Department for
Business, Energy
& Industrial Strategy

CAPACITY MARKET

Five-year Review (2014 – 2019)

July 2019

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Introduction

1. The Capacity Market (CM) is at the heart of the Government's plans for a secure and reliable electricity system. It ensures sufficient investment in the overall level of reliable capacity (both supply and demand sides) needed to provide secure electricity supplies. The CM ensures sufficient reliable capacity to meet peak demand, for example during cold, still periods where demand is high and wind generation is low. The CM works by giving all capacity providers a steady payment to ensure enough capacity is in place to meet demand. Capacity providers face penalties if they fail to deliver energy when needed.
2. The CM brings forward investment by allowing the market to competitively set a price for capacity. Capacity agreements are offered to investors in existing and new capacity four years and one year ahead of the year capacity must be delivered, giving them certainty over part of the future revenues they will receive. The CM operates alongside the electricity market and the existing services National Grid Electricity System Operator (ESO) contracts to ensure moment to moment balancing of the electricity system.
3. The CM has three objectives:
   - *Security of supply:* to incentivise sufficient investment in capacity to ensure security of electricity supply;
   - *Cost-effectiveness:* to ensure the most efficient level of capacity is secured at minimum cost to consumers; and
   - *Avoiding unintended consequences:* to minimise design risks and complement the decarbonisation agenda.
4. The CM was implemented in 2014 as part of the Government's policy of Electricity Market Reform (EMR), through four pieces of legislation, the Energy Act 2013 ("the Act"), the Electricity Capacity Regulations 2014 ("the Regulations"), the Electricity Capacity (Supplier Payment etc.) Regulations 2014 ("the Supplier Payment Regulations") and the Capacity Market Rules ("the Rules"). The Act, the Regulations and the Rules each contain a requirement for the Government to carry out five-yearly reviews of the policy and its implementing legislation to assess, in summary, three areas:
   - Whether the objectives of the CM and its implementing legislation remain appropriate
   - The extent to which those objectives are being met
   - Whether the objectives can be achieved in the future in a way that imposes less regulation
5. The Regulations and the Rules are the key legislation which implement the objectives of the CM (including security of supply), together with the Supplier Payment Regulations. As both the Rules and the Regulations contain a requirement to carry out a five-yearly review and publish a report, we have produced this single report ("the Five-year Review") to meet both requirements and avoid duplication of overlapping content.
6. In addition, an updated version of this report will form the basis of one chapter of a wider report that will be published and laid in parliament later in the year to satisfy the review requirements in the Act.

7. Although not specifically required by the legislation, we have included two additional aims for the Five-year Review, in order to report on the wider work undertaken as part of the review. These are to:
   - Assess whether the CM is still needed
   - Discuss next steps
8. To inform the Five-year Review, a call for evidence (CFE) was published in August 2018. It sought views and evidence on the performance of the CM and whether there are aspects of its design that may require improvement if it is to continue meeting its objectives in the future. In March 2019, we published a summary of the responses to the CFE[1].
9. In parallel to the Government's Five-year Review, Ofgem are required to carry out a review of the Rules every five years ("the Five-year Review of the Rules"). To inform their review, they published an open letter in September 2018 seeking views and evidence on the Rules[2]. In March 2019 Ofgem ran a further consultation on proposed changes to the Rules, based on the findings of the open letter[3]. This consultation is the first phase in Ofgem's plan to develop a longer-term programme of changes to the Rules, as part of their Five-year Review of the Rules. They published a decision letter on 18 July 2019[4] outlining their decisions on amendments to the Rules ahead of 2019 prequalification, following the consultation issued in April. They intend to publish a report that summarises their Five-year Review of the Rules in the Summer, as well as an accompanying Forward Work Plan which will signpost their future work streams. We have referred to documents related to their review in this report, where relevant.
10. On 15 November 2018, a judgment of the General Court of the CJEU ("the General Court judgment") annulled the European Commission's July 2014 State aid approval of Great Britain's (GB's) CM[5], on grounds that, in summary, the European Commission should have carried out a second stage investigation into the scheme. This judgment means that, as at the date of this report, the CM is in a standstill period (see Glossary in Annex C), with the Government unable to make capacity payments or grant capacity agreements conferring a right to receive capacity payments, until the CM is approved.
11. In light of the General Court judgement, we have needed to take action to maintain security of supply and to secure State aid approval as quickly as possible. We have therefore limited the amount of formal consultation on proposals related to the Five-year Review that we have brought forward. This has been because it would be inappropriate to consult on and make legislative changes related to certain issues during the current standstill period.
12. Nonetheless, in March 2019, we came forward with proposed changes to two priority issues raised in the CFE: interconnector de-rating and the inclusion of further renewable technologies in the CM (see Glossary in Annex C). These changes help to ensure that the CM is as open as possible to all technologies, and that they are assessed and rewarded fairly for their contribution to security of supply. In order to bring these changes into effect, the Government has amended the Rules and the Regulations where necessary. The Capacity Market Amendment (No. 3) Rules 2019 came into force in late May and amended

[1] https://www.gov.uk/government/consultations/capacity-market-and-emissions-performance-standard-review-call-for-evidence
[2] https://www.ofgem.gov.uk/publications-and-updates/open-letter-five-year-review-capacity-market-rules-and-nget-s-incentives
[3] https://www.ofgem.gov.uk/publications-and-updates/five-year-review-capacity-market-rules-first-policy-consultation
[4] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
[5] http://ec.europa.eu/competition/state_aid/cases/253240/253240_1579271_165_2.pdf

the methodology for interconnector de-rating and introduced further renewable technologies to the CM. These changes were further supported by the Capacity Market Amendment (No. 4) Rules 2019, which came into force with the Electricity Capacity (No.2) Regulations in late July.

13. We are continuing to reflect on the full range of issues raised in the CFE. We have set out, in the section entitled 'Next steps' below the areas in which we intend to carry out further work, including further consultation and legislative changes where appropriate, after the publication of this report.

14. This expectation and the conclusions of this report, in particular, the areas in which we intend to carry out further work (set out in the section entitled 'Next steps' below) and associated timescales, are predicated on the assumption that the CM receives State aid approval in good time.

The need for a Capacity Market and whether the objectives of the Capacity Market remain appropriate

15. There was overwhelming support amongst respondents to our CFE for continuation of the CM. This supports the Government's view that there is a strong need to maintain the CM, given that many of the underlying issues that led to its introduction continue. In particular, the significant coal and nuclear plant closures expected in the 2020s, the persistence of the 'missing money' problem (see Glossary in Annex C) and the rapid evolution of the GB electricity system. This is supported by recent analysis from National Grid ESO, which demonstrates that without the CM, GB would be unlikely to consistently meet its reliability standard (see Glossary in Annex C) of three hours loss of load expectation (LOLE) on an annual basis out to 2024[6]. We will revisit the need for a CM as part of the ten-year review of the CM (we are required by legislation to carry out a review every five years).

16. Whilst we recognise the importance of the CM, we understand that there is also room for improvement in the current design, to ensure it better meets its objectives. Responses to the CFE focused in particular on the need to remove perceived market distortions that may impact auction competition and the need to adapt to future security of supply challenges (e.g. the changing nature of system stress events (SSEs - see Glossary in Annex C) and also how the CM interacts with other electricity system requirements such as flexibility). We agree that certain areas of the CM require review in this regard. In the section entitled 'Next steps' below we have explored the issues raised in the CFE and set out our intentions going forward. Subject to State aid approval for the CM being forthcoming, we expect to consult further and make legislative changes where appropriate, following the publication of this report.

17. The Government's view is that the CM's objectives remain well aligned and central to delivering the Government's energy priorities. The majority of responses to the CFE endorsed our position. We therefore believe that the objectives themselves remain suitable and do not require amendment, nor should any additional objectives be added. We continue to think (and the State aid guidelines require) that the CM's design should

[6] National Grid ESO have undertaken a detailed review of the economics of coal, gas and small peaking plant utilising the best publicly available cost data with their own assessment of the various market revenue streams e.g. wholesale, balancing, ancillary services and the CM. This enabled them to identify the individual plants at greatest risk of closing when CM revenues are no longer available and the impact of their closure on loss of load expectation (LOLE). They also carried out sensitivity analysis on their assessment, by analysing what the impact would be on the margin and LOLE metrics if there were 1GW less or more closures than expected.

continue to be consistent with the EU principle of technology neutrality, as this is critical to maximising competition in the auctions and ensuring capacity is secured at the minimum cost to consumers. We also believe that securing an optimal mix of technologies is best achieved through ensuring, as far as possible, that competition in the capacity auctions is based on a level playing field, and that collectively, energy policies enable assets to monetise the range of benefits they provide to the system but also bear any costs for which they are responsible.

18. At this time, we do not believe the CM should be amended to offset the impact of possible market distortions arising in other policies or schemes or have an additional objective linked to other non-security of supply related energy objectives. Such an approach risks introducing significant complexity within the CM design and would also require revisions to the State aid notification. Our preference at this time is to remove any potential market distortions that may arise within the CM directly and then address any possible market distortions that may arise outside the CM by ensuring that the other policies and schemes offer appropriate incentives and close any loopholes. We also wish to make sure that the CM continues to remain compatible and consistent with decarbonisation policies. This approach was advocated by a number of respondents to the CFE.

The extent to which the Capacity Market is meeting its objectives and whether its objectives can be achieved in the future in a way that imposes less regulation

Security of supply

19. Overall, performance against this objective has been strong. The auctions have secured the large majority of our capacity needs out to 2021/22 (the remaining capacity needed for each delivery year will be secured through the upcoming auctions held one year before delivery (T-1)), including 5.6GW of new capacity from a range of technologies, at low clearing prices. There have been no SSEs to date and only 2 Capacity Market Notices (CMNs) issued[7] (see Glossary in Annex C). Responses to the CFE confirmed that the CM has been important in ensuring security of supply. Capacity agreements have been awarded to a diverse mix of energy technologies, including significant amounts of flexible and smart technologies, such as demand side response (DSR), batteries and reciprocating engines. This has been positive in facilitating the transition to a smarter, more flexible electricity system. We also recognise the importance of ensuring that large, mid-merit and baseload plant can compete in the CM and the significant contributions these plants make to security of supply in GB.

20. The CFE highlighted several areas for improvement regarding security of supply, in particular, to ensure that competition in the CM continues to be based on a level playing field between technologies, to strengthen the regime of penalties for capacity providers that are not available during a SSE and to continue planning for the forthcoming requirement to implement the direct participation of foreign plants, as part of the EU's Clean Energy Package[8].

[7] https://gbcmn.nationalgrid.co.uk/
[8] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search

Cost-effectiveness

21. Cost-effectiveness of the CM has been good. Liquidity and competition within the capacity auctions have been high. 30% to 50% more capacity entered the T-4 auctions (the capacity auctions held 4 years ahead of delivery) than the capacity target to procure, and more than twice the capacity target entered the 2017 T-1 auction. CM costs have turned out to be at the lower end of the range predicted by the Impact Assessments (about £1bn per annum in nominal prices)[9]. Respondents to the CFE agreed that the CM has been cost-effective and liquidity and competition high. In addition, the deployment of a range of technologies through the CM, including flexible technologies, has helped to minimise whole system costs.

