



Department for
Business, Energy
& Industrial Strategy

CAPACITY MARKET CONSULTATION – IMPROVING THE FRAMEWORK

Government Response

December 2017

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CAPACITY MARKET CONSULTATION – IMPROVING THE FRAMEWORK

Government Response

The consultation can be found on GOV.UK:

<https://www.gov.uk/government/consultations/capacity-market-consultation-improving-the-framework-detailed-proposals>

CAPACITY MARKET CONSULTATION – IMPROVING THE FRAMEWORK

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Any enquiries regarding this publication should be sent to us at energy.security@beis.gov.uk

Introduction

The Capacity Market (CM) is designed to use competition to achieve a defined level of electricity security in Great Britain at the lowest cost to consumers.

On 24 July 2017 the Government published a consultation¹ seeking views on a number of changes to the CM Rules to ensure a more level playing field, improve the functioning of certain areas and better align segments of the Rules with the original policy intent. If enacted, the Rule changes will only apply to capacity agreements awarded after the Rules come into force. The changes will not apply to existing capacity agreements.

In summary, we sought views on:

- **Amending generating technology classes and the de-rating methodology related to storage Capacity Market Units (CMUs) (Questions 1 – 9).** The proposed change would ensure that storage capacity is remunerated appropriately for its contribution to security of supply and reduce the risk of insufficient capacity being secured to meet our reliability standard, which is 3 hours of expected loss of load per capacity year. We also sought views on streamlining the approach taken to consulting on and revising calculation methodologies under Rules 2.3.8 and 2.3.10.
- **How delivery assurance can best be provided for unproven Demand Side Response (DSR) (Questions 10 – 12)** awarded agreements in the four-year-ahead (T-4) auctions to provide the Government with the ability to replace any failing capacity through the one-year-ahead (T-1) auctions;
- **Strengthening the arrangements relating to Satisfactory Performance Days (SPDs) (Questions 13 – 15)** to improve confidence that Capacity Committed CMUs are physically capable of delivering their capacity obligations; and
- A number of other clarifications and changes (**Question 16**):
 - Allowing Capacity Providers to **re-take a metering assessment** if necessary;
 - **Shifting the planning consent deadline to January** to avoid the Christmas period;
 - **Disaggregating some of the generating technology classes** to improve transparency, support analysis and allow the potential for more specific application of de-rating factors in future; and

The Government also highlighted, via a stakeholder bulletin on 24 August 2017, that it wished to obtain input on an additional CM Rule change proposal as part of this consultation. The

¹ Capacity market consultation – improving the framework
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/631842/CM_consultation_-_detailed_proposals-template.pdf

additional proposal related to a clarification of the CM Rules to ensure the Adjusted Load Factor Capacity Obligation (ALFCO) applies to interconnectors as intended. Specifically it was proposed to amend Rule 8.5.2 so that references to a generating CMU are changed to also include an interconnector CMU.

56 written responses to the consultation were received by the closing date of 8 September 2017. The Government also met with interested stakeholders over the consultation period, through a series of bi-lateral meetings and a workshop held on 5 September 2017.

The Government has carefully considered the responses to the consultation and has concluded that all proposals, with the exception of the proposals relating to improving delivery assurance of unproven DSR, are appropriate and proportionate and should be implemented through changes to the CM Rules². A number of the proposals have been refined in light of stakeholder comments. The final position in relation to each of the proposals being taken forward is summarised below:

- **Limited duration storage and security of supply:** The storage generating technology class will be divided into separate storage generating technology classes differentiated by the amount of time for which a CMU can generate at its full connection capacity without recharging ('duration bands'). These duration bands will be at 30-minute intervals. For both the upcoming T-1 and T-4 auctions storage generating technology classes of 3.5 hours minimum duration and below will be duration limited.

The new de-rating methodology, based on Equivalent Firm Capacity (EFC), will be used to calculate de-rating factors for storage CMUs which fall in storage generating technology classes that are duration limited. Storage generating technology classes that are not duration limited (i.e. those that have a minimum duration of 4 hours and above for the upcoming T-1 and T-4 auctions) will be de-rated using the existing TCWAA methodology. To note, the development of the EFC methodology was the subject of a separate consultation by National Grid during August 2017³ and National Grid today published its final report on Duration-Limited Storage De-rating Factor Assessment⁴ which sets out the proposed de-rating factors.

Applicants for storage CMUs will be able to self-select their storage generating technology class. Storage CMUs will be required, once every 3 years, to demonstrate their duration via an extended performance requirement (see Paragraphs 82 – 84).

- **Strengthening SPDs:** CMUs will be required to complete three SPDs during winter of relevant delivery year, with at least one demonstration of satisfactory performance in the period January to April of the relevant Delivery Year. Failure will result in suspension of

² All changes will come into effect ahead of the upcoming January 2018 auctions, with the exception of changes to non-storage generating technology classes, which will come into effect for prequalification in 2018.

³ <https://www.emrdeliverybody.com/Capacity%20Markets%20Document%20Library/Duration-Limited%20Storage%20Workshop%20-%202010%20August%202017.pdf>

⁴ <https://www.emrdeliverybody.com/SitePages/Home.aspx>

capacity payments until three further SPDs are completed, in May to July of the same delivery year, and failure to demonstrate the three additional SPDs will be treated as a termination event with an associated fee level of £15k/MW.

- **Metering re-assessment:** the CM Rules will be amended to clarify that Capacity Providers can re-take a metering assessment where necessary.
- **Planning consent:** the planning consents deadline for T-4 auctions will be moved by a few days to avoid the period between Christmas and New Year's Eve. The new deadline will fall in January.
- **Generating technology classes:** The current generating technology classes will be disaggregated as proposed in the consultation.
- **ALFCO with reference to interconnectors:** The CM Rules will be amended to clarify that the ALFCO calculation applies to interconnector CMUs.

Amendments to the CM Rules required to implement these changes will be laid in Parliament shortly. The Government took the opportunity to amend the approach taken to consulting on and revising calculation methodologies under Rules 2.3.8 and 2.3.10 in the Capacity Market (Amendment) (No. 3) Rules 2017, as no responses were received in relation to this proposal.

This document summarises the main points raised by respondents through the consultation process and describes the Government's consideration of these points in reaching its final decision in relation to each of the proposals. Annex A outlines the Government's assessment of the impacts of each CM Rules change.

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Limited duration storage and security of supply

1. Before considering the responses given to specific consultation questions relating to the proposal to amend the generating technology classes and the de-rating methodology related to storage Capacity Market Units (CMUs), it is worth reflecting on concerns raised by some respondents that:
 - the proposals have adverse effects on the business case for storage projects, particularly batteries, and so appear contrary to the Government's position on storage as set out in its 'Smart Systems and Flexibility Plan';
 - the Government should publish the full evidence underpinning the proposal, as well as the draft de-rating factors, for comment; and
 - the Government proposed to implement the changes for this year's capacity auctions.
2. The Government has carefully considered these points, but does not share the underlying concerns.

Government action to facilitate growth in storage

3. The Government recognises the potential for storage, including batteries, to help us use energy more flexibly and decarbonise our energy system cost effectively. That is why the Government's and Ofgem's 'Smart Systems and Flexibility Plan'⁵ sets out a range of actions intended to facilitate growth in this area. Many of these actions focus on removing barriers (including the revision of licensing, planning and charging regimes for storage), and supporting the rollout of storage on the same site as renewable generation. The Government also committed up to £70 million of funding to support innovation in DSR, storage and other smart technologies.
4. Progress has already been made in this space, for example: Ofgem has launched consultations on the modified generation license for storage and has proposed changes to existing network charges for storage. BEIS has also launched a number of innovation competitions to encourage the development of new business models. Reform is happening to ensure a level-playing-field in the markets including code modifications to ensure distributed resources can enter the Balancing Mechanism as well as National Grid working to reform the ancillary services markets. Finally, to ensure we are held to account on the

⁵ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/633442/upgrading-our-energy-system-july-2017.pdf

actions in the plan, BEIS and Ofgem have jointly launched the Smart Systems Forum to enable a wide range of stakeholders to input on our progress.

5. It is important to stress that we value storage because of its potential technical performance and application, which is dependent on the specific design of individual projects.
6. Storage is able to provide numerous applications to the electricity system and we are striving to design a system which allows projects to monetise value where they create value for that system – not just in the context of storage but for all technology types. We believe the proposed change in approach to de-rating storage in the CM is entirely consistent with this ‘system design’ approach and that it should help ensure the storage sector develops in a sustainable manner that provides a net positive contribution to British consumers.

Consulting on proposals for implementation in the upcoming auction

7. The Government recognises the importance of regulatory stability, and is committed to establishing a stable and predictable cycle for running the CM auctions. That said, we also have a responsibility to regularly review the CM, given it operates in a rapidly evolving environment. Where necessary, we will make changes to the CM legislative framework, within timeframes shaped by the annual cycle of auctions, to ensure it remains fit for purpose. Failure to do so could lead to inefficient auction outcomes with potential long-term impacts and costs to consumers.
8. The emergence of batteries in the last round of auctions was considered to be a sufficiently significant development to prompt a review to consider whether changes were needed ahead of the next round of auctions to facilitate their participation going forwards on a fair and equal basis to other technologies.
9. At the time of the review there was (a) emerging evidence that market signals were driving the deployment of limited duration batteries that could generate continuously for a maximum of 30 – 60 minutes, and (b) initial analysis from National Grid that suggested that the duration of stress events may frequently exceed this. This raised concerns regarding the potential for storage to be over-rewarded in the CM relative to its ability to contribute capacity during longer stress events, which in turn could lead to a reduction in security of supply.
10. Industry stakeholders were also raising similar concerns – some citing their own or other technical analysis – with some submitting Rule change proposals to Ofgem which were the subject of a consultation in March 2017⁶. The independent Panel of Technical Experts (PTE) also included a recommendation in its 2017 report⁷ that “*National Grid develop a*

⁶ <https://www.ofgem.gov.uk/publications-and-updates/statutory-consultation-amendments-capacity-market-rules-2014>

⁷ <https://www.gov.uk/government/publications/electricity-market-reform-panel-of-technical-experts-2017-final-report-on-national-grids-electricity-capacity-report-2017>

derating methodology for energy storage that considers the size of the storage tank in relation to derating factors". National Grid's Electricity Capacity Report (ECR) in July 2017⁸ set out its plans to develop a new de-rating methodology during summer 2017.

11. We were also aware that capacity markets in other countries had also implemented specific arrangements to manage the lower contribution to security of supply made by limited duration storage – in other words, this was an internationally recognised issue⁹.

