roposal for a Capacity Market Rules Change

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Reference number *(to be completed by Ofgem)*:

Name of Organisation(s) / individual(s): **Melanie Ellis, Shell**	**Date Submitted:** **15th March 2023**
Type of Change: ☒ **Amendment** ☐ **Addition** ☐ **Revoke** ☐ **Substitution**	**If applicable, whether you are aware of an alternative proposal already submitted which this proposal relates to:** We are not aware of any alternative proposals already submitted but note that in their recent CM consultation, DESNZ asked the market for evidence of their challenges with EPT.

Proposal summary *(short summary, suitable for published description on our website)*

Changes to the Extended Performance Test (EPT) to better demonstrate the ability of storage assets to meet its contracted volume and duration, rather than the unduly burdensome tests we have today, which can lead to the unnecessary termination of storage CMUs and/or reduced volume being entered in the auctions in order to pass the EPT.

What the proposal relates to and if applicable, what current provision of Rules the proposal relates to *(please state provision number)***:**
The proposal relates to 'Demonstrating extended performance' which is set out in the Capacity Market (CM) Rules in section 13.4A. In addition part of the definition for the calculation of the EPT is shown in section 2.3.5.

Description of the issue that the change proposal seeks to address:

Summary of the Issue

- CMUs taking multi-year capacity market contracts containing storage must select their battery storage duration at prequalification. They can select between half an hour and 9.5 hours plus, for which they are awarded different de-rating factors which determine their AACO (Auction Acquired Capacity Obligation).
- In order to validate battery storage durations, multi-year storage CMUs must pass an Extended Performance test (EPT) in its first year and then every 3 years thereafter.
- The current methodology (described further below) requires these CMUs to perform at much higher levels than their AACO and allows for minimal battery degradation.
- This is resulting in early vintage battery storage CMUs struggling to pass their EPT and are subsequently being terminated.
- This year we also saw a large proportion of battery storage CMUs adjust their volume down by up to 40% in order to set themselves up to pass future EPTs under the current requirement.

Summary of the causes

- CMUs containing storage are failing their EPT as they require battery degradation to be managed so assets can still perform at their 7-year average MEL. As batteries are generally failing these tests in their second EPT it suggests that the methodology is not aligned to battery degradation and should be reviewed.

- We challenge whether the EPT is fit for purpose as it requires storage units to deliver at a much higher level of their name plated capacity than is required to meet their AACO for their CM payments.

Summary of the proposed solution

- We therefore propose to change the methodology used for EPT such that it tests a battery duration, which was the initial intention of the test, but we do so by testing the duration against the AACO rather than some theoretical assumptions around degradation i.e., a 2-hour T-4 Storage CMU would need to demonstrate its export for 2 consecutive hours at its AACO or higher. The intention is that this change would apply to both historical CMUs required to calculate an EPT as well as future CMUs.
- We note that the CM Rules require participants to ensure they can meet their AACO obligation over the life of their contract. These proposals in no way contradict this requirement for storage participants to ensure they can meet their AACO which will be factored into their maintenance plans for the batteries.

Detailed review

The latest storage duration de-ratings are shown below and are calculated in accordance with Schedule 3B of the CM Rules. De-ratings are low and only over 50% for durations of 3hrs plus. We note that most batteries with a CM contract are either 1-hour (11.81%) or 2-hour batteries (23.63%).

latest battery de-ratings

Name for Technology Class	Plant Types Included		De-rating factors T-1 & ST (%)	De-rating factors T-4 (%)
Storage	Conversion of imported electricity into a form of energy which can be stored, the storing of the energy which has been so converted and the re-conversion of the stored energy into electrical energy Includes hydro Generating Units which form part of a Storage Facility (pumped storage hydro stations).	Storage Duration: 0.5h	9.30	5.95
		Storage Duration: 1h	18.60	11.81
		Storage Duration: 1.5h	27.90	17.77
		Storage Duration: 2h	37.02	23.63
		Storage Duration: 2.5h	45.95	29.58
		Storage Duration: 3h	53.39	35.53
		Storage Duration: 3.5h	58.79	41.11
		Storage Duration: 4h	62.32	45.86
		Storage Duration: 4.5h	64.74	49.48
		Storage Duration: 5.0h	66.97	52.83
		Storage Duration: 5.5h	69.02	55.81
		Storage Duration: 6h	95.25	58.97
		Storage Duration: 6.5h	95.25	61.95
		Storage Duration: 7h	95.25	64.92
		Storage Duration: 7.5h	95.25	67.99
		Storage Duration: 8h	95.25	70.88
		Storage Duration: 8.5h	95.25	73.85
		Storage Duration: 9h	95.25	76.64
		Storage Duration: 9.5h+	95.25	95.25

Our understanding is that the EPT was introduced to demonstrate that a CMU, with limited duration storage, can meet its AACO for its agreed duration, which underpins its CM contract.

