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03 February 2021

Dynamic Containment Terms and Conditions

Dear Alastair,

In accordance with Article 18 of COMMISSION REGULATION (EU) 2017/2195 of 23 November 2017 (as applicable and as amended in Great Britain) establishing a guideline on electricity balancing (EBGL), National Grid ESO is required to propose terms and conditions related to balancing.

This letter confirms terms and conditions for a new service, Dynamic Containment (DC), and how they comply with Article 18 of EBGL. Detailed references to the relevant service terms for the DC service have been included in Table 1 in Annex 1 of this letter.

If approved, these DC terms will then form part of the Article 18 terms and conditions as envisaged in CUSC section 4, paragraph 4.2B.5 and as required in that paragraph any subsequent amendments to the Article 18 terms within the DC terms will follow an amendment process which is compliant with the EBGL amendment process requirements.

DC has been developed in order to mitigate operational risks of larger system loss and lower inertia. With lower inertia on the system, the frequency changes more quickly. The DC service will provide fast-acting response that will reduce the overall volume of response needed and enable the system to be secure for a range of loss sizes & types.

In accordance with EBGL, a consultation on the Article 18 DC terms was undertaken from 17 December 2020 to the 21 January 2021. Following the EBGL consultation for DC, we have made several changes to the relevant DC service terms reflecting the responses we received which in our view improve the terms and provide the clarity expected. We have also made some typographical and housekeeping updates. In total, we received nine consultation responses, and have responded to each of these. Table 2 in Annex 2 of this letter includes these responses, and NGEN's reply to the points raised.

If you have any queries regarding this proposal, please contact box.futureofbalancingservices@nationalgrideso.com

Yours sincerely



Colm Murphy
Electricity Market Change Delivery Manager

Annex 1

Amendment of EBGL Article 18 mapping to include Dynamic Containment Terms and Conditions requirements

Please note: In accordance with EBGL Article 18, this table provides references to relevant parts of the GB codes and additional Service Terms which place obligations on registered service providers.

This document does not constitute compliance with Article 18 of the EBGL. Its purpose is to demonstrate where new Terms and Conditions for DC in the scope of EBGL Article 18 can be found. Where there is any conflict between this document, the Service Terms and GB Codes, the Service Terms and GB Codes shall take precedence.

Table 1

Below is the mapping of EBGL Article 18 with **highlighted** references for DC service terms. This remains unchanged.

Article	Text	Code	Section
18.2	The terms and conditions pursuant to paragraph 1 shall also include the rules for suspension and restoration of market activities pursuant to Article 36 of Regulation (EU) 2017/2196 and rules for settlement in case of market suspension pursuant to Article 39 of Regulation (EU) 2017/2196 once approved in accordance with Article 4 of Regulation (EU) 2017/2196.	Grid Code	OC9.4
		BSC	G3
18.4	The terms and conditions for balancing service providers shall:	-	-
18.4.a	define reasonable and justified requirements for the provisions of balancing services;	SCT	DC Service Terms 5-Service Availability 6-Service Delivery 7-Availability Payments 15- Monitoring and Metering Data
		BSC	BSC Section A, H3, H4.2, H4.7, H4.8, H5.5, H6, H10, J3.3, J3.6, J3.7 and J3.8
		CUSC	Section 4.1.3
18.4.b	allow the aggregation of demand facilities, energy storage facilities and power generating facilities in a scheduling area to offer balancing services subject to conditions referred to in paragraph 5 (c);	BSC	K3.3, K8, S6.2, S6.3 and S11
		Grid Code	DRSC 4.2, BC1.4
			DC Participation Guidance document

			<ul style="list-style-type: none"> - Service parameters - Transitional Arrangements DC Glossary Part 4 Dynamic Containment Specific Terms- - Eligible Asset definition - Response Unit definition-
18.4.c	allow demand facility owners, third parties and owners of power generating facilities from conventional and renewable energy sources as well as owners of energy storage units to become balancing service providers;	BSC	K3.2, K3.3, K8
18.4.d	require that each balancing energy bid from a balancing service provider is assigned to one or more balance responsible parties to enable the calculation of an imbalance adjustment pursuant to Article 49.	BSC	T4, Q7.2, Q6.4
18.5	The terms and conditions for balancing service providers shall contain:	-	-
18.5.a	the rules for the qualification process to become a balancing service provider pursuant to Article 16;	Standard Contract Terms	<ul style="list-style-type: none"> DC Participation Guidance Document -Service Parameters -Registration -Testing -Baselines -State of Energy -Data - Capacity Market -Active Network Management -Transitional Arrangements DC Tender Rules 4 Registration
		Grid Code	BC5, BC4.4.2
		CUSC	Section 4.1
		BSC	J3.3, J3.6, J3.7, J3.8, K3.2, K3.3 and K8

Article	Text	Code	Section
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<p>18.5.b</p>	<p>the rules, requirements and timescales for the procurement and transfer of balancing capacity pursuant to Articles 32, 33 and 34;</p>	<p>Standard Contract Terms</p>	<p>DC Participation Guidance Document Registration Tenders</p> <p>DC General Terms and Conditions 7- Assignments and transfer</p> <p>DC Tender Rules 5 – DC Tender Submissions 7 - Disqualification of DC Tenders 8 - Tender Assessment 9 - Acceptance and rejection 12 – Exceptional Circumstances</p>
<p>18.5.c</p>	<p>the rules and conditions for the aggregation of demand facilities, energy storage facilities and power generating facilities in a scheduling area to become a balancing service provider;</p>	<p>Guidance document</p>	<p>DC Participation Guidance Document Service Parameters Transitional Arrangements</p>
		<p>BSC</p>	<p>K3.3 and K8</p>
		<p>Grid Code</p>	<p>BC1.4 and BC1.A.10</p>
<p>18.5.d</p>	<p>the requirements on data and information to be delivered to the connecting TSO and, where relevant, to the reserve connecting DSO during the prequalification process and operation of the balancing market;</p>	<p>Standard Contract Terms</p>	<p>DC Participation Guidance Registration Tenders Testing Settlement Baselines Data Transitional Arrangements</p> <p>DC General Terms and Conditions 8 - Confidentiality and Announcements 18 – EMR</p> <p>DC Service Terms Section 5 Service Availability 5.1, 5.2, 5.3 Section 6 Service Delivery</p>

			6.2, 6.3, 6.4, 6.5 13 - Communication 15 - Monitoring and metering data
		BSC	BSC Section O
		Grid Code	DRC, BC5 BC1.4,
		CUSC	Section 4.1.3.14 and 4.1.3.19
18.5.e	the rules and conditions for the assignment of each balancing energy bid from a balancing service provider to one or more balance responsible parties pursuant to paragraph 4 (d);	BSC	T4
			DC Service Terms 16- ABSVD DC Participation Guidance Document Settlement
18.5.f	the requirements on data and information to be delivered to the connecting TSO and, where relevant, to the reserve connecting DSO to evaluate the provisions of balancing services pursuant to Article 154(1), Article 154(8), Article 158(1)(e), Article 158(4)(b), Article 161(1)(f) and Article 161(4)(b) of Regulation (EU) 2017/1485;	Standard Contract Terms	DC Service Terms 13 - Communication 15 - Monitoring and metering data DC Tender Rules 4 - Registration 5 - DC Tender submissions
		Grid Code	Grid Code BC1.4, BC1.A.10,
		CUSC	4.1.3.19
18.5.g	the definition of a location for each standard product and each specific product taking into account paragraph 5 (c);	Grid Code	BC1.4
18.5.h	the rules for the determination of the volume of balancing energy to be settled with the balancing service provider pursuant to Article 45;	BSC	BSC T3
18.5.i	the rules for the settlement of balancing service providers defined pursuant to Chapters 2 and 5 of Title V;	Standard Contract Terms	DC Participant Guidance Document Settlement DC Service Terms

			<p>7- Availability Payments</p> <p>8- Payment procedure</p> <p>Schedule 2 - Availability Payments</p> <p>DC General Terms and Conditions</p> <p>4- Payments</p>
		BSC	T1.14, T3 and U
		CUSC	Section 4.1.3.9 and 4.1.3.9A
18.5. j	a maximum period for the finalisation of the settlement of balancing energy with a balancing service provider in accordance with Article 45, for any given imbalance settlement period;	Standard Contract Terms	DC General Terms and Conditions 4- Payment
		BSC	U2.2
		CUSC	Section 4.3.2.6
18.5. k	the consequences in case of non-compliance with the terms and conditions applicable to balancing service providers.	Standard Contract Terms	<p>DC General Terms and Conditions</p> <p>6- Termination of Balancing Services Contracts</p> <p>DC Tender Rules</p> <p>7- Disqualification of DC Tenders</p> <p>DC Service Terms</p> <p>4, 5, 6, 11, 12, 14</p> <p>5.5 - settlement period of unavailability</p> <p>5.6 - complied with SOE rules</p> <p>5.7 - Unable to meet requirements - deemed unavailable</p> <p>6.5 - failure to prep baseline - deemed unavailable</p> <p>6.12 - non com SOE rules - deemed unavailable</p>