22. Due to the clearing prices being lower than the net cost of new entry (net CONE - currently set at £49/kW) and the slope of the demand curve used in the capacity auctions (see Glossary in Annex C), the auction outcomes have led to more capacity being purchased than the target in all capacity auctions held to date, as the structure of the auction deems this to be the most cost-effective outcome for the consumer. For delivery year 2018/19, 0.7GW of capacity was purchased beyond the target in the T-4 auction and 0.9GW in the T-1 auction (the amount of capacity purchased at T-1 takes into account any over or under-procurement in T-4). This contributed to a LOLE in 2018/19 that was significantly lower than our reliability standard of three hours per year. The primary reason for low LOLE has been plant without capacity agreements staying open for longer than was expected, with additional procurement through the capacity auctions making a minor contribution. LOLE in 2017/18 was 0.01 hours and LOLE in 2018/19 was 0.001 hours[10]. This indicates that the electricity system in GB is very secure. However, we do not intend or expect to maintain such low levels of LOLE into the future, as the reliability standard represents the most cost-effective amount of LOLE for consumers. Therefore, we expect LOLE to rise over the coming years (but remain below three hours), as plant without capacity agreements close. The level of LOLE in GB is influenced by the amount of capacity secured in the capacity auctions. Therefore, it is reviewed each year as part of our annual auction parameter setting process.

23. We considered several alternative capacity auction designs over the last five years to improve efficiency of the CM (e.g. a pay as bid auction, a split auction and a price duration equivalence auction) but none of these were found to be more cost effective than the existing design (a single, pay as clear auction). See the Glossary in Annex C for an explanation of these auction designs. At this time, we therefore remain satisfied with the current design of the capacity auction and want to avoid making any changes to the auction structure that could destabilise investor confidence and in turn increase costs, unless there is compelling evidence that it would produce more efficient overall results. Nonetheless, it is important both that overall CM costs are as low as possible, and that it remains an effective vehicle for bringing forward the new capacity we need as and when it is required. We will therefore continue to monitor the outcomes of the capacity auctions, including prices and new build volumes, and analyse whether the current model is likely (as we currently expect) to continue to produce the most efficient results under all likely future market scenarios. This will involve refreshing our past analysis on split auctions, using data on previous capacity auction outcomes, as well as considering the outcomes of a split auction compared to a single auction under a range of future scenarios. Our intention is to check that our past conclusions on split auctions remain robust and that, going forward, the

[9] https://obr.uk/download/october-2018-economic-and-fiscal-outlook-supplementqary-fiscal-tables-receipts-and-other/
[10] https://www.nationalgrideso.com/insights/winter-outlook

capacity auctions are designed such that overall CM costs are minimised, particularly as the proportion of new capacity winning capacity agreements is likely to rise in the future.

24. To further improve cost effectiveness of the CM going forward and in response to concerns about over-procurement raised in response to the CFE, we intend to review the reliability standard, including its components (net CONE and the value of lost load (VoLL) (see Glossary in Annex C) to make sure that we are providing cost-effectiveness to the consumer. Varying the amount of capacity set-aside for the T-1 auctions is also a useful tool for mitigating the risks of over-procurement or security of supply. We will consider how best to make use of this in the future.

Avoiding unintended consequences

25. The CM has been generally effective in avoiding unintended consequences and complementing decarbonisation. Capacity providers are required to comply with carbon emission limits enshrined in other policies and regulations, such as the EU Emissions Trading Scheme (EU-ETS) and the Emissions Performance Standard (EPS) (see Glossary in Annex C). The inclusion of further classes of renewable technologies in the CM has also helped to complement decarbonisation.

26. The annual capacity auctions have provided an opportunity to reflect on and address any unintended consequences when they have emerged. For example, concerns were raised about the air quality impacts caused by a small (in terms of capacity) but significantly higher than expected number of diesel reciprocating engines that won capacity agreements in the early auctions. It was determined that this type of generation was unfairly benefitting from a loophole in emission control regulations and a potentially disproportionate revenue stream arising from the transmission charging arrangements. In line with our stance not to amend the CM to address possible market distortions arising from elsewhere, we worked with Ofgem, Defra and the Environment Agency to remove these distortions at source and, as a consequence, the level of success of new diesel generation in the more recent capacity auctions has significantly reduced.

27. The CFE highlighted several perceived market distortions that may have arisen within the CM, in particular a need to continue to maintain a level playing field for some technologies.

28. A range of possible market distortions arising outside the CM were raised in responses to the CFE, created by Balancing Services Use of System (BSUoS) and Transmission Network Use of System (TNUoS) charges, and carbon policies such as the EU-ETS and Carbon Capture Readiness (CCR). The potential for better alignment with ancillary services to reduce the whole costs of the electricity system was also mentioned (see the Glossary in Annex C). As stated, our preference at this time regarding possible market distortions arising from outside the CM is to ensure that the other policies and schemes offer appropriate incentives and close any loopholes. To achieve this, we intend to work across Government to raise awareness of the potential impacts on capacity auction outcomes and push for change where appropriate and practicable.

29. Issues within the institutional framework of the CM were raised by the CFE, in particular the need for simplification of the Rules, the Regulations and processes. This is something we intend to consider. More generally, it was noted in the CFE that there are several issues with the simplicity and user-friendliness of the CM's administrative and operational procedures. We recognise these concerns, which are generally determined by the Rules and/or the processes and procedures of the Delivery Body. We have therefore shared the concerns raised in response to our CFE with Ofgem, so that they may be reflected in their parallel Five-year Review of the Rules. We will continue to support them with simplification wherever possible.

Next steps

30. Overall, there is a strong need for continuation of the CM and performance against its objectives in the last five years has generally been good. Responses to the CFE and other engagements with stakeholders have highlighted several areas of the scheme which would benefit from refinement. In addition, we are required by the legislation to consider ways in which the CM can meet its objectives whilst imposing less regulation. Making too many changes too quickly to the CM could have a destabilising effect on the market so we need to strike the right balance between stability and improvement, by sequencing changes over a suitable timeframe.

31. In May 2019, we consulted on proposals to address two priority issues raised in the CFE. These were changes to interconnector de-rating and the inclusion of further classes of renewable technologies in the CM. These changes help ensure that the CM is as open as possible to all technologies, and that they are assessed and rewarded fairly for their contribution to security of supply. In May and July 2019, following broad support from stakeholders, we implemented these changes via the Capacity Market Amendment (No. 3) Rules 2019 and the Capacity Market Amendment (No. 4) Rules 2019.

32. The EU's Clean Energy Package Electricity Regulation (Recast)[11] entered into force on 4 July 2019. It introduced the requirement to phase out, starting with new build capacity, capacity agreements and payments for generation capacity that emit more than 550g of CO_2 of fossil fuel origin per kWh of electricity. In July 2019, through the Capacity Market Amendment (No. 5) Rules 2019, we implemented the limit for new build capacity in the CM. We intend to launch a consultation in July 2019 which considers proposals on how to implement the carbon emissions limit for existing and refurbished plant.

33. Emerging from this review, there are three key themes under which we intend to make further improvements to the CM, described below (subject to State aid approval for the CM, which will affect any proposals we bring forward and associated timescales). These improvements will take the form of a series of consultations, evidence gathering exercises and legislative changes (if necessary).

34. Futureproofing and maintaining technology neutrality. While we are confident that the CM as implemented in 2014 was appropriate for the conditions at that time, we recognise that the energy market is constantly evolving. Therefore, to ensure the CM continues to remain fit for the future, we intend to:

    - Review potential issues related to DSR (especially delivery assurance, agreements lengths, de-rating & component transparency and the 2MW minimum capacity threshold). See the Glossary in Annex C for an explanation of these terms.
    - Monitor agreement lengths for all technologies.
    - Review and simplify de-rating for all technologies where appropriate.
    - Strengthen the penalty regime.
    - Address issues related to connection capacity for co-located projects (see Glossary in Annex C).
    - Work across Government to understand and address (if appropriate) possible distortions arising from outside the CM, including the EU-ETS and CCR.

[11] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search

- Continue planning for the forthcoming requirement to implement the direct participation of foreign plants, as part of the EU's Clean Energy Package[12].
- Implement a carbon emissions limit for existing and refurbished plants, as part of the EU's Clean Energy Package[13].
- Gather evidence on battery augmentation (see Glossary in Annex C).
- Gather evidence through a review of overseas capacity mechanisms, to support the improvements we are making to the CM. In particular our review will focus on non-delivery penalties, DSR delivery assurance, agreement lengths, models for the participation of foreign capacity, governance and administration. We intend to review the French, Italian, New England (ISO-NE), Pennsylvania-New Jersey & Maryland (PJM), Irish and Polish capacity mechanisms, as well as possibly others.
- Consider the case for moving the T-1 and T-4 auctions back so that, as far as possible, a full 4 years/1 year is available between the T-4/T-1 and the delivery year.

35. Simplification. To reduce complexity, barriers to entry and regulation, and to give participants further certainty, we would like to consider the case for simplifying the institutional framework behind the CM and the roles and responsibilities of delivery partners. In addition, Ofgem's Five-year Review of the Rules[14] is considering ways to simplify prequalification, secondary trading and the rule change process, which we will support. And we are also intending to simplify fees and events termination events and fees (which will result in less burdens) and consider the co-ordination of capacity during a SSE (see Glossary in Annex C).

36. Procuring the right amount of capacity. To ensure cost-effectiveness in the capacity auction outcomes, we intend to review the reliability standard. Although we believe that the reliability standard itself lies within the right range and is suitable in an international context[15], we recognise that some of the components that make up the standard may require an update (e.g. net CONE and VoLL). Additionally, whilst we remain satisfied with the design of the auction at this time, we intend to refresh our past analysis on split auctions now that more data is available on previous capacity auction outcomes, as well as carry out analysis that considers the outcomes of a split auction compared to a single auction under a range of future scenarios. Our intention is to check that our past conclusions on split auctions remain robust and that, going forward, the capacity auctions are designed such that overall CM costs are minimised. Particularly as the proportion of new capacity winning capacity agreements is likely to rise in the future. More generally, we will continue to consider the design of the capacity auction, and decisions taken within it (such as the amount of capacity set-aside for the T-1 auction) to balance the risks of structural over-procurement, which would impose unnecessary consumer costs, against the need to mitigate all plausible risks of delivery failure across the full range of technology types on which we now rely. Furthermore, in April 2018 Ofgem introduced a new regulatory and incentives framework for National Grid ESO[16], including an incentive for accurate demand forecasting. This will help to ensure that the demand forecasting produced by

[12] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search
[13] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search
[14] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
[15] http://sites.ieee.org/pes-rrpasc/working-groups/wg-on-lole-best-practices/
[16] https://www.ofgem.gov.uk/publications-and-updates/independent-review-eso-regulatory-and-incentives-framework

National Grid ESO (on which the capacity target to be procured at auctions is based) remains accurate and robust.

37. As discussed above, we intend to launch a consultation in July 2019 which considers proposals on how to implement a carbon emissions limit for existing and refurbished plant. We then plan to hold another consultation process on issues raised during the Five-year Review and associated CFE before the end of 2019, following the conclusion of the approval process under State aid by the European Commission later in 2019. This consultation will be comprised of two sections. The first section will likely cover proposals on the following:

    - Strengthening the penalty regime.
    - Reducing the 2MW minimum capacity threshold.
    - Addressing issues related to connection capacity for co-located projects.

    The second section will seek to gather further evidence and information on the other issues we have committed to considering as part of this Five-year Review but are not yet ready to consult on proposals for. This may cover (but not be limited to):

    - DSR related issues.
    - De-rating for all technologies.
    - Termination events and fees.

38. Following this first consultation and evidence gathering process, we intend to implement any agreed solutions swiftly. We expect to have completed our analysis on split auctions by the end of 2019. We will then look to come forward as soon as is appropriate with further consultations during 2020. Similar to the first consultation, we may split some of these consultations into two sections to gather further evidence on some issues at the same time as bringing forward proposals on others. Following the series of consultations in 2020, we expect to have taken a decision on the large majority of issues raised during the Five-year Review and associated CFE, and completed our review of the reliability standard. A few of the longer-term issues, such as the direct participation of foreign plants, will likely require further consultation and stakeholder engagement beyond this point. See Table 1 below for an overview of timescales.