Battery de-ratings are now so low that the AACO is much lower than the levels set for the EPT. It seems unduly onerous that a battery is rewarded on a low de-rating level but is required to function at a much higher level for EPT.

The tables below contains 2 real life examples of how the EPT, as currently defined, is adversely impacting multi-year storage CMUs, which will ultimately reduce available volume, result in lower volumes being entered for multi-year contacts and may increase the prices of CM auctions.

Example 1 of the issues with the current EPT

2017 T-4 New Build Storage CMU – one component

	CMU Particulars	EPT Particulars	Comment
Name plated MW	3.750	3.750	
MW entered in CM	3.750	3.750	Full volume entered
De-rating % (1-hour)	36.44%	n/a	
De-rated volume (AACO) MW	1.367	n/a	
Adjusted connection capacity (ACC) in MW	n/a	3.549	
ACC as a % of MW entered in CM	n/a	94.64%	ACC performance 58% higher than the de-rated level

The first example is a storage component from a 2017 New Build T-4 CMU which won a 15-year contract. The de-rating level is 36.44% while the EPT requires a demonstration of 95% of the name plated capacity. This CMU containing this component has just failed its EPT by a small margin and has been terminated. This takes a CMU out of the CM which means there is less volume which will now need to be repurchased in future auctions.

Example 2 of the issues with the current EPT

2022 T-4 New Build Storage CMU

	CMU Particulars	EPT Particulars	Comment
Name plated MW	50.000	50.000	
MW entered in CM	30.000	30.000	40% reduced volume due to EPT requirements
De-rating % (1-hour)	11.81%	n/a	
De-rated volume (AACO) MW	3.543	n/a	
Adjusted connection capacity (ACC) in MW	n/a	28.302	
ACC as a % of MW entered in CM	n/a	94.64%	ACC performance 83% higher than the de-rated level

To mitigate the stringent requirements of the EPT we are seeing some storage assets enter a 40% lower volume, versus their name rated capacity, to ensure they meet EPT over the life of their contract. This was evident across many of the CMUs we entered in the recent 2023 auctions.

In the example above a 50MW asset was entered as 30MWs to ensure it can meet its EPTs over its 15-year life. The current de-rating for a 1-hour battery is now 11.81%, but this battery will still need to demonstrate an Adjusted Connection Capacity of c.95% of its entered capacity in near term EPT tests.

By reducing its entry volume the EPT target is set at 28MW, which can only be met by using its full name plated capacity of 50MW. This EPT volume equates to 57% of its actual name rated capacity (28/50) which it can achieve. Therefore it is only by reducing its entry volume that the CMU can pass its EPT. We note that the EPT volume is 83% higher than the AACO which the CMU is paid for.

Calculating the EPT

As defined in the CM Rules section 13.4A.2, the EPT is calculate by multiplying the Connection Capacity of the CMU and the Technology Class Weighted Average Availability (TCWAA) of the storage generating technology class. The TCWAA is defined in rule 2.3.5(a) and involves taking into account the declared Maximum Export Limit over the last seven core winter periods. We have never calculated the TCWAA but instead relied on NGESO to provide.

Outcome and recommendations
CMUs containing storage are failing their EPT as they require battery degradation to be managed so assets can perform at their 7-year average MEL. As batteries are failing these tests in their second EPT it suggests that the methodology is not aligned to battery degradation and should be reviewed and replaced.

We believe the simplest solution is to require storage CMUs to demonstrate their contracted duration based on their AACO i.e., a 2-hour T-4 Storage CMU would need to demonstrate its export for 2 consecutive hours at its AACO or higher. This would align with our understanding of the rationale for the EPT, to demonstrate that a CMU with limited duration storage, can meet its AACO for its agreed duration.