		BSC	H3, Z7 and A5.2
		CUSC	Sections 4.1.3.9, 4.1.3.9A and 4.1.3.14
18.6	The terms and conditions for balance responsible parties shall contain:	-	-
18.6.a	the definition of balance responsibility for each connection in a way that avoids any gaps or overlaps in the balance responsibility of different market participants providing services to that connection;	BSC	K1.2, P3 and T4.5
18.6.b	the requirements for becoming a balance responsible party;	BSC	A, H3, H4.2, H4.7, H4.8, H5.5, H6, H10, J3.3, J3.6, J3.7, J3.8., K2, K3.3 and K8
18.6.c	the requirement that all balance responsible parties shall be financially responsible for their imbalances, and that the imbalances shall be settled with the connecting TSO;	BSC	N2, N6, N8, N12, and T4,
18.6.d	the requirements on data and information to be delivered to the connecting TSO to calculate the imbalances;	BSC	BSC Section O, Q3, Q5.3, Q5.6, Q6.2, Q6.3, Q6.4
		Grid Code	BC1.4.2,3,4, BC1 Appendix 1 BC2.5.1,
18.6.e	the rules for balance responsible parties to change their schedules prior to and after the intraday energy gate closure time pursuant to paragraphs 3 and 4 of Article 17;	BSC	P2
		Grid Code	BC1.4.3,4,
18.6.f	the rules for the settlement of balance responsible parties defined pursuant to Chapter 4 of Title V;	BSC	T4, U2

Article	Text	Code	Section
18.6.g	the delineation of an imbalance area pursuant to Article 54(2) and an imbalance price area;		<i>GB constitutes one imbalance area and imbalance price area and they are equal to the synchronous area</i>
18.6.h	a maximum period for the finalisation of the settlement of imbalances with balance responsible parties for any given imbalance settlement period pursuant to Article 54;	BSC	U2.2
18.6.i	the consequences in case of non-compliance with the terms and conditions applicable to balance responsible parties;	BSC	H3,Z7 and A5.2

18.6.j	an obligation for balance responsible parties to submit to the connecting TSO any modifications of the position;	BSC	P2
18.6.k	the settlement rules pursuant to Articles 52, 53, 54 and 55;	BSC	T4, U2
18.6.l	where existing, the provisions for the exclusion of imbalances from the imbalance settlement when they are associated with the introduction of ramping restrictions for the alleviation of deterministic frequency deviations pursuant to Article 137(4) of Regulation (EU) 2017/1485.	Deterministic frequency deviation is a continental European concept and is not a characteristic of the GB system. Therefore, this requirement does not apply to GB.	N/A

Non- Mandatory elements

Article	Text	Comment
18.7. a	a requirement for balancing service providers to provide information on unused generation capacity and other balancing resources from balancing service providers, after the day-ahead market gate closure time and after the intraday cross-zonal gate closure time;	NG ESO does not expect to require this from Balancing Service Providers.
18.7. b	where justified, a requirement for balancing service providers to offer the unused generation capacity or other balancing resources through balancing energy bids or integrated scheduling process bids in the balancing markets after day ahead market gate closure time, without prejudice to the possibility of balancing service providers to change their balancing energy bids prior to the balancing energy gate closure time or the integrated scheduling process gate closure time due to trading within intraday market;	NG ESO does not expect to require this from Balancing Service Providers, except where balancing capacity or energy has been contracted. Although in the BM defaulting rules apply if data is not updated, there is no legal requirement for parties to offer unused generation capacity or any other balancing resource.
18.7.c	where justified, a requirement for balancing service providers to offer the unused generation capacity or other balancing resources through balancing energy bids or integrated scheduling process bids in the balancing markets after intraday cross-zonal gate closure time;	NG ESO does not expect to require this from Balancing Service Providers, except where balancing capacity or energy has been contracted. Although in the BM defaulting rules apply if data is not updated, there is no legal requirement for parties to offer unused generation capacity or any other balancing resource.
18.7. d	specific requirements with regard to the position of balance responsible parties submitted after the day-ahead market timeframe to ensure that the sum of their internal and external commercial trade schedules equals the sum of the physical generation and consumption schedules, taking into account electrical losses compensation, where relevant;	NG ESO does not expect to require this from Balancing Service Providers. No BSC party is required to contract to match its Final Physical Notifications (FPNs).

18.7. e	an exemption to publish information on offered prices of balancing energy or balancing capacity bids due to market abuse concerns pursuant to Article 12(4)	NG ESO does not expect to require this exemption. Such data is published on BMRS.
18.7. f	an exemption for specific products defined in Article 26(3)(b) to predetermine the price of the balancing energy bids from a balancing capacity contract pursuant to Article 16(6)	DC A derogation has been approved under Regulation (EU) 2019/943 Article 6(14) from the requirements of Regulation (EU) 2019/943 Article 6(2)
18.7. g	An application for the use of dual pricing for all imbalances based on the conditions established pursuant to Article 52(2)(d)(i) and the methodology for applying dual pricing pursuant to Article 52(2)(d)(ii).	NG ESO does not expect to apply for the use of dual pricing for all imbalances. A single imbalance price was adopted by the GB market in November 2015.

Annex 2

EBGL Article 18 Dynamic Containment Terms and Conditions Consultation Responses summary

Table 1

Summary of responses and key themes from the consultation responses and NGESO comments. For responses provided on the official template we have only included the specific questions the provider responded to, all other questions should be assumed as “no comment” from the provider. Where providers have submitted detailed letter’s or their response is very detailed on the response template NGESO has summarised the response into key themes.

<i>Respondent</i>	<i>Response or Key Theme</i>	<i>NGESO Comments</i>
Flexitricity Limited	<p>Do you agree with the updates in the proposal for Dynamic Containment?</p> <p>Flexitricity wholeheartedly supports NGESO in their open-minded approach to the proposal, in particular the enthusiasm shown in engaging with providers over the last 3 months as Dynamic Containment has commenced as a commercial, and crucial, service.</p> <p>We welcome the commitment to treat 13 days as a maximum elapse time from registration, and to amend the market window to open at D-1 15:00. Both of these measures indicate an understanding of the commercial and resourcing pressures that providers have faced.</p> <p>The ability to increase/decrease capacity provision through daily submissions has been championed by Flexitricity as vital to support the aim of the service, which is to provide reliable capacity to NGESO. The current situation of “all-or-withdrawal” is not reflective of the normal operational circumstances, particularly of storage assets, which do on occasion required preventative measures/maintenance on a single container or inverter. This, coupled with settlement being calculated on a daily basis, will deliver a more robust, equitable service to NGESO.</p> <p>Flexitricity is appreciative that ANM agreements, and the availability of assets under such agreements, will no longer to a barrier to participation. Where ANM has an 0.01% decrease in availability as</p>	<p>NGESO thank you for taking the time to provide the feedback you have given in support of our proposals, and we look forward to continuing working with you.</p>

	<p>verified by the DNO (one of our clients), ANM should not be a barrier to DC participation. We are grateful to NGESO's pragmatism and look forward to understanding the parameters by which NGESO will utilise discretion within this process.</p>	
<p>Grid Beyond</p>	<p>Do you have any other comments on the Dynamic Containment proposal?</p> <p><i>Procurement Time:</i> The current procurement process for 24 hours is not possible for demand assets, shorter windows are preferred such as settlement period, this will enable participation of demand/BTM assets and renewable. If this is not possible at this point, procurement should be broken to smaller windows. We have a large volume of carbon-free assets that are suitable to participate in DC and the only challenge is that they are not available for 24 hours.</p> <p><i>Baseline:</i> To allow participation of carbon-free assets such as demand/BTM assets and renewable, you should avoid request for any baseline prediction.</p> <p>We need to be able to calculate the baseline at the point of dispatch to be able to give you an accurate number, or alternatively you can use the live metering data to calculate the baseline.</p>	<p>NGESO thank you taking the time to provide the feedback you have given. ESO recognise that in order to launch the service at pace we have implemented the service with a number of manual processes. We are committed to implementing a procurement platform that will offer enhanced automation and increased bidding granularity both for DC and other ancillary services. We recognise scoping, tendering and implementing such a solution will take time and are reviewing whether there are any interim solutions we can put in place to unlock the benefits outlined. These developments and plans will be shared via the traditional communication channels.</p> <p>ESO note that as part of the consultation we did not make any changes to the current baseline process. We have identified baselines as a topic of interest to industry and included this explicitly in our Wave 2 workstream under the DC Soft Launch Developments document.</p> <p>Baselines are important to allow us to measure the response delivery and therefore the performance of any participating unit. We acknowledge feedback that submitting baselines and following them can be challenging for certain types of units/assets. These units might be able to deliver the service but may not be able to meet our existing baseline requirements, thus making participation challenging. We look forward to unlocking these challenges under our Wave 2 work with industry and welcome more detailed insights through this workstream.</p>
<p>Limejump Ltd</p>	<p>Do you agree with the updates in the proposal for Dynamic Containment?</p>	<p>NGESO thank you for taking the time to provide the feedback you have given in support of some of our proposals, and we look forward to continuing working with you in the future. For ease,</p>