Evidence available during the consultation

12. Our consultation provided commentary on the emerging trends and evidence (outlined above) and was supported by National Grid's separate consultation on the technical aspects of the new de-rating methodology.
13. Through its consultation, National Grid provided details of the evidential basis for its initial analysis on stress event durations¹⁰. The detail of the model and assumptions to be used were also described in National Grid's response to its consultation¹¹ together with links to the model methodology documentation on the Lane Clark & Peacock website. This information was made available during the course of the Government's consultation.
14. We considered the available evidence was a reasonable basis for the Government to consult over the summer on the principle of changing the approach to de-rating storage ahead of the next round of auctions if further analysis demonstrated this was necessary.

Reflecting on evidence obtained since the consultation

15. National Grid published today its final report on Duration-Limited Storage De-rating Factor Assessment. This confirms the conclusions of their initial analysis – that the mean stress event duration is around two hours, with some events lasting much longer, but the large majority lasting less than four hours (see figure 1). National Grid also calculated new de-rating factors for limited duration storage (see Table 1) based on analysis of its availability during stress events.

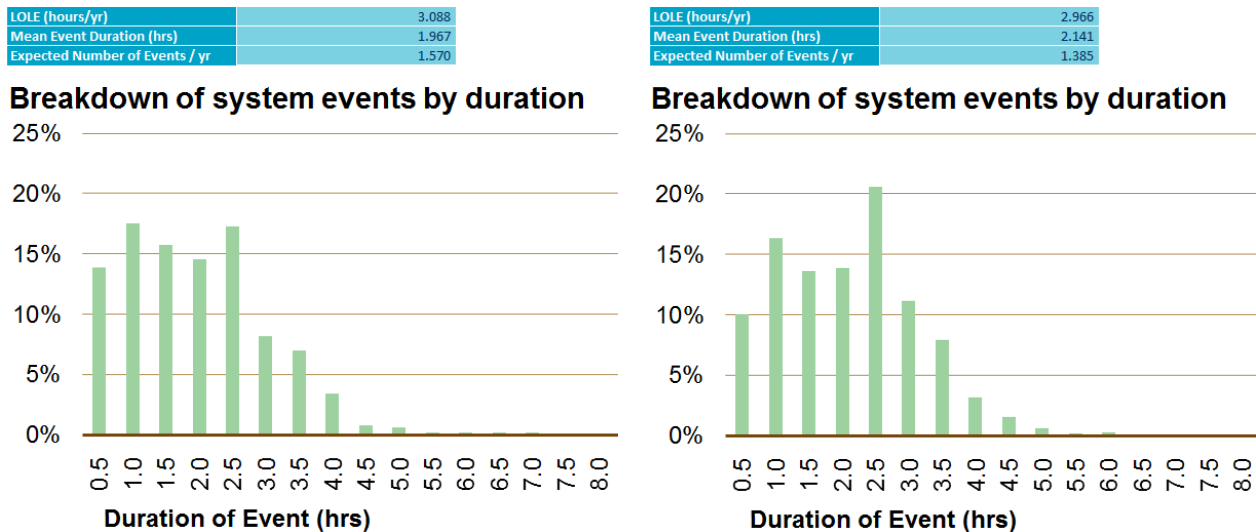
⁸ <https://www.emrdeliverybody.com/Lists/Latest%20News/Attachments/116/Electricity%20Capacity%20Report%202017.pdf>

⁹ For example, the Capacity Market in Ireland utilises a similar approach to de-rating storage to that proposed for GB. See <http://www.sem-o.com/ISEM/General/Initial%20Auction%20Information%20Pack.pdf>

¹⁰ It was based on Lane Clark & Peacock's (LCP) Unserved Energy Model (UEM) which is a time sequential Monte Carlo simulation model of GB adequacy

¹¹ https://www.emrdeliverybody.com/Lists/Latest%20News/Attachments/134/Storage%20De-rating%20consultation%20Response%20Summary_Sept%202017.pdf

Figure 1: Histograms of Stress Event Durations in 2018/19 (on the left) and 2021/22 (on the right) assuming a reliability standard of 3 hours loss of load expectation (LOLE) and deployment of 0.4GW and 1GW battery storage respectively.



Source: National Grid, Duration-Limited Storage De-Rating Factor Assessment – Final Report

Table 1: Proposed Storage De-Rating Factors

Minimum Duration	2018/19 T-1	2021/22 T-4
0.5 hours	21.34%	17.89%
1 hours	40.41%	36.44%
1.5 hours	55.95%	52.28%
2 hours	68.05%	64.79%
2.5 hours	77.27%	75.47%
3 hours	82.63%	82.03%
3.5 hours	85.74%	85.74%
4 hours +	96.11%	96.11%

Source: National Grid, Duration-Limited Storage De-Rating Factor Assessment – Final Report

16. The prequalification results for the upcoming auctions have now also been published¹² and show around 6GW of new build battery capacity applied to prequalify for the T-4 auction, and over 2GW for the T-1 auction. These results demonstrate there is a real possibility of a rapid increase in market penetration of shorter duration batteries, with consequential concerns around security of supply.

17. It is, therefore, clear that the change in approach to de-rating limited duration storage is now necessary. Continuing to award all storage a de-rating factor of 96.11% in the upcoming auctions would over-value limited-duration storage relative to its contribution to security of supply, thereby distorting competition and risking inefficient auction outcomes.

¹² CM Registers are available via <https://www.emrdeliverybody.com/CM/Registers.aspx>

The most obvious, but probably not the only, manifestation of inefficient outcomes is that the auctions would have secured insufficient capacity to meet the CM's reliability standard. In relation to the T-4 auction, any shortfall in capacity would need to be re-procured in future CM auctions which would lead to an increase in costs to consumers. In relation to the T-1 auction, there would be no opportunity to replace any shortfall in capacity – but as the Government cannot accept a lower standard of security of supply we would need to increase this year's auction target to 'buy through' the prequalified storage capacity, which again would have significant impacts on costs to consumers. We estimate that the total additional cost to consumers of these actions could be between £50m to £500m over 15 years, with a central estimate of around £200m (2017 prices, discounted). We have included details of how this is estimated as part of a full cost and benefit analysis of these measures as an Annex to this Consultation Response.

18. We conclude that implementing the new approach to de-rating storage supports the Government's – and the CM's – objective of delivering security of supply at least cost to the consumer. We also note that knowingly over-rewarding a specific technology, once there is firm evidence available, would be contrary to the CM policy of technology neutrality, and unfair to other market participants.
19. As noted earlier, the methodology supporting the proposed de-rating factors in Table 1 was the subject of a separate consultation and has been scrutinised and validated by the independent PTE¹³, and so we are satisfied that it is robust and represents the best basis upon which to de-rate storage in the upcoming auctions. The methodology will be subject to regular review and improvement – National Grid has noted, in its final report, a number of modelling improvements that can be applied in subsequent years as the amount of duration-limited storage builds out and there is more experience with, and operational data from, this new form of capacity.
20. The Government is clear that it is appropriate in this case to introduce these changes prior to the upcoming T-1 and T-4 auctions. Updated Auction Guidelines will be available at least three weeks prior to the start of the next capacity auction.
21. As indicated in the consultation, the new de-rating factors will only apply to new agreements – leaving payments for projects which won agreements in past auctions unaffected.

¹³ See Appendix 4 of National Grid's final report on Duration-Limited Storage De-rating Factor Assessment.

Consultation question:

1. Can you provide evidence that current economic and market signals will tend to drive the deployment of batteries that can generate at full capacity for less than four hours? How might this change over time?

Summary of responses:

22. There was broad consensus amongst the forty responses that commented on this question. Commentary included the following points:
- The cost of battery storage projects is driven by MWh (rather than MW) and so costs rise significantly with duration. Developers are therefore incentivised to keep duration to the minimum necessary to meet the technical requirements of targeted revenue streams;
 - Currently, the primary revenue streams are Enhanced Frequency Response (EFR) and Firm Frequency Response (FFR), which can be met by batteries with a duration of 30 minutes and one hour respectively. The CM is another important revenue stream, principally because the 15-year agreements enable access to debt finance, but currently does not establish any entry requirement relating to duration; and
 - Consequently, market signals are driving deployment of batteries that can generate for a maximum of 30 – 60 minutes.
23. Some respondents suggested that the size of the frequency response market will naturally curtail investment in limited duration batteries, whilst others felt the future size and shape of the market was uncertain, particularly given National Grid's consultation on the System Needs and Product Strategy.
24. Where respondents commented on how the market might evolve in future, there appears to be a general expectation that improvements in performance and reductions in battery technology costs will open up access to other revenue streams, including energy arbitrage. It was felt this will tend to drive a trend towards longer duration batteries/storage and support greater levels of deployment.

Government response:

25. The Government welcomes the comments provided in relation to this question which broadly align with our view of the market and trends in the deployment of storage.
26. However, we do not necessarily adhere to the view that the size of the frequency response market will curtail investment in limited duration batteries at low levels for reasons outlined later (Paragraph 31).

Consultation question:

2. Do you agree with our assessment that, under the current rules, displacement of enduring capacity by short duration storage in the CM creates security of supply risks?

Summary of responses:

27. Of the 44 respondents who commented on this question, over half fully or broadly agreed with the hypothesis in the consultation that the displacement of enduring capacity by limited duration storage risks security of supply, and a few provided a neutral response.

28. Reasons given by the remaining respondents disagreeing with this hypothesis included:

- historic stress events have not exceeded 30 minutes in duration, so it is unlikely that stress events would regularly last for multiple hours in future;
- it is not possible to fully judge the risk to security of supply until the full analysis of stress event durations is published by National Grid;
- any risk to security of supply is not material because current penetration by limited duration batteries is limited and future penetration will be naturally capped at a relatively low level by the size of the EFR/FFR market;
- the majority of batteries will not be required to provide capacity during a stress event as most will have EFR/FFR contracts which the CM lists as relevant balancing services;
- batteries make a broader, positive contribution to security of supply which should be rewarded through the CM – examples given included their speed of their response to an event, their provision of grid support services (which also frees up a greater number of MW of conventional generation that would otherwise be required to provide mandatory frequency response), and their facilitation of low carbon technology deployment;
- security of supply risks will not arise in practice since operators of limited duration storage will be able to use secondary trading to supply the additional capacity required during stress events that exceeded the duration of their asset; and
- the Government should consider other risks to security of supply such as the ability of technologies to respond quickly to stress events.

