

Capacity Market 2023: strengthening security of supply and alignment with net zero

Consultation response from Regen

03/03/2023

About Regen

Regen is an independent centre of energy expertise with a mission to accelerate the transition to a zero carbon energy system. We have 20 years' experience in transforming the energy system for net zero and delivering expert advice and market insight on the systemic challenges of decarbonising power, heat and transport.

Regen is also a membership organisation and manages the Electricity Storage Network (ESN) – the voice of the UK storage industry. We have over 150 members, 77 specifically focused on electricity storage, who share our mission, including clean energy developers, businesses, local authorities, community energy groups, academic institutions, and research organisations across the energy sector.

This response is based on extensive practical experience and input from our members. We are keen to continue to engage the DESNZ team in the development of the CM in the future.

1. Introduction

The [Electricity Storage Network](#) (ESN), managed by Regen, hosted a workshop with several members to garner feedback on this consultation on 16 February 2023. We had a wide-ranging discussion on the relevant questions and sections that apply to energy storage technologies. The points made have fed in to this response throughout.

1.1 REMA context

In our response to BEIS' Review of Electricity Market Arrangements (REMA) consultation, we highlighted the need for a radical evolution of the electricity system and markets to unlock the step change in renewable deployment required to achieve net zero. Within this, our priorities for capacity adequacy were as follows:

- Develop a long-term plan for Capacity Adequacy and System Operability as part of an integrated Net Zero and Energy Security Delivery plan and the future system architecture. We have called this a Capacity Adequacy Plus approach.
- Review the definition and requirements for future stress events, recognising that they are already becoming far more frequent, diverse and dynamic and will therefore require a range of responsive assets, flexibility and other market solutions. Doing so will allow projects and technologies to design towards delivering for typical 2035 stress events rather than 2022 stress events.
- Begin the process of removing fossil fuels from the Capacity Market, moving those that are still required for capacity adequacy into a Strategic Reserve.
- Give the ability to prioritise low carbon ancillary services to the ESO and future FSO as soon as practically possible. This includes the creation of clear carbon reporting and setting emissions limits where feasible/appropriate.

We do not believe the Capacity Market should be used to procure ancillary services, but we do support the idea of an enhanced Capacity Market that ensures the development of flexibility assets, low carbon dispatchable generation and investment in other system attributes. This means a more sophisticated Capacity Market arrangement that places value on responsiveness, dispatchability, flexibility, operability, diversity of supply and duration as well as absolute power capacity.

The REMA consultation also introduced the concept of multipliers for use in the CM. In our response we agreed that some form of multiplier would be beneficial for any new CM contracts and auctions, and that response time and duration are useful starting points for discussion.

Such multipliers could be an excellent way to flexibly value low carbon assets as these can be adjusted over time.

Finally, any changes to the CM need to align with the new set of reserve services being implemented by the ESO. These services require faster acting assets (full activation within 15 mins of instruction) and procurement at day-ahead or intraday, and there may be some lessons to be learnt from these services.

1.2 Continuing engagement

We would like to offer our help and insight as the reform process continues following this consultation. As a centre of expertise and a collection of leading companies and organisations, both in the electricity storage sector and the wider energy sector, we are well positioned to help design the solutions and additional work that will follow on from this initial consultation.

Electricity Storage Network Lead – Olly Frankland

Olly is an expert in effective stakeholder engagement, working closely with our members, chairing and facilitating working groups, presenting on key issues and writing consultation responses.

T: 07465 201596

E: ofrankland@regen.co.uk

Markets Lead – Ellie Brundrett

Ellie led Regen's response to BEIS's REMA consultation, bringing together subject matter experts from across Regen's knowledge areas and helping to run two member events on the subject. She continues to lead Regen's work in market reform.

T: 07939 835 059

E: ebrundrett@regen.co.uk

2. Strengthening security of supply

When discussing the proposed changes at our workshop with ESN members, there were consistent concerns that the impacts of these changes on battery storage had not been properly considered. Reflecting these concerns, our main recommendations are as follows:

Changes to the SPD process

- Remove the potential for a termination notice to be issued following failure to deliver in the first SPD window per year. Removing revenue for the period until you get approval via another SPD is a more appropriate penalty.
- Provide a longer period of at least two months for the extended window (rather than one) for an extended performance test to be completed to reduce the risk of suspension and termination, allowing more battery storage participation in the CM.
- Prorate revenue payments linked to availability via SPDs, rather than a blanket loss of revenue for an extended performance test fail.

Extended performance testing

- Review the requirements for an extended performance test and, if continued, reduce the frequency of extended performance tests in the CM for battery storage.
- Base the extended performance tests on the de-rated capacity and not the connection capacity.

Changes to the penalty process

- Reduce the proposed penalty rate to be less severe.
- Work with providers to develop a more liquid secondary trading market that could better protect security of supply.
- Take into account in all decision-making that the relatively high risk of penalties proposed may reduce the amount of low carbon flexibility (e.g. battery storage) that chooses to bid in future auctions.
- Clearly state the process and timeframes associated with removal of any suspension.

Challenges facing storage CMUs

- In the short term, we advocate for a specific process for battery storage to be able to define the capacity of the CMU up to, but not higher than the TEC, MEC or average output for non multi-unit sites.
- In the long term, battery storage should have the ability to provide an expected capacity curve for the 15-year contract period. This would be re-assessed at intervals to update with

the actual level of degradation. This will require a new portal and an updated process to be delivered.

- Allow CM contracted sites to add energy capacity to their sites within the 15-year contract period.
- Consider increasing the cap on portfolio SPDs to increase security of supply and flexibility for providers with multiple assets to deliver the expected capacity.
- Carefully consider in all decision-making the impact of changes on low carbon flexibility such as battery storage.

Co-located sites

- Provide additional flexibility to co-located/multi-unit projects to specify the connection capacity.
- Provide an optimised process for co-located battery storage sites to participate in CM via a new generating technology class.

Metering issues

- Reduce the time taken to process metered data and include this in the portal after each SPD/test event to help identify issues earlier and increase reliability.

Other

- Review the effectiveness of the portal and whether it is impacting progress in the CM. Work to streamline processes to allow participants to engage more efficiently.

2.1 Response questions

1. Do you agree with the proposed changes to the SPD process? Are the proposed changes likely to cause any unintended consequences?