<p>We welcome the opportunity to feed into this consultation. Whilst we are currently not participating in DC, we have extensive knowledge in managing batteries in FFR and the BM and have plans to enter DC.</p> <p>We support the following proposals in the consultation: The ability to update the price and/or quantity or to withdraw a tender by resubmitting a revised tender in a market window prior to the service day. We note the need to have previously made a submission.</p> <p>Whilst we support the DAH Market Window opening at D-1 at 15:00 rather than D0 at 07:00, we recommend that the closing time is extended from 10:00 to 11:00 or 12:00 to allow sufficient time for the results of the Day Ahead auctions to be published before submitting DC tenders.</p> <p>We support moving the penalty to apply daily rather than weekly so participants are not disincentivised to stop delivering if they fail a test early in the week.</p> <p>We support the proposal to widen the error tolerance from 50 milliseconds to 200 milliseconds, so participants do not risk losing payments after a 1 x 50 millisecond spike taking them out of limits. We recommend this is reassessed in 6 months when there are more market participants.</p> <p>Adding a tolerance of 0.05 seconds to the minimum lag time of 0.25 seconds.</p> <p>Testing tolerances being based on maximum Contracted volume rather than Expected volume, resulting in higher tolerances across each frequency level test.</p> <p>With regard to the proposed increase in the unit cap from 50MW to 100MW we would like to understand the rationale for the cap. Is it designed to allow a minimum number of participants or reduce the risk from a single point of failure?</p>	<p>we have added topic titles to confirm each of our specific responses:</p> <p><u>Day Ahead Market Window</u> Under the current manual processes associated with running day ahead procurement for DC there is limited scope for us to amend the closing time due to the manual processes and internal checks. ESO recognise the value of moving the tender closing time based on your feedback and hope to be able to review this further when we move to more sophisticated, automated procurement processes.</p> <p><u>Widen error tolerances</u> We welcome your support to widen the error tolerance. We look forward to continue learning from the changes we have made through this consultation and developing the service as we move through the soft launch waves of work.</p> <p><u>Unit Cap</u> Maximising the number of participants in our markets is key to delivering competition and ultimately creating savings for the end consumer, however this cap is driven by the technical risk in holding too much response on one asset creating a single point of failure on the network.</p> <p><u>Active Management Network (AMN)</u> Thank you for your feedback regarding AMN, we understand set criteria would be useful. During the early stages of the soft launch ESO recognised it is not credible to have a comprehensive list of all scenarios around ANM connections. Therefore, to ensure we facilitate maximum participation and learning from interaction with ANMs we would like to work with parties on a case by case basis to build up a better understanding throughout the soft launch period. In the future as we learn and increase our understanding and experience in this area we agree that formalising a clear set of criteria would</p>
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	<p>Instead of NG having sole discretion to allow assets participating in Active Network Management (AMN) to participate in DC, we recommend that NG set particular criteria they will use to assess whether an asset providing AMN services can participate in DC. These criteria and the volume of contracts entering DC via this method should be published in a timely fashion.</p> <p>Annex 1: Do you have any comments on the highlighted mapping for DC service?</p> <p>We welcome NG providing guidance on ramp rates in Annex 1. Our understanding is that where a Responding unit is providing DC-Low Frequency (i.e., Discharge services) that it may discharge at its chosen ramp rate outside of a DC instruction, but where it is charging it must follow the DC prescribed maximum ramp rate of 5%.</p> <p>In general, we agree that the Maximum Ramp Rate should be calculated by reference to whether the Response Unit is providing DC-low frequency, DC-High Frequency, or both, and whether its Operational Baseline is showing either an increase or reduction in level of Active Power Output or an increase or reduction in level of Demand.</p> <p>We recommend including examples in Annex 1 to cover DC -Low Frequency whilst providing BM services both separately and concurrently.</p> <p>Do you have any other comments on the DC proposal?</p> <p>We support the move to allow DC-Low Frequency to participate in the BM on the bid side. We would welcome guidance on how this might operate when high and low frequency products are in place and the asset is also participating in the BM.</p>	<p>be beneficial and we look forward to working with industry to develop this. In the meantime, as specified in the guidance document we will exercise the discretion to allow participation where we can see evidence of very high forecasted availability as part of the proposal.</p> <p><u>Ramp Rates</u></p> <p>ESO can confirm your understanding is correct. The Balancing Mechanism stacking paper we published provides detail on how Bid Offer Acceptances are to be concurrently provided with Dynamic Containment. Bid Offer Acceptance instructions are not constrained by the ramp-rate limits that apply to providers submitted Physical Notifications. Further information can be found in the paper: https://www.nationalgrideso.com/document/184466/download</p> <p><u>DC High and Low frequency</u></p> <p>ESO expect Balancing Mechanism stacking with Dynamic Containment High Frequency(HF) to operate with the same principles as the recently launched Low Frequency (LF) Balancing Mechanism stacking. We are learning with industry how best to stack certain services, so our approach is subject to change. Extra guidance will be issued (if necessary) when Dynamic Containment High Frequency service is launched. Like for the LF element we anticipate this will be introduced after a period of embedding the HF service.</p>
<p>Statera Energy Limited</p>	<p>Do you agree with the updates in the proposal for Dynamic Containment?</p> <p>Thank you for the opportunity to respond to this consultation. We welcome and support the continued development of the Dynamic Containment service.</p>	<p>NGESO thank you for you feedback, we appreciate your comprehensive response that you have provided.</p> <p>Standard Deviation criterion was originally intended to ensure a stable response but we acknowledge this is onerous over a short</p>

It is our view that the standard deviation pass/fail criteria in the DC Testing Guidelines Consultation Draft should be changed to be brought into line with the proposed changes made to the Allowable Power Tolerance.

Detailed response

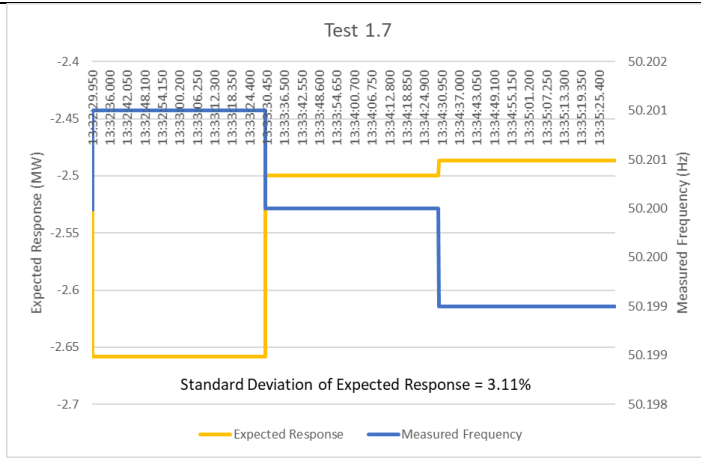
Under the standard deviation pass fail criteria in the DC Testing Guidelines consultation draft the Allowable Power Tolerance for Test 1 has been relaxed to +-3% of maximum contracted power, however the pass criteria for standard deviation remains +-2.5% of expected active power response, which for certain tests can be challenging.

This is most apparent in tests 1.7 and 1.8, as these are at the knee point of the Dynamic Containment droop curve a small deviation in frequency measurement has a large effect on power. For example, for a 50MW plant, in test 1.7, the expected active power response is 2.5MW (5% of 50MW), and therefore the allowed standard deviation is 2.5% of 2.5MW, or 0.0625MW (62.5kW), which is equivalent to 0.13% of the maximum contracted power.

Additionally, the tightness of this standard deviation is such that in tests 1.7 and 1.8, the metering accuracy of the site alone can give results outside of the of the 2.5% tolerance, even with a meter that meets the DC Service Terms. For example, if a battery had no error in response or delay (which is of course impossible), then if the measuring error in the metering of the battery was 0.001Hz (as allowed under paragraph 15.5 of the DC Service Terms) and during the 3 minute test the measured frequency was at 50.201Hz for 1 minute, 50.2Hz for 1 minute and 50.199Hz for 1 minute, then the standard deviation of this test would be 3.11% and would fail the testing.

To address this, we suggest that the pass criteria for standard deviation is changed to +-2.5% of maximum contracted power, in line with the change to Allowable Power Tolerance.

time period of three minutes. We have now removed this from Test 1. We believe that now the assessment is more closely aligned with performance monitoring, tolerance bands will be used instead of Standard Deviation.



These requirements may not have been noticed by existing DC participants due to an error in the calculation of standard deviation in the DC Testing Analysis tool V1 – addressed in the latest version of this tool under consultation. The error occurs in cells V5 to V16 of the “Test 1 Main” where the formulae in these cells incorrectly references the standard deviation for test 1.1 for all tests. The standard deviation in test 1.1 is an absolute value which will naturally be lower as the target power for test 1.1 is zero with an expected response of +-0 for a small deviation in frequency either side. The standard deviation for test 1.1 is then divided by the correct expected power for each test, and so will fall for each test. An example of these effect of this on the pass / fail criteria of a data set can be seen below, showing the results from the V1 tool on the left and the Consultation Draft tool on the right (columns Q to U and W to AA respectively hidden for clarity).

P	V	V	AB
	Test 1		Test 1
	Standard Deviation		Standard Deviation
Test 1.1	#DIV/0!	Test 1.1	#DIV/0!
Test 1.2	#DIV/0!	Test 1.2	#DIV/0!
Test 1.3	-37.82%	Test 1.3	-39.01%
Test 1.4	37.82%	Test 1.4	36.35%
Test 1.5	-2.22%	Test 1.5	-1.12%
Test 1.6	2.22%	Test 1.6	2.02%
Test 1.7	-1.02%	Test 1.7	-4.93%
Test 1.8	1.02%	Test 1.8	5.21%
Test 1.9	-0.14%	Test 1.9	-1.03%
Test 1.10	0.14%	Test 1.10	1.12%
Test 1.11	-0.07%	Test 1.11	-0.68%
Test 1.12	0.07%	Test 1.12	0.56%
Test 1.13	-0.05%	Test 1.13	-0.35%
Test 1.14	0.05%	Test 1.14	0.34%

Based on the above, this unit would pass the standard deviation pass/fail criteria for test 1.7 and 1.8 using the V1 tool due to this spreadsheet error and fail using the correct formulae in the consultation spreadsheet.

EDF

Do you agree with the updates in the proposal for Dynamic Containment?