Government response:

29. The Government notes that, in judging future risks to security of supply, historic events and performance are not necessarily a reliable guide in the context of a rapidly evolving electricity system as margins were significantly higher than would be given by the implementation of the reliability standard.

30. National Grid's recently published analytical work indicates there could be around two stress events a year (assuming the system is at the reliability standard of 3 hours LOLE), and identifies mean stress event duration as just over two hours, with the vast majority lasting less than four hours (figure 1). This confirms the initial analysis described in the consultation and our view that displacement of enduring capacity by limited duration storage in the CM creates potential security of supply risks.
31. Moreover, whilst we acknowledge market penetration is currently limited, there is potential for this position to change quickly and for enduring capacity to be displaced at levels which could have a material impact on security of supply and therefore we need to ensure the CM is future proof – in this regard we note the large amount of applications to prequalify new build battery storage in both the upcoming T-1 (2GW) and T-4 (6GW) auctions. And although the size of the frequency response market might theoretically act as a cap on deployment, this may not be the case given (a) in the short term there is a risk of 'overbuild' if battery developers equally assume success in securing frequency response contracts, and (b) in the longer term battery business cases will inevitably evolve as capital costs decrease and batteries extract greater value from a wider range of revenue streams, potentially supporting deployment of larger amounts of battery storage.
32. The Government recognises that batteries can provide a broader, positive contribution to system stability and security of supply given its incredibly fast response time and high levels of flexibility. That said, we note there are other markets available specifically designed to value flexibility and speed of response. The primary purpose of the CM is, on the other hand, to value capacity; the proposed sliding scale of de-rating factors for storage of different durations fits well with that objective and the concept of designing markets to allow firms to monetise value where they create value for that system. In most cases, it is possible to stack revenues from these different markets so that technologies capture the full value of the full range of technical performance they can offer the system.
33. The question of whether provision of a Relevant Balancing Service should be taken into account when setting de-rating factors was considered in National Grid's consultation on the de-rating methodology. As noted in National Grid's response to that consultation, provision of a Relevant Balancing Service does not remove the need for capacity to be technically capable of fulfilling its CM obligations if necessary, not least because capacity providers cannot be certain they will always have a balancing service contract throughout the delivery year/s (particularly in the case of 15-year CM agreements) or, where one is in place, that they will be called upon to deliver under this contract during a stress event.

Consultation question:

3. Do you agree that de-rating factors for storage should be amended to reflect duration? Are there other technologies we should consider in future?

Summary of responses:

34. A total of forty-eight respondents commented on this question, of which over half agreed with the proposal, one third disagreed, and a few provided a neutral response.
35. Those disagreeing with the proposal did so on the basis that, as argued in response to Question 2, there was no risk to security of supply (or insufficient evidence of one).
36. A number of respondents felt the risk to security of supply needed to be balanced against the negative impact on investor confidence in the nascent grid scale battery storage industry. Several suggested that any change to de-rating factors should be introduced next year, or that, if introduced this year, consideration should be given to providing a grace period for those investors who have taken Final Investment Decisions prior to the announcement of the consultation. However, others felt that investors and developers had been given sufficient warning of the potential for forthcoming change and recognised the need for Government to act quickly to safeguard security of supply. A number welcomed the confirmation given in the consultation document that any changes to de-rating factors would not impact on agreements awarded in earlier auctions.
37. Several respondents highlighted that a battery can be augmented within its lifetime to increase its duration, and that consideration therefore needed to be given to providing augmented storage with the option of increasing its de-rating factor during its 15-year CM agreement.
38. A number of respondents proposed alternative solutions. Several felt that any security of supply risks would be more effectively addressed by tightening up the existing penalty regime rather than amending de-rating factors. By contrast, another respondent argued the de-rating approach is preferable to penalties because it requires developers to consider duration as part of their business designs at the outset, whereas penalty regimes expose the consumer to the risk of developers making incorrect assumptions around the likelihood of longer stress events occurring.
39. Other alternative approaches proposed included setting minimum delivery durations for CM participants, using a pay for performance model, or splitting the CM auctions into separate auctions, one for enduring capacity and another for flexible capacity. A few respondents argued that capacity providers should be able to self-nominate the service on offer and define an appropriate de-rating factor.
40. A number of respondents felt that the proposed changes would undermine the technology neutrality of the CM. Some respondents argued there should be a wider review which

takes account of, and ensures capacity providers are valued for, other attributes such as ramp rates, start up times, emissions, dispatchability, and dependence on imports of electricity from international markets.

41. Others felt all technology classes should be required to demonstrate that they can meet their obligation for the full duration of likely stress events, or at least that other 'duration limited' technologies should also be de-rated in a similar fashion. The most commonly named technologies that respondents felt could be duration limited were DSR and diesel peaking plant. However, other respondents argued that these technologies are not duration limited on the basis that diesel engines have adequate fuel storage capacity to generate for a sustained period of time, and DSR tends not to have hard and fast limitations around duration but rather is affected by the increasing cost of providing the service over longer periods. Other technologies that were identified as possibly being duration limited were oil fired plants, CHP plants, interconnectors, and intermittent renewables (if and when they are eligible to participate in the CM).

Government response:

42. The Government welcomes the comments provided and acknowledges, despite the broad support for the proposal, the strength of concern amongst some within the storage sector.
43. The Government did assess alternative options for addressing concerns with limited duration storage but concluded that these would be less effective. In relation to the three main alternatives suggested in consultation responses, we make the following observations:
- *Tightening up the penalty regime* – the purpose of the penalty regime is to provide a commercial incentive to operators to ensure delivery of capacity on the day and in the moment it is needed. The design and detail of the current penalty regime has been subject to more than one consultation in the past, and any changes would need to consider the implications across a wider range of sectors than were the immediate subject of the current consultation. In particular, extending its purpose to influence design and investment decisions four years ahead of delivery would represent a significant shift in purpose and there is no guarantee this would be effective given (a) the level at which penalties may be effective is likely to vary between CM participants, (b) it is dependent on developers taking an accurate view of stress event frequency and duration, and (c) anticipated participation in Relevant Balancing Services may give cause for developers to discount the likelihood of incurring penalties. Higher penalties may also act as a barrier to entry, particularly to small scale independents, and could have a significant impact on CM costs;
 - *Setting minimum delivery durations* – this would act as a hard barrier to entry for limited duration storage, whereas these resources do have a role to play in ensuring security of supply; and

- *Split auctions for flexible and firm capacity* – this would represent a substantial re-design of the CM, introduce significant additional complexity and reduce competitive forces.

44. The Government believes that refining the approach to de-rating limited duration storage, so that the aid awarded is proportionate to the level of contribution to security of supply, is entirely consistent with the application of the principle of technology neutrality – in fact, it is an essential development to ensure continued adherence. And whilst there may be other duration limited generating technology classes (we note that some respondents mentioned DSR and diesel in particular), it is evident through the differing views submitted by respondents that the case for action is less clear cut for other technologies and we are not yet aware of evidence of the sort that is now available in respect of storage. We will consider further and come forward with proposals if necessary.
45. In light of concerns regarding the potential impact on investor confidence, the Government also considered whether the new de-rating factors should be introduced next year, instead of ahead of this year's auctions, in order to provide more time for developers and investors to adjust to the new arrangements. However, the Government's overriding responsibility is to ensure security of supply at least cost to the consumer. As noted earlier, the potential costs of a delay are substantial (around £200m over 15 years). The CM is technology neutral and so the Government cannot knowingly (a) over-reward limited duration storage for its contribution to security of supply, or (b) secure insufficient capacity through an auction to meet our reliability standard (this is a particular risk in relation to the T-1 auction where we have no further opportunity to make up any shortfall in capacity arising from the over-reward of limited duration storage). To do so would risk distorting the auction process and potentially lead to inefficient outcomes with long term impacts on costs. For these reasons, we intend to proceed with the new approach to de-rating ahead of the upcoming auctions.
46. The Government has also considered arguments for providing a 'grace period' which delays implementation of the new de-rating factors for a year for just a subset of prequalified storage CMUs, for example, those storage CMUs in relation to which Final Investment Decisions had been taken prior to the consultation. Whilst this should have less of an impact on costs than a delay for all storage CMUs, by limiting the number of storage CMUs that can access the existing de-rating factor of 96.11%, the same issues apply i.e. we would still knowingly over-reward some capacity providers in relation to their technical performance and distort competition in the auctions. Moreover, we would be treating one subset of storage CMUs differently from other storage CMUs in the same auction, on grounds other than technical performance.
47. We can confirm, however, that we will continue with our past practice of ensuring that existing capacity agreements are not affected by new policy changes. So any capacity agreements awarded to storage in previous auctions will be unaffected by the new approach to de-rating storage.

48. We remain interested in the idea of enabling battery developers who augment their projects, in terms of capacity and/or duration, to capture the additional value through the CM. We will continue to investigate and would welcome further feedback on this issue. To note, we consider it essential that any solution requires battery developers to bid their additional capacity into the main auctions.

Consultation question:

4. Do you agree with the proposed banding of duration categories?

Summary of responses:

49. Thirty-nine responses addressed this question, of which half were in agreement, just over a third disagreed, and a few were neutral.
50. A number of those disagreeing with the proposed banding did so on the basis that, as argued in response to Question 2, there was no risk to security of supply (or insufficient evidence of one).
51. A significant proportion of those respondents in disagreement argued that the banding should be more granular to allow as much flexibility as possible and avoid creating step effects, as storage developers will target the duration of their assets to be equal to the lower limit of each band but no more. Various alternative suggestions were proposed ranging from banding on a minute-by-minute basis, to banding by 10 or 15 minute durations. Another respondent suggested that the bands should not be regularly sized but instead should follow a curve.
52. A number of these respondents also felt that storage providers should be able to change duration bands on an annual basis over the lifetime of their agreement to allow for the augmentation of an asset, or equally, its degradation. It was argued this approach would more accurately reward an asset's contribution, at any given time, to security of supply.
53. Conversely, many of those respondents in agreement felt the proposed half-hour interval of the duration banding of the storage technology class was well aligned with the duration of settlement periods and metering requirements, and, since the industry tends to work with "round numbers", is likely to fit with the expected size of battery systems. A number did, however, highlight the importance of refining the bandings and the upper limit for storage to be considered 'duration limited' in light of the outcome of National Grid's modelling work.
54. Several responses questioned why the limit above which storage would no longer be considered 'duration limited' had been set at four hours, whereas others suggested variously a limit of 3 hours or 5 hours.