39. In taking forward any proposals which we intend to consult on, we will ensure that any changes we propose are consistent with the principles derived from State aid rules of technology neutrality and the efficient use of resources. We expect to engage with the State aid regulator early on in the process of policy development. When determining the exact timeframes of the consultations we will also take into consideration the need to maintain stability in the market, and the significant evidence base and development of legislative alterations that may be needed for some changes.

40. Finally, we intend to carry out an evaluation as part of the ten-year review of the CM, which will be following six full delivery years of the scheme. We will develop and share plans for the evaluation and monitoring process that will inform this evaluation in due course.

Table 1. Overview of timescales for future consultations

	2018						2019				2020		2021		2022
	July	Aug	Sept	Oct	Nov	Dec	Q1	Q2	Q3	Q4	Q1 – 2	Q3 - 4	Q1 - 2	Q3 - 4	
Call for evidence (CFE)															
Standstill period															
First consultation on CFE issues															
Implementation of solutions															
Publication of Five-year Review report															
Consultation on a carbon emissions limit for existing and refurbished plants															
Second consultation on CFE issues															
Implementation of solutions															
Further consultations on CFE issues															
Implementation of solutions															
Final consultations on longer-term CFE issues															
Implementation of solutions															

1. Introduction

1.1 Introduction

41. The Capacity Market (CM) is at the heart of the Government's plans for a secure and reliable electricity system. It ensures sufficient investment in the overall level of reliable capacity (both supply and demand sides) needed to provide secure electricity supplies. The CM ensures sufficient reliable capacity to meet peak demand, for example during cold, still periods where demand is high and wind generation is low. The CM works by giving all capacity providers a steady payment to ensure enough capacity is in place to meet demand. Capacity providers face penalties if they fail to deliver energy when needed.

42. The CM brings forward investment by allowing the market to competitively set a price for capacity. Capacity agreements are offered to investors in existing and new capacity four years and one year ahead of the year capacity must be delivered, giving them certainty over part of the future revenues they will receive. The CM operates alongside the electricity market and the existing services National Grid Electricity System Operator (ESO) contracts to ensure moment to moment balancing of the electricity system.

43. The CM has three objectives:

- *Security of supply:* to incentivise sufficient investment in capacity to ensure security of electricity supply;
- *Cost-effectiveness:* to ensure the most efficient level of capacity is secured at minimum cost to consumers; and
- *Avoiding unintended consequences:* to minimise design risks and complement the decarbonisation agenda.

44. The Government is conducting a review of the CM ("the Five-year Review") for three reasons. Firstly, as it has been five years since its implementation, there is a legislative requirement to carry out a review. The legislative review requirements are explained in Section 1.4 below.

45. Secondly, the first delivery year of the policy (31 October 2017 – 30 September 2018) has recently completed and it is, therefore, a good time to check progress and make sure the CM is working as intended. There have been some calls to review the CM earlier than this, but we feel that it has been important to wait until a full delivery year has been completed before considering any significant changes, to maintain stability and investor confidence, as well as to allow a chance to see how the market delivers in practice. It is also efficient to align the review with the legislative requirements.

46. Finally, the Government was required under the terms of the CM's original State aid approval to conduct a review after five years of operation. Although that State aid approval has now been annulled, the overall review process has been initiated and designed to satisfy this requirement as well, and we are ensuring that the European Commission are aware of the review process and findings.

1.2 Background

47. For the Five-year Review, a forward-looking review process, based on a call for evidence (CFE) and analysis of existing data, has been chosen over an evaluation for several reasons.

48. Firstly, the scheme has only completed one full delivery year. Therefore, there is limited operational data available on which to carry out an evaluation. We intend to carry out an evaluation as part of the ten-year review of the CM, following six delivery years of the scheme. We intend to develop and share plans for the evaluation and monitoring process that will inform this evaluation in due course.

49. Secondly, an independent evaluation of Electricity Market Reform (EMR), which included the CM, was carried out one year after the first capacity auctions were held[17], and the two transitional arrangement (TA) auctions held in 2016 and 2017[18] were also evaluated separately (see Annex A for a summary of these evaluations). The TA auction evaluations in particular covered the auctions and operations for both delivery years (2016/2017 and 2017/18) of the scheme in great detail. This has given us a good understanding of how the CM works in practice. Data from the TA evaluations has been referenced in this report, where relevant.

50. Thirdly, the annual repetition of the capacity auctions has allowed for incremental learnings and improvements to be made, based on the auction outcomes. The auction outcomes have generated a large amount of existing data, which has been drawn on extensively in this review. For example, data has been included on auction price and bids, market liquidity & competition and rates of termination events (see Glossary in Annex C). National Grid ESO also carry out extensive analysis each year on security of supply in Great Britain (GB) through the development of their Electricity Capacity Reports (ECRs)[19]. This analysis is used to set the parameters of the capacity auctions each year. Data from their analysis over the last five years (for example, on capacity margins) has been drawn upon in this review where relevant.

51. Fourthly, we have recently held a CFE (a summary of the responses to the CFE was published in March 2019[20]), to gather qualitative data from stakeholders. We received responses to the CFE from a wide variety of organisations such as generators, trade associations, environmental organisations and demand side response (DSR) providers. The individual capacity providers who responded to the CFE covered around 90% of both the capacity entering prequalification for the auctions (see Glossary in Annex C), and the capacity winning agreements in the 2017 T-4 auction (the auction held four years ahead of delivery). Additional capacity providers may also have provided feedback through the trade bodies that responded. Therefore, we feel the responses are representative of a large majority of capacity providers and cover a comprehensive range of views and issue. Although one group that may be underrepresented are operators who do not participate in the CM at all.

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17 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/468257/Independent_evaluation_of_Electricity_Market_Reform_-_Final_report_-_14_....pdf

18 https://www.gov.uk/government/collections/transitional-arrangements-auction

19 https://www.emrdeliverybody.com/CM/CMDocumentLibrary.aspx

20 https://www.gov.uk/government/consultations/capacity-market-and-emissions-performance-standard-review-call-for-evidence

52. Finally, we have held multiple consultations on the CM over the last five years to ensure continued improvement, effective administration and clarity. The previous consultations both collected feedback and evidence on issues within the CM and implemented improvements to the scheme. In Annex A we have set out a full list of all consultations and evaluations held since the implementation of the CM in 2014, including a brief summary of the technical changes arising from the responses to those consultations. Additional amendments to the Rules have also been made each year, managed by Ofgem[21]. These have covered technical amendments to the Rules, to facilitate the efficient operation and administration of the CM. To date, 85 rule change proposals have been accepted by Ofgem[22]. We therefore have a good understanding of, and have discussed at length with stakeholders, the successes and shortcomings of the scheme to date. For this reason, we are keen to be forward-looking in our Five-year Review.

1.3 Aims

53. Table 2 below sets out the aims of the Five-year Review, the chapters and sections of this report in which each aim is discussed and the legislative provision that is met by each aim.

Table 2. Aims of the Five-year Review

Aim	Chapter & Section(s)	Legislative provisions
To assess whether the CM is still needed in future*	Chapter 2, Section 2.1	-
To assess whether the objectives of the CM and its implementing legislation remain appropriate	Chapter 2, Section 2.2 Annex B	Regulation 81(2)(c), Rule 15.1.2(c)
To assess the extent to which the objectives have been achieved	Chapter 3 Annex B	Regulation 81(2)(b), Rule 15.1.2(b)
To assess whether the objectives can be achieved in the future in a way that imposes less regulation	Chapter 3 Annex B	Regulation 81(2)(c), Rule 15.1.2(c)
To discuss next steps*	Chapter 4	-

*These are not specifically required by the legislation; however, we have included them in order to report on the wider work undertaken as part of the Five-year Review.

21 https://www.ofgem.gov.uk/system/files/docs/2016/09/revised_guidelines_for_the_capacity_market_rules_150916.pdf

22 All rule change proposals are listed at: https://www.ofgem.gov.uk/electricity/wholesale-market/market-efficiency-review-and-reform/electricity-market-reform/change-proposals
These can be filtered to include only proposals that have been Accepted, Rejected, are Open, or are Under Consultation.

1.4 Legislative review requirements

54. The CM was implemented in 2014 as part of the Government's policy of EMR, through four pieces of legislation. Three of these four pieces of legislation require the Government to carry out five-yearly reviews of the CM. These are the Energy Act 2013[23] ("the Act"), the Electricity Capacity Regulations 2014[24] ("the Regulations") and the Capacity Market Rules 2014[25] ("the Rules"). The review requirements in each piece of legislation are set out below. The fourth piece of legislation which implements the CM, the Electricity Capacity (Supplier Payment etc.) Regulations 2014[26] ("the Supplier Payment Regulations"), does not contain a requirement to carry out five-yearly reviews of the CM, but is referred to below for completeness.

55. The Regulations and the Rules are the key legislation which implement the objectives of the CM (including security of supply), together with the Supplier Payment Regulations. As both the Rules and the Regulations contain a requirement to carry out a five-yearly review and publish a report, we have produced this single report to meet both requirements and avoid duplication of overlapping content.

56. In addition, an updated version of this report will form the basis of one chapter of a wider report that will be published and laid in parliament later in the year to satisfy the requirement in section 66 of the Act to review provisions of the Act implementing EMR.

1.4.1 The Energy Act 2013

57. The Act is the primary legislation which provides the powers for secondary legislation to be made to establish the CM. Part 2 of the Act sets out the provisions for EMR. Section 66, which contains the requirement for a five-yearly review of each element of EMR, including the CM, is set out below.

> *(1) As soon as reasonably practicable after the end of the period of 5 years beginning with the day on which this Act is passed* [18 December 2013]*, the Secretary of State must carry out a review of the provisions of…* [Chapter 3 of Part 2 of the Act (capacity market)]*; …*
>
> *(2) The Secretary of State must set out the conclusions of the review in a report.*
>
> *(3) The report must, in particular—*
>
> *a) set out the objectives of the provisions of each Chapter subject to review,*
>
> *b) assess the extent to which those objectives have been achieved, and*
>
> *c) assess whether those objectives remain appropriate and, if so, the extent to which those objectives could be achieved in a way that imposes less regulation.*
>
> *(4) The Secretary of State must lay the report before Parliament.*

[23] http://www.legislation.gov.uk/ukpga/2013/32/contents/enacted
[24] http://www.legislation.gov.uk/uksi/2014/2043/contents/made
[25] https://www.ofgem.gov.uk/publications-and-updates/publication-consolidated-capacity-market-rules-2018
[26] https://www.legislation.gov.uk/ukdsi/2014/9780111123119

1.4.2 The Electricity Capacity Regulations 2014

58. The Regulations, together with the Supplier Payment Regulations and the Rules, are the secondary legislation implementing the Capacity Market. The Regulations provide detail on the functions and powers of the Secretary of State and the CM delivery partners as well as the overall implementation of the scheme by the CM's delivery partners. The application of the Regulations is currently modified by the Electricity Capacity (No. 1) Regulations 2019.

59. Regulation 81 sets out the requirement for the Secretary of State to review the Regulations and the functions conferred on the Authority (Ofgem) by the Rules on a five-yearly basis and publish a report setting out the conclusions of the Review. In summary, the report must set out the objectives of the Regulations (which are the same as the objectives of the CM, set out in Section 1.1 above), assess the extent to which those objectives are achieved and assess whether those objectives remain appropriate and if so, whether they can be achieved in a less burdensome way.