Yes we found the update and new proposals generally useful and progressive. The layout of the document was also clear however it would have been good to have these questions below each section to sign post where you were looking for views.

- Tenders – allowing participants flexibility to adjust the MW volume on a daily basis as well as price and withdraw will prevent ESO from losing sites full capacity if a proportion of the volume was unavailable. It will also help with unlocking stacking of BOAs within the BM.
- Widening the DC Market Window to support parties running their processes whilst tendering is still manual. Proposal to extend from 07:00-10:00 to D-1 15:00 – 10:00.
- Increasing the 50MW unit cap to 100MW will remove a barrier to access for larger assets and should facilitate greater participation and competition.

NGESO thank you for taking the time to provide the feedback you have given in support of some of our proposals, and we look forward to continuing working with you in the future. For ease, we have added topic titles to confirm each our specific responses:

Tenders

The ESO welcomes this positive support for our proposal.

Performance Monitoring

ESO welcome the positive feedback regarding the performance tolerance proposals. We take on board that a review of performance data submissions would be welcomed to make further improvements. Under our soft launch work we shall continue to review this topic.

Aggregation

- Performance monitoring - we welcome the relaxation in some of the criteria such as introducing a min error duration of 0.2seconds before penalties apply.
 - It would be good to be able to correct the data in the performance monitoring CV file where we've had to quickly restart the machine etc so that we can comply and get paid. The file is not flexible to change and thus it would be good if ESO could look to create a way for parties to amend/ correct their data where they are still complying with the contract but not getting paid.
 - It would also be good to understand how co-located sites could participate and demonstrate delivery. We raised this last October but it is not clear what improvements are being done on this front to enable the greater MWs the ESO is looking to get in DC.

Do you have any other comments on the DC proposal?

NGESO have published an excel testing tool to verify compliance with the DC tests. The rules specifically state that a full response must start no later than 0.25 – 0.50 seconds (with a new 0.05s lower bound tolerance) and also state that a full response must end no longer than 1s. However, in the excel testing tool, it appears to require maximum power test responses within 0.95s instead of the full 1s (e.g. 't+slow' in the tabs for tests 1.13 and 1.14). The excel testing tool proposal shifts the full response end time by 0.05s which is not consistent with the service terms (effectively recommending the full response to occur by 0.95s). This is shown by the values in cells AU10-AU19 being 0.05s lower than one would expect in 'Test 1 Main'.

The last comment we have is more qualitative. It appears from the testing guidance and service terms that very low responses are expected to change at well controlled ramp-rates. In fact, the guidance does not discern between ramp-rates for low-power responses and high-power responses. Specifically, for test 1.5, It may be very difficult for assets to stay within 2 s-1 and 4 s-1 of ramp-rate for a 2.3% response, which would require the asset to complete its response

Under the current service terms ESO have a transitional arrangement in place for one year which enables parties to aggregate units up to a Grid Supply Point (GSP) Group level. Currently when this period lapses the default position will be GSP. Noting this we have outlined in our Wave 2 workstream for Dynamic Containment Soft Launch that we will be reviewing aggregation rules and working with industry to develop and finalise the enduring ruleset. We anticipate achieving this prior to the transitional arrangement ending.

Testing

Thank you for raising this issue and we apologise for any confusion this has caused. The minimum initiation time (0.25s) and maximum initiation time (0.5s) remain unchanged. However, following feedback from industry we are adding a tolerance of 0.05s to both these values. In practice this means that the minimum initiation time is 0.20s the maximum initiation time is 0.55s. We would encourage all providers to deliver the service in-line with the specification and only use the available tolerances if absolutely required. Please inform your account manager if your asset expects to use the tolerance to meet this performance criteria.

ESO will continually review individual and aggregate performance of Dynamic Containment Response Units. On the second point, for lower power changes we do not require assets to keep to the ramp rates. We only require that the response is within 0.2 and 0.5 (0.55) seconds.

	<p>between 5.75 and 11.5 milliseconds from the time the response started.</p>	
<p>Arenko</p>	<p>Do you agree with the updates in the proposal for Dynamic Containment?</p> <p>Overall we are supportive of the changes and the direction of travel of the updates. However we feel like there is an excessive softening of the technical requirements of the service. The testing and operational performance requirements must provide the ESO comfort that the post fault response will be delivered as expected so it can be procured at a level to minimise costs to the consumer. More detail below:</p> <ul style="list-style-type: none"> • Regarding pre-qualification testing: <ul style="list-style-type: none"> ○ We support the change to the pre-qualification test step timings in test 1. Scaling the timings as a fraction of contracted response and adding an overlap better represents normal service operation and avoids a pass or fail being dependent on the timing of a single sample. ○ The three percent bound appears to be too large for pre-qualification tests 1.5 to 1.6 as it leads to a response in the opposite direction being acceptable. A scaled tolerance bound gives a better test of the assets capability, for example 1% of target in tests up to 1.6, scaling up to 3% of target for tests 1.13/1.14. If on the other-hand the 3% of contracted is kept (to stay inline with delivery), then the test guidance needs to be updated to state that the response should be in the correct direction for tests 1.5 and 1.6 as well as 1.3 and 1.4. ○ We support the other changes made to the testing tool, specifically the correction of standard deviations and the use of interpolation in the equations for plotting of test 4. ○ We are supportive of the clarification of Frequency metering resolution at 0.001Hz this is appropriate for the service and well within equipment capability. • Regarding availability determination <ul style="list-style-type: none"> ○ We support the separation of availability determination for high-frequency and low-frequency services in both operational and performance reporting. 	<p>NGESO thank you for taking the time to provide the feedback you have given in support of some of our proposals, and we look forward to continuing working with you in the future. For ease, we have added topic titles to confirm each our specific responses:</p> <p><u>Pre-qualification Testing</u></p> <p>We welcome your support of our proposals to change the prequalification test step timings in Test 1 and your concerns regarding the 3% bound. Whilst we understand the point raised on the 3% tolerance in the tests related to low power, one of the main reasons to moving to 3% tolerance across testing is to align with the performance monitoring tolerances. To adopt the suggestion of smaller tolerances would move away from the objective of aligning performance monitoring and testing. We received a lot of feedback that aligning these would reduce confusion and improve service clarity for industry. We have removed the 49.9Hz and 50.1Hz step tests (formerly 1.5 and 1.6) as the ESO note the live frequency Test 4 better assesses that delivery in this frequency range is as expected.</p> <p><u>Payment Calculation</u></p> <p>Thank you for raising your concerns here and we apologise if this was unclear. To clarify, the unavailability variable Fij does not impact the calculation of the performance penalty Ke. Fij effectively nullifies any settlement period where unavailability has occurred while Ke is the performance penalty score based on all valid settlement periods.</p> <p><u>Lag lower bound</u></p> <p>Thank you for raising your concerns here and we apologise if this was unclear. ESO wanted to ensure that providers delivered their response in an envelope (of time) that we had modelled. The delay was introduced to ensure that DC did not interact or</p>

- Regarding the **change to the lag lower bound from 0.25s to 0.20s**
 - The purpose of the new “tol_tl_min” term is not clear. If the aim is to reduce the lag lower bound time, changing the value of “tl_min” would be simpler.
 - The Overview slideshow mentions that the intention is *not* for DC participants to program in a delay to their frequency response. The meaning of this is not clear, as it was previously stated in the service Q&As (#53) that a programmed delay was necessary for the goals of the service. We are happy with either a 0.20s or 0.25s delay, but would appreciate some clarification around ESO’s rationale.
- Regarding availability **payment calculation**:
 - We support the changes to the availability payment calculation, both the limiting of the impact of a delivery error to a single Service Day, rather than a Service Week, and the use of a rolling minimum to avoid imposing penalties for single-data-point metering errors.
 - The interaction between F_{ij} and K_e is still unclear. In the rules as written, a period of unavailability in a settlement period sets the payment due for that period to zero, via the F_{ij} term. It is not clear from the schedule as written how unavailability should be treated when calculating K , and whether this would result in being penalised for an entire service day for a limited period of unavailability.
- Regarding K factor performance adjustment, we think you could consider a smaller lower bound 'A' in the payment adjustment curve 3% is excessive. A 1% lower bound, for example is well within the capability of assets providing a post fault support service. The rationale behind this suggestion is to drive investment into the design and upkeep of assets and associated control systems. If you maximise the performance and reliability of the assets delivering the service you will minimise the procurement volumes required as trust in the post fault response will be high.
- Regarding tendering:
 - We support the additional ability to vary volumes throughout the week. We believe the additional flexibility this allows from

compromise other fast frequency/stability/inertia services and also automatic schemes like fault clearance and inter-trips. Whether or not a programmed delay is necessary will be dependent on the unit characteristics. We acknowledge our communication on this could have been clearer and we hope to have made improvements to the clarity of our documentation as a result of this feedback.

Tendering

ESO welcome your feedback on this. ESO will be tendering for an enduring procurement platform which will offer enhanced automation across a range of ancillary services. We recognise the benefits this automation will bring and are investigating if there are any viable interim options available. Updates on this will be communicated through the traditional communication channels.

Schedule 2 – Formulae

Thank you for your feedback, the ESO appreciates the suggestions for clarity on the service terms document. Throughout this process, we have worked to provide better definitions, further clarifications and consistency. We welcome your suggested changes to the ramp rate formula, and the simplification of the error formulae, both of which have been incorporated. We shall keep your further suggestions under review.

participants will help drive competition, reducing cost to consumer.