Government response:

55. The Government is grateful for the comments received on this issue and confirms that, as proposed in the consultation, the duration bands will be set at half hour intervals. This unit of duration is widely used within the electricity system (e.g. it is consistent with the length of settlement periods) and we note that the current CM requirements relating to Satisfactory Performance Days (SPDs) effectively establish a minimum duration of 30 minutes already. Storage CMUs will be required to declare which duration banding should apply to them as part of prequalification (transitional arrangements to apply ahead of the upcoming auctions in early 2018).
56. The duration bands will extend out to 12 hours. However, as noted in the consultation, the Government intends to establish a means for identifying, in relation to each auction, an 'upper' duration band above which storage should be treated as 'firm' capacity (i.e. de-rated on the basis of TCWAA only, which is currently 96.11%). A storage generating technology class will be 'duration limited' for a particular capacity auction if at least 5% of stress events for the corresponding delivery year are estimated to last longer than the specified minimum duration for that generating technology class. Therefore, this may vary from auction-to-auction depending on the estimated distribution of stress event durations which can be affected by, for example, annual increases in market penetration of duration limited storage.
57. On this basis, as can be seen from the histograms of stress events durations for both 2018/19 and 2021/22 (figure 1), the upper duration band for both the upcoming T-1 and T-4 auctions is set at 4 hours. We note that, duration limited bands could, theoretically, be set out to around 24 hours. Establishing an upper band represents a pragmatic approach to dealing with this issue – it maintains a high level of security of supply in accordance with the reliability standard, recognises that model accuracy and assumptions in this region of probability distributions is challenging¹⁴ and avoids potentially significant costs associated with the process of verifying that CMUs are able to generate for such long durations (see Question 6(2)).
58. The Government does not intend to allow storage CMUs to change duration bands on an annual basis over the lifetime of multi-year agreements¹⁵, to allow for augmentation or degradation of an asset, as this would require the Government to take on and manage significant additional risk. For example, allowing for degradation of an asset would expose the Government (and ultimately the consumer) to a risk of unpredictable changes in capacity requirements that would add pressure to the T-1 auction targets, with consequential liquidity risks and cost impacts. Rather we believe that it is the responsibility of capacity providers to maintain their asset in a manner that ensures they are capable of providing the technical performance to which they committed themselves at the time of accepting the capacity agreement, or face penalties accordingly. As noted earlier, in

¹⁴ For further details see National Grid's final report on "Duration Limited Storage De-rating Factor Assessment"

¹⁵ Noting that this is already possible for one-year agreements

relation to the issue of augmentation of assets, we will explore solutions which might allow battery CMUs to bid any additional capacity into future auctions.

Consultation question:

5. Do you agree that we should take additional factors, such as participation in other commercial revenue streams, into account when calculating the values of EFC?

Summary of responses:

59. Of the forty-two responses to this question, a quarter agreed that participation in other revenue streams should be taken into account when calculating Equivalent Firm Capacity (EFC). A small number of responses were neutral, and just over half disagreed.
60. Some of those respondents who felt that the calculation of EFC should take account of other revenue streams, argued that EFR/FFR participants should not be de-rated according to duration at all, but instead should retain the current de-rating factor of 96%, or potentially have this increased to over 100%. Reasons given included:
- the provision of frequency response by storage releases at least the equivalent capacity of conventional generation to respond in stress events;
 - frequency response services take preference, and so storage contracted to provide these services does not need to be available for dispatch in a CM stress event, making its duration irrelevant; and
 - participation in multiple markets is beneficial to the system operator and cost-efficient for the consumer, so should not be discouraged by negatively impacting EFC.
61. By contrast, some respondents felt that EFR/FFR participants should be subject to more stringent de-rating as they are likely to be only partially charged at any one time. It was also commented that there is no guarantee that assets contracted to deliver balancing services will be called upon to provide that service during a stress event.
62. Many of the respondents that disagreed with this proposal highlighted the complexity of attempting to take into account participation in EFR/FFR due to the uncertainty around the shape of the future ancillary services market, the difference in contract lengths between the different markets, and variation in the revenue stack between different assets. Others pointed out that participation in other markets is not taken into account when setting the de-rating factors for other technologies.

Government Response:

63. The issue of whether other commercial revenue streams should be taken into account when calculating EFC was considered through National Grid's consultation on 'Storage De-rating'. National Grid's response to this consultation, and the more recent final report on 'Duration-Limited Storage De-rating Factor Assessment', concluded that the most appropriate assumption to make when calculating EFC is that all storage resources have uniform CM de-rating factors regardless of ancillary service provision.
64. We note that the majority of respondents to the BEIS consultation are in agreement with that position and the decision made by National Grid concurs with the majority of arguments put forward by these respondents in support of their stance. In particular, we would draw attention to the dichotomy between the short term balancing service contracts and the longer term CM agreements (e.g. awarded four-years ahead and for up to 15 years delivery).
65. We would also stress the importance of differentiating between (a) the potential technical availability of a technology (to be reflected in the calculation of de-rating factors) and (b) actual performance in a stress event which can be affected by a range of short term and often commercial factors (to be reflected in penalties). Provision of ancillary services does not affect the former, and so it is right that it should not be taken into account in the EFC calculation. But it does affect the latter and so, given the importance of balancing services to safeguarding the stability of the system, allowances are made in the CM Rules to exempt CM contracted capacity that simultaneously provides a Relevant Balancing Service from penalty payments during CM stress events.

Consultation question:

6(1). Do you have any evidence or sources of information about breakdown rates for short duration storage that can be used to calculate their de-rating factors?

Summary of responses:

66. A total of eighteen respondents commented on this question. Over half felt that there is not yet enough evidence available for gridscale batteries to calculate their own de-rating factors. The remaining respondents gave some kind of indication of what breakdown rates for limited duration storage might be.
67. Respondents agreed that it was appropriate to continue to apply the breakdown rates of 'pumped hydro' storage to the calculation of EFC for limited duration storage until such a time as sufficient evidence regarding the reliability of assets in these categories becomes available. One respondent also stated that it was important not to use reliability data from

existing experimental assets that had been built for purposes other than long-term capacity provision, since these providers had no incentive to develop robust and enduring designs.

68. Where respondents gave some indication of the expected reliability of limited duration storage (all examples given referred to batteries), it was widely stated that this is believed to be very high. Where figures were given, these were all 95% or over. In support of this, it was noted that the availability requirement for providers of EFR is 95%. One respondent also commented that many manufacturers are prepared to guarantee availability at over 95%.
69. One respondent stated that it was important to ensure that a lack of evidence of the reliability of new, innovative technologies does not lead to low de-rating factors being awarded to those technologies.

Government response:

70. This issue was also considered through National Grid's consultation process – their final report on 'Duration-Limited Storage De-rating Factor Assessment' confirms that the technical availability of storage will be applied as a linear scalar to the simulation based EFC to derive the overall de-rating factor.
71. The Government will not make any further distinction of the storage technology class by constituent technology (pumped storage, battery storage, compressed air storage etc.) until such a time that there is sufficient historical and technical availability performance data available for this purpose.
72. The Government is grateful for the comments submitted in response to this question which provide some reassurance that it is appropriate to use the rolling 7-year average availability of pumped hydro, at 96.11%, as the scalar to be applied to the EFC for all types of storage.

Consultation question:

6(2). Which is your preferred option for verifying duration? Please provide a justification.

Summary of responses:

73. Of the forty-three responses to this question, nearly two thirds gave testing as their preferred option for verifying duration, whereas a small number expressed a preference for OEM guarantees. A handful of respondents preferred giving storage providers the choice of the two options. A few were opposed to both options, and one was neutral.
74. Those respondents expressing a preference for OEM guarantees generally did so on the basis that this option would be the least costly. However, those expressing a preference for amending the testing regime felt that the provision of OEM guarantees would not be a suitable check for verifying duration because they can be complex and commercially sensitive, are contingent on battery usage and cycling which can change over time, and do not necessarily account for constraints introduced during installation (e.g. line losses and parasitic load).
75. Respondents in favour of extending the testing regime felt this was a clear and objective way of verifying duration. However, those not in favour felt this was the more expensive option and could affect degradation of the asset. In light of this, some responses suggested the check should only be undertaken once every two – three years.
76. A number of respondents suggested that the requirement for extended SPDs should be applied to all technology classes to ensure a level playing field. However, others noted that extended SPDs may be particularly costly for DSR CMUs.
77. Finally, some respondents felt that termination of a CM agreement for failing to meet the verification checks was too punitive and instead suggested the CMU be re-banded into a lower duration category which reflects actual performance.

Government response:

78. See response to Question 7.

Consultation question:

7. Would all storage facilities, including pumped hydro, be able to provide a suitable guarantee(s), and would these be a reliable way of verifying duration on their own?

Summary of responses:

79. Of the thirty-two respondents commented on this question, over two-thirds did not believe either guarantees were an appropriate way of verifying duration or that all storage providers would be able to provide a suitable guarantee. Of the remainder, a small number thought that all storage would be able to provide either a suitable guarantee or another form of certification. A couple of responses were neutral.

80. Many of the respondents relied on arguments put forward in response to Q.6(2). Additionally, some respondents argued that a requirement to provide OEM guarantees is likely to:

- be problematic for pumped hydro, given their age (some responses suggested alternatives such as director declarations based on historic performance or the measurement of storage volume), second-hand batteries and new innovative technologies;
- increase costs if they need to be provided over a long time period or are linked to penalties; and
- distort competition as other technology classes do not face similar requirements or costs.

Government response – Questions 6(2) and 7

81. The Government notes the clear preference amongst respondents for using an extended testing regime to verify storage duration and the significant concerns associated with use of OEM guarantees. We also note there was some concern around the costs of implementing extended testing.

82. We therefore intend to introduce a new extended performance requirement requiring storage CMUs that secure new CM agreements (i.e. agreements issued after these arrangements are introduced) will be required to generate continuously at an average of their connection capacity multiplied by TCWAA for a number of consecutive settlement periods equivalent to the lower bound of the duration band they declared should apply to them. Note that storage CMUs that are not duration limited will be subject to the same requirement, albeit for a number of settlement periods equivalent to the lower bound of the

shortest duration storage generating technology class that is not duration limited (i.e. for the upcoming T-1 and T-4 auctions, CMUs in the minimum 5 hours duration storage Generating Technology Class will be required to generate for at least 8 consecutive settlement periods, as storage Generating Technology Classes of 4 hours or more will not be duration limited in the upcoming auctions).