By way of completeness we also flag that under rule 2.3.8(b), that the Delivery Body can propose an alternative to the current definition to TCWAA, providing there is justification for the change. This may represent an alternative option but we propose a change to using the ACCO as the simplest option.

If applicable, please state the proposed revised drafting *(please highlight the change)***:**

We can replace the current wording shown below to reflect changes to the Adjusted Connection Capacity calculation so that it becomes the product of the AACO and the storage duration awarded a CM contract. We can process these changes if CMAG supports the change proposal.

Current wording:

13.4A.3 In this Rule 13.4A, "extended performance" means:

(a) for a Capacity Committed CMU in a Storage Generating Technology Class that is Duration Limited (or a Capacity Committed CMU that is an Unproven DSR CMU to which Rule 13.4A.3A applies), a performance of capacity at a level equal to or greater than its Adjusted Connection Capacity for the number of consecutive Settlement Periods that is equivalent in duration to the specified minimum duration for that Storage Generating Technology Class; and

(b) for a Capacity Committed CMU in a Storage Generating Technology Class that is not Duration Limited (or a Capacity Committed CMU that is an Unproven DSR CMU to which Rule 13.4A.3B applies), a performance of capacity at a level equal to or greater than its Adjusted Connection Capacity for the number of consecutive Settlement Periods that is equivalent in duration to the specified minimum duration for the shortest-duration Storage Generating Technology Class that is not Duration Limited.

13.4A.3B This Rule 13.4A.3B applies to an Unproven DSR CMU if:

(a) the CMU has been awarded a Capacity Agreement of a duration exceeding one Delivery Year, regardless of whether the duration of the Capacity Agreement was reduced under Rule 8.3.6(d);

(b) a declaration was made under Rule 3.10.1(aa)(iv)(aa) that the CMU would contain at least one DSR CMU Component that contains a Storage Facility); and

(c) the Generating Technology Class specified in the declaration made under Rule 3.10.1(aa)(iv)(bb) is not Duration Limited.

2.3.5 With respect to the first Delivery Year, TCWAA and AABS are calculated by the Delivery Body as follows:

(a) for TCWAA, by:

(i) determining the Average Availability (AA) for each BM Unit directly connected to the Transmission Network in the Generating Technology Class over the seven immediately preceding Core Winter Periods. The Average Availability is a mean average equal to:

(aa) the sum of each declared Maximum Export Limit of that BM Unit at real time in High Demand Settlement Periods over the seven Core Winter Periods, excluding any declared Maximum Export Limit which exceeds the 95th percentile of all declared Maximum Export Limits of that BM Unit in those Core Winter Periods, divided by

(bb) the sum of the highest declared Maximum Export Limit figure from each Core Winter Period, excluding any declared Maximum Export Limit which exceeds the 95th percentile of the declared Maximum Export Limits of that BM Unit in that Core Winter Period ("BM Unit Max MEL"); and

(ii) determining the mean average of AA for all BM Units directly connected to the Transmission Network in that Generating Technology Class, weighted according to the BM Unit Max MEL of each such BM Unit; and

(b) for AABS, by determining the mean average of the declared availabilities of all Non-BSC Balancing Services at real time in High Demand Settlement Periods over the three immediately preceding Core Winter Periods, divided by their contracted volumes.

2.3.5A EFIC is determined by the Secretary of State for an Interconnector CMU in accordance with the methodology set out in Schedule 3A.

2.3.5B EFC is determined in accordance with the methodology set out in Schedule 3B by the Delivery Body for a Storage Generating Technology Class that is Duration Limited and a Non-dispatchable Generating Technology Class.

Analysis and evidence on the impact on industry and/or consumers including any risks to note when making the revision - including, any potential implications for industry codes:
We recommend that the changes are made ahead of the 2023 Prequalification so as to prevent storage CMUs from reducing their volume going into the auction. It would also be useful to apply the change ahead of the extended time for the EPT for live CMUs performing their tests.

As mentioned above we believe the changes will have a favourable impact for industry and the end consumer as there will be more storage volume and therefore competition in the next auctions, and the test for existing multi-year storage contracts will reflect their capability to deliver if there was a System Stress Event.

One area to consider would be whether there was any way for batteries who previously reduced their entry volumes to meet EPT, to increase their volume. We assume this would only be possible if the other volume could be separately metered.

Details of Proposer
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