- We support the increased window for tender submissions from 7am-10am to 3pm D-1 to 10am
- We support the increased MW cap from 50MW to 100MW
- Arenko would like to see a digital approach to the tendering process. The data portal is developing well and provides us a great interface to automate the dispatch of the asset to remove human error (with manual alerting and back-up of course). It would be great to get this extended to the tender submissions. A stepping stone to this could be a web based form with auto rejection of erroneous submissions.

Do you have any other comments on the DC proposal?

It is clear that an effort has been made to improve the clarity of the formulae in Schedule 2 of the SCTs, and we appreciate this. There are still some areas where we have had difficulty understanding the formulae, and we would like to suggest possible ways to make them clearer.

- Equation and section numbering is not used consistently throughout, making referring to specific formulae difficult.
- The notation in the main Availability Payment formula is inconsistent with other code documents. The use of “i” and “j” imply that this is supposed to match the subscript conventions used in the BSC and other codes, but it differs in confusing ways:
 - For terms with multiple “subscripts” only one character is presented as a subscript
 - The “e” subscript for days within the summation is superfluous, in other documents a “j” subscript signifies a unique settlement period on a specific day.
 - “e” used for service day instead of “d” used in other codes. The letter “e” is also used elsewhere in the document for error values. See rendering of equation amended to avoid these issues:
- On page 21, there is a possible typo “ $LB(t) = RLC(R(F...))$ ” where “RLC” should be “RL”

- In A.1.1.3, “P” is used to represent the contracted quantity for the high-frequency service. It would be clearer to move the definition for P and Q in A.1.1.4 earlier, and use the same terms throughout.
- Splitting K into K_j and K_e to make the scope clearer is a welcome change.
- It would be clearer to remove the 100 factor from the formulae for es_m, and set A = 0.03 and 7 = 0.07.
- One of the more complicated equations in the schedule is the ramp-rate-limiting function. It has a lot of repeated terms, and uses a “+dt” notation not used elsewhere, that makes the definition site look very different from the use-sites. Below is a version we drew up when implementing these functions in our own code to try to make sense of it, which we think is easier to understand than the current layout.

$$RL(R(t), r_u, r_l) = \begin{cases} RL_{prev} - r_l \times \Delta t & R(t) < RL_{prev} - r_l \times \Delta t \\ RL_{prev} + r_u \times \Delta t & R(t) > RL_{prev} + r_u \times \Delta t \\ R(t) & \text{otherwise} \end{cases}$$

where $RL_{prev} = RL(R(t - \Delta t), r_u, r_l)$

- We support the addition of an overlap between the initial response window and target response window for tests 1.5 to 1.14. However on page 8 of the user guide states ‘a change in frequency should start to occur between the two green dotted lines...’ This should read ‘an initial power response should start...’
- We cannot see any update in this proposal for how advanced baselines will be submitted for non-BMUs, if this is by a new method will it need to be included in a further consultation?
- There is no description in the participation guidance of how the ABSVD volumes for DC response are calculated. As the ABSVD does not seem to be submitted to Elexon until the first

	<p>reconciliation gate, it would be helpful to see the methodology used to determine it, so that we can better anticipate our imbalance charges.</p> <p>We would welcome further definition on when unavailability should be declared due to data loss. For clarity in the scenario of data loss when the asset is still delivering the service.</p>	
<p>Centrica</p>	<p>Do you agree with the updates in the proposal for Dynamic Containment?</p> <p>We welcome that National Grid Electricity System Operator (NG ESO) has moved quickly to consult on changes to improve the operation of the newly implemented Dynamic Containment product.</p> <p>In response to this question, we have focused on areas that we believe there are areas where further clarifications are needed.</p> <p>Recharging of limited energy asset: What is the rationale behind imposing a minimal amount of volume when recharging a limited energy asset? For a limited energy asset, we would like to be able to plan a recharge even when we are below this minimal volume. Imposing minimal amount of volume of recharge, could result in providers over-dimensioning a battery, or selling less volume in DC for a given C-rate of battery.</p> <p>To provide a bit more detail: If a DC provider could choose when to recharge flexibly and a mechanism existed to adjust available service capacity for the state of energy (SOE) restoration periods, then when HF+LF DC operation is procured, limited energy assets would not need to reduce the amount of DC that they can contract for the whole day to reserve the minimum capacity required.</p> <p>With the current proposals, operators will need to offer a reduced capacity to reserve the minimum active power (MW) to restore the SOE, just in case there is an event that moves SOE sufficient to require a correction. Where an event or the imbalance is such that restoration</p>	<p>NGESO thank you for taking the time to provide the feedback, and we look forward to continuing working with you in the future. For ease, we have added topic titles to confirm each our specific responses:</p> <p><u>Recharging of limited energy asset</u></p> <p>We have specified the minimum volume of energy that a provider must be able to recover in a single settlement period. This is set at 20% of the response energy volume, also equal to the equivalent of 3 minutes at full contracted power. These values were defined following modelling of previous system frequency events - thus we believe that (the equivalent of) 3 minutes of recovery per settlement period will be sufficient to maintain Dynamic Containment (DC) response provision in all but the most extreme (and very unlikely) system events. This is a fair balance between security and cost, recognise that this requirement can limit the quantity of DC available from some providers.</p> <p>We welcome the suggestion for a 'dynamic' capacity of DC following an event to allow for greater provision from energy limited assets. We believe there is value of exploring this further through the DC Soft Launch. It is important to note that the rules on State of Energy (SoE) restoration will need to be clear and unambiguous to all parties for such a critical service as DC. Allowing a provider complete flexibility on how/when SoE is restored may put the ESO in a position of uncertainty with respect to DC capacity and availability. The baseline ramp-rate rules have been designed in-part to mitigate the coordinated SoE management that is described.</p>

<p>is needed, the capacity could be just reduced for the restoration period and this would significantly increase the available LF+HF DC capacity available during a substantial fraction of the day.</p> <p>With the current proposals, it is probable that if an asset is forced to recharge/discharge based on a fixed delay after a major frequency event, all contracted DC provision will be doing the same SOE Restoration at the same time. This would all act in the same direction compounding with the cause of the previous frequency issue, which may add stress to a system that is already under pressure. With flexible restoration the asset owner could avoid being forced to balance in the peak hours or during an extended period of system stress, reducing operational costs and providing more DC to support the system at critical times.</p> <p>Delivery Duration On page 15 of the service terms, the delivery duration is specified as a range from 10 to 20 minutes. We would welcome some clarity and explanation behind this range. Does this mean that despite this value has been set at 15 minutes for the soft launch it could be modified in the future, either being reduced to 10 minutes, or increased to 20 minutes? We firmly believe that this value (and other parameters) should be fixed. The delivery duration directly impacts the cost of DC provision, as it will change the number of MWs a given asset can sell.</p> <p>Performance Monitoring We welcome the positive changes of the performance monitoring scheme, but highlights that it still does not allow for some outliers or spikes in the delivery that would occur for longer than 200ms. Centrica therefore asks NG ESO to remain open to further refinements of the formula based on the feedback that will be gathered in the coming months with the participation of additional technologies and assets in the product.</p> <p>Active Network Management</p>	<p>Delivery duration Thank you for this feedback and we apologise for this not being clear. The range of values was left in the service terms to indicate our initial thinking during the soft launch. To avoid any confusion or misunderstanding ESO have removed the 10-20 minute example to ensure it is very clear that the delivery duration (for energy limited assets) is 15 minutes. It is possible that this value could change in the future (following further consultations). For example, reducing the value could increase the quantity of DC available from energy limited assets.</p> <p><u>Performance Monitoring</u> ESO take this point on board and we will continue to keep this under review as we progress through the soft launch period. As part of this consultation we have added some additional flexibility in this area and we look forward to learning from these additional tolerances throughout the soft launch period. Accurate and reliable data is incredibly important to ESO given the crucial nature of this service.</p> <p>Active Network Management (ANM) Thank you for your feedback regarding ANM, we understand set criteria would be useful for transparency purposes. During the early stages of the soft launch ESO recognised it is not credible to have a comprehensive list of all scenarios around ANM connections. Therefore, to ensure we facilitate maximum participation and learning from interaction with ANMs we would like to work with parties on a case by case basis to build up a better understanding throughout the soft launch period. In the future as we learn and increase our understanding and experience in this area we agree that formalising a clear set of criteria would be beneficial and we look forward to working with industry to develop this. In the meantime, as specified in the guidance document we will exercise the discretion to allow participation where we can see evidence of very high forecasted availability as part of the proposal.</p>
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We welcome that National Grid ESO is seeking solutions to ensure that assets under Active Network Management (ANM) are not excluded from the provision of the Dynamic Containment balancing service. However, we believe that the proposed solution for ANM assets is not ideal. The solution to this issue should be as transparent and public as possible, instead of relying on bilateral discussions. It is key to keep the process as transparent as possible.

Testing

The pass criteria for the service in the consultation's Excel DC testing analysis tool does not reflect the response profile previously provided and is misaligned - and in conflict - with the consultation service terms and multiple other NGESO current and consultation documents provided for the service. We outline the detail at the bottom of this section.

We object to any change to $T_{d_{max}}$ and propose that the 1s fixed value for response delivery remains valid. We have been delivering technical changes to align with the $T_{d_{max}}$ value of 1 second. If this is changed, this could add significant development costs in ensuring that an asset can meet this service and could delay participation.

Having the ability to vary the ramp rate, in relation to the required quantity, will reduce unnecessary life expenditure of battery assets by reducing cyclic thermal stress at lower delivery quantities, which prevail for the majority of time when full capacity ramp rates are not required. It will also improve control stability for large dynamic ranges, overshoots are reduced and control accuracy is improved. This could reduce the life costs of provisioning the service.