Yes No

Please explain your answer below

We do not agree with the proposed changes to the SPD process and are concerned that there may be a number of unintended consequences as a result of these changes. During our workshop with ESN members several points were raised regarding the SPD process, including:

- While there was general support for the change of windows approach outlined in the consultation, members were particularly concerned by the penalty process associated with the SPD process. The current timeframes provide a one month extended window for an SPD after suspension, with the risk of termination associated with the first window. Firstly, we think this would unfairly increase risk and could limit participation.

The risk of termination after the first SPD window is too severe and an overcorrection on the current approach. Secondly, we feel that the timeframe for the extended window is too short and that this unduly increases risks for projects.

Recommendation: Remove the potential for a termination notice to be issued following failure to deliver in the first SPD window per year. Removing revenue for the period until you get approval via another SPD is a more appropriate penalty.

Recommendation: Provide a longer period of at least two months for the extended window (rather than one) for an extended performance test to be completed to reduce the risk of suspension and termination, allowing more battery storage participation in the CM.

- Members outlined that SPDs are not an effective reflection of an asset’s availability, as you only need to be available three days of the year to achieve them. However, if you fail an extended performance test marginally (e.g. by 3%) you would potentially receive an *intend to terminate* notice – and only if this is withdrawn would you keep payment due. Crucially, you cannot recover the revenue for the period in time the notice was in force. This feels unfair as a practice and risks penalising battery storage more than other technologies. Furthermore, members raised that it does not accurately represent the level of engagement participants may have in the market – some participants might not engage for most of the year but are available for the required days to make the SPD, and other people engaging in the market much more who might only achieve 95% of their expected capacity and are penalised by having their entire contract removed.

Recommendation: Prorate revenue payments linked to availability via SPDs, rather than a blanket loss of revenue for an extended performance test fail.

- A wider comment raised by members on the penalty process is that, while we have seen high prices in recent CM auctions that make the current administrative burden of the CM bid, SPD & testing, portal, and general processes worthwhile, the real test will be when prices drop. If the current level of administrative burden is maintained, as well as the relatively high risk of penalties proposed, project developers may decide not to bid, limiting low carbon capacity availability in the CM in future auctions. A number of members raised the concern that the risk/reward balance of participating in this market might shift to the point where it is no longer economical for them to participate.

Recommendation: Take into account in all decision-making that the relatively high risk of penalties proposed may reduce the amount of low carbon flexibility (e.g. battery storage) that chooses to bid in future auctions.

- A further discussion point was around the process and length of time to remove a suspension of a site that may have passed an additional SPD after failing an earlier one. Current experience from industry has been this process has taken months and led to considerable lost revenue over that period, with participants struggling to set their assets as live on the portal due to the inefficiencies of the process.

Recommendation: Clearly state the process and timeframes associated with removal of any suspension.

- Metering is a further challenge in the SPD and enhanced performance testing process. We understand that there is no information shared on the metering with the site owner until the end of the SPD process. Therefore, there may have been metering issues identified but they are not brought to light until the end of the SPD process. This could adversely impact the site in question and keep it unavailable for a longer period than is necessary. This could also become a problem in a stress event, as the delays in processing metering data would impact the ability to identify those sites that had delivered.

Recommendation: Reduce the time taken to process metered data and include this in the portal after each SPD/test event to help identify issues earlier and increase reliability.

2. Are there any barriers faced by storage CMUs in meeting the CM's performance and duration testing requirements, and if so, can you suggest any potential solutions? Please provide evidence to support your response.

During our workshop with ESN members, several points were raised regarding performance and testing requirements.

Extended performance testing

The extended performance test only applies to battery storage and has to be undertaken every three years, unfairly penalising and adding costs to battery storage projects looking to enter the CM. Furthermore, a number of members raised a concern that the current rules on Extended Performance need reviewing. At present they are linked to an 'Adjusted Connection Capacity' which is defined using the Connection Capacity in the Consolidated CM rules. This

means that if you have a connection capacity of 100 MW, for example, and then only build 20 MW of storage (if it were co-located, for example), the extended performance test would cause issues as you would struggle to deliver the capacity required.

Recommendation: Review the requirements for an extended performance test and, if continued, reduce the frequency of extended performance tests in the CM for battery storage.

Members were concerned about the current state of the extended performance tests that apply to battery storage. The current test is based on the connection capacity and not on the de-rated capacity. This seems like an unfair application of the rules that negatively impacts battery storage projects, as the nature of battery storage technology includes a degradation rate that will act to reduce the energy capacity over a 15-year contract and extended performance tests on the connection capacity.

Recommendation: Base the extended performance tests on the de-rated capacity and not the connection capacity.

Degradation

The process and systems in place to apply for Capacity Market contracts do not take into account the technology characteristics of the current dominant energy storage technology, Li-ion batteries. This technology has a degradation rate that is well known and understood. Providers limit the number of cycles they do per day in order to maintain the health of the battery cells and to stay within their warranty guidelines. In the T-4 auction, a 15-year contract is available and a battery storage project will degrade by a certain percentage rate over that time (depending on a variety of operational factors). This means that if they submit any bids using their full capacity they will not be able to meet that requirement over the 15-year contract.

The alternative to this is to submit less than the stated connection capacity at the pre-qualification stage informally, which is not an ideal process and could be improved – we have seen many CMUs bidding with a capacity that is lower than actual to include the assumed degradation over the length of the contract. This is counterproductive for developers and the bodies involved, is a challenge to assess and limits the potential for this technology. It is also a compromise for asset owners who are limiting the commercial potential of their asset. However, we are aware there are limitations associated with the current portal and systems that are due to updated so we have two initial recommendations:

Recommendation: In the short term, we advocate for a specific process for battery storage to be able to define the capacity of the CMU up to, but not higher than the TEC, MEC or average output for non multi-unit sites.

Recommendation: In the long term, battery storage should have the ability to provide an expected capacity curve for the 15-year contract period. This would be re-assessed at intervals to update with the actual level of degradation. This will require a new portal and an updated process to be delivered.

Changes to duration and technology during a 15-year contract

A further point of discussion was around the potential to amend the rules to allow for changes to duration and technology in energy storage projects, so that sites can be used more effectively in CM. A given project may want to upgrade the site following prequalification in the future and within their 15-year CM contract length. This could be done by adding energy capacity at the site and increasing the duration, which is something that many developers are planning to do.