83. Given the comments around costs, this extended performance requirement will only be required once every 3 delivery years as one of the three standard SPDs to be completed in the winter in the years in which it is required – the Capacity Provider will be able to choose which of its three winter SPDs has demonstrated extended performance.
84. Failure to meet the extended performance requirement will have similar consequences as failure to meet a standard SPD, including suspension of payments and termination (see Government Response to Questions 13 – 15 for details of separate proposals to strengthen arrangements relating to SPDs).
85. The Government does not believe it is necessary to apply the extended performance requirement to all CMUs. There is no clear technical justification for doing this and it would likely drive up CM costs which are ultimately borne by the consumer.
86. We will continue to explore alternative ways of verifying duration that could be introduced in future.

Consultation questions:

8. Do you agree that the changes will have the expected impacts? Please provide evidence to support your views
9. Will the changes have other impacts that we have not foreseen? Please provide evidence to support your views

Summary of responses:

87. A total of forty-two responses provided some commentary on the expected impacts.
88. A number of respondents agreed that the proposals would help ensure security of supply and level the playing field. However, one respondent felt the proposals were not sufficient to guarantee security of supply, whilst others repeated earlier arguments that the risk posed by limited duration batteries was unproven or small.
89. There were divergent views on the extent to which the proposals could slow the deployment of batteries, ranging from a slight to a major slow down.
90. A number of respondents stressed the significance of the CM as a revenue stream for batteries, in particular the ability to access debt-finance. Others thought it should be possible for any reduction in CM revenues to be replaced by increasing revenues from the

frequency response market. Some respondents also felt other factors would have a greater impact particularly over the longer term, such as the evolution of the frequency response market, performance improvement and cost reduction, and progress with removing other barriers to storage deployment. Several felt the proposals could help promote longer duration technologies.

91. Several respondents thought battery developers may seek to mitigate the impact of the proposals on their projects by co-locating with other forms of generation or moving behind-the-meter. Other respondents thought this latter option was unlikely given it could mean relinquishing the ability to secure 15-year agreements and it is widely understood that some of the revenues for behind-the-meter generation are under review e.g. Ofgem is reviewing triad revenues.
92. A number of respondents felt the speed at which the proposals are being taken forward could impact investor confidence, particularly the small number of projects that had secured EFR contracts based on an assumption that they would secure long term CM agreements at an assumed price in the upcoming auction. Several also claimed that the proposals could undermine the credibility and deliverability of the Government's objectives to support storage deployment in the UK. Others felt the changes were foreseeable and had been sign-posted ahead of the consultation.
93. A number of respondents thought that the changes could lead to an overall increase in consumer costs. For example, higher pricing for other services, particularly FFR, to replace lost CM revenues; reduced storage leading to higher costs to balance the system; reduced investor confidence pushing up risk premiums; and CM auctions clearing at a higher price.
94. Finally, several responses suggested the timeline to post credit cover should be amended to align with the publication of the new de-rating factors.

Government response:

95. The Government welcomes the comments submitted in relation to these questions which have been fed into the development of a revised analysis of impacts (see Annex A).
96. Responding specifically to the point on credit cover, we note that applicants, who have their de-rated capacity reduced as a consequence of the new approach to de-rating storage, will be able to request the return of part of their credit cover under regulation 58(2).

Improving delivery assurance for Unproven DSR

Consultation Questions:

10. We would welcome views on how we can best balance facilitating the participation of robust new DSR resources in the CM with the need to understand their delivery progress, and any likely failures, before it is too late to secure alternative replacement capacity?

11. Should the DSR metering and testing deadlines be brought forward as suggested to mitigate against the risk of non-delivery? If not, please outline alternative solutions.

12. We would welcome views and evidence on the likely impacts of the above option. For DSR providers: how would the suggested deadlines impact your ability to recruit DSR clients/components? Do the component reallocation proposals help or would you instead look to enter more capacity in the T-1 auctions?

Summary of responses:

97. Of the twenty-six responses to this group of questions, the majority accepted the need for better delivery assurance for Unproven DSR. That said, a number of respondents felt the level of non-delivery risk had been overstated in the consultation, with some going as far as arguing the risk of non-delivery of Unproven DSR was minimal. Reasons given included:

- unproven DSR remains a relatively small proportion of total auction acquired capacity and the risk of non-delivery is inherently less than for new build;
- the non-delivery rates observed following the first Transitional Arrangements auction should be seen in the context of this being the first ever delivery year with weak penalties for failure; and
- DSR performed well in other, more established capacity markets overseas.

98. Half the respondents indicated they were in favour of bringing forward the DSR metering and testing deadlines as suggested in the consultation. These respondents felt the current lack of delivery assurance created a security of supply risk and/or believed the introduction of tougher delivery assurance requirements for Unproven DSR would help level the playing field with respect to new build CMUs.

99. Those not in favour of the proposal either questioned the need for the proposals, or were concerned that the suggested deadlines would substantially compress the time available

for aggregators to recruit customers which could act to reduce DSR volumes, increase costs and/or lead to reliability problems. It was also noted that recruitment of clients, particularly those offering turn-down DSR, more than one year ahead of delivery is highly problematic due to difficulty with forecasting how they will use their assets as a result of, for example, variable production requirements, process changes and asset risks.

100. On this final point, only a limited number of responses commented on the suggestion made in the consultation that Ofgem's proposals relating to asset reallocation (Of12) could help facilitate the early sign-up of clients and so address the practical difficulties with meeting the earlier deadlines. The views of those that did comment were divergent; some noted that component reallocation could help, others felt this offered little / no help, or at least not whilst DSR penetration is still growing. A number also argued that it would be inadvisable to link the introduction of new delivery assurances arrangements with the asset reallocation arrangements given it was unclear when these would be introduced.

101. More than half of the responses¹⁶ put forward alternative solutions, including:

- **Alternative DSR metering and testing deadlines** – several responses acknowledged that the metering and testing deadlines proposed by Government could create difficulties with client recruitment and so suggested slightly softer deadlines. For example:
 - At T-21 months, aggregators to supply a list of Meter Point Administration Numbers (MPANs) they expect to use at delivery, including details of commercial arrangements and volumes; and
 - At T-13 months, completion of DSR tests.
- **Tackle causes of non-delivery** – a number of responses felt that simpler, more flexible requirements would help reduce non-delivery risks. Suggestions made included refining the requirements around MPANs and allowing component reallocation following the DSR test up until the start of the delivery year.
- **Allow late delivery** – some responses suggested that providing a degree of flexibility for DSR to deliver late, similar to the arrangements in place in relation to new build CMUs, would reduce the need to terminate capacity shortly ahead of a delivery year and ultimately the scale of any shortfall in capacity.
- **Greater assurance of T-1 volumes** – a number of responses argued that greater certainty in relation to T-1 target volumes would likely shift DSR participation away from the T-4 auctions, which in turn would reduce the need for new delivery assurance requirements for DSR winning in the T-4 auction.

¹⁶ A mixture of those for and against the suggested changes to the DSR metering and testing deadlines.

- **Progressive registration of components** – several respondents suggested that, rather than testing all components of a DSR CMU by a deadline close to the delivery year, enabling progressive testing and registration of components – potentially linked with a requirement to register more than a minimum amount shortly ahead of the T-1 auction – would provide greater insight into progress towards delivery and from an earlier date.
- **Pipeline analysis** – several respondents suggested that aggregators should be required to report, 1 month ahead of the T-1 auction, full details of the clients and components (e.g. MPANs, addresses, volumes, exclusivity agreements) they intend to recruit in the lead up to the start of the delivery year.
- **New reporting requirements** – other respondents suggested introducing a new requirement to report every 6 months on progress with client sign-up, with the reports providing details of the commercial arrangements and addresses of the components.
- **Credit cover** – a variety of suggestions were made with a view to making credit cover a more effective tool for incentivising early delivery, including:
 - Double the amount of credit cover required for Unproven DSR so that it aligns with that for new build generating CMUs
 - Double the amount of credit cover one month before the T-1 auction if less than a minimum proportion of the Unproven DSR CMU has been proven by this point
 - Progressively release credit cover as components are proven in the run up to the start of the delivery year (linked to the suggestion of progressive registration of components).

102. In many instances, respondents put forward one or more of these solutions to act in combination.

Government Response:

103. In response to the comments made regarding the scale of the non-delivery risk related to Unproven DSR, the Government makes the following points:

- Whilst the non-delivery rates in capacity markets overseas provide interesting context, they are likely a reflection of the specific characteristics of those markets (e.g. non-delivery penalties) and so of limited value when assessing non-delivery risks in the GB capacity market.
- As noted in the consultation, the Government accepts that the non-delivery rates observed in the first Transitional Auction are unlikely to be representative in the longer term. That said, experience from the second TA and ‘early’ auction indicates that non-delivery risk for DSR continues to be significant – 11% of Unproven DSR from the

second TA, and 42% from the early auction, failed to provide the necessary DSR certificate by the start of the Delivery Year¹⁷.

- There is an inherent risk that, despite best endeavours, last minute technical, operational or commercial challenges can prevent expected DSR capacity from being delivered; and
- Whilst the amount of Unproven DSR winning agreements remains a small proportion of total capacity, it has grown rapidly in successive auctions and is approaching levels comparable to the amount of new build (there are already robust delivery assurance arrangements in place for new build). There has been an increase in the number of prequalification applications again this year.

104. Therefore, the Government maintains that it is in principle prudent to introduce delivery assurance measures for Unproven DSR so that we can replace, as far as possible, any lost capacity in the T-1 auction.

105. However, we acknowledge respondents' concerns regarding the practical difficulties associated with meeting the earlier deadlines. This suggests the consultation proposals may not achieve the correct balance between facilitating the participation of robust new DSR resources in the CM with the need to understand progress towards delivery. Therefore, the specific consultation proposals will not be taken forward to implementation.

106. The Government welcomes the alternatives put forward by respondents. We think there is potential to develop a solution which better balances facilitating the participation of robust new DSR resources in the CM with the need to understand their delivery progress and any likely failure, before it is too late to secure alternative replacement capacity.

107. Any change to the credit cover requirements will necessitate a change to the CM Regulations which may take some time to bring forward due to the requirement for Parliamentary time. However, it may be possible to progress with those elements that rely on CM Rule changes to a quicker timeframe.

108. The Government will now work up detailed proposals, in discussion with Ofgem, National Grid and industry, with a view to further consultation.

¹⁷ These figures do not factor the outcome of the subsequent appeals process.

Strengthening Satisfactory Performance Days

Consultation question:

13. Do you agree that failure to demonstrate satisfactory performance within the relevant Delivery Year should be added to list of termination events in the Capacity Market Rules?