- The Test1 graphs of the Excel DC testing analysis tool being consulted on: $T_{d_{max}}$ is lower than 1 second depending on quantity Rx. This is fundamentally different to previous information and could require a fundamental redevelopment to enable DC. This has not explicitly consulted on and therefore this should not be changed.

Testing

We thank you for your comprehensive feedback. The ESO acknowledge that the original testing did not align fully with the service delivery description and apologise for any confusion this may have caused. We have now aligned the testing to the performance monitoring tolerances in the service terms to ensure it is consistent. $T_{d_{max}}$ in the service terms has always been at a maximum when frequency deviation is for full saturation quantity and is one second for this occasion, smaller deviations have a smaller maximum response times depending on the severity of the deviation. ESO have added additional "plain" English wording to our DC Participation Guidance Document which will hopefully support industry.

Housekeeping

ESO take this point on board and recognise improvements can be made in this area. Through this process we have sought to clarify and improve the level of descriptions, clarity and consistency through our service terms and other documents. We hope this has the desired effect and we look forward to continually learning and improving as we move through the soft launch of DC.

Baseline and GSP Group aggregation

ESO note that as part of this EBGL consultation we have not proposed any changes to the current aggregation rule set. Aggregation currently has a one year transitional arrangement in place to support the work and learning. We communicated in early December that this topic would fall under the Wave 2 workstream and we look forward to engaging with industry on this. Further information around our Wave 1 and Wave 2 work can be found in the DC Soft Launch Development document on our website. Any plans and developments will be communicated with industry as early as possible through the usual channels.

- The existing Excel DC testing tool aligns with the Service Parameters of schedule 1, i.e. Td_{max} is set at 1 second.
- New Consultation DC Service Terms V2 document under Service Parameters of Schedule 1: This continues to set Td_{max} at 1 second. This conflicts with the new excel testing tool.

In conclusion, the Td_{max} figure should be set at 1 second as previously indicated. Any change to this could have an impact on development costs for participation in the DC product. NG ESO should be properly consulting on this change with the associated rationale for change, rather than making the change in the Excel tool, but without changing in other documents.

Housekeeping

Any terms NG ESO are using in the technical text as references for service parameters should be described in the Glossary, e.g. "Required Quantity", "Required Volume", Rx etc. with engineering units where appropriate to avoid any potential for differences in interpretation

Do you have any other comments on the DC proposal?

Improvements to Dynamic Containment – Baselineing and GSP Group aggregation

We would like to take this opportunity to reiterate some key points regarding DC design. We strongly believe that National Grid Electricity System Operator (NG ESO) should allow GSP Group aggregation on an enduring basis and consider changes to the baselining methodology. If solutions can be found to these two areas, we firmly believe that this could unlock technologies and aggregation, resulting in greater volumes (from assets down to domestic level) that could provide Dynamic Containment.

We welcome that NG ESO has committed to considering these areas further in their ‘Wave 2’ work.

As soon as possible, NG ESO should provide to industry the delivery dates for the different topics to be addressed in Wave 2. We expect

High Frequency Dynamic Containment

In our Soft Launch Development document, which we launched in early December 2020 we outlined to industry that we intend to launch the High Frequency element of the service under our Wave 2 workstream. Further information around our Wave 1 and Wave 2 work can be found in the DC Soft Launch Development document on our website. Any plans and developments will be communicated with industry as early as possible through the usual channels. With regards to market volumes, as per our other frequency response services and DC Low Frequency service, market requirements are communicated through our monthly Frequency Response Market Information Reports.

Dynamic Regulation and Dynamic Moderation

ESO note this EBGL consultation process is specifically focusing on the formal change process for Short Term Operating Reserve (STOR) and DC only. For engagement on our wider frequency reform work ESO encourage engagement through the normal communication channels and your account manager. We will be engaging outside of the DC workstream for the new products and we look forward to your engagement on these new services.

Phasing out of FFR

ESO note that the current EBGL consultation focusses on the Article 18 mapping and contractual suite of documents. Plans around our procurement approaches and wider frequency reform commitments shall be communicated through the normal engagement channels. We would recommend signing up to the Future of Balancing Services newsletter to ensure that no key industry communications are missed.

these to align with the transitional arrangements end-dates, but we need this clarification so that we can plan accordingly. We intend to engage on these topics primarily through the ADE, but are happy to engage bilaterally as and when is required.

High Frequency Dynamic Containment:

Can NG ESO clarify when HF DC will be introduced? The documentation indicates that a sufficient volume of LF DC is a pre-requisite, but without giving more details on this, nor indicating by when HF DC will start to be procured. This clarity will help current and future Dynamic Containment providers, and frequency response more generally, plan their investments.

Can NG ESO clarify what will be the expected volumes for HF DC? Centrica understands that it will be the same order of magnitude (if not exactly the same) than for LF DC, i.e. 1 GW.

Dynamic Moderation (DM) and Dynamic Regulation (DR)

NG ESO needs to provide market participants with clarity on the proposed timings for DM and DR implementation. Our understanding is that this will be implemented by April 2022, therefore early engagement and discussions are needed.

Stacking DC with DR and DM from day 1 of these new products will be absolutely key; it will avoid having NG ESO buy more MWs than needed. This is why we are asking for clarity on DM and DR.

If there are limitations that do not allow stacking between each of the frequency services, market participants will not be able to maximise the potential of each asset – as there would need to be a) a discrete segmenting (to the nearest MW) of the sold power and energy, meaning they will be fractions of MWs not procured and b) more importantly, the synergies between the different products to extract the maximum potential of an asset or a pool of assets in all the products will not be possible.

Phase-out of existing frequency products

	<p>Enhanced Frequency Response contracts will be coming to the end of their contract at the end of 2021. Can NG ESO clarify how the 200 MW of EFR contracts will be taken into account in its procurement volumes?</p> <p>From April 2022, will all FFR MWs be phased out. Can NG ESO confirm that this will include Firm Frequency Response (Static and Dynamic) and weekly trial volumes?</p>	
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<p>Everoze</p>	<p>Do you agree with the updates in the proposal for Dynamic Containment?</p> <p>Some but not all. Some of the updates appear very sensible in light of what we have seen during testing and performance in DC to date. The tolerances are now at +/- 3% of <u>contracted</u> power, which is actually more relaxed than it needs to be for most assets, though most providers won't complain I'm sure! Power meter accuracy is still at 1.0% of rated power, so tolerances could probably be tightened to that if beneficial to NG ESO. Linking to contracted power like this is much better aligned to equipment specifications and industry norms – so a good improvement.</p> <p>However, the updates in terms of speed of response requirements within the analysis tool appear to contradict previously communicated intentions as well as Schedule 1 of the consultation Service Terms and may be onerous for some providers to achieve. The basis for</p>	<p>NGESO thank you for you feedback, we appreciate your comprehensive response that you have provided and south to address your concerns below.</p> <p>The ESO has now aligned the Testing document to the Service Terms. In response to stakeholder feedback we have also made the performance monitoring formulas clearer. In response to assets that have already passed the previous DC testing requirements there will be no requirement for these assets to be retested in line with the proposed changes unless there are any performance issues whereby ESO have concerns regarding the ability of the assets to deliver the DC service. For clarity we have removed the 49.9Hz and 50.1Hz step tests (formerly 1.5 and 1.6) as we note the live frequency Test 4 better assesses that delivery in this frequency range is as expected.</p>
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these updated speed of response requirements is neither well communicated nor obvious in the current documentation.

These speed of response updates are not captured within the draft DC Testing Guidelines Consultation document (including the test criteria listed therein) nor the consultation Service Terms and are only apparent within the analysis tool and its associated user guide, which could cause last-minute problems for providers who have not gone further than a review of the guidance or Service Terms prior to testing.

I have sought to set out a more detailed response at the bottom of this proforma to help better illustrate my concerns.

Do you have any other comments on the DC proposal?

What is the change Everoze is concerned about?

Within the analysis tool and the associated user guide, the expected response times required within tests 1.5 to 1.14 are now a function of the size of the frequency shift.

This should be achievable for most well-designed battery assets when designed for this from the outset, but it is currently only communicated *in* the analysis tool and associated guidance note, with Schedule 1 of the Service Terms not updated to reflect this and no communication of this at all within the Test Guidance Note.

Why is Everoze concerned about this?

1. Some existing battery assets should be able to achieve this, but it may require relatively major upgrades for some others. See “Technical basis for why some providers may need to upgrade their assets” below.
2. This has not been clearly communicated neither in the consultation nor beforehand:
 - a. There is no reference made to these changes in the Test Guidance document, including the test criteria listed therein, and the changes are only apparent within the analysis tool and its associated user guide. This could cause last-minute problems for providers who have not gone further than a review of the Test Guidance document prior to testing.

In response to specific concerns:

2a - We have now aligned Testing with Performance Monitoring for consistency.

2b - Based on feedback from Providers, the response time now aligns with the Service Terms.

2c - The proposed changes align the testing analysis tool with the performance monitoring formula in the Service Terms which is based on service delivery. We have updated our DC Participation Guidance Document as part of this consultation process to include further clarity on the service to improve understanding.

2d - During the consultation we have not changed the speed of response. However we acknowledge that this requirement could have been clearer in the original DC Soft Launch documentation and apologise for any confusion.

ESO thanks you for the technical insight you have provided. This is very useful information that can be considered when we start to look at product development and changes in the future.