For example, to upgrade from a 50 MW/ 50 MWh site with 1-hour duration, to a 50 MW/200 MWh 4-hour duration project would, at present, require separate metering, rather than being able to easily procure an extra contract to make up for the additional asset. There is clear recognition that longer duration energy storage projects would be a significant asset to the energy system, see for example the [DESNZ LLES call for evidence response](#). However, at present there is no incentive for developers to do this under existing CM contracts, and the complexity prohibits them from exploring these options. Furthermore, the current high CAPEX and market structures are limiting the majority of pipeline projects to 1-, 2- and 4-hour duration that will be fixed over the contract length.

Recommendation: Allow CM contracted sites to add energy capacity to their sites within the 15-year contract period.

Lack of recognition of how the CM interacts with other markets

Members outlined that SPDs are not an effective reflection of an asset's availability, as you only need to be available three days of the year to achieve them. Furthermore, several members raised a concern that the performance testing does not properly consider the impact on batteries which might be participating in multiple markets, and does not accurately represent the level of engagement participants may have in the CM. For example, if a storage asset was also participating in a Fast Frequency Response (FFR) market, there might be some situations where they are unable to achieve their SPD, but that is not a reflection of their availability in a future system stress event. It is important that the impact of such changes is examined across all technology types participating in the CM, to ensure reforms are not disproportionately benefiting or harming one technology type.

Recommendation: Carefully consider in all decision-making the impact of changes on low carbon flexibility such as battery storage.

Aggregating sites in a portfolio

Several members questioned why there was not a more efficient way to deliver agreements at an aggregate level across a portfolio, which would allow for more flexibility if a provider was not able to deliver on one specific asset. Currently, there is an option for a portfolio SPD, but the maximum aggregation of 50 MW limits the ability of providers to use this to full advantage. For example, if a provider has a 50 MW site then they have immediately hit the portfolio limit.

Members have raised concerns that if the government does take the proposed SPD changes forward, then this portfolio cap could become too punitive and should be raised. This would help with unintended outages, as currently if anything goes wrong there is immediate risk of a termination, which members did not feel was efficient or good value for consumers. Raising the cap would allow for flexibility across assets for providers, increasing security of supply.

Recommendation: Consider increasing the cap on portfolio SPDs to increase security of supply and flexibility for providers with multiple assets to deliver the expected capacity.

Issues with portal holding back long-term policy development

Finally, several members raised concerns that the lack of flexibility within the portal, and the wider processes associated with qualification, are holding back longer term policy development in the Capacity Market and restricting the potential growth in this market, to the detriment of security of supply. For example, the need to submit paperwork for each CMU as part of the pre-qualification process represents a significant burden for those participants with a portfolio of assets. It is a time-consuming process and the highly manual nature of it increases the risk of error. As one member explained:

"[You can] can easily make a mistake... if you're copying over cover letter cover letter – miss over one CMU ID and they reject your whole application, [with] no flexibility. It's pretty harsh given how much paperwork there is and that they don't give any advice prior to the pre-qual process. It doesn't feel necessary to go through the admin of an account for each CMU – you should have it all on one account."

In this way, participants with a portfolio of assets should be able to link these CMUs to a single account, to save time and reduce the risk of error. This feeds into wider issues with the portal that were raised by members, such as the inflexibility with regards to allocating additional capacity or duration to a site. The inability to align different CMUs on the same site, and the additional complexity of the metering associated with such a task, led members to feel that the relatively archaic legacy portal, and the delays in transitioning fully to the new portal, are restricting the ability of participants to develop their sites, with a knock-on impact for security of supply.

Recommendation: Review the effectiveness of the portal and whether it is impacting progress in the CM. Work to streamline processes to allow participants to engage more efficiently.

3. Do you agree with the proposed changes to enable Capacity Providers to determine a CMU's connection capacity solely on the basis of TEC, MEC or Average Output? Are there any unintended consequences of taking this approach?

Yes No

Please explain your answer below

Degradation profiles

As discussed in our response to Q2, the process and systems in place to apply for Capacity Market contract do not take into account the technology characteristics of the current dominant energy storage technology, Li-Ion batteries. This technology has a degradation rate that is well known and understood. Providers limit the number of cycles they do per day in order to maintain the health of the battery cells and stay within their warranty guidelines. In the T-4 auction a 15-year contract is available and a battery storage project will degrade by a certain % rate over that time (depending on a variety of operational factors). This means that if they submit any bids using their full capacity, they will not be able to meet that requirement over the 15-year contract.

The alternative to this is to submit less than the stated connection capacity at the pre-qualification stage informally, which is not an ideal process and could be improved – we have seen many CMUs bidding with a capacity that is lower than actual to include the assumed degradation over the length of the contract. This is counterproductive for developers and the bodies involved, is a challenge to assess and limits the potential for this technology. It is also a compromise for asset owners who are limiting the commercial potential of their asset. However, we are aware there are limitations associated with the current portal and systems that are due to updated so we have two initial recommendations:

Recommendation: In the short term, we advocate for a specific process for battery storage to be able to define the capacity of the CMU up to, but not higher than the TEC, MEC or average output for non multi-unit sites.

Recommendation: In the long term, battery storage should have the ability to provide an expected capacity curve for the 15-year contract period. This would be re-assessed at intervals to update with the actual level of degradation. This will require a new portal and an updated process to be delivered.

Adverse impacts on co-located projects

During our workshop a number of members raised the potential for the options outlined in the consultation to adversely impact co-located sites. We define co-location here as when energy storage is sited with generation (normally solar PV) and/or demand, and there is a shared grid connection. This is also known as a hybrid site, or a multi-unit site, as it is referred to in the consultation. If DESNZ mandates that the connection capacity is set solely on the basis of TEC, MEC or Average Output, then co-located sites that share a grid connection will be penalised and receive lower revenues. As a growing number of energy storage projects in the pipeline are co-located – approx. 40% at distribution and 50%-60% at transmission – this issue is likely to grow in importance over the coming years. Our members raised the concern that this approach could effectively reduce the contracted capacity and, by extension, the revenues available to participants with co-located assets, in comparison to the most recent approach used at 2022 prequalification.

In addition, this type of project may oversize in terms of the solar PV capacity and energy storage capacity in relation to their connection capacity, but still be able to respond to system stress events and contribute to security of supply.