60. Regarding the requirement to review the functions conferred on the Authority (Ofgem) by the Rules, the same requirement exists in the Rules, set out in Section 1.4.4 below. This requirement has been met by the reviews contained in Section 3 and Annex B of this report.

61. The Regulations also require that the Five-year Review takes account of two different pieces of work by Ofgem. Firstly, the annual operational reports published as part of the annual review of the Capacity Market Rules[27]. Five of these have been published to date. Secondly, Ofgem's Five-year Review of the Rules, which has been undertaken in parallel to our Five-year Review. We have therefore referred to the relevant documents where necessary in this report. The text of Regulation 81 is included below.

(1) The Secretary of State must from time to time —

(a)carry out a review of —

(i)these Regulations; and

(ii)the functions conferred on the Authority by capacity market rules

(b)set out the conclusions in a report; and

(c)publish the report.

(2) The report must in particular —

(a)set out the objectives intended to be achieved by these Regulations;

(b)assess the extent to which those objectives are achieved; and

(c)assess whether those objectives remain appropriate and, if so, the extent to which they could be achieved in a less burdensome way.

(3) The first report under this regulation must be published before the end of the period of five years beginning with the date on which these Regulations come into force [31 July 2014].

(4) Reports under this regulation are, after the first report, to be published at intervals not exceeding five years.

[27] https://www.ofgem.gov.uk/electricity/wholesale-market/market-efficiency-review-and-reform/electricity-market-reform-emr

(5) In carrying out the review under paragraph (1)(a), the Secretary of State must take account of any reports published by the Authority under regulation 82 [Ofgem's Five-year Review of the Capacity Market Rules] *or provided to the Secretary of State under regulation 83* [Ofgem's Annual Reports on the Operation of the CM].

1.4.3 The Electricity Capacity (Supplier Payment etc.) Regulations 2014

62. The Supplier Payment Regulations make provision about payments to be made by and to electricity suppliers and capacity providers in relation to the CM. In particular, they impose an obligation on electricity suppliers to pay a supplier charge to fund capacity payments payable to capacity providers under the Regulations, and a Settlements Costs Levy to fund the cost of the Settlement Body administering those payments. The Supplier Payment Regulations also confer functions on the Settlement Body in relation to the calculation, determination and administration of such payments. The application of the Supplier Payment Regulations are currently modified by the Electricity Capacity (No. 1) Regulations 2019.

63. The Supplier Payment Regulations do not contain a review requirement.

1.4.4 The Capacity Market Rules 2014

64. The Rules supplement the Regulations and Supplier Payment Regulations by setting out the technical and operational details for the implementation of the CM. The Rules are amended from time to time. Broadly, Ofgem is responsible for updating the contents of the Rules. The Secretary of State may also make changes to the Rules (see Annex B for a list of rules made or amended by the Secretary of State since 30 June 2015), typically to align the Rules with changes made to the Regulations. Ofgem carry out an annual review of the Rules and publish annual reports on the operation of the CM[28].

65. Rule 15.1.1 sets out a requirement for the Secretary of State to carry out a review of the Rules once every five years, set out the conclusions of the review in a report and publish the report alongside the report for parliament. In summary, the report must set out the objectives of the Rules, assess the extent to which those objectives are achieved and assess whether those objectives remain appropriate and if so, can they be achieved in a less burdensome way. The text of Rules 15.1 to 15.3 is set out below.

15.1.1 The Secretary of State must from time to time:

(a) carry out a review of the following provisions of the Rules, namely:

(i) any rules that confer functions on the Secretary of State or the Authority; and

(ii) any rules made or amended by the Secretary of State after 30 June 2015; and

(b) publish a report setting out the conclusions of the review.

15.1.2 The report must in particular:

(a) set out the objectives intended to be achieved by the rules reviewed under this Rule 15.1;

(b) assess the extent to which those objectives are achieved; and

(c) assess whether those objectives remain appropriate and, if so, the extent to which they could be achieved in a less burdensome way.

[28] https://www.ofgem.gov.uk/publications-library

> *15.1.3 The first report under this Rule 15.1 must be published with the report by the Secretary of State under Regulation 81* [i.e. this report].

66. This review requirement applies to a small minority of rules: rules that confer functions on the Secretary of State or the Authority (Ofgem), and any rules made or amended by the Secretary of State since 30 June 2015. Therefore, rather than producing a separate report, the review of the Rules by the Secretary of State has been integrated into this report. Annex B summarises the findings of the review, which is also partially integrated with the review contained in Section 3. We have cross referenced the relevant parts of Section 3 in Annex B where necessary.

1.5 Call for evidence and data sources

67. To gather evidence for the Five-year Review, a CFE was published in August 2018[29]. It sought views and evidence on the performance of the CM and whether there are aspects of its design that may require improvement if it is to continue meeting its objectives in the future. This included, for example, the auction parameter setting process, application of the principle of technology neutrality, non-delivery penalties, termination fees and delivery assurance arrangements (see Glossary in Annex C). The closing date for responses was 1 October 2018.

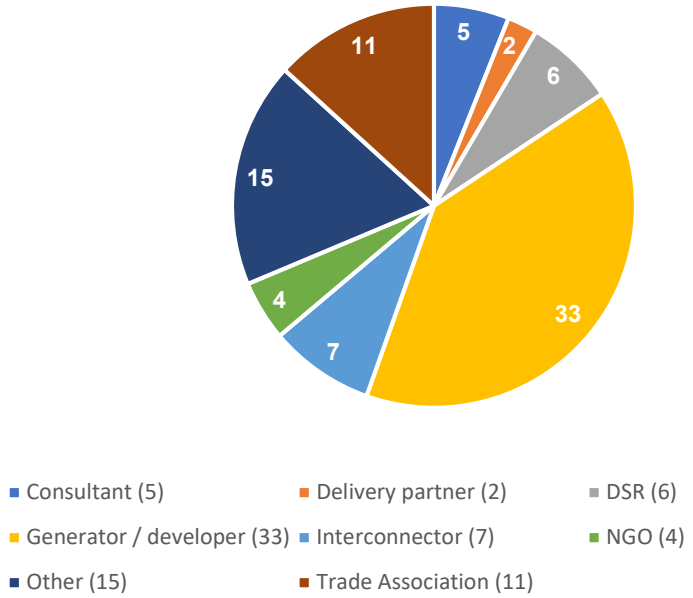
68. The CFE highlighted that the Government's view going into the review was that the CM is broadly working as intended, albeit there are some opportunities to further improve it.

69. A total of 83 responses were submitted to the CFE by a wide variety of organisations (Figure 1). This was a greater number of respondents than expected and allowed for the collection of rich information with plenty of coverage on all the issues discussed. The individual capacity providers who responded to the CFE covered around 90% of both the capacity entering prequalification for the auction, and the capacity winning agreements in the 2017 T-4 auction. Additional capacity providers may also have provided feedback through the trade bodies that responded. Therefore, the responses are representative of a large majority of capacity providers and cover a comprehensive range of views and issue. Although one group that may be underrepresented are operators who do not participate in the CM at all.

70. In March 2019, we published a summary of the responses to our CFE[30].

[29] https://www.gov.uk/government/consultations/capacity-market-and-emissions-performance-standard-review-call-for-evidence
[30] https://www.gov.uk/government/consultations/capacity-market-and-emissions-performance-standard-review-call-for-evidence

Figure 1. Breakdown of responses to the call for evidence



71. In addition to the CFE, the Five-year Review has also drawn on evidence gathered from published data and reports such as the Delivery Body's auction registers[31], National Grid's Winter Outlook Reports[32], Government's Evaluation of the TA auctions[33] and Ofgem's Annual Reports on the Operation of the CM[34].

1.6 The State aid judgment of the General Court of the Court of Justice of the European Union (CJEU) and implications for the Five-year Review

72. On 15 November 2018, a judgment of the General Court of the CJEU ("the General Court judgment") annulled the European Commission's July 2014 State aid approval of GB's CM[35], on grounds that, in summary, the European Commission should have carried out a second stage investigation into the scheme. This judgment means that, as at the date of this report, the CM is in a standstill period (see Glossary in Annex C), with the Government unable to make capacity payments or grant capacity agreements conferring a right to receive capacity payments, until the CM is approved.

73. In light of the General Court judgement, we have needed to take action to maintain security of supply and to secure State aid approval as quickly as possible. We have therefore limited the amount of formal consultation on proposals related to the Five-year Review that we have brought forward. This has been because it would be inappropriate to consult on and make legislative changes related to certain issues during the current standstill period.

74. Nonetheless, in March 2019, we came forward with proposed changes to two priority issues raised in the CFE: interconnector de-rating and the inclusion of further renewable technologies in the CM (see Glossary in Annex C). These changes help to ensure that the

[31] https://www.emrdeliverybody.com/CM/Registers.aspx
[32] https://www.nationalgrideso.com/insights/winter-outlook
[33] https://www.gov.uk/government/collections/transitional-arrangements-auction
[34] https://www.ofgem.gov.uk/publications-library
[35] http://ec.europa.eu/competition/state_aid/cases/253240/253240_1579271_165_2.pdf

CM is as open as possible to all technologies, and that they are assessed and rewarded fairly for their contribution to security of supply. In order to bring these changes into effect, the Government has amended the Rules and the Regulations where necessary. The Capacity Market Amendment (No. 3) Rules 2019 came into force in late May and amended the methodology for interconnector de-rating and introduced further renewable technologies to the CM. These changes were further supported by the Capacity Market Amendment (No. 4) Rules 2019, which came into force with the Electricity Capacity (No.2) Regulations in late July.

75. We are continuing to reflect on the full range of issues raised in the CFE. We have set out, in Section 4 the areas in which we intend to carry out further work, including further consultation and legislative changes where appropriate, after the publication of this report.

76. This expectation and the conclusions of this report, in particular, the areas in which we intend to carry out further work (set out in Section 4) and associated timescales, are predicated on the assumption that the CM receives State aid approval in good time.

1.7 Ofgem's Five-year Review of the Capacity Market Rules

77. Ofgem are required by the legislation to carry out a review of the Rules every five years ("the Five-year Review of the Rules"), alongside the Government's Five-year Review of the CM.

78. In parallel to the CFE, Ofgem published an open letter on 11 September 2018 seeking views and evidence on the Rules, the annual Rule change process and the Delivery Body's incentives[36]. In March 2019 Ofgem ran a further consultation on proposed changes to the Rules, based on the findings of the open letter[37]. This consultation considered both improvements to discrete areas of the Rules and/or the CM framework to align with the priorities identified in the open letter, as well as other groups of proposals such as those that had been delayed from previous years.

79. On 18 July 2019, Ofgem published a decision letter[38], which highlights their decisions and reasoning for specific proposals relating to changes to the Rules put forward in Annex A of their consultation issued in April 2019[39]. A table summarising the specific Rule changes they have decided to implement ahead of the 2019 prequalification window is included in the letter, alongside a full set of drafting amendments to the Rules in an Annex.

80. The March consultation was the first phase in Ofgem's plan to develop a longer-term programme of changes to the Rules, as part of their Five-year Review of the Rules. They intend to publish further consultations in the future to cover further-reaching changes.

81. In addition, they intend to publish a report that summarises their Five-year Review of the Rules in the Summer, as well as an accompanying Forward Work Plan which will signpost their future work streams.

82. Our review has been informed, in part, by Ofgem's Five-year Review of the Rules and we have referred to documents related to their review where relevant in this report.