Summary of responses:

110. There were forty-one responses to this question, of which over half disagreed with the proposal with some of those agreeing adding caveats. The primary reasons for disagreeing with the proposal were concerns that a termination event is disproportionate, that failure to meet the Satisfactory Performance Day requirements may be due to circumstances outside the provider's control and that the proposal could deter DSR and smaller providers from entering the CM due to the increased level of risk. Respondents also questioned the need for new penalties, either because they feel that existing penalties are sufficient or they do not believe that the issue represents a genuine risk. In addition, some flagged a lack of liquidity in obligation trading making it more difficult for providers to trade out any capacity that they are unable to demonstrate.
111. Many respondents suggested alternative solutions, notably some form of "partial termination" whereby the capacity agreement is terminated in proportion to the percentage of capacity that had not been demonstrated. They pointed out this would ensure that security of supply is not damaged by terminating providers who have demonstrated an ability to deliver the bulk of their agreed capacity.

Government Response:

112. The Government notes the strength of feeling on this proposal and the concerns raised. In particular, we recognise the merit in suggestions of alternative penalty mechanisms that would allow for a "partial termination" and permit CMUs to remain in the CM at a lower level of capacity obligation equivalent to that which they were able to demonstrate. Such a mechanism, alongside an appropriate penalty fee, would offer more flexibility and proportionality than the full termination model proposed.
113. However, introducing a new mechanism along these lines would require regulatory change and is therefore not a practical option in the short term. We believe that immediate

action is required to help ensure that CMUs are able to demonstrate their ability to meet their capacity obligations. We therefore intend to introduce a new termination event as proposed while committing to examine the alternative options alongside any future regulatory changes.

Consultation question:

14. Do you feel that the termination fee level for the proposed new termination event should be set as category T5, with a fee of £35,000/MW? If not, what category/fee level would be appropriate and why?

Summary of responses:

114. There were thirty-four responses to this question with the overwhelming majority of respondents feeling that the proposed termination fee is too high. The main reasons for disagreeing were that the proposed level of fee is unduly punitive, is disproportionate compared to the clearing price and that the equivalence to relinquishing TEC is not valid.
115. Respondents also noted that a fee of the level proposed would increase the risk borne by operators and this may both increase future clearing prices and deter many CMUs – especially smaller ones and those utilising new technologies – from entering the CM.
116. No respondents suggested an alternative fee level but some suggested models in which fees are linked to the clearing price or the scale of non-delivery.

Government response:

117. The Government notes the very strong opposition to the proposed level of termination fee. On reflection, we believe that it is not essential to equate failure to demonstrate SPDs with loss of TEC, at a fee level of TF5 (£35,000/MW). We will therefore implement the proposal at the lower, but still substantive, level of TF4 (£15,000/MW).
118. In addition to the above, the indicative drafting will be amended to simplify the requirements for CMUs to perform remedial SPDs following appeal against termination: where a termination notice is withdrawn, a capacity provider will not be required to perform any additional SPDs; and where a capacity provider is given an extension of time to comply with the SPD requirements to avoid termination, the capacity provider must perform the outstanding additional SPDs by the end of the extension period.

Consultation question:

15. Do you agree with the proposal to require at least one SPD be demonstrated in January-April of the Delivery Year?

Summary of responses:

119. There were thirty-seven responses to this question, with a small majority disagreeing outright and a number of others indicating only partial agreement. The main reason for disagreeing was a feeling that there is no evidence that such a change is needed.
120. Some respondents suggested alternative changes to the way in which SPDs are demonstrated, either by allowing them to be demonstrated across a broader period or by moving away from physical demonstration methods to alternative monitoring options which do not encourage out-of-merit running, distort the market and are more feasible for interconnectors.

Government response:

121. The Government notes the concerns raised in the consultation responses. However, we continue to feel that there is merit in ensuring that at least one SPD is demonstrated during the second half of the winter period. We therefore intend to implement the proposal as outlined.

Metering re-assessment, planning consent and technology classes

Consultation question:

16. We would welcome views on the following proposals:

Proposal 3 - metering re-assessment

Proposal 4 - planning consent deadline

Proposal 5 - technology classes

Summary of responses:

123. Both Proposal 3 and Proposal 4 attracted fourteen responses each. Sixteen respondents commented on Proposal 5. Almost all respondents were in favour of the three proposals.

124. The most substantive issues were raised in relation to Proposal 5. One response sought clarity over the implications of the removal of auto-generation from the title of the existing 'CHP & auto-generation' technology class. Several respondents noted that the list of generating technology classes should be adapted to provide for the participation by unsubsidised renewable generation and accommodate hybrid technologies (e.g. co-location of storage with a reciprocating engine). There were also several suggestions that technology classes should apply at component level.

Government Response:

125. The Government welcomes the broad support for these policy proposals and intends to introduce changes to the CM Rules to proceed with their implementation.

126. With respect to Proposal 5 – disaggregation of generating technology classes – and the removal of references to “Autogeneration” as a separately identifiable plant type, this is a reflection of our view that this is a description of the capacity provider (i.e. it is generation of electricity by a person whose main business is not electricity generation, the electricity being produced mainly for that person’s own use) and not a distinct technology type. CMUs previously categorised as autogeneration can continue to participate in the CM and should be classified on the basis of the underlying generating technology.

127. The amended generating technology classes, which will take effect from prequalification next year, are summarised in the Table 2 below.

Table 2: List of revised generating technology classes

Generating Technology Class
Oil-fired steam generators
Open Cycle Gas Turbine (OCGT)
Reciprocating engines
Nuclear
Hydro (excluding tidal / waves / geothermal / ocean currents / storage)
Storage <i>[to be split into half-hourly duration bands, from 30mins to 12 hours]</i>
Combined Cycle Gas Turbine (CCGT)
Combined Heat and Power (CHP)
Coal
Biomass
Energy from waste

128. As part of its CM Rules Change process, Ofgem is considering a number of stakeholder-submitted proposals to further amend generating technology class. These include proposals to enable unsubsidised renewables to participate in future auctions and to accommodate hybrid technologies within the framework. Ofgem will consult on the change proposals that it decides to take forward in Spring 2018.

Adjusted Load Factor Capacity Obligation (ALFCO) with reference to interconnectors

Summary of responses:

129. Just two responses commented on the proposed clarification to the ALFCO calculation i.e. amend Rule 8.5.2 so that references to a generating CMU are changed to also include an interconnector CMU. Both were supportive, although one noted the need to amend 8.5.4 as well to avoid penalising interconnectors for delivering balancing services.

Government Response:

130. The Government welcomes the comments and confirms that it will proceed with the clarification, including the additional change suggested to 8.5.4.

Annex A: An analytical assessment of the impacts of the Government Response to the Capacity Market Consultation – improving the framework

The Capacity Market (CM) is designed to use competition to achieve a defined level of electricity security in Great Britain at the lowest cost to consumers¹⁸.

This assessment accompanies the Government Response to the ‘Capacity Market consultation – improving the framework’ and examines the case for six changes to the CM Rules to ensure a more level playing field, improve the functioning of certain areas and better align segments of the Rules with the original policy intent. The six policy amendments that are being taken forward are as follows:

1. *Amending generating technology classes and the de-rating methodology related to storage Capacity Market Units (CMUs);*
2. *Strengthening the arrangements relating to Satisfactory Performance days (SPDs);*
3. *Allowing Capacity Providers to re-take a metering assessment if necessary;*
4. *Shifting the planning consent deadline to January to avoid the Christmas period;*
5. *Disaggregating some of the generating technology classes; and*
6. *Including interconnectors in the list of CMUs that have to deliver ALFCO¹⁹ in a stress event.*

This assessment considers each of these in turn, discussing the high level rationale for the change and then the main costs and benefits of the changes. In each case, the change is compared to a ‘Do nothing’ option (i.e. where no changes are made).

This assessment has been carried out in line with Government’s existing formal framework for producing Impact Assessments²⁰.

¹⁸ A more detailed description of the market failures in the electricity market and the rationale for introducing a Capacity Market can be found in our original Impact Assessment for the CM (2012): https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66039/7103-energy-bill-capacity-market-impact-assessment.pdf

¹⁹ Adjusted Load Factor Obligation

1. Amending generating technology classes and the de-rating methodology related to storage Capacity Market Units (CMUs)

Policy Objective and Rationale for the Intervention

- 1.1 Generating plants get rewarded in the CM based on their contribution to security of supply. These plants are scaled down, or ‘de-rated’, according to their technical availability.
- 1.2 The existing de-rating factor of 96.11% for the storage generating technology class is currently based on the historic technical availability of pumped hydro stations. However the existing de-rating factor methodology does not take into account the limitation of storage technologies in terms of the duration for which they can generate before needing to recharge – this limitation poses a risk to security of supply if these technologies are not able to fulfil their CM obligation and generate for the length of all stress events.
- 1.3 National Grid conducted analysis to examine the potential length of future stress events and the contributions and risks that limited duration storage could make to security of supply. The analysis²¹ found that most stress event durations are likely be four hours or less with a mean duration of around two hours (see figure 1 in the main body of the Government Response). The analysis suggests that stress event durations longer than four hours are rare (less than 5% of event durations are expected to be longer than four hours).
- 1.4 On the basis of this analysis, National Grid has proposed a new de-rating methodology based on Equivalent Firm Capacity (EFC) which will be used to calculate de-rating factors for storage CMUs which fall in to storage technology classes that are duration limited. National Grid has also published the proposed de-rating factors for duration limited storage CMUs in the upcoming T-1 and T-4 auctions (see Table 1 in the main body of the Government Response). The proposed methodology and outputs from National Grid’s analysis are considered robust and have been endorsed by the independent Panel of Technical Experts (PTE).
- 1.5 The key issue that has been evidenced by National Grid’s analysis is that if storage continues to be awarded a de-rating factor of 96.11% (based on the plant availability of pumped hydro) in future CM auctions there is a risk that:
 - Duration limited storage technologies will be over-rewarded for their contribution to security of supply; and

²⁰ CM options are not regulatory provisions; therefore the impacts of the proposed changes are out of scope of OITO and business impact target.

²¹ For further information please refer to National Grid , 2017: ‘Duration-Limited Storage De-Rating Factor Assessment – Final Report’

- National Grid does not procure sufficient capacity to meet the Government's reliability standard²² which could increase costs to consumers as any shortfall²³ will need to be re-procured.