We would advocate that a more flexible approach to defining the capacity available would be more appropriate for multi-unit/co-located sites, as there are considerable benefits to the overall energy system from having such sites included in CM.

While we understand there has been some negotiations to allow co-located sites to pre-qualify and win contracts in the CM, the process of engaging the EMR delivery body for each site is inefficient. This needs reform to help improve integration of this type of site in to the CM. There were also discussions in the past regarding the creation of a hybrid CMUs category in the CM open letter from BEIS in 2020¹. As the number of co-located sites grows at the distribution and transmission network scale, this is something that we would like to see explored in more detail. We believe now is the right time to re-open the discussion regarding a new generating technology class.

Recommendation: Provide additional flexibility to co-located/multi-unit projects to specify the connection capacity.

Recommendation: Provide an optimised process for co-located battery storage sites to participate in CM via a new generating technology class.

¹ BEIS, 2020 <https://www.gov.uk/government/consultations/capacity-market-new-technologies-2020/open-letter-on-new-technologies-in-the-capacity-market#fn:2>

4. Should Capacity Providers be allowed to self-nominate their CMUs' connection capacity, provided the nominated figure is not higher than TEC, MEC or Average Output?

Yes No

Please explain your answer below

As we have discussed in our answer to Question 3, the process and systems in place to apply for Capacity Market contract do not take into account the technology characteristics of the current dominant energy storage technology, Li-Ion batteries. This technology has a degradation rate that is well known and understood. Providers limit the number of cycles they do per day in order to maintain the health of the battery cells and to stay within their warranty guidelines. In the T-4 auction, a 15-year contract is available, and a battery storage project will degrade by a certain percentage rate over that time (depending on a variety of operational factors). This means that if they submit any bids using their full capacity, they will not be able to meet that requirement over the 15-year contract.

The alternative to this is to submit less than the stated connection capacity at the pre-qualification stage informally, which is not an ideal process and could be improved – we have seen many CMUs bidding with a capacity that is lower than actual to include the assumed degradation over the length of the contract. This is counterproductive for developers and the bodies involved, is a challenge to assess and limits the potential for this technology. It is also a compromise for asset owners who are limiting the commercial potential of their asset. However, we are aware there are limitations associated with the current portal and systems that are due to updated so we have two initial recommendations:

Recommendation: In the short term, we advocate for a specific process for battery storage to be able to define the capacity of the CMU up to, but not higher than the TEC, MEC or average output for non multi-unit sites.

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MEC or Average Output, then co-located sites that share a grid connection will be penalised and receive lower revenues. As a growing number of energy storage projects in the pipeline are co-located – approx. 40% at distribution and 50%-60% at transmission – this issue is likely to grow in importance over the coming years. Our members raised the concern that this approach could effectively reduce the contracted capacity and, by extension, the revenues available to participants with co-located assets, in comparison to the most recent approach used at 2022 prequalification.

In addition, this type of project may oversize in terms of the solar PV capacity and energy storage capacity in relation to their connection capacity, but still be able to respond to system stress events and contribute to security of supply.

We would advocate that a more flexible approach to defining the capacity available would be more appropriate for multi-unit/co-located sites, as there are considerable benefits to the overall energy system from having such sites included in CM.

While we understand there has been some negotiations to allow co-located sites to pre-qualify and win contracts in the CM, the process of engaging the EMR delivery body for each site is inefficient. This needs reform to help improve integration of this type of site in to the CM. There were also discussions in the past regarding the creation of a hybrid CMUs category in the CM open letter from BEIS in 2020². As the number of co-located sites grows at the distribution and transmission network scale, this is something that we would like to see explored in more detail. We believe now is the right time to re-open the discussion regarding a new generating technology class.

Recommendation: Provide additional flexibility to co-located/multi-unit projects to specify the connection capacity.

Recommendation: Provide an optimised process for co-located battery storage sites to participate in CM via a new generating technology class.

5. Do you agree with the proposed changes to enable mothballed plants which are existing Generating CMUs to return to the CM? Would these changes result in any unintended consequences?

Yes No

Please explain your answer below

² BEIS, 2020 <https://www.gov.uk/government/consultations/capacity-market-new-technologies-2020/open-letter-on-new-technologies-in-the-capacity-market#fn:2>

This change looks to help high carbon assets re-join the CM after being mothballed. This is something that will help maintain the existing dominance of high carbon assets in the CM and contradicts many of the suggestions put forward in the REMA consultation that intended to increase the share of low carbon assets in the CM. Fundamentally, a review of the Capacity Market represents an opportunity for policy makers to focus investment on well-established, reliable forms of clean dispatchable power. However, by continuing to offer 15-year contracts to fossil fuel generators the government risks locking in the UK's dependence on such fuels until the mid-2030s, jeopardising our ability to reach the 2035 net zero power target.

6. Do you agree with the proposed changes to the CM's penalty rate? Are any unintended consequences likely to result from this change?

Yes No

Please explain your answer below

We do not agree with the proposed changes to the penalty rate, and are concerned that there may be a number of unintended consequences as a result of these changes:

- Members raised the point on the penalty process that to go from 1/24th rate to 1/4 rate feels far too severe when there has never been a System Stress Event in the CM and, as we discuss in our response to Section 3, there is no effective arrangement for secondary trading to offset or mitigate this risk. For example, the battery storage sector is currently experiencing significant supply chain issues, which is causing delays to the construction of some new-build units. At present, if you experience an unexpected delay then you risk incurring penalties for not delivering on a contract that you intended to be live for. A better functioning secondary trading market could allow those providers to pass on their contract to a site which does not have a CM contract in place but would like one, allowing for no loss in security of supply as that capacity obligation is being fulfilled by a third party and allowing providers to better manage that risk.

Recommendation: Reduce the proposed penalty rate to be less severe.

Recommendation: Work with providers to develop a more liquid secondary trading market that could better protect security of supply.

- Furthermore, while we have seen high prices in recent CM auctions that make the current administrative burden of the CM bid, SPD & testing, portal, and general processes worthwhile, the real test will be when prices drop. If the current level of administrative burden is maintained, as well as the relatively high risk of penalties proposed, project developers may decide not to bid, limiting low carbon capacity

availability in the CM in future auctions. A number of members raised the concern that the risk/reward balance of participating in this market might shift to the point where it is no longer economical for them to participate.

