 5MW	3.5%
Between 5MW and 100MW	0.1%

For a unit providing both High and Low Frequency support this would average out to close to zero output overall (the amount of time above 50Hz is equal to the amount of time below).

If providers were required to submit prices for balancing energy they would need to develop IT solutions and business processes to support this. It will also require additional processes to check settlement and deal with disputes etc. This extra complexity would be for a very small payment for energy delivered. The main benefit for a provider is the payment they get for availability.

Hence, we believe that in this instance, setting the price to zero is the efficient thing to do. We do not believe that paying for energy delivered as part of dynamic containment provides any significant signal to market players, but adds additional costs and complexity to support the submission of non-zero prices close to real-time.

We request derogation from Article 6(2) based on this evidence and rationale.

Dynamic Containment and Operational Security

NGESO are requesting a derogation for dynamic containment under the criteria that standard balancing products are not sufficient to ensure operational security.

There is no standard FCR product and so there is no standard product to use to ensure operational security.

In this section, we will explain why this new product is necessary and why existing local products are not sufficient.

The energy industry is changing; we are seeing increasing levels of inverter connected energy sources on the system, which is creating issues associated with low system inertia.

Existing products (such as Primary, Secondary and High, PSH, Frequency Response) are not fast enough to secure our low-inertia system because the rate at which they deliver power is not sufficient when frequency is moving quickly. Frequency can reach statutory limits, and below, before it can be arrested by Primary response.

A new service is needed to arrest frequency in low-inertia, large loss scenarios. In these scenarios, the Rate of Change of Frequency (RoCoF) is faster, thus a faster response product is required. Dynamic containment delivers in 1 second. Hence it matches the characteristics of a low inertia system suffering from a large loss (unlike Primary which delivers in 10 seconds).

A ‘faster’ version of existing Primary, Secondary or High (PSH) may help but ignores the distinction between pre-fault and post-fault management and the interaction of all frequency services in the control cycle. Our proposed new product suite is a faster version of PSH, but the issues we are managing have been split (pre/post-fault) and the products designed around the system need.

Existing static services are fast but include compromises that will make them infeasible in the near future, including managing their deactivation and their lack of suitability to manage a range of loss sizes. The challenges of using static response arise precisely because they are not dynamic.

The full contracted quantity of static services is delivered onto the system in response to frequency reaching a pre-defined set-point regardless of the sequence of events that led to the change (e.g gradual or instantaneous). In some situations, this is desirable, but in others it is overproportionate. This approach is not viable on a system which experiences very large ranges of inertia (and hence RoCoF) and large ranges of loss sizes, both demand and generation.

Often the suggested approach is to change the quantity of static response as inertia and loss size change, and to use a range of frequency set-points to stagger the delivery of response. This approach in itself highlights why dynamic services are preferred to static services.

The ESO has previously outlined its thinking around static and dynamic services in the 2019 Operability Strategy Report.

Enhanced Frequency Response (EFR) is fast. Necessary tweaks to its design, e.g. to avoid harming pre-fault frequency, have resulted in Dynamic Containment.

The service design of EFR allows for energy limited providers to manage their state of energy when frequency is near to the deadband. The un-intended effect of this is that it allows charging to occur when frequency is low and discharging to occur when frequency is high. Even with relatively small quantities of EFR (~200MW) this consequence has had a noticeable effect on the quality of pre-fault frequency.

This issue has been resolved in the design of dynamic containment by implementing specific rules on how and when energy limited providers can manage their state of energy.

In summary, there is a need for fast acting frequency response services both now and in the future:

Now: Large loss (nuclear power stations and interconnectors) and Loss of Mains (LoM) volume means that the system is at risk of being insecure in some periods because response services are not fast enough to arrest the changing frequency before limits are reached/triggered.

Future: LoM volume will be much diminished, but the risk of large losses will still be present (new interconnection, large offshore wind). We will still need faster acting response products due to consistently lower system inertia.