[36] https://www.ofgem.gov.uk/publications-and-updates/open-letter-five-year-review-capacity-market-rules-and-nget-s-incentives
[37] https://www.ofgem.gov.uk/publications-and-updates/five-year-review-capacity-market-rules-first-policy-consultation
[38] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
[39] https://www.ofgem.gov.uk/publications-and-updates/five-year-review-capacity-market-rules-first-policy-consultation

2 The future of the Capacity Market

2.1 Do we still need a Capacity Market?

83. There was overwhelming support amongst respondents to our CFE for continuation of the CM. This supports the Government's view that there is a strong need to maintain the CM, given that many of the underlying issues that led to its introduction continue. In particular, the significant coal and nuclear plant closures expected in the 2020s, the persistence of the 'missing money' problem (see Glossary in Annex C) and the rapid evolution of the GB electricity system.

84. The large majority of respondents to the CFE felt that the CM remains critical to providing investor confidence during a time of rapid change. The CFE also noted that a clearing price close to zero for a sustained period could be interpreted as an indication that the 'missing money' problem may have been resolved. While clearing prices have been low in recent auctions, over the lifetime of the CM they have been variable, and many respondents believed they are likely increase in future.

85. Recent analysis from National Grid ESO supports the need for a continuation of the CM. Their assessment is that loss of load expectation (LOLE) (see Glossary in Annex C) will be above three hours between 2019/20 and 2023/24 without the CM (or any alternative measure, such as a strategic reserve)[40]. In contrast, with a CM in place, National Grid ESO forecast LOLE to range between zero and one hour in the same period. Our reliability standard in GB is three hours LOLE, therefore without the CM it appears unlikely that we would consistently meet the reliability standard over the next 5 years.

86. In light of the assessment by National Grid ESO and the responses to our CFE, we are committed to the continuation of the CM for the foreseeable future. We will revisit the need for a CM as part of the ten-year review (as we are required by the legislation to carry out a review of the CM every five years).

87. Whilst we recognise the importance of the CM, we understand that there is also room for improvement in the current design, to ensure it better meets its objectives. Responses to the CFE focused in particular on the need to remove perceived market distortions that may impact auction competition and the need to adapt to future security of supply challenges (e.g. the changing nature of system stress events (SSEs - see Glossary in Annex C) and also how the CM interacts with other electricity system requirements such as flexibility). We agree that certain areas of the CM require review in this regard. In Sections 3 and 4 of this report we have explored the issues raised in the CFE and set out our intentions going forward. Subject to the State aid approval for the CM being forthcoming, we expect to consult further and make legislative changes where appropriate, following the publication of this report.

[40] National Grid ESO have undertaken a detailed review of the economics of coal, gas and small peaking plant utilising the best publicly available cost data with their own assessment of the various market revenue streams e.g. wholesale, balancing, ancillary services and the CM. This enabled them to identify the individual plants at greatest risk of closing when CM revenues are no longer available and the impact of their closure on loss of load expectation (LOLE). They also carried out sensitivity analysis on their assessment, by analysing what the impact would be on the margin and LOLE metrics if there were 1GW less or more closures than expected.

88. The impact assessments (IAs) conducted as part of the implementation of the CM in 2011[41], 2012[42] and 2014[43] consider several alternatives to a CM. In particular, a strategic reserve and a reliability market (see Glossary in Annex C). In the 2014 IA, the CM was found to be a cost-effective option (providing a £346m improvement in net welfare over the period 2012-2030). The 2011 and 2012 IAs found that an administrative CM has fewer drawbacks than alternatives. However, a small minority of respondents to our CFE were opposed to the continuation of the CM on the basis that that there are other ways of achieving security of supply (e.g. a strategic reserve).

89. We believe that the analysis conducted in 2011, 2012 and 2014 and contained in the IAs was robust and the context has not changed significantly. In particular, significant coal and nuclear plant closures are still expected in the 2020s, the 'missing money' problem persists, and our electricity system is continuing to evolve rapidly.

90. A strategic reserve had several downsides compared to a CM. It applies less downward pressure on wholesale prices, creates a risk that plants not selected for the reserve would close down, offers less support for non-generation approaches and has the potential to distort the merit order. Additionally, fundamental changes to the scheme for ensuring security of supply at this point in time could have severe destabilising effects on industry and investors. On this basis, we have not reconsidered alternatives to the CM as part of our Five-year Review. In the last five years, several capacity mechanisms have been developed in other regions[44]. This shows that a capacity mechanism is recognised internationally as a solution to many of the problems faced by modern energy systems.

2.2 Do the objectives of the Capacity Market remain appropriate?

2.2.1 Appropriateness of existing objectives

91. Our view is that the CM's objectives remain well aligned and central to delivering the Government's energy priorities. The majority of responses to the CFE endorsed our position. However, a minority argued that the CM's design should be amended to favour their choice of technology over others, in recognition of the contribution this technology can make to delivering wider energy objectives. In a similar vein, other respondents queried whether the CM was securing the optimal mix of projects and technologies in terms of minimising whole system costs and delivering emission reductions.

92. We continue to think (and the State aid guidelines require) that the CM's design should continue to be consistent with the EU principle of technology neutrality, as this is critical to maximising competition in the auctions and ensuring capacity is secured at the minimum cost to consumers. We also believe that securing an optimal mix of technologies is best achieved through ensuring, as far as possible, competition in the capacity auctions is based on a level playing field, and that collectively, energy policies enable assets to monetise the range of benefits they provide to the system but also bear any costs for which they are responsible.

[41] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42797/3883-capacity-mechanism-consultation-impact-assessment.pdf
[42] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/66039/7103-energy-bill-capacity-market-impact-assessment.pdf
[43] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/354677/CM_-_revised_IA_and_front_page__September_2014__pdf_-_Adobe_Acrobat.pdf
[44] E.g. Ireland, Poland, Italy and France.

93. We agree that some changes to the CM may be required to ensure it better meets its objectives. However, we believe that the objectives themselves remain suitable and do not require amendment.

2.2.2 The need for additional objectives

94. As noted in the CFE, although the CM is not intended in and of itself to drive decarbonisation, it has been designed to be compatible and consistent with decarbonisation policies. Capacity providers are required to comply with emission limits enshrined in other policies and regulations, such as the EU Emission Trading Scheme (EU-ETS) and Emissions Performance Standard (EPS) (see Glossary in Annex C). This is an approach that we continue to support and was also advocated by a number of respondents to the CFE, although some felt the CM should do more and have a stronger objective linked to decarbonisation or a specific decarbonisation objective.

95. At this time, we do not believe the CM should be amended to offset the impact of possible market distortions arising in other policies or scheme or to have an additional objective linked to other non-security of supply related energy objectives. Such an approach risks introducing significant complexity within the CM design and would also require revisions to the State aid notification. Our preference at this time is to remove any possible market distortions that may arise within the CM directly and then address any possible distortions that may arise outside the CM by ensuring that the other policies and schemes offer appropriate incentives and close any loopholes.

96. Overall, we believe that the objectives of the CM remain appropriate and we do not at this time intend to include any additional objectives. We will work across Government to ensure that possible market distortions and potential benefits arising in the wider policy landscape are properly considered. It is worth noting that some of the changes already implemented as part of the Five-year Review (e.g. the inclusion of further renewable technologies[45] and a carbon emissions limit for new plants) will further support decarbonisation. Additionally, we intend to launch a consultation in July 2019 which considers proposals on how to implement a carbon emissions limit for existing and refurbished plant.

[45] Although we do not believe CM revenues in themselves will have a material impact on the amount of new renewable projects coming forward.

3. The extent to which the Capacity Market is meeting its objectives and whether its objectives can be achieved in the future in a way that imposes less regulation

3.1 Security of supply

98. The first objective of the CM is to incentivise sufficient investment in capacity to ensure security of electricity supply. We have considered performance against this objective under three themes:

- Technology neutrality and futureproofing
- Investment in capacity
- Delivery during a stress event

3.1.1 Technology neutrality and futureproofing

99. The CM's design is consistent with the EU principle of technology neutrality, which requires State aid approved electricity resource adequacy schemes (like the CM) to enable participation by all technologies capable of the required technical performance. Capacity agreements have been awarded to a diverse mix of energy technologies (see Table 3 for a summary of capacity agreements awarded in the 2017 auctions as an example of this). This has included significant amounts of flexible and smart technologies, such as DSR, batteries and reciprocating engines. This has been positive in facilitating the transition to a smarter, more flexible electricity system. We also recognise the importance of ensuring that large, mid-merit and baseload plant (see Glossary in Annex C) can compete in the CM and the significant contributions these plants make to security of supply in GB.

Table 3. Capacity agreements awarded by technology type in the 2017 capacity auctions[46]

Technology	MW in the 2017 T-4	MW in the 2017 T-1
Combined cycle gas turbine (CCGT)	23,074	2,215
Nuclear	7,926	0
Combined heat and power (CHP) and auto-generation	4,681	662
Interconnectors	4,558	0
Storage	2,682	101
Coal	2,565	438

[46] Source: EMR Delivery Body CM Registers 30 April 2019

Technology	MW in the 2017 T-4	MW in the 2017 T-1
Open cycle gas turbine (OCGT) and Reciprocating engines (gas fuelled)	1,928	1,516
DSR	1,207	410
Hydro	654	0
Waste	481	162
Open cycle gas turbines (OCGT) and reciprocating engines (diesel fuelled)	357	99
Open cycle gas turbines (OCGT) and reciprocating engines (other fuels)	244	86
Biomass	61	33
Other	0	7
Total	**50,417**	**5,728**

100. We intend to ensure that competition in the CM continues to be based on a level playing field between technologies. This approach was supported by the majority of responses to our CFE. In order for there to be a level playing field there will be instances in which it is appropriate or necessary for the CM to vary and flex the provision it makes for particular technologies to reflect differences in the technical performance or circumstances associated with different technologies.

101. In order to maintain the principle of technology neutrality, we have in the past acted to level the playing field in the CM. For example, in the past we changed our approach to de-rating limited duration battery storage to ensure it was remunerated appropriately for its contribution to security of supply. It remains our intention to continue to maintain a level playing field in this fashion, by addressing any possible barriers within the CM as they arise.

102. Currently there is rapid technological development in three broad areas of our energy system: digitalisation and smart demand; renewable energy generation technologies; and batteries and storage technologies[47]. In light of this rapid development, it is important not only that we react to level the playing field and remove any possible barriers that affect technology neutrality within the CM as and when they arise, but also that we try to anticipate and remove barriers before they arise in the future, thereby ensuring that the CM is futureproofed. On this basis, in March 2019, we consulted on proposals to address two priority issues raised in the CFE, related to specific technologies. These were changes to interconnector de-rating and the inclusion of further renewable technologies in the CM. In May and July 2019, following broad support from stakeholders, we implemented these changes through the Capacity Market Amendment (No. 3) Rules 2019 and the Capacity Market Amendment (No. 4) Rules 2019. Moving forward, we intend to continue to proactively address and prevent barriers that affect technology neutrality in the CM.

[47] https://www.gov.uk/government/publications/cost-of-energy-independent-review

De-rating

103. All capacity that bids into the CM must be 'de-rated' to adjust for the risk that some or all will not be available to respond during a SSE (see Glossary in Annex C). The Secretary of State and the Delivery Body determine the de-rating factors[48] for each technology by considering the average contribution that a particular resource may bring to the GB market during a SSE, based on several factors such as historic reliability.

104. When the CM was implemented in 2014, the concept of de-rating was designed primarily with thermal generation in mind. It has been relatively simple to derive de-rating factors for thermal plants. However, as the diversity of technologies winning capacity agreements has rapidly increased, de-rating has become a more complex exercise and has required existing methodologies be adapted and new methodologies introduced (see Table 4, which shows the de-rating factors for all capacity auctions held to date).