Recommendation: Take into account in all decision-making that the relatively high risk of penalties proposed may reduce the amount of low carbon flexibility (e.g. battery storage) that chooses to bid in future auctions.

- Members were also particularly concerned on the penalty process associated with the SPD process. The current timeframes provide a one month extended window for an SPD after suspension, with the risk of termination associated with the first window. Firstly we think this would unfairly increase risk and could limit participation. The risk of termination after the first SPD window is too severe and an overcorrection on the current approach. Secondly, we feel that this timeframe for extended the extended window is too short and that this unduly increases risks for projects.

Recommendation: Remove the potential for a termination notice to be issued following failure to deliver in the first SPD window per year. Removing revenue for the period until you get approval via another SPD is a more appropriate penalty.

Recommendation: Provide a longer period of at least two months for the extended window (rather than one) for an extended performance test to be completed to reduce the risk of suspension and termination, allowing more battery storage participation in the CM.

- Members outlined that SPDs are not an effective reflection of an asset's availability, as you only need to be available three days of the year to achieve them. However, if you fail an extended performance test marginally (e.g. by 3%) you would potentially receive an *intend to terminate* notice – and only if this is withdrawn would you keep payment due. Crucially, you can't recover the revenue for the period in time the notice was in force. This feels unfair as a practice and risks penalising battery storage more than other technologies. Furthermore, members raised that it does not accurately represent the level of engagement participants may have in the market – some participants might not engage for most of the year but are available for the required days to make the SPD, and other people engaging in the market much more who might only achieve 95% of their expected capacity and are penalised by having their entire contract removed.

Recommendation: Prorate revenue payments linked to availability via SPDs, rather than a blanket loss of revenue for an extended performance test fail.

- A further discussion point was around the process and length of time to remove a suspension of a site that may have passed an additional SPD after failing an earlier one. Current experience from industry has been this process has taken months and led to considerable lost revenue over that period, with participants struggling to set their assets as live on the portal due to the inefficiencies of the process.

Recommendation: Clearly state the process and timeframes associated with removal of any suspension.

- Metering is a further challenge in the SPD and enhanced performance testing process. We understand that there is no information shared on the metering with the site owner until the end of the SPD process. Therefore, there may have been metering issues identified but they are not brought to light until the end of the SPD process. This could adversely impact the site in question and keep it unavailable for a longer period than is necessary. This could also become a problem in a stress event, as the delays in processing metering data would impact the ability to identify those sites that had delivered.

Recommendation: Reduce the time taken to process metered data and include this in the portal after each SPD/test event to help identify issues earlier and increase reliability.

7. Do you agree with the proposed changes to the timelines for calculating non-delivery penalties?

Yes No

Please explain your answer below

As discussed in our response to Q6, members have raised a number of issues around the length of time it takes to remove a suspension of a site that may have passed an additional SPD after failing an earlier one, and significant challenges faced in receiving timely metering feedback.

Therefore, we do not think the timelines for calculating penalties should be extended, but that the process should be made more efficient to allow such issues to be resolved more quickly.

3. Aligning the Capacity Market with net zero

Regen and ESN have been raising the issue of accounting for carbon in operational signals for several years (e.g. see our [position paper](#) published in 2020). It is also a policy area we have focused on as part of our ongoing discussions with National Grid ESO in the Electricity Storage Network Markets and Revenues working group. Broadly, we are asking for better valuation of carbon in electricity markets, including clear carbon reporting on all markets and services, and setting emissions limits where feasible/appropriate (e.g. in a new Capacity Market auction). In our REMA response we asked for policy changes to deliver on these areas. We welcome the data being provided by the ESO from the Balancing Mechanism and new methodology for carbon reporting of DSO services. However, we would welcome further ESO services to monitor the carbon intensity of the services and markets they deliver, and we have been working with the ESO on how the new Future System Operator role could work more effectively at driving net zero delivery.

We are pleased to see that the government recognises that the Capacity Market as it is currently designed is inconsistent with net zero, and aims to align the current rules on emissions limits with net zero targets. However, we are concerned by the timescales being proposed, with new emissions limits not being implemented until 2034. We are also disappointed to see a rowing back on ambition proposed in the 2021 Call for Evidence, such as the limiting of 15-year contracts exclusively to low carbon assets.

Fundamentally, a review of the Capacity Market represents an opportunity for policy makers to focus investment on well-established, reliable forms of clean dispatchable power. However, by continuing to offer 15-year contracts to fossil fuel generators the government risks locking in the UK's dependence on such fuels until the mid-2030s, jeopardising our ability to reach the 2035 net zero power target. We do not feel that the amendments proposed in this consultation go far enough in preparing the Capacity Market for a net zero future, and our key recommendations are provided below:

Limiting contracts

- **Re-explore the possibility of limiting long-term contracts to low carbon assets, as part of more fundamental reforms to the Capacity Market.**
- **Longer term, begin the process of moving unabated fossil fuel assets out of the Capacity Market and into a Strategic Reserve, including the option to bring into public ownership.**

Tech-specific amendments

- Carefully consider in all decision-making the impact of changes on low carbon flexibility such as battery storage.

Flat emissions limits

- Replace the flat reduction in the emissions limit from 2034 with an annual downwards adjustment.
- Remove the annual emissions limit from 2034 to provide a stronger signal to fossil assets that they are required to decarbonise in order to participate in the CM.

Multipliers

- Re-explore the possibility of introducing multipliers to better value low carbon assets and other variables such as location and duration.

Secondary trading

- Work with providers to develop a more liquid secondary trading market that could better protect security of supply and support the development of new assets across a number of technology classes.

Finally, in our REMA response we highlighted the need to move from a capacity neutral position (all MW are the same) to better align the Capacity Market with the delivery of an overall net zero system architecture and a set of system attributes and capabilities required for resilience and operability – such as duration, responsiveness, reliability, flexibility, power quality, stability, recovery, diversity of supply and low carbon. It is clear that assets that are low carbon, provide sustained response, two-way response and have fast ramp rates are under-rewarded by the CM for the value they provide at present and that this needs to change³.

While recognition that the Capacity Market as it is currently designed is inconsistent with net zero – and a proposed tightening of the emissions limit from 2034 – are steps in the right direction, the above highlights the need for valuing low carbon assets more explicitly in the CM.