- 1.6 In the 2016 T-4 auction, around 500MW of battery capacity (~1% of total capacity procured) won CM agreements, most of these are expected to be 30-60 minute duration batteries²⁴. As this shows, batteries are now competing in the auctions and their participation in the CM is expected to increase over time. Indeed the recently published pre-qualification results support this view (new build battery storage capacity of 2GW and 6GW applied to pre-qualify for the T-1 and T-4 auctions respectively).
- 1.7 Consequently, to ensure that security of supply is maintained at a minimum cost in the upcoming auctions, as well as all future CM auctions, the Government will proceed with the proposed changes for the storage technology class and the new de-rating methodology.
- 1.8 The Government will also proceed with an extended performance requirement for storage (see paragraph 1.12 for further detail on this change) as a means of verifying that storage CMUs are able to generate for the length of time that they declare at pre-qualification over the length of their CM contracts, or for the length of time of the shortest duration storage Generating Technology Class that is not duration limited. Verification will help mitigate against the risk of over-rewarding capacity for its contribution to security of supply and will help ensure that sufficient capacity is procured.

Assessment of costs and benefits

- 1.9 **Counterfactual 'Do nothing' option** – In the 'Do nothing' scenario we have assumed that duration limited storage continues to be awarded their current de-rating factor of 96.11%.
- 1.10 We have then assumed that the Government will have had to procure additional capacity to replace the expected shortfall in capacity to ensure that the reliability standard and consequently security of supply is maintained in each year. This would be carried out by:
- Increasing auction targets based on the expected penetration of duration limited storage before the auctions (before the fact); and/or
 - By procuring additional capacity through future T-1 and T-4 auctions to correct for the remaining shortfall.

²² Government, Annex C Reliability standard (2013):

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/223653/emr_consultation_annex_c.pdf

²³ Expected and/or known

²⁴ Based on market intelligence and responses to the Consultation

- 1.11 If the Government did not procure additional capacity, it is expected that there would be an increase in Expected Energy unserved (EEU)²⁵ and an increased expectation that Government will not meet its obligation to meet the security of supply target of 3 hour Loss of Load Expectation (LOLE).
- 1.12 **‘Do something’ option** – Under the ‘Do something’ scenario we have assumed that Government implements the proposed changes for all future CM auctions, specifically the Government will:
- i. Amend the storage technology classes (storage classes to be split into categories differentiated by duration);
 - ii. Use National Grid’s proposed new de-rating methodology based on Equivalent Firm Capacity (EFC) for storage CMUs that are duration limited in all future CM auctions.
- For the upcoming T-1 and T-4 auctions* (delivery years 2018/19 and 2021/22) – use the de-rating factors for duration limited storage that National Grid has calculated using the new methodology which takes duration into account (see *Table 1 in the Government Response*).
- For all other future CM T-1 and T-4 auctions* – Future de-rating factors for storage CMUs are currently unknown as they will need to be re-calculated every year by National Grid using the new methodology and updated base cases for the relevant delivery years; and
- iii. Amend the SPD requirements²⁶ for storage CMUs to ensure that duration is verified over the length of the CM contract.
- 1.13 Capacity agreements awarded to storage CMUs in previous CM auctions will not be affected by the changes outlined above.
- 1.14 Amending the storage technology classes in and of themselves will not directly affect participants in the market. However, the other two proposed changes outlined above could have a direct impact on the following groups: consumers (bill payers), storage CMUs and other electricity generators. The impacts of the proposed changes on these groups relative to the ‘Do nothing’ scenario are considered in the following sections:
- a) Amending the de-rating factors for duration limited storage; and
 - b) Implementing an extended performance requirement for storage CMUs.
- a) Amending the de-rating factors for duration limited storage**
-

²⁵ This is the amount of electricity demand – measured in MWh – that is expected not to be met by generation in a given year.

²⁶ See Paragraphs 82 – 84 of the main Government Response.

- 1.15 Overall this change is expected to be net beneficial as it will help ensure that sufficient capacity is procured to meet the Government's security of supply targets (i.e. the reliability standard) at a lower cost relative to the 'Do nothing' scenario.
- 1.16 Although the Government will have secured the same amount of firm capacity under both the 'Do nothing' and 'Do something' scenarios, the overall costs of procurement under the 'Do something' scenario are expected to be less because the Government will no longer effectively have to pay twice for some of the capacity secured. This is because in the 'Do nothing' scenario, in order to meet the overall procurement target of firm capacity needed to maintain security of supply, the Government will have needed to re-procure some proportion of duration limited storage capacity which won/or were expected to win CM agreements.
- 1.17 This change will result in a more efficient procurement of capacity in future auctions which will be achieved through the redistribution (transfer) of revenues from duration limited storage CMUs to consumers.
- 1.18 Compared to a 'Do nothing' scenario, we have estimated that this change could reduce the total costs of securing the same amount of firm capacity for the upcoming T-1 and T-4 auctions alone by around £200m²⁷. These savings are expected to be spread out over a number years²⁸ out to 2035/2036. In order to calculate this, we have assumed that 2.7GW of 1 hour duration (new build) storage wins CM agreements in the counterfactual in the upcoming T-1 and T-4 auctions.
- 1.19 We have estimated a range around this central estimate of between £50 and £500 million²⁹. This is based on varying two key factors: the amount and type (duration) of storage capacity that would have won CM agreements in the counterfactual.
- 1.20 The assumptions and sensitivities used to create this range are set out in Table 1 and Box 1. To note, in reality the overall magnitude of these potential cost savings will depend on future demand and generation in the auction delivery years.

Table 1: Avoided cost estimates for the upcoming T-1 and T-4 auctions³⁰

²⁷ 2017/18 prices, discounted at a rate of 3.5% with a base year of 2017/18.

²⁸ Costs avoided: 1 year from 2018/19 for the T-1 and over 15 years from 2021/22 for the T-4.

²⁹ 2017/18 prices, discounted at a rate of 3.5% with a base year of 2017/18.

T-1 2017 auction

	Low	Central	High
Storage duration	2 hour duration	1 hour duration	0.5 hour duration
De-rating factors %	68%	40%	21%
Clearing prices £/kW	£15	£15	£15
Duration limited capacity procured (MW)	300	700	1300
Shortfall (MW)	100	400	1000

T-4 2017 auction

	Low	Central	High
Storage duration	2 hour duration	1 hour duration	0.5 hour duration
De-rating factors %	65%	36%	18%
Clearing prices £/kW	£15	£15	£15
Duration limited capacity procured (MW)	1000	2,000	4000
Shortfall (MW)	300	1200	3100

Total avoided cost of both auctions	Low	Central	High
Total discounted cost (millions)	£50	£200	£500

1.21 In summary, if the de-rating factors are not amended by the upcoming auction, every MW of 30 minute duration storage that is procured in the upcoming auctions could cost an additional £12,000 (based on a clearing price of £15/kW) in re-procurement costs for every year that capacity was procured for (or £175,000 pounds over 15 years for a 1 MW new build 30 minute duration storage CMU)³¹.

1.22 The analysis in Table 1 considers the potential avoided cost of having to procure additional capacity in the upcoming T-1 and T-4 auctions if the storage de-rating factors remain unchanged. Given that the de-rating factors for future CM auctions are currently unknown³², it has not been possible to quantify the avoided costs across all future CM

³⁰ Total avoided cost estimates presented in this table are in 2017/18 prices and discounted at a rate of 3.5% with a base year of 2017/18.

De-rating factors used in this analysis are the new proposed de-rating factors from National Grid.

³¹ Figures presented above are in 2017/18 prices and undiscounted.

³² The de-rating factors will be re-calculated every year using updated base case scenarios

auctions. However we note that the above estimates would be a significant underestimate if the existing de-rating factor of 96.11% was never changed.

- 1.23 The scenarios outlined above have been constructed to provide a range of estimates given the uncertainties around the amount and type (duration) of storage penetration that would have cleared in the upcoming auctions at the existing de-rating factor.

Box 1: Methodology used to estimate the avoided costs

- Auction clearing prices of £15/kW for both auctions were used to illustrate the potential avoided costs. These are based on the average of the maximum and minimum CM auction clearing prices that have been seen to date³³. In reality clearing prices for the auctions may be higher or lower, and this will depend on the type of capacity that bids in to each auction and the amount (i.e. how liquid the auctions are).
- The assumptions for the amount of duration limited storage that will have won CM agreements under a 'Do nothing' scenario are not an output from our modelling. These have been based on the 2017 applications for pre-qualification for the upcoming T-1 and T-4 auctions³⁴. For the central scenario, the analysis assumes a similar success rate for battery storage as the 2016 CM T-4 auction. Success rates may differ from auction to auction, to reflect this uncertainty a range for duration limited storage capacity procured has been used.
- To reflect the uncertainty around the duration of the storage that will have won CM agreements in the counterfactual a range of between 0.5 – 2 hours has been used.
- To estimate the shortfall, the expected capacity was multiplied by the existing de-rating factor of 96.11% as well as the relevant new de-rating factor. The expected shortfall that will have needed to be re-procured is the difference between the two.
- All short duration storage capacity is assumed to be new build and therefore win a 1 year CM agreement for the T-1 auction and 15 year agreement for the T-4 auction.

- 1.24 **Impact on consumers:** In the 'Do nothing' scenario National Grid would be expected to procure additional capacity to replace any shortfall (known or expected) that will result from duration limited storage winning CM agreements. The additional cost associated with procuring this additional capacity will have been passed on to consumers. Consequently the key benefit of this change to consumers in a 'Do something' scenario is the avoided cost of having to procure the additional capacity which we have estimated to

³³ Excluding the Transitional Auctions: Maximum - £22.50/kW (2016 T-4 auction) and Minimum - 6.95/kW (2017 Early Auction)

³⁴ Around 2GW and 6GW of new build battery storage applied for the T-1 and T-4 respectively

be around £200m³⁵ with a range of between £50-500 million in the upcoming auctions alone.

- 1.25 **Impact on Electricity Generators and Storage Providers:** This change will reduce the revenues that duration limited storage technologies in the CM will have received under the ‘Do nothing’ scenario by the same amount as the avoided cost to consumers (see previous section).
- 1.26 However it is also likely to mean that storage providers will need to alter their bidding strategies in the CM as well as other markets (i.e. attempt to re-coup lost potential revenue by increasing their bids and/or entering new markets).
- 1.27 Changes in the bidding behaviour of CMUs is uncertain and difficult to predict, but the change is expected to reduce the likelihood that duration limited storage wins agreements in the CM and will likely lead to less deployment of duration limited storage at least in the short term. This may change the generation mix procured in the CM auction (as well as the clearing price).
- 1.28 At this stage, it is not known whether and what type of technology might win CM agreements in place of storage in the upcoming auctions. However, the CM is technology neutral and provided that different technologies compete on a level playing field (which this change helps ensure), the auctions should deliver the most efficient outcome. Given the uncertainties and complexities we have not been able to quantify this effect.

b) Implementing an extended performance requirement for storage CMUs:

- 1.29 **Impact on storage CMUs:** when compared to a ‘Do nothing’ scenario we believe that the proposed change to performance requirement for storage could increase the costs of compliance for storage CMUs. The potential additional cost is associated with an extended performance test once every 3 delivery years. This is not expected to be significant because CMUs can choose when to be tested and we would expect them to align tests with normal running patterns.
- 1.30 However it might not always be economic for them to generate for up to four hours for some storage CMUs³⁶ so there is a risk of an increased cost. We have not quantified this. Failure to meet these additional requirements will result in the same consequences as the standard SPD³⁷ and therefore there is no change in this respect.