105. While in every case the Government is confident, in the light of technical expert advice, that the methodologies are appropriate and robust for the specific technologies being considered, the greater number of methodologies arguably makes it more challenging to ensure that, or at least articulate how, all technologies are being de-rated accurately and fairly. This view was shared by respondents to our CFE. In the past, we have tended to consider issues with de-rating factors for specific technologies in isolation (e.g. storage). Emerging from the Five-year Review, it is our intention to review de-rating for all technologies, with a view to setting out the guiding principles and objectives within which the existing specific methodologies can still sit.

106. We want to take stock of the changes we have made to date, see if there are any opportunities for simplification, consider emerging technological developments (e.g. DSR battery components, hybrid projects) (see Glossary in Annex C) and ensure that the process for updating de-rating factors is sufficiently regular, transparent and flexible. This will enable new information to be incorporated quickly to avoid risks to security of supply and unnecessary barriers to entry. This includes the potential to refresh de-rating formulas for well-established technologies in light of new information e.g. end of life operation. In this regard, we also note the suggestion made by respondents to the CFE of allowing capacity providers to choose a lower de-rating factor than those set by the Delivery Body.

107. We do not foresee making any significant changes to the concept of de-rating as part of this review. Rather, we want to review de-rating factors in the round and make sure the process of de-rating is as simple and fair as possible. We wish to do this in a way which maintains stability in the CM and aligns with other changes that we would like to make. We will work closely with Ofgem, the Delivery Body, the Panel of Technical Experts (PTE) and industry to gather evidence to inform our review, before we come forward with any appropriate or necessary proposals.

Table 4. De-rating factors by technology[49,50]

Technology	De-rating factors				
	2014 T-4	2015 T-4	2016 T-4	2017 T-4	2017 T-1
Oil-fired steam generators	82.10%	84.61%	85.44%	88.04%	88.04%

[48] The Delivery Body is required by Rule 2.3.1 to determine the de-rating factor for DSR and generating technology classes (including batteries), and the Secretary of State is required by Rule 2.3.1A to determine de-rating factors for interconnectors (Annex B of this report contains a description of this function).
[49] https://www.emrdeliverybody.com/CM/Auction-Results-1.aspx
[50] Wind and solar have been incorporated into the CM in 2019 and will have de-rating factors in the auctions this year.

Technology		De-rating factors				
		2014 T-4	2015 T-4	2016 T-4	2017 T-4	2017 T-1
Open cycle gas turbines (OCGT) and reciprocating engines (non-auto-generation)		93.61%	94.54%	94.17%	94.81%	94.81%
Nuclear		81.39%	82.31%	84.36%	85.24%	85.24%
Hydro		83.61%	84.87%	86.16%	87.92%	87.92%
Storage	All durations	97.38%	96.63%	96.29%	n/a	n/a
	Storage Duration: 0.5h	n/a	n/a	n/a	17.89%	21.34%
	Storage Duration: 1h	n/a	n/a	n/a	36.44%	40.41%
	Storage Duration: 1.5h	n/a	n/a	n/a	52.28%	55.95%
	Storage Duration: 2h	n/a	n/a	n/a	64.79%	68.05%
	Storage Duration: 2.5h	n/a	n/a	n/a	75.47%	77.27%
	Storage Duration: 3h	n/a	n/a	n/a	82.03%	82.63%
	Storage Duration: 3.5h	n/a	n/a	n/a	85.74%	85.74%
	Storage Duration: 4h+	n/a	n/a	n/a	96.11%	96.11%
Combined cycle gas turbines (CCGT)		88.00%	89.00%	90.00%	90.00%	88.54%
Combined heat and power (CHP) and auto-generation		90.00%	90.00%	90.00%	90.00%	90.00%
Coal/biomass		87.64%	87.86%	86.92%	87.58%	87.58%
DSR		89.70%	86.80%	86.88%	86.34%	86.34%
Interconnectors	IFA (France)	n/a	52.00%	60.00%	63.00%	n/a
	Eleclink (France)	n/a	56.00%	65.00%	69.00%	n/a
	BritNED (Netherlands)	n/a	69.00%	74.00%	76.00%	n/a
	NEMO (Belgium)	n/a	54.00%	77.00%	75.00%	n/a
	Moyle (Ireland)	n/a	6.00%	26.00%	28.00%	n/a
	EWIC (Ireland)	n/a	6.00%	26.00%	59.00%	n/a
	IFA2 (France)	n/a	n/a	62.00%	65.00%	n/a
	NSL (Norway)	n/a	n/a	78.00%	85.00%	n/a

Demand side response (DSR)

108. DSR is an active reduction in the amount of electricity that a user is taking from the grid at a given moment in time. It can be delivered by a number of technologies and processes.

It makes an important contribution to security of supply and is a smart approach to managing the electricity system.

109. To help prepare the DSR and small-scale distribution connected generation sectors for the open capacity auctions, two TA auctions were held in 2016 and 2017[51]. The TA auctions delivered around 300MW of DSR each (after terminations). The TA auctions developed the market for DSR aggregators (see Glossary in Annex C) and made the technology more competitive in the open capacity auctions. DSR participation in the open capacity auctions has increased steadily since the TAs with the amount of DSR entering the T-4 auctions more than trebling over the four auctions and doubling over the two T-1 auctions. The volume of DSR being successful in the capacity auctions has also grown over the period (See Table 5).

Table 5. DSR performance in the capacity auctions[52]

Auction	DSR performance		
	Entered auction (MW)	Won capacity agreements (MW)	
T-4 2014	603	174	(29% success)
T-4 2015	673	456	(68% success)
T-4 2016	1,798	1,408	(78% success)
T-4 2017	2,246	1,207	(54% success)
T-4 2018	2,620		
T-1 2017	1,283	442	(34% success)
T-1 2018	2,092		
2015 TA	619	475	(77% success)
2016 TA (turn-down DSR only – see Glossary in Annex C)	373	312	(84% success)

110. The outcome of the CFE highlighted several potential issues related to DSR in the CM. These focused in particular on the need for fair checks and balances to ensure the delivery of unproven DSR (see Glossary in Annex C), the removal of potential barriers to DSR and the need for greater transparency of DSR components. Full details are set out below.

111. We understand that the DSR sector is evolving and has changed significantly since 2014. There is also now greater experience and understanding, both within industry and Government, of how DSR participates and performs in the CM. We therefore agree that while the approach to DSR was appropriate in 2014, the potential issues related to DSR that were raised in response to the CFE require consideration. As part of our Five-year Review, we therefore intend to review these issues. We want to ensure that all technologies, including DSR, can continue to compete on a fair and level playing field in the

[51] https://www.gov.uk/government/collections/transitional-arrangements-auction

[52] Source: EMR Delivery Body CM Registers 30 April 2019

CM. We intend to engage with both industry and our delivery partners to gather evidence and may come forward with proposals in due course.

Capacity agreement lengths for DSR

112. In response to the CFE there were differing views on whether capacity agreements longer than one year should be made available for DSR. Some felt that DSR would benefit from access to longer term capacity agreements to help with planning and covering administration costs, whereas others felt they were not necessary.

113. Our preference is to maintain one year agreement lengths wherever possible, unless there is strong evidence to deviate away from this. Longer-term agreements expose the consumer to price, competition and volume risks. Therefore, our preference minimises financial risk to the consumer and the disbenefits of 'locking-in' capacity for the long-term, such as a lack of innovation and reduced environmental performance. Regarding DSR, no quantitative evidence, or any other sufficiently strong evidence, was presented via the CFE or other means, that could be used to inform a policy decision on whether multi-year agreements for DSR are necessary. But we remain open to considering the possibility of multi-year agreements for DSR, should the need for this be supported by the evidence. We will research and gather evidence on DSR agreement lengths. We will engage with industry and the Delivery Body as part of our research and evidence gathering.

The amount of T-1 set-aside

114. Some respondents to the CFE felt that the smaller T-1 set-aside (see Glossary in Annex C) in recent auctions (see Table 6) had been detrimental to DSR participation and therefore recommended increasing the amount of T-1 set-aside in future auctions. Others felt that increasing the amount of T-1 set-aside was not important for DSR, given the high participation of DSR in the recent T-4 auctions (see Table 5 above). There were additional suggestions that Government should enshrine in the Regulations the commitment to procure at least 50% of the set-aside in T-1 in line with the requirements of the State aid approval[53], to ensure that this commitment is honoured and to give certainty on auction volumes.

Table 6. T-1 set-aside capacity

Delivery year	Capacity set-aside for T-1 (GW)
2018/19	2.5
2019/20	2.5
2020/21	0.6
2021/22	0.4

115. We agree that it does not appear that the smaller T-1 set-aside is having a significant impact on DSR participation, as participation in the T-4 auctions is healthy. That said, the Government recognises that a segment of the sector still views the T-1 auction as the more desirable route to market. We retain the flexibility to change the proportion of set-aside from one year to the next, as part of our auction parameter setting process. This is an important tool for balancing the risk of over-procurement of capacity against risks to security of

[53] See paragraph 46 of the European Commission's July 2014 decision http://ec.europa.eu/competition/state_aid/cases/253240/253240_1579271_165_2.pdf

supply. We have in the past, and will continue to, utilise this flexibility to balance the risks of structural over-procurement of capacity, which would impose unnecessary consumer costs, against the need to mitigate all plausible risks of delivery failure across the full range of technology types on which we now rely. The Government considered itself bound to auction at least 50% of the set-aside in T-1 auctions as a condition of our original State aid approval, and we would expect it to form part of any future approval in a similar way. Therefore, we do not believe that it is necessary for the commitment to be enshrined in the Regulations and we will continue to auction at least 50% of set-aside volumes at T-1 auctions.

Reducing the 2MW minimum capacity threshold

116. Responses to the CFE highlighted the possibility of reducing the 2MW minimum capacity threshold, which places a minimum threshold to participate in the CM upon capacity providers (including capacity that has been aggregated within one Capacity Market Unit (CMU)) (See Glossary in Annex C). Reducing the threshold would allow additional DSR that is difficult to aggregate to participate, as well as small scale generation and storage units.

117. When the CM was implemented, the 2MW minimum capacity threshold achieved the correct balance between maximising liquidity of the capacity auctions and minimising administrative costs. In 2014, 2MW was a low threshold when compared to other energy markets at that time. However, since 2014, the energy systems in both GB and internationally have changed significantly. In particular, there is a trend towards the deployment of smaller, more distributed energy resources such as DSR and reciprocating engines. In line with this, transmission system operators (TSOs) are handling capacity in smaller increments. The forthcoming Trans European Replacement Reserve Exchange Project (Project TERRE) will use a threshold of 1MW for trading (see Glossary in Annex C). In addition, some ancillary services procured by National Grid ESO already have a 1MW minimum capacity threshold, e.g. Firm Frequency Response. Due to the trends in the energy system since 2014 and the imminence of Project TERRE, we think there could be a case for reducing the 2MW threshold in the CM to 1MW. We intend, in collaboration with National Grid ESO, to consider this change and come forward with proposals in due course.

Delivery assurance for DSR – credit cover, delivery milestones and termination fees

118. Respondents to the CFE held opposing views as to whether credit cover (see Glossary in Annex C) should be increased (in line with credit cover for new build generation), decreased or kept the same for DSR. The main suggestion that emerged was that credit cover should be released progressively as DSR components are registered over time, with an increase in cover required just ahead of T-1 for any remaining unfilled capacity at this time. This suggestion was also made in response to our 2017 consultation[54]. Several responses suggested additional reporting requirements for DSR to demonstrate progress in recruitment of components or tightening some of the delivery milestones (e.g. bringing forward the timing of the DSR Test to take place ahead of the T-1 auction) (see Glossary in Annex C).