³ For Further discussion see [Day in the Life of the Energy System 2035](#).

3.1 Response questions

8. Do you agree with our proposal to introduce lower emissions limits for new and Refurbishing CMUs from 2035?

Yes No

Please explain your answer below

While we are pleased to see that the government aims to align the current rules on emissions limits with net zero targets, we are concerned by the timescales being proposed, with new emissions limits not being implemented until 2034. Coupled with support for fossil CMUs to decarbonise, a key pillar of the proposed reforms appears to be a tightening of the emissions limits. Fundamentally, we do not feel that the proposed emissions limit goes far enough in preparing the Capacity Market for a net zero future, or in properly valuing the emissions avoided by participation of low carbon assets in the CM.

Specifically, we have concerns around the implementation of a flat reduction in 2034 that effectively creates a cliff-edge for decarbonisation, rather than a managed reduction in the carbon intensity of the CM function. If a flat limit is to be implemented, this should be adjusted annually in order to strengthen to limits sooner and better value low carbon assets, rather than having a steep reduction so late in the day that, if the emissions limit is not achieved, it risks achieving the 2035 net zero power target.

Furthermore, we are concerned that continuing to allow fossil fuel generators to meet a yearly emissions limit, even after the intensity emission limit is tightened after 2034, risks creating a situation where unabated gas assets continue to participate in the CM. This is because, even if an unabated asset does not meet the intensity emission limit, it could still generate for a percentage of time annually in order to meet the yearly limit. By continuing to provide contracts under this principle, the financial incentive of participation might be greater than any penalties incurred for breaching the yearly emission limit, incentivising them to maximise their output in order to maximise revenues regardless of any emissions limit.

Because of this, we would advocate for the removal of an annual emissions limit from 2034, to provide a stronger signal to fossil assets that they are required to decarbonise in order to participate in the CM.

Recommendation: Replace the flat reduction in the emissions limit from 2034 with an annual downwards adjustment.

Remove the annual emissions limit from 2034 to provide a stronger signal to fossil assets that they are required to decarbonise in order to participate in the CM.

As mentioned in the introduction to this section, the 2021 Call for Evidence included a proposal to limit the award of multi-year agreements to exclusively low carbon plants, which we are disappointed to see has not been included in this consultation as an option. By continuing to offer fossil assets long-term contracts, there is a risk of perpetuating the link between energy bills and marginal price of gas by locking gas into the CM. This is likely to also reduce the potential growth in low carbon assets such as battery storage which are having to compete for agreements without the relative carbon saving being properly valued. Fundamentally, this decision appears inconsistent with the government's decarbonisation aims: by continuing to award 15-year contracts to fossil fuel assets today, the government is locking in a carbon intensive form of capacity adequacy into the late 2030s, with no guarantee that the required decarbonisation technology will emerge in that time.

Recommendation: Re-explore the possibility of limiting long-term contracts to low carbon assets, as part of more fundamental reforms to the Capacity Market.

Finally, the REMA consultation introduced the concept of multipliers for use in the CM. In our response we agreed that some form of multiplier would be beneficial for any new CM contracts and auctions. Such multipliers could be an excellent way to flexibly value low carbon assets as, rather than committing to a single emissions limit in 2034, these can be adjusted over time. They could also be used to better value other factors such as duration, to explore the development of long-duration storage. This concept was also raised in the 2021 Call for Evidence, and it is disheartening to see that it has not been included in this consultation.

Recommendation: Re-explore the possibility of introducing multipliers to better value low carbon assets and other variables such as location and duration.

9. Do you agree with our proposed changes to the emission limits regime?

Yes No

Please explain your answer below

See answer to Q8.

10. Are there any further required changes to the emissions limits regime which have not been identified?

As discussed in our answer to Q8, we do not feel that the proposed emissions limit goes far enough in preparing the Capacity Market for a net zero future, or in properly valuing the emissions avoided by participation of low carbon assets in the CM.

To summarise:

- **Strengthening emissions limit annually:** if a flat limit is to be implemented, this should be adjusted annually in order to strengthen to limits sooner and better value low carbon assets, rather than having a steep reduction so late in the day that, if the emissions limit is not achieved, it risks achieving the 2035 net zero power target.
- **Removing yearly emissions limit:** to avoid continued participation by unabated fossil fuel generators beyond their emissions limit in order to maximise revenue, we would advocate for the removal of an annual emissions limit from 2034. This would provide a stronger signal to fossil assets that they are required to decarbonise in order to participate in the CM.
- **Creation of multipliers:** which could be an excellent way to flexibly value low carbon assets as, rather than committing to a single emissions limit in 2034, these can be adjusted over time.

Recommendation: Replace the flat reduction in the emissions limit from 2034 with an annual downwards adjustment.

Remove the annual emissions limit from 2034 to provide a stronger signal to fossil assets that they are required to decarbonise in order to participate in the CM.

Recommendation: Re-explore the possibility of introducing multipliers to better value low carbon assets and other variables such as location and duration.

11. Do you have any views or evidence on the impact that the emissions limit proposal may have on investment in transitional pathways, such as hydrogen blending or CCUS retrofit?

12. If you have an unabated gas CMU in the CM, what are your plans for this capacity as the power sector decarbonises? Do you intend to decarbonise your CMU once viable pathways such as the DPA are available?

Yes No N/A

Please explain your answer below

13. From the perspective of a Capacity Provider, are there any additional barriers to decarbonisation than those mentioned above? Would it be necessary to terminate your CM agreement in order to decarbonise your CMU?

14. How long would it take to retrofit your plant(s) to either CCUS or Hydrogen and when would it be feasible for your plant(s) to come offline to do so? Please provide a breakdown of this where possible.

15. Do you have any comments on our suggestions of how CMUs could decarbonise or suggestions of your own? If so, please provide details of this.

The Capacity Market is intended to be a technology-neutral scheme for procuring capacity. However, a number of the proposed amendments appear to be specifically designed to support the decarbonisation of unabated gas plants, either through the development of CCUS or hydrogen. For example, no other capacity provider is able to suspend their agreement to fix what is effectively defective equipment, so the proposal to create “*managed exits routes which enable CMUs to be withdrawn from the CM for decarbonisation purposes*” that would allow them to exit agreements early without incurring a penalty appears to be favouring one technology above others.