The ESO acknowledges that the service specification could have been clearer in the original DC documentation suite and that this may have caused some confusion with providers. We apologise for this and understand the pain this may have caused some parties. We have updated our DC Participation Guidance document as part of this process to include a short Plain English overview of the service parameters to help aid understanding of the Service Terms.

We do not require providers to keep to the minimum ramp rate when responding to small frequency deviations. If the required change in response is less than 10% (minimum ramp rate X 0.05 s), we would consider that a small deviation).

- b. The derivation of the new response time requirements is unclear. These are captured in cells AS10 to AU19 of the “Test 1 Main” sheet, but solely as values and it is not clear how these have been derived or on what basis. These are close to being proportional to the size of the frequency shift, but not precisely so.
- c. In Schedule 1 of the DC Service Terms (both the previous and the new consultation version) the definitions of the following are all aligned with the current (pre-consultation) interpretation of response time and are therefore not aligned with the consultation analysis tool:
 - i. min and max initiation times are between 0.25s and 0.5s
 - ii. min and max full delivery times are between 0.5s and 1.0s
 - iii. min and max ramp rates result in 0.25s to 0.5s from “change in response delivery and reaching required delivery”
i.e. from initiation time to full delivery time.
- d. I have not been involved in all previous webinars or consultations on DC, but from those I have attended / read, I have not previously seen or heard an intention to change speed of response requirements with the magnitude of response. I am therefore concerned that providers will see this as a significant change in course for the DC service. Please ignore this comment if I have simply missed this intention in past communications.

Technical basis for why some providers may need to upgrade their assets:

As stated above, based on performance seen to date, the new speed of response requirements set out in the test analyser tool should be achievable for battery assets in principle. However, some existing assets will probably need a new control system and/or metering devices and associated outage times to achieve this. The reason for this is as follows:

Short version: Time to respond is not proportional to the size of a frequency shift

<p>Sembcorp</p>	<p>Production definition</p> <p>There is confusion around the DC service definition and in our view NGENSO needs to remedy this issue rapidly in order to create certainty in the market and deliver value for consumers.</p> <p>In both the original and proposed service terms, the dynamic containment product is defined in the table in Schedule 1 as reaching the relevant quantity in 1 second. The term relevant quantity is not explicitly defined in the document. We interpreted this as the MW target for a given frequency excursion. This aligned with the original testing document where in Test 1 for each of the frequency steps the MW target had to be reached in 1 second. In addition, this is the way in which it was interpreted within parts of NGENSO during our conversations around qualification for the service.</p> <p>In discussions with the NGENSO Quantitative Analysis team around performance monitoring we discovered that this assumes a different service definition. In the performance monitoring calculations, it is assumed that the relevant quantity is equivalent to the contracted quantity and lower MW volumes must be delivered proportionally quicker, resulting in a requirement for a faster service at lower frequency deviations. NGENSO has indicated that the performance monitoring approach was always the intended service. We find this confusing for two reasons. Firstly, from a system perspective it is not clear why a frequency deviation to 49.8 Hz would require a quicker output response than a deviation to 49.5 Hz. Secondly, in answer to FAQ question 134 on 10 September 2020 it is explicitly stated that required quantity and contracted quantity are different. This suggests that on 10 September the service definition was aligned with our interpretation of the definition in Schedule 1 and the original tests. It would be useful to know whether there was a change in service definition between 10 September and launch or whether there has been confusion internally on the definition. The table in the service terms, the original testing requirements and the FAQ are all aligned in assuming that the relevant quantity is not equal to the</p>	<p><u>Product Definition</u></p> <p>Thank you for identifying where the terms should have been more precise and we apologise for any misunderstanding that this has caused. We agree that ‘relevant quantity’ should have been more clearly defined in the table in Schedule 1 and we have updated the service terms to clarify that it meant saturation quantity. Quantity at saturation is defined in the ‘Service Parameters’ section of that schedule.</p> <p>We have designed a service whereby continuous frequency deviations are followed, and response is delivered within the specified lag time. This combination with fixed ramp rates is fundamental to how we model the effectiveness of Dynamic Containment (DC) response as well as allowing us to performance monitor response delivery.</p> <p>In all but the most extreme cases frequency does not move in 0.5Hz step changes, but at smaller deviations. In practice, we want the service to catch the frequency quickly at smaller deviations before the situation deteriorates. As the system decarbonises with less inertia and a higher Rate of Change of Frequency this capability becomes even more important. We have modelled DC response that responds to all frequency deviations within one second and found that not only does it damage system stability to an unacceptable level but would also be more expensive for the end consumer.</p> <p><u>Initial and ongoing testing criteria</u></p> <p>Thank you for raising concerns regarding the lack of clarity ESO has provided, specifically using testing as an example and we appreciate you recognising this was not our intention. We agree that whilst the overall tests in the testing guidance haven't changed, the tolerances and expected response times in the testing spreadsheet have and we could have been clearer on this.</p>
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<p>contracted quantity. Only the performance monitoring assumes that they are the same.</p> <p>We urge NGESO to provide clarity on the service definition and ensure that this is widely understood both internally and externally. We believe that the service as interpreted by us and currently tested for, makes more sense from a system perspective and would reduce costs to consumers as more participants could take part. We do understand that performance monitoring is easier to implement for a service with proportional delivery time but we would not want this to be the driver of service definition. If NGESO decides to adopt the definition as per the performance monitoring, we would request that their modelling is supplied to explain why the alternative definition is not appropriate.</p> <p>Initial and ongoing testing criteria</p> <p>In all of the conversations with industry regarding this consultation, NGESO has stated that the purpose is to increase clarity and make it easier to participate. For example, in relation to a question raised in the Operational Forum on 6 January NGESO stated:</p> <p>We are not looking to make any major redesign changes to the service and we have been absolutely satisfied with how it has worked since launch and it has actually been activated a few times since launch in October. What we are doing is make amendments to the product clarifying some of the descriptions and contractual documentation to make it easier for providers to partake in the market, and also make the product more enduring for the future.</p> <p>From a testing perspective this is not the case. The tests as described in the consultation spreadsheet require much faster response times in Test 1 for target values below contracted output than the previous qualifying tests and also the ongoing performance monitoring. This could create a barrier to entry for participants and result in increased costs for consumers as a number of participants who could deliver the service would be prevented from entering the market. Whilst some market participants may want to keep barriers in place to minimise competition and increase</p>	<p>The minimum initiation time (0.25s) and maximum initiation time (0.5s) are unchanged. However, following feedback we are adding a tolerance of 0.05s to both these values. In practice this means that:</p> <ul style="list-style-type: none"> the minimum initiation time can be 0.20s the maximum initiation time can be 0.55s <p>(These tolerances can be found in Schedule 2 as “Lag lower bound tolerance” and “Lag upper bound tolerance”)</p> <p>The proposed changes to the response times and tolerance for testing have been made to align with the performance monitoring tolerances and expected service delivery, in line with the service terms. The change to the tolerances in testing is seen as removing a barrier to entry as previous feedback, including feedback from Sembcorp, was that the original tolerances based on expected delivery rather than maximum contracted value were too tight in the low power ranges and did not reflect service delivery.</p> <p>It is the ESO’s intention that as the service becomes established, we will continue to review the testing requirements for the service. We have already started to consider options around longer term testing and moving towards lighter testing with more emphasis on performance monitoring as one of the options. We would encourage all providers to deliver the service in-line with the specification and only use the available tolerance if absolutely required. Please inform your account manager if your asset expects to use the tolerance to meet this performance criteria. NGESO will continually review individual and aggregate performance of DC and reserves the right to withdraw or adjust the tolerance (subject to consultation).</p> <p><u>Clarity of communications with industry</u></p> <p>Thank you for highlighting areas in your feedback where we could have provided better clarity to market participants and clearer communications. We have taken these points on</p>
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the value of their assets, our view is that consumers are best served if the maximum number of participants can enter the market, whilst still maintaining frequency management, as this will drive competition and reduce costs.

At a minimum we propose that NGESO introduces the tolerance bands from performance monitoring into the qualifying testing. Furthermore, it may be useful to reflect on whether qualifying testing is required if there is ongoing performance monitoring.

In addition, we suggest that NGESO investigates the impact of increasing the width of the tolerance band in performance monitoring. In order to maximise consumer value, the bands should be as wide as possible whilst maintaining frequency management. For example, there had been conversations about widening the initial response time from 0.25-0.5 s to 0.2-0.55 s. The lower bound has been reduced to 0.2 but the upper bound currently remains unchanged and it would be useful to understand the impact of changing it. In addition, it would be interesting to investigate the impact on frequency management of implementing the service as interpreted by us and defined in the original tests, and we would strongly encourage NGESO to carry out this analysis.

Clarity of communications with industry

NGESO must be commended for implementing DC so rapidly as there is a clear need for the service. A casualty of this rapid implementation has been clarity of communications both within NGESO and with wider industry. Examples include the service definition issues described above and the fact that significant changes to the qualifying testing requirements proposed in the consultation are embedded in a spreadsheet and not highlighted elsewhere in the documentation. We know from talking to other market participants that they had not identified this change.