119. We believe that there is a need to develop an alternative 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. We note the suggestions made in the CFE, particularly

[54] https://www.gov.uk/government/consultations/capacity-market-consultation-improving-the-framework-detailed-proposals

the progressive release of credit cover. We will consider options for improving delivery assurance for DSR. We also intend to review and simplify termination events and fees for all CM participants (see Section 3.1.2). We will engage with industry and delivery partners during these processes and may come forward with proposals.

The methodology for charging suppliers to fund capacity payments (the "supplier charge")

120. Responses to the CFE noted that the methodology for the supplier charge may have the potential to create market distortions, despite ongoing efforts to address these via changes to the Rules and broader efforts by Ofgem.

121. In 2016, we consulted on changes (implemented in 2017[55]) to make the formula for the supplier charge (see Glossary in Annex C) based on gross demand (total demand) instead of net demand (total demand minus supply) to prevent the possibility of behind-the-meter generation (BTMG) receiving double payments for reducing supplier's demand (and thus their share of CM costs) as well as receiving CM payments[56]. In our response to the consultation, we stated that we will consider whether further changes are needed to remove the potential for BTMG to unfairly benefit from double payments and, if appropriate, come forward with consultation proposals in due course.

122. As part of its Future Charging and Access (FCA) programme of reform (a holistic review of transmission, distribution and balancing charging) Ofgem are carrying out a Targeted Charging Review (TCR) to assess how residual network charges should be set and recovered in Great Britain[57]. They are also currently considering several other proposed areas of reform which overlap to some extent with the TCR. These reviews may affect how Transmission Network Use of System (TNUoS) charges are levied on suppliers (see Glossary in Annex C). We await the outcomes of these reviews. In light of these reviews, we may consider changes to the CM supplier charging methodology, recognising that all models of supplier charging have the potential to create winners and losers. We will also take account of any other relevant changes that are made by Ofgem to network charging arrangements.

DSR component reallocation and transparency

123. Respondents to the CFE highlighted the importance of enabling DSR capacity providers to change individual components in the delivery year. There were also calls for greater transparency of DSR components and technologies.

124. In July 2019, Ofgem implemented changes to the Rules to enable DSR to re-allocate components during the delivery year (OF12), as part of their Five-year Review of the Rules[58].

125. Regarding transparency of DSR components, we agree that there is a need for transparency and we intend to consider options for achieving this, in collaboration with Ofgem. Transparency of the components behind each DSR CMU will help make the de-rating of DSR fairer and more accurate, as well as improve Government's understanding of technological trends within the DSR sector e.g. uptake of BTMG, uptake of storage components, the frequency of component re-allocation etc. (see Glossary in Annex C).

[55] Changes to the Supplier Payment Regulations were introduced via the Electricity Capacity (Amendment) Regulations 2017 https://www.legislation.gov.uk/uksi/2017/1053/contents/made

[56] https://www.gov.uk/government/consultations/capacity-market-proposals-to-simplify-and-improve-accessibility-in-future-capacity-auctions

[57] https://www.ofgem.gov.uk/electricity/transmission-networks/charging/targeted-charging-review-significant-code-review

[58] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2

DSR de-rating

126. Responses to the CFE felt that the way in which DSR CMUs are de-rated should be more closely linked to the technologies of the constituent DSR components. One particular risk identified was that of behind-the-meter batteries benefitting from a higher de-rating factor as a DSR component than they would receive as a battery CMU, which may not represent their true contribution to security of supply.

127. In 2017 we implemented changes to the de-rating methodology for storage that can supply electricity for less than 4 hours[59]. We noted that there may be other duration limited generating technology classes e.g. DSR or reciprocating engines for which it would be appropriate to make a similar change in the future. As part of our wider review of de-rating, we intend to work with the Delivery Body to understand the need for changes to DSR de-rating, including the potential need for a duration component to accurately reflect the real contribution of DSR resources in a SSE.

Other DSR-related issues

128. Other DSR issues and suggestions raised by respondents to the CFE include:

- Introducing lower cost and less disruptive bespoke metering arrangements and providing greater flexibility around the timing of the DSR Tests;
- Writing accountability for data flows from Half Hourly Data Aggregators and Half Hourly Data Collectors into the Rules; and
- Changing the definition of "non-Central Meter Registration Service distribution CMU" to enable non-exporting generation, including combined heat and power (CHP), to participate.

129. See the Glossary in Annex C for a description of these terms. We need to gather more evidence on these issues before we can decide whether to act and what action to take.

Renewables and hybrid projects

130. In response to substantial feedback raised through our CFE and in line with the principle of technology neutrality, we have recently expanded the list of renewable technologies which can participate in the CM (as was always intended as part of our State aid approval). These technologies will be able to participate in the upcoming capacity auctions planned for early 2020 (T-4, T-3, and T-1). This change has provided the opportunity for unsubsidised renewable generators to receive fair and appropriate compensation for their contributions to security of supply. A de-rating methodology has been developed by the Delivery Body to accurately account for their contributions to security of supply. On a de-rated basis, we estimate that around 360MW of existing renewable capacity will exit the Renewables Obligation (see Glossary in Annex C) before the 2029-30 delivery year[60] and could be eligible to participate in the CM.

131. The CFE also sought views on the facilitation of hybrid projects (non-dispatchable renewables coupled with other energy technologies, usually storage) in the CM. There was some disagreement among respondents about how best to do this. Some felt that existing arrangements (secondary trading and entering as separate CMUs) were suitable, whereas others thought that hybrid CMUs should be categorised in the CM and a de-rating methodology developed (see Glossary in Annex C). Developing effective de-rating factors

[59] https://www.gov.uk/government/consultations/capacity-market-proposals-to-simplify-and-improve-accessibility-in-future-capacity-auctions
[60] https://www.gov.uk/government/consultations/capacity-market-further-technical-amendments

was identified as the critical issue to get right for hybrid sites. More recently, in response to our March 2019 consultation[60] on the inclusion of certain renewable technologies in the CM, stakeholders were almost completely in agreement that the existing approach of adding the separate CMUs together is sufficiently accurate for de-rating hybrid CMUs. Therefore, although developing a more technically rigorous solution might be needed in the future, it does not appear to be creating a barrier to entry presently.

132. We are continuing to work with the Delivery Body to identify the full range of issues that may need to be considered to facilitate participation by hybrid projects, including whether a new de-rating factor assessment process should be developed (recognising this could be very complex). This work will feed into our wider review of de-rating and we may come forward with proposals on the inclusion of hybrid projects in due course, if appropriate. We note the importance of addressing issues related to connection capacity (discussed below in paragraph 143) in relation to de-rating for hybrid projects (see Glossary in Annex C).

Interconnectors and foreign generation

133. In response to comments in our CFE which identified interconnector de-rating as a priority issue, we have recently made changes to remove the requirement for historical data to provide a 'floor' for interconnector de-rating factors and to encourage increased transparency and greater opportunities for stakeholder engagement in the process of setting interconnector de-rating factors[61]. The Government considers that there is an ongoing role for historical data in interconnector de-rating, but has not yet formed any firm conclusions on how it should be used in the long-term. We intend to ask the PTE, who already play a key role in helping the Secretary of State to set de-rating factors, to help examine whether a specific methodology can be established which includes an appropriate role for historic evidence, alongside future-focused statistical (stochastic / probabilistic) modelling. Any such methodology could then be set out in the Rules for future years.

134. Moving forward, we are heading towards a significant change in the way that overseas capacity is treated in the CM. Interconnector participation in the CM was introduced in 2015 as a requirement of the CM's State aid approval. This was always intended to be a temporary measure until such time as it was possible to enable direct cross-border participation. As part of the EU's Clean Energy Package[62] which came into effect on 4 July 2019, in the coming years we will be required to facilitate the direct participation of foreign plants. Responses to the CFE highlighted a range of potential issues related to foreign plant participation, which will need further consideration. We intend to engage with the Delivery Body, industry and the PTE to gather further evidence. We also plan to engage with the European Network of Transmission System Operators for Electricity (ENTSO-E) development of methodologies for direct participation and electricity resource adequacy as part of the implementation of the Clean Energy Package.

135. In addition to the interconnector-related issues we addressed in June 2019[63], some responses to the CFE raised several concerns about the potential fairness of interconnector participation due to possible market distortions arising in the wider policy landscape:

- Their access to the cap and floor regime which some argue means that interconnectors are not exposed to the 'missing money' problem or non-delivery penalties in the same way as domestic capacity (see Glossary in Annex C).

[61] https://www.gov.uk/government/consultations/capacity-market-further-technical-amendments
[62] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search
[63] https://www.gov.uk/government/consultations/capacity-market-further-technical-amendments

- Their exemption from Transmission Network Use of System (TNUoS) and Balancing Services Use of System (BSUoS) charges (see Glossary in Annex C).
- The difference in carbon price paid in the connected countries.
- The lighter touch Satisfactory Performance Day (SPD) arrangements for interconnectors (see Glossary in Annex C). This means that interconnectors are required to demonstrate capacity availability during the delivery year in a different way to other CMUs.
- The ability of interconnectors to participate in two different CMs and their de-rating factors in the other CM. This means there is a possibility that interconnectors are rewarded twice for their capacity.

136. As the direct participation of foreign plants may change the way in which interconnectors participate in the CM, we will consider potential issues related to interconnector competition as part of our wider work to facilitate the participation of foreign plants, as well as the potential participation of distribution connected interconnectors (e.g. the Isle of Man).

Batteries and storage

137. Responses to the CFE discussed how the CM could facilitate battery augmentation. Battery augmentation refers to the process of enhancing a battery to increase its storage capacity partway through its lifetime. Degradation of batteries over the lifetime can also result in the opposite effect. There is currently no mechanism within the CM which allows battery capacity providers with existing multi-year agreements to alter the size of their CMU to account for augmentation or degradation. A range of solutions were proposed, including the possibility for storage CMUs to change duration bands and therefore de-rating factors on an annual basis.

138. In 2017[64], as part of our response to a consultation on proposed changes to battery de-rating we stated that we did not intend to allow storage CMUs to change duration bands on an annual basis over the lifetime of multi-year agreements, to allow for augmentation or degradation of an asset, as this would require the Government to take on and manage significant additional risk. However, 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 also acknowledge that such arrangements should also apply in respect of other technologies. We consider it essential that any solution requires developers to bid their additional capacity into the main auctions. We will continue to engage with industry to explore two potential solutions which would ensure value for money for consumers: bidding additional capacity into future auctions as a separate CMU (noting this would likely introduce considerable complexity) or using secondary trading arrangements to take on additional capacity obligations (noting that this would unlikely provide the certainty desired by developers).

139. Regarding storage technologies more generally, we recognise the concerns raised in the CFE that current BSUoS arrangements may place storage at a relative disadvantage. See Section 3.3.3 for our response to this issue.

Pumped storage hydropower (PSH) and auction timings

140. Respondents to the CFE raised several suggestions to enable new PSH (see Glossary in Annex C) projects to compete in the CM more effectively. While existing PSH is eligible

[64] https://www.gov.uk/government/consultations/capacity-market-consultation-improving-the-framework-detailed-proposals

to compete (and does so), some respondents suggested that facilitating new PSH projects might require a capacity auction further ahead of the delivery year (e.g. T-6 or T-8) and capacity agreement lengths of 20 or 25 years. Respondents also noted that emerging technologies, e.g. battery storage, that tends to be quicker to build than four years, may require auction timings in between T-4 and T-1 (e.g. T-3 or T-2).