As outlined above, this creates an environment where carbon-intensive technologies continue to be provided 15-year contracts and are relied on to decarbonise within the required timescale, creating targeted interventions in a supposedly technology neutral mechanism in an attempt to achieve this. While there will be a role for hydrogen and CCUS in our net zero energy system, and specific support mechanisms should be designed to support this, these technologies are still being developed and, by providing such tech-specific provisions, there is a risk that these forms of technology are favoured over well-established, reliable forms of capacity adequacy such as battery storage. Storage providers have delivered several GWs of capacity in the CM since battery storage first won contracts for delivery in 2020/21, and any perception that fossil fuel plants are more reliable than batteries is not rooted in evidence. A number of our members are concerned that in focusing reforms on the decarbonisation of fossil CMUs, this consultation does not fully consider the potential ramifications and unintended consequences for other technologies.

Recommendation: Carefully consider in all decision-making the impact of changes on low carbon flexibility such as battery storage.

In our REMA response, we raised the idea that legacy fossil fuel assets, such as older CCGT plants, that are still required for system backup and security of supply, should, over the next decade, be moved out of the Capacity Market and into a Strategic Reserve as part of their ‘end-of-operating-life’ management plan. This Strategic Reserve option may be the most cost efficient option to ensure adequate reserve capacity, especially of legacy fossil fuel plants.

We note that the ESO has recently secured a capacity adequacy services from 5 coal fired power stations for winter 2022/23, as a form of [Strategic Reserve](#):

*“the units contracted will **not be available to the open market and will only be dispatched at the request of ESO**. These contracts are only intended to be used when **all commercial options have been exhausted** within the Balancing Mechanism.”*

We note also that the ESO has previously established a ‘Supplementary Balancing Reserve’ service which had many of the characteristics of a ‘Strategic Reserve’ from 2014/15 to 2017/18,

albeit on a temporary and time-boxed basis. The service was available for NGET between 6am and 8pm on non-holiday weekdays in the months of November to February. SBR providers were not able to participate in the market for the duration of their contracts. See paragraph 1.3 [here](#).

In a similar manner, these Strategic Reserve assets would no longer participate in the wholesale, balancing or ancillary service markets and would only operate under instruction from the ESO under prescribed conditions.

At some point, the government may need to consider bringing Strategic Reserve assets into public ownership, either because of cost, security of supply or commercial reasons. Given the status of these generators as assets critical to security of supply, but ones that we would only retain as an insurance policy rather than for operation within the market, the option to nationalise should be proactively explored. This work should consider the conditions under which public ownership, rather than subsidy to private owners, would be the best option for delivering our overall system objectives.

Moving unabated fossil fuel assets into a Strategic Reserve, alongside a low carbon Capacity Market, offers a number of advantages:

- Creating a clear market demarcation between active low carbon assets and legacy assets that are on stand-by for energy security.
- Avoiding the risk that Capacity Market clearing prices are set by end-of-life assets that are able to exploit security rents.
- Providing a better basis to negotiate a bespoke end-of-life management plan for assets (including the option to bring into public ownership).

Recommendation: Re-explore the possibility of limiting long-term contracts to low carbon assets, as part of more fundamental reforms to the Capacity Market.

Longer term, begin the process of moving unabated fossil fuel assets out of the Capacity Market and into a Strategic Reserve, including the option to bring into public ownership.

16. Could secondary trading provide a pathway to the decarbonisation of an existing CMU? Please provide an explanation to your answer.

X Yes X No

Please explain your answer below

While we support the growth of a secondary trading market, we do not feel it is fit for purpose currently and so, given the lack of liquidity in this market currently, it would not provide a viable pathway for CMUs wishing to decarbonise. The need for substantial reform in this market was

raised by participants at the end of 2018, and has been actioned by both Ofgem and the CM Advisory Group with no significant outcomes.

There is the potential for a successful secondary trading market that could benefit providers, if some of the conditions were changed. For example, the battery storage sector is currently experiencing significant supply chain issues, which is causing delays to the construction of some new-build units. At present, if you experience an unexpected delay then you risk incurring penalties for not delivering on a contract that you intended to be live for. A better functioning secondary trading market could allow those providers to pass on their contract to a site which does not have a CM contract in place but would like one, allowing for no loss in security of supply as that capacity obligation is being fulfilled by a third party.

Recommendation: Work with providers to develop a more liquid secondary trading market that could better protect security of supply and support the development of new assets across a number of technology classes.

17. Could reactively procuring capacity provide a pathway for CMUs to decarbonise whilst ensuring security of supply? Please provide an explanation for your answer.

Yes No

Please explain your answer below

18. Could over-procurement of replacement capacity via the CM enable CMUs to decarbonise whilst ensuring security of supply? Please provide an explanation to your answer.

Yes No

Please explain your answer below

19. Do you agree with the proposal to introduce 3-year agreements for low carbon, low capex CMUs? If not, do you have any suggestions for an alternative approach?

Yes No

Please explain your answer below

20. Are there any potential consequences or risks that you think the government should further consider?

21. Specifically, which low carbon technologies do you expect might benefit from a 3-year agreement with no capex threshold?

22. Do you agree with the proposed changes to the reference cost levels underpinning the CM's 3-year and 15-year Capex Thresholds?

Yes No

Please explain your answer below

The proposed changes make sense.

23. Do you have any concerns about the assumptions made regarding the calculation of the revised reference cost levels?

Yes No

If yes, please expand

24. Do you foresee any unintended consequences which could result from making this change to the approach for the 3-year and the 15-year Capex Thresholds? Conversely, do you foresee any unintended consequences which could result from not making substantial changes to the level of the 3-year and the 15-year Capex Thresholds?

25. Do you agree with the proposed introduction of a 9-year Capex Threshold for low carbon CMUs? Do you foresee any unintended consequences?

Yes No

Please explain your answer below

The Capacity Market is intended to be a technology-neutral scheme for procuring capacity. However, our members expressed concern that the introduction of a 9-year Capex threshold might disproportionately support decarbonising CMUs, at the expense of the development of existing low carbon generation such as battery storage.

Recommendation: Carefully consider in all decision-making the impact of changes on low carbon flexibility such as battery storage.

26. Do you agree with the proposed reference cost level underpinning the new 9-year Capex Threshold for low-carbon CMUs? If not, do you have further evidence on alternative reference cost levels?