It is stated that the new tests are aligned with performance monitoring although this isn't strictly the case as performance monitoring has tolerances which are not included in the tests. In addition, it was not clear to us until we had detailed conversations with NGESO that the

board and are pleased that industry also valued the speed at which ESO have launched the DC service. We recognise that through the speed of implementation and soft launch approach that there will be areas of learning and improvement and we look forward to continued engagement with industry to help shape and develop the enduring service. With regards to the specific points raised above please see the below comments:

- ESO will be seeking to adjust the tests to include the same tolerances that feature in the performance formulas for consistency.
- We recognise that DC is a challenging complex service and that creating a clear English description of the complexities associated with our fastest acting frequency product would help both existing and new participants to the market. We have sought to expand the Guidance Document wording around the service parameters to provide a narrative explanation to supplement the formulae in the service terms.
- ESO shared our performance script with all active participants who requested it in 2020 and we take on board the feedback future providers would find this useful and will consider the most appropriate channels to share this information.

DC Pricing

Thank you for raising your concerns in regards to the DC Pricing. ESO recognise that the EBGL consultation process underway is solely focused on DC and does not cover market pricing and wider services procurement strategies. We would however like to share the below information to support the queries raised.

DC price is based on alternative actions needed to be taken in the absence of the DC service. It allows us to take fewer actions in constraining largest losses and increasing inertia. DC

performance monitoring had tighter requirements than the original qualifying tests. Conversations with other market participants suggest that we are not the only ones in this situation.

We now seem to be in a position where the service is only described in the equations of Schedule 2. This is problematic as the parameters of the equations are not all defined in the document and equations are not the natural language of many market participants. We propose that NGENSO creates service terms where a clear English definition accompanies any equations and that this is supported by a webinar session where changes are laid out explicitly. It would also be useful if NGENSO made its performance monitoring script available to all existing and potential market participants.

Service terms

DC Pricing

We would raise our concerns that the administered price in use for Dynamic Containment is not conducive to a free and fair market mechanism. There is no visibility of this market cap until providers risk an entire 24-hour unavailability and the price does not appear to be flexed in relation to market conditions. A recent example can be found when units were rejected for minimal price increases during the highest imbalance price ever seen in the market. The eventual risk to the ESO and the system as a whole is that the entirety of the DC market could disappear from providing frequency services altogether, as the ESO's purchasing mechanism lacks the flexibility to pay a fair market rate for their services. We would recommend that the ESO provide transparency on what the administered price is for each auction, even if this is provided post event as is the case for the week-ahead FFR market. This would still provide transparency on the mechanism to the market. We would also appreciate some clarification around what back-testing the ESO is conducting to price the alternative actions they are able to take in the market, to assess the correctness of their price cap.

Performance

We support the move to daily penalties rather than weekly penalties. This is preferable as more contractually compliant with a daily

specifically targets risks associated with largest loss and consequential Rate of Change of Frequency (RoCoF) loss. As per the requirement published in [MIR for Frequency Products](#), the DC requirement ranges between 600 – 800 MW. To date, we have been able to meet up to 390 MW which leaves us with an unfulfilled requirement as the DC market is still in a developing phase. DC volumes help ESO mitigate constraint risks however some alternative actions need to be taken to fully mitigate the risks associated with largest loss and consequential RoCoF loss. The soft launch of DC and early phase of this market was anticipated to be a time whereby the level of competition was lower than that which has been seen in other response markets in recent years. As such, DC market prices converged quickly, with little movement since whilst the market continues to grow.

To date, we have received positive feedback that this pricing level is a price signal that will enable investment which will ultimately lead to this market becoming more competitive. The price has been set based as mentioned on alternative cost. When compared with other markets, DC price is set higher than Firm Frequency Response (FFR) monthly price, Dynamic Low High (DLH) weekly and the average price paid for the Enhanced Frequency Response (EFR) service and we have experienced providers moving their units into the DC market. As per SNAPS/ Reserve and Response Roadmap, we follow the following design principles when considering our new markets/products/service:

- simple
- transparent
- aligned with operational needs.

These principles will ultimately enable deep, liquid competitive markets that ensure the NGENSO can balance the system at least cost, creating value for end consumers. The

procurement process where the ESO enters into individual daily contracts. Daily penalties would also remove the perverse incentive to no longer provide the service for the remainder of a contracted week, after an identified performance issue. We consider weekly performance penalties discriminatory as they would penalise more a provider spending longer periods in the DC market than an identical (failing) provider who only contracted for a single day to different amounts for the same performance.

Baselines

We are keen to reiterate that we disagree with holding parties to such lengthy notice periods to submit baselines and limiting the ramp profile of delivery. We have yet to see evidence from the ESO that allowing parties to provide their own state of charge management would cause any stability issues to the Grid. We would recommend that these restrictions are removed or scaled back in line with other proposals. A proposed solution would be for parties to submit a baseline live to a set % of their contracted capacity. For example, they could be allowed to use 10-20% of their contract to manage state of charge. If the ESO deems it necessary, a shorter notice period for baseline adjustments could also be used as with the toted 5-minute notification.

Furthermore, as the service becomes bidirectional, providers will be required by these baselining rules to sacrifice 5% of their contractable output to allow for state of charge management. Overall this would already represent a likely 20MW loss of service delivery to the ESO, expanding to over 50MW once the full capacity requirement is made available. We do not consider this an economic solution either for participating parties or for consumers, as it will be inevitable that parties will price the lost capacity into their bid strategy.

It is worth noting that not-contracted parties face no restrictions on how they operate their assets, either as non-BM registered assets or as BM providers. It was just revealed in the new DC/BM stacking rules that parties are free to submit and act on BOAs to any commercial arrangement even where these are not in line with the DC baseline rules. We believe that this shows that such activity is not a risk to the stability of the grid and should

assessment was designed to incentivise provider behaviour that acknowledges the need to recover their costs with some profit.

By introducing a day ahead product, we provided the market with the flexibility to participate in different markets at short notice (compared with a month ahead tender that locks capacity in for 30 days). Additional Balancing Mechanism BM stacking further allows providers to participate in two markets simultaneously. To further attract market DC participants, we are currently working on implementing the below items.

Updates on these workstreams can be found via the DC Soft Launch development document and usual channels.

- DC high as the next stackable service with DC low (with Dynamic Regulation (DR) and Dynamic Moderation (DM) to follow in the future).
- Procurement automation
- Introducing some form of granularity for bidding and allowing market participants to move easier across markets and periods.

We also noted that you have recommended the cap price to be provided once the tender results are published. This is an approach we are trialling under the weekly response auction trial though is not standard practice for our other procurement mechanisms. We continue to take the learning from the auction trial and note that the competition in that market has varied since the trial commenced.

Performance

We welcome this feedback and recognise the benefits these changes bring to the market.

Baselines

Thank you for your feedback and recommendations.

<p>not therefore be unnecessarily restrained from the optimum management of assets.</p> <p>Overall, we believe that liberalisation of the baseline methodology would allow more efficient plant operation as well as better commercial management and response to market conditions, which would improve the economic benefit to the end consumer through a more efficient DC service.</p> <p><u>Tendering</u></p> <p>We fully support the proposed changes to the tendering methodology. Our only remark is that it would be of great value to avoid potential manual errors of data entry if the DC submission template contained the exact date of service delivery for each column. We would also look for future capability to automatically submit tenders as part of a machine-to-machine interface to allow for more algorithmic engagement in the DC market.</p>	<p>We note you disagree with the notice periods to submit baselines and so we hope the clarification below as to why we consider this to be necessary is helpful:</p> <ul style="list-style-type: none"> • The use of baselines, in the form of Physical Notification (PN)s with their associated lead-times, is fundamental to how the ESO balances the system and how the power markets operate in GB. We acknowledge there are some potential benefits to shorter duration baselines – in extremis a zero baseline confers maximum optionality to the unit however at this stage in the development of DC (and with a view to the introduction of DM and DR) we are unable to relax our baseline requirements. • The limitation on a ramp rate for submitted baselines when under contract of DC is required to reduce the impact of herding behaviour when assets manage their state of energy. The State of Energy (SoE) and baseline rules have been designed to work together and ensure that DC is available to the ESO at all periods of the contract. • We welcome your suggestions on how to improve the service through providers managing their own state of management requirements. However, allowing assets to use 10-20% of their contract to manage SoE may not be as simple/clean as first assumed. For example, the ESO would not know if or when the DC capability would be reduced by 10-20% for SoE management. This may mean the ESO would have to buy extra DC to cover this possibility or just operate with unknown periods of increased risk. Of course, not all assets would behave in exactly the same way, which may mitigate some of the risk. But in this case the rules would have to make it very clear how and when the 10-20% capacity could be used. For example, would it be entirely at the discretion of the asset or within 1hr of SoE falling below a certain level? If
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		<p>the rules are too specific they may encourage the type of herding behaviours that we would ideally not encounter.</p> <ul style="list-style-type: none">• We agree that a (energy limited) unit providing equal amounts of DC- Low Frequency (LF)+ High Frequency (HF) will need to reserve some capacity for SoE and that the opportunity cost will be included in the service price. It may be possible in the future, once we have experience running with the bidirectional service, that the requirements/obligations for SoE management can be relaxed or reduced – we welcome industry views on this.• BM Bid Offer Acceptance (BOA)s when stacked with DC are not required to follow the baseline rules (i.e. ramp rate) precisely because it is an ESO instruction – i.e. it is our decision if/when to make these instructions. We make these instructions with knowledge and visibility of the system conditions hence why they need not be constrained by some of the rules. <p><u>Tendering</u></p> <p>We welcome the support of the proposed changes. With regards to the suggestion of further amendments to the existing submission templates, ESO is seeking to make minimal changes to this manual process but we are prioritising the automation of procurement, which covers tender submission and assessment and will look to enhance our capabilities. We're looking forward to sharing more with industry in the next couple of months.</p>
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