141. The changes required to facilitate new PSH participation would involve a significant upheaval to the CM and it is not clear whether any new PSH projects would come forward to participate even with the changes in place. Change on this scale to the CM could easily result in unforeseen consequences elsewhere. We will continue to be open to evidence on the ways in which PSH currently participates in the CM, but at this stage we do not think it would be proportionate to make fundamental changes to the structure of the CM (e.g. holding further ahead auctions) solely for the benefit of new-build PSH. It is worth noting that, as set out in our Smart Systems and Flexibility Plan (and subsequent Progress Update)[65] the Government, Ofgem and industry are taking forward a range of actions to remove barriers to storage technologies.

142. We also do not believe that a T-3 or T-2 auction is necessary to facilitate newer technologies, as technologies with build times of less than four years are already able to (and do) participate in the T-4. However, we are committed to ensuring that there is sufficient time between the auctions and the delivery year to allow new capacity to be built. In this regard, we note that the timings of the T-1 and T-4 auctions have slipped by several months so that they do not take place a full four years or one year before the start of the relevant delivery year. Our intention is to consider the case for moving them back, so that, as far as possible, a full four years/one year is available between the T-4/T-1 and the delivery year. As part of this, we note the possibility of consistently holding the T-4 auction before the T-1, as suggested in the CFE.

Connection capacity

143. We recognise the need to address issues relating to the demonstration of connection capacity to mitigate the risk of providers over-stating their connection capacity in an attempt to circumvent the impacts of de-rating (see Glossary in Annex C). In response to the CFE, it was suggested that CM should be reviewed to ensure that components not participating in the CM are given de-rating factors so that sufficient connection capacity is available for all sources feeding into a particular connection point. The Government notes the importance of these proposals as a way of laying the foundation for the potential introduction of partial terminations (a termination in relation to part of a capacity obligation held by a capacity prover, rather than the full obligation) in future. We also note the possibility of assigning de-rating factors to non-CM components as a method of accounting for connection constraints. We intend to come forward with proposals to address this issue in due course.

Generation located on private wire

144. As raised in the CFE, we are aware that some new build generation assets located on private wire (see Glossary in Annex C) may be unable to access the CM. We will work with the Delivery Body to understand the barriers to generation on private wire and may then come forward with proposals.

[65] https://www.gov.uk/government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan

Electricity demand reduction (EDR)

145. The Electricity Demand Reduction (EDR) pilot launched in 2014 to test whether energy efficiency projects that deliver lasting electricity savings at peak could in future compete for funding in the CM[66]. Although the pilot has provided some useful learnings, it concluded that energy efficiency projects are not yet ready to enter the CM. A CFE has been launched alongside the publication of this report and the Evaluation of the EDR Pilot to seek views on market barriers to energy efficiency measures in the UK. The CFE asks questions on how we can create new markets for energy efficiency, securing its role in the wider energy market, contributing to flexibility and becoming a reliable alternative to distributed generation and network reinforcement[67]. This is not anticipated to impact the CM in the near term.

3.1.2 Investment in capacity

146. In order to achieve security of supply, it is important that the CM stimulates sufficient investment in capacity, both new and existing. Significant quantities of new capacity will be needed to fill the gap that will be left by the significant coal and nuclear plant closures expected in the 2020s, as well as to meet our increasing electricity demand. We want to ensure that the CM continues to be effective at driving investment in capacity.

147. To date the auctions have secured the majority of our capacity needs out to 2021/22 (the remaining capacity needed for each delivery year will be secured through the upcoming T-1 auctions), including 5.6GW of new capacity from a range of technologies, at low clearing prices. Respondents to the CFE noted the success of the CM in supporting investment in capacity. Table 7 below shows the proportion of capacity agreements awarded in each auction to different capacity types.

Table 7. Split of capacity awarded in the capacity auctions (without terminations)

Capacity type	2014 T-4	2015 T-4	2016 T-4	2017 T-4	2017 T-1
Existing Generating CMU	66%	91%	85%	86%	82%
New build Generating CMU	2%	4%	6%	2%	11%*
Refurbishing Generating CMU	32%**	0%	2%	1%	0%
DSR CMU	0%	1%	3%	2%	7%
Existing Interconnector CMU	n/a***	4%	4%	5%	n/a***
New Build Interconnector CMU	n/a	0%	0%	4%	n/a

*This was predominantly early delivery and so was only awarded one year agreements.
**These CMUs were all awarded one year agreements.
***Interconnectors did not participate in the 2018/19 delivery year.

148. In order to maintain the success of the CM in driving investments in capacity, we need to ensure that there are both suitable incentives for investing in capacity and suitable disincentives for not delivering new capacity that wins a capacity agreement in a capacity auction.

[66] https://www.gov.uk/guidance/electricity-demand-reduction-pilot
[67] https://www.gov.uk/government/consultations/facilitating-energy-efficiency-in-the-electricity-system

Capacity agreement lengths

149. To enable investment in high capital new build and refurbished projects on the basis of a capacity agreement, 15 year and three year agreement lengths are offered to those project types respectively. Access to these multi-year agreements is based on capital expenditure thresholds. The thresholds are an auction parameter and so can vary from one capacity auction to the next. In the 2019 T-1 auction, the thresholds were £270/kW for a 15 year agreement and £135/kW for a three year agreement. Generation with capital costs below these limits, DSR and interconnectors are all ineligible for multi-year agreements. Currently, 15 year agreements represent 2% of the total capacity secured through the CM and three year agreements represent less than 1%.

150. In response to the CFE, there were mixed views on agreement lengths. As discussed in Section 3.1.1, respondents were divided on whether multi-year agreements should be made available to DSR. In addition, there were some suggestions that the 15 year agreement lengths were unnecessary and could be shortened to ten, five or three years (or lengthened to accommodate PSH). Some also felt that the three year agreements for refurbished plant had been ineffective in their current guise.

151. Our preference is to maintain one year agreement lengths wherever possible, unless there is strong evidence to deviate away from this. Longer-term agreements expose the consumer to price, competition and volume risks. Therefore, our preference minimises financial risk to the consumer and the disbenefits of 'locking-in' capacity for the long-term, such as a lack of innovation and reduced environmental performance. We consider 15 year and three year agreements to be a necessary exception to our preference, as there is concrete evidence that they allow high capital projects to access finance. As discussed, multi-year agreements currently represent a very small proportion of total capacity. But we expect the proportion of multi-year agreements to rise in the future, as a greater proportion of new projects win capacity agreements. We therefore intend to monitor agreement lengths over the coming years, to make sure that they continue to achieve the right balance of risk and reward. We will consider agreement lengths for all technologies as part of this monitoring. This includes refurbishment status. Regarding agreement lengths for DSR specifically, as stated we intend to research and gather evidence on the potential for DSR to access multi-year agreements. The capacity auction outcomes to date have provided learnings that we will take into consideration as part of our monitoring of agreement lengths.

Termination events and fees

152. In order to prevent speculative bidding and create strong incentives for new build CMUs to deliver new capacity on time, new build capacity and unproven DSR that is not on track to deliver in time for the delivery year may have its capacity agreement terminated, resulting in termination fees. Aside from the termination of the capacity agreement held by a large gas fired plant in the 2014 T-4 auction, the volume of capacity agreements terminated so far has been low (see Table 8 below). This implies the delivery assurance arrangements in place, including credit cover and termination fees, are having the intended effect on the market (although we recognise that delivery assurance for DSR requires review and terminations events and fees likely require simplification). See the Glossary in Annex C for an explanation of these terms.

153. In 2015[68] and 2016[69], in response to evidence that some capacity providers were contemplating reneging on their commitments, we implemented changes to raise

[68] https://www.gov.uk/government/consultations/2015-consultation-on-capacity-market-supplementary-design-proposals-and-changes-to-the-rules-and-regulations
[69] https://www.gov.uk/government/consultations/consultation-on-reforms-to-the-capacity-market-march-2016

termination fees, disqualify failed units from participating in capacity auctions for two years, and increase credit cover for most applicants already required to lodge credit cover. We believe that termination fees are now within the right range to serve their purpose, as termination events have been low and there is no longer evidence that some capacity providers are contemplating reneging on their commitments. While it is important that termination fees send a strong signal to deliver capacity on time, increasing them further could limit participation in the capacity auctions due to the increased financial risk. We want to ensure that the CM continues to provide a stable and attractive platform for investment in capacity in GB, whilst deterring gaming and speculative bidding.

Table 8. CM terminations as of April 2019[70]

	Capacity (MW)	Percentage of total capacity procured	Number of CMUs
2016 TA	101	12.56%	11
2017 TA	16	5.03%	4
2014 T-4	1,731	3.51%	7
2015 T-4	118	0.26%	7
2016 T-4	12	0.02%	1
2017 T-4	0	0.00%	0
2017 T-1	63	1.08%	13

154. However, we agree with the responses to the CFE that the approach to determining fees for termination events is overly complex. In particular, it was noted that the range in fees was too broad, some events attracted no termination fee and there are different fees allocated to similar events for different technology types. In response to these concerns and in line with the aim of this review to assess whether the objectives of the CM can be achieved in the future in a way that imposes less regulation, we therefore intend to review termination events and fees, to simplify them and ensure there continues to be equitable exposure between different types of capacity. We note the suggestions made to improve termination events and fees in the CFE and we will be considering the need for partial termination as well as the possibility for termination fees to rise following the T-1. We are exploring the best way to achieve this with Ofgem and intend to come forward with proposals in due course.

3.1.3 Delivery during a system stress event (SSE)

155. A SSE occurs when a demand control event[71] has occurred and that demand control event has been confirmed after post-event analysis, conducted by National Grid ESO, to have been definitively triggered by a national shortage of energy resources. If the risk of a SSE in the GB electricity network is higher than under normal circumstances (determined by a set of criteria selected by National Grid ESO), National Grid ESO issues a Capacity Market Notice (CMN). A CMN is a signal four hours in advance that there may be less

[70] Source: EMR Delivery Body CM Registers 30 April 2019
[71] A period during which National Grid ESO had to curtail demand

generation available than expected to meet national electricity demand on the transmission system.

156. Since the CM's implementation in 2014 and in the delivery year (2017/18) and partial delivery year (2018/19) to date, there has not been a SSE. There have only been 2 CMNs issued since the implementation of the CM[72], on the 31 October 2016 and 7 November 2016. These came during the delivery year of the first TA auction (2016/17), before the first delivery year of the CM. Neither of these CMNs lead to a SSE.

157. Despite the fact that a SSE has not yet occurred, we need to make sure that there are strong incentives for capacity providers to deliver their capacity obligation during a SSE, and that this capacity is co-ordinated effectively.

Penalties

158. The CM penalty regime is designed to provide a guarantee of delivery during a SSE by imposing financial penalties on capacity providers that do not deliver their capacity obligation. However, respondents to our CFE were concerned that the current penalty regime is too weak and a majority were in favour of strengthening the regime. A number also argued that stronger penalties would better incentivise desirable behaviours during prequalification and the delivery year and promote secondary trading.

159. The Government agrees that the penalty regime needs to be strengthened. We (and respondents to the CFE) have noted that other changes to the CM will be complemented by a strengthening of the penalty regime, including the recent addition of further renewable technologies to the CM, changes related to connection capacity, the review of de-rating and improvements to secondary trading (see the Glossary in Annex C for a description of these terms). Strengthening the penalty regime also has the potential to create a platform for further simplification in other areas of the CM. Regarding improvements to secondary trading, we reference Ofgem's Five-year Review of the Rules[73] which highlights a future programme of work aiming to simplify the secondary trading arrangements. As part of this, we intend to support Ofgem in the development and communication of the policy intent for secondary trading. We also note the suggestions made in responses to the CFE regarding both changes to the penalty rate and the penalty cap and will consider