The above points illustrate that dynamic containment is critical to ensuring future operational security. This derogation is required to ensure that operational security can be effectively managed.

Dynamic Containment and its effect on markets

As per Article 6(14), there are 3 criteria we must also address.

1. **description of measures proposed to minimise the use of specific products, subject to economic efficiency**

   This section is not applicable to FCR products as there is not a standard FCR product that we can use in preference to any specific products. As there is no standard FCR product we may only use specific FCR products in an economically efficient manner, in line with our license obligations to manage the system safely and effectively.

   As noted in the previous section, Dynamic Containment is required to ensure operational security. As a standard product does not exist to rectify these issues, Dynamic Containment has been developed and will be used to address the issues stated above.

   Dynamic Containment, like other frequency containment reserve services, is always required to be available. An unexpected demand or generation loss can happen at any time. NGESO, in line with our ‘efficient and economic’

license condition will only procure the minimum required quantity of Dynamic Containment to mitigate the risks which we aim to secure.

2. a demonstration that the specific products do not create significant inefficiencies and distortions in the balancing market either inside or outside the scheduling area

This element of the derogation structure does not apply to FCR standard products as there is no standard product on which inefficiencies and distortions could apply.

Impacts inside the scheduling area

First, we consider whether the design of Dynamic Containment causes significant inefficiencies or distortions to balancing markets inside of the scheduling area.

Dynamic Containment is technically different from the currently available alternatives because it provides dynamic frequency response while restricting access to reserve at a ratio very close to 1:1 (i.e. for every 1MW of DC we lose access to 1MW of power that could be used for reserve). The alternative (PSH) provides (slower) dynamic response but restricts access to reserve at a ratio of approx 1:1.55 (i.e. for every 1MW of PSH we lose access to 1.55MW of power that could be used for reserve).

Within the scheduling area, other frequency response products are unlikely to be significantly affected as the technical parameters are so different. Dynamic Containment is aiming to build volume through new assets and technology. There may be some existing assets that will move from the Firm Frequency Response tender (FFR) to the Dynamic Containment product; it is forecasted that these volumes will be fairly small[2]. Note that there has not been an impact on the volumes in the October round for FFR.

Impact on areas outside the scheduling area

Dynamic containment will not create inefficiencies or distortions outside the scheduling areas because there is no standard FCR product that is traded across scheduling areas for it to distort.

Impact on other GB markets

Dynamic containment has been developed to reduce inefficiencies and distortions created by existing products and therefore is a significant improvement on current frequency response products. Dynamic containment is a response product; reserve products are very different, and the markets use different providers and assets. It is therefore foreseen that that will be no impact on reserve markets.

In respect of capacity markets, if providers are required to provide services to capacity markets, then they will prioritise this service over Dynamic Containment should a stress event occur. As a mitigating action, NGESO are exploring the option of having Dynamic Containment registered as a Relevant Balancing Service which will remove the risk entirely. This activity is happening in parallel to go live.

3. the rules and information for the process for converting the balancing energy bids from specific balancing products into balancing energy bids from standard balancing products

NGESO do not believe this element of the derogation structure is applicable as a standard product does not exist for FCR. There is no standard product to convert Dynamic Containment into.

Conclusion

This derogation is required to ensure we can meet security of supply. The derogation will also allow our response and reserve reform to be undertaken as supported by stakeholders and outlined in both our ESO Forward Plan 2019-2021 and our draft ESO RIIO-2 Business Plan.

We are happy to provide regular updates to Ofgem and/or industry in respect of our views on the need for and extent of any further derogation in relation to the development of our response and reserve products.

[2] Note we are forecasting this volume to initially be around 100MW. Over time, we expect this volume to increase up to 500MW. The long-term intention is that dynamic containment will replace FFR volumes as the response reform products are launched.

If you have any queries regarding this derogation request or supporting evidence, please contact Bernie Dolan in the first instance on 07787669574 or at Bernie.Dolan@nationalgrideso.com.

Yours sincerely,

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