Summary

³⁵ 2017/18 prices, discounted at a rate of 3.5% with a base year of 2017/18.

³⁶ The cap of four hours applies to the upcoming T-1 and T-4 auctions, this threshold may change in future CM auctions

³⁷ See section 2 which outlines changes to standard SPD requirements

- 1.31 The analysis presented above demonstrates the clear benefits of the change relative to the counterfactual. The most significant benefit arises from the efficiency savings in the form of the avoided costs of having to re-procure capacity which was estimated at around £200 million with a range of between £50-500 million for the upcoming T-1 and T-4 auctions alone (2017/18 prices and 2017/18 base year, discounted).

2. To strengthen the arrangements relating to Satisfactory Performance days (SPDs)

Policy Objective and Rationale for Intervention

- 2.1 The rationale for this proposed amendment is to ensure security of supply is maintained by discouraging CMUs from bidding in to the CM on a speculative basis. To ensure this, we are introducing a termination fee to ensure that CMUs face a financial cost for non-compliance.

Assessment of costs and benefits

- 2.2 **‘Do nothing’ option:** In the ‘Do nothing’ scenario CMUs must complete three SPDs during the winter of the relevant delivery year to demonstrate they are able to meet their obligations. Failure to meet this requirement results in the suspension of capacity payments until three further SPDs are completed in the same delivery year or subsequent delivery year, however failure to complete SPDs does not currently result in a termination of a CM agreement.
- 2.3 **‘Do something’ option:** In the ‘Do something’ scenario Government introduces the following additional changes to maintain security of supply:
- i. CMUs will still need to complete three SPDs in the relevant delivery year, however one of the SPDs must now be completed between January and March of the delivery year;
 - ii. If CMUs fail to deliver this, an additional three SPDs need to be completed in the same delivery year (i.e. no longer have the option to deliver this requirement in the subsequent delivery year); and
 - iii. If they fail to complete the three SPDs then their CM agreement is terminated and a fee based on TF4³⁸ of £15,000/MW would be applied (which would be applied in addition to the suspension of CM payments).
- 2.4 **Benefits:** When compared to the ‘Do nothing’ scenario, the key expected benefit of this change is increased certainty that CMUs can deliver when required to. The change is

³⁸EMR, Termination of Capacity Agreements, (2017):
<https://www.emrsettlement.co.uk/documentstore/guidance/g11-termination-of-capacity-agreements.pdf>

expected to reduce the risk of non-delivery and consequently avoid costs associated with an increased risk to security of supply. This change is expected to be net beneficial to society. Whilst it has not been possible to quantify the magnitude of the overall impacts of this change, the benefit is expected to outweigh any potential additional costs to CMUs.

- 2.5 Costs: When compared to the ‘Do nothing’ scenario this change could potentially increase the costs to CMUs associated with failure, through the new termination fee. It is difficult to know how this would affect the business case for participation of these units in the CM as it would depend on the extent to which they were at risk of non-delivery. At the extreme end this might lower the potential rate of return for a plant and the plant may require higher CM payments to compensate for the additional risk of a termination fee. This could change their competitiveness in the CM.
- 2.6 It is expected that different types of CMUs could be affected differently (larger versus smaller, new build versus existing, new technologies versus conventional), however we have insufficient evidence to provide a robust assessment on these relative impacts.
- 2.7 The magnitude of this impact is not expected to be significant given that the following aspects of this change will help ensure that any impacts on generators are minimised:
- CMUs will still have two chances to complete the SPD requirement;
 - CMUs will still be able to make use of the secondary trading; and
 - The appeals process will still be available for CMUs who consider they have reasonable grounds to appeal.

3. To allow Capacity Providers to re-take a metering assessment if necessary

Policy rationale and Rationale for Intervention

- 3.1 The rationale for this change is to clarify the existing policy intent regarding the option to re-take metering assessments in CM rules. The policy intent was set out in a published FAQ³⁹ earlier this year.

Assessment of costs and benefits

- 3.2 The key benefit of this change relative to a ‘Do nothing’ scenario is through the additional option value to CMUs (to re-take a metering assessment). The impacts of this change are not expected to be significant as the policy intent on re-taking metering assessments was

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https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/645826/Capacity_Market_FAQ_from_website_updated.pdf

published in a FAQ earlier this year; consequently this change serves only to clarify the existing position formally in the CM rules.

4 Shifting the planning consent deadline to January to avoid the Christmas period

Policy Objective and Rationale for Intervention

- 4.1 The rationale for this change is to help minimise any hassle costs associated with having to meet the current planning consent deadline as this currently falls between Christmas and New Year's Eve. This change will move the deadline to January.

Assessment of costs and benefits

- 4.2 Relative to the 'Do nothing' scenario this change is expected to minimise any hassle costs currently incurred by National Grid as well as potential CMUs as a result of the planning consent deadline falling over the festive holiday period. The overall impact of this change is expected to be net beneficial but not significant.

5 Disaggregating some of the generating technology classes

Policy Objective and Rationale for Intervention

- 5.1 The rationale for this change is primarily to improve transparency by disaggregating some of the generating technology classes (refer to the Government Response for further detail on this change). In the 'Do nothing' scenario this information would only have been available to the Delivery Body. This change will increase transparency by enabling interested parties to access additional information on the disaggregated technologies. This could help interested parties improve their own analysis of the CM.

Assessment of costs and benefits

- 5.2 The key benefit of this proposed amendment relative to the 'Do nothing' scenario is increased transparency for interested parties. This change is not expected to result in any additional direct financial costs or benefits to business. There may be indirect benefits as a result of the increase in transparency of information pertaining to the new disaggregated classes, however these are not expected to be significant.

6 To include interconnectors in the list of CMUs that have to deliver ALFCO⁴⁰ in a stress event.

⁴⁰ Adjusted Load Factor Capacity Obligation

Policy Objective and Rationale for intervention

6.1 The rationale for this change is to clarify the existing position formally in CM rules.

Assessment of costs and benefits

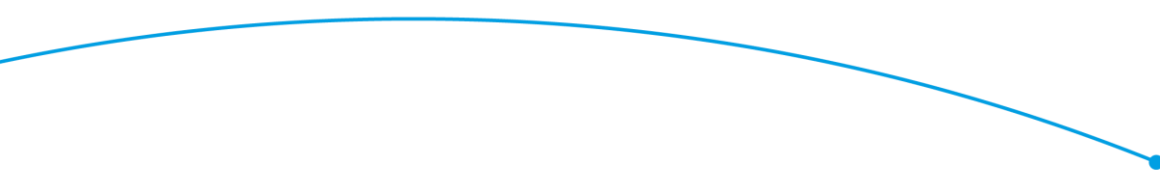
- 6.2 Overall the impacts of this change are expected to be broadly negligible relative to the ‘Do nothing’ scenario. The Rules 8.5.2 and 8.5.4 relate to the ALFCO calculation and relevant exemption services for CMUs; they currently make references to ‘a generating CMU’ and don’t explicitly reference interconnectors.
- 6.3 Both Government’s and Industry’s existing interpretation of these Rules has been that Interconnectors would be treated the same as the generating units with respect to these Rules. Consequently, this change is considered as essentially a technical change as it serves only to clarify the rules, by including specific references to interconnectors. This change is expected to have no direct or indirect impacts.

7 Summary

- 7.1 All of the CM Rule changes outlined above are consistent with the primary purpose of the CM. As a result, the key benefit of all the changes is the expected increased confidence in our ability to use the CM to maintain security of supply in GB at the lowest cost to consumers.
- 7.2 The changes may also result in additional familiarisation and administration costs to businesses as CMUs would need to familiarise themselves and comply with the Rule changes. Some of the changes may result in additional costs to generators who may need to amend their bidding strategies for the CM auctions as well as other markets; however these additional costs are expected to be outweighed by the key benefit: ensuring security of supply is maintained through CM at least cost to consumers.
- 7.3 Table 2 summarises the expected impacts of each of the proposed changes.

Table 2: Summary of the impacts of the changes

	Policy amendments	Summary key impacts
1	Amending generating technology classes and the de-rating methodology related to storage Capacity Market Units (CMUs)	<p>Relative to counterfactual, this change is expected to result in efficiency savings in the form of the avoided costs of having to re-procure capacity. This is estimated at around £200 million with a range of between £50-500 million for the upcoming T-1 and T-4 auctions alone (2017/18 prices and 2017/18 base year, discounted).</p> <p>There may be additional costs to storage CMUs as a result of the new extended performance requirements, though these are not expected to be significant.</p>
2	Strengthening the arrangements relating to Satisfactory Performance days (SPDs)	<p>This change could potentially increase costs for CMUs relative to the counterfactual as a result of the new termination fee. However this potential additional cost is expected to be outweighed by the additional benefit of the reduced risk of speculative bidders in the CM.</p>
3	Allowing Capacity Providers to re-take a metering assessment if necessary	<p>This change will clarify the existing policy intent, consequently the additional impact of this change is not expected to be significant.</p>
4	Shifting the planning consent deadline to January to avoid the Christmas period	<p>Relative to the counterfactual this change could reduce any hassle costs currently incurred by National Grid and potential CMUs as a result of the deadline falling during the festive holiday period. However this impact is not expected to be significant.</p>
5	Disaggregating some of the generating technology classes	<p>This change is not expected to result in any direct financial costs or benefits to CMUs. The key benefit is increased transparency of the more disaggregated generating technology classes relative to the counterfactual.</p>
6	Including interconnectors in the list of CMUs that have to deliver ALFCO in a stress event.	<p>Overall the impacts of this change are expected to be broadly negligible as this change only serves to clarify the existing position formally in CM rules.</p>



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Department for Business, Energy & Industrial Strategy

1 Victoria Street, London SW1H 0ET

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