Yes No

Please explain your answer below

As discussed in our response to Q25, we do not agree with introduction of this threshold.

27. Do you agree with the proposed changes to the definition of Total Project Spend to extend the scope of the existing permitted period for Capex in respect of new build CMUs (i.e. in effect a 77-month period prior to the commencement of their first Delivery Year) to include

Refurbishing CMUs? Do you foresee any unintended consequences which could arise from this change?

Yes No

Please explain your answer below

28. The government remains open to considering proposals to address challenges faced by projects with long build times. Please provide further evidence or proposals that you feel would address such challenges.

We are aware of the [commitment from the government](#) to ensure the deployment of sufficient LLES to balance the overall system by developing appropriate policy to enable investment by 2024, and so it is disappointing to not see more progress on this in this consultation.

As we discussed in our [response to BEIS' call for evidence on long duration storage](#) in 2021, the Capacity Market is unlikely to be sufficient on its own to incentivise large-scale, long-duration electricity storage (LLES). However, we don't believe that changes to the current market will be enough to establish an investment case for LLES and agree that the creation of a new market based on the principle of a capacity mechanism that allows larger assets with longer lead times, and retains the de-rating factors for duration, could be an opportunity to incentivise LLES projects to develop. This would still only form a small component of the revenue stack and would therefore need to be complemented with additional dedicated market opportunities and support mechanisms for LLES.

The REMA consultation also introduced the concept of multipliers for use in the CM. In our response we agreed that some form of multiplier would be beneficial for any new CM contracts and auctions. Such multipliers could be an excellent way to flexibly value low carbon assets and variable benefits such as duration, as these can be adjusted over time. This concept was also raised in the 2021 Call for Evidence, and it is disheartening to see that it has not been included in this consultation.

Recommendation: Re-explore the possibility of introducing multipliers to better value low carbon assets and other variables such as location and duration.

4. Additional improvements to the Capacity Market

The consultation states that the focus of Section 4 is “*removing administrative burdens in the auction cycle*”. While we agree with a number of the proposals, when discussing this section with ESN members, additional issues with the administrative process were raised that have not been addressed in this consultation. Several members raised concerns that the lack of flexibility within the portal, and the wider processes associated with qualification, are holding back longer term policy development in the Capacity Market and restricting the potential growth in this market, to the detriment of security of supply. For example, the need to submit paperwork for each CMU as part of the pre-qualification process represents a significant burden for those participants with a portfolio of assets. It is a time-consuming process and the highly manual nature of it increases the risk of error. As one member explained:

“[You can] can easily make a mistake... if you're copying over cover letter cover letter – miss over one CMU ID and they reject your whole application, [with] no flexibility. It's pretty harsh given how much paperwork there is and that they don't give any advice prior to the pre-qual process. It doesn't feel necessary to go through the admin of an account for each CMU – you should have it all on one account.”

In this way, participants with a portfolio of assets should be able to link these CMUs to a single account, to save time and reduce the risk of error. As discussed in our response to Section 2, this feeds into wider issues with the portal that were raised by members, such as the inflexibility with regards to allocating additional capacity or duration to a site. The inability to align different CMUs on the same site, and the additional complexity of the metering associated with such a task, led members to feel that the relatively archaic legacy portal, and the delays in transitioning fully to the new portal, are restricting the ability of participants to develop their sites, with a knock-on impact for security of supply.

Recommendation: Review the effectiveness of the portal and whether it is impacting progress in the CM. Work to streamline processes to allow participants to engage more efficiently.

4.1 Response questions

29. Do you agree with the proposed clarification to Rule 5.9.7? Does the proposed clarification have any unintended consequences?

Yes No

Please explain your answer below

We agree with the proposed clarification.

30. Do you agree with the proposed amendment? Does the proposed amendment have any unintended consequences?

Yes No

Please explain your answer below

We agree with the proposed amendment to publication requirements such that the SoS is required only to publish a decision not to hold an auction.

31. Do you agree with the proposed change to the CM Regulations to enable Capacity Providers with relevant CMUs to use the CM to CfD transfer route in practice? Do you foresee any unintended consequences of making this change?

Yes No

Please explain your answer below

32. Do you think that the amended transfer route should continue to be available to new CM agreements in the future, or should it be restricted to existing agreements?

Continue to be available Restricted to existing agreements

Please expand on your answer if applicable

33. Do you agree with the proposed amendment? Does the proposed amendment have any unintended consequences?

Yes No

Please explain your answer below

We support this amendment as the completion of ITE assessments is a significant administrative burden for which it seems there is little added value. This is particularly the case if you are a new build developer; you could end up completing lots of these which is a time-consuming exercise.

34. Do you have any comments or concerns regarding our proposed phased implementation of the requirement for Fossil Fuel Emissions Declarations to be independently verified?

5. Assessment of impacts

Response questions

35. Do you agree with the consideration of impacts in section 5? Are there any additional impacts which the government has not considered? Please provide supporting evidence where possible.

Yes No

Lack of recognition of how the CM interacts with other markets

As discussed in our response to Section 2 of this consultation, several members raised a concern that the performance testing does not properly consider the impact on batteries which might be participating in multiple markets, and does not accurately represent the level of engagement participants may have in the CM. For example, if a storage asset was also participating in a Fast Frequency Response (FFR) market, there might be some situations where they are unable to achieve their SPD, but that is not a reflection of their availability in a future system stress event. It is important that the impact of such changes are examined across all technology types participating in the CM, to ensure reforms are not disproportionately benefiting or harming one technology type.

Technology-specific reforms

As discussed in our response to Section 3 of this consultation, a number of our members raised a concern that in focusing reforms on the decarbonisation of fossil CMUs, this consultation does not fully consider the potential ramifications and unintended consequences for other technologies. For example, while the Capacity Market is intended to be a technology-neutral scheme for procuring capacity, our members expressed concern that the introduction of a 9-year Capex threshold might disproportionately support decarbonising CMUs, at the expense of the development of existing low carbon generation such as battery storage. It is important that the impact of such changes are examined across all technology types participating in the CM, to ensure reforms are not disproportionately benefiting or harming one technology type.

Recommendation: Carefully consider in all decision-making the impact of changes on low carbon flexibility such as battery storage.

Regen

Bradinch Court, Castle Street, Exeter, EX4 3PL
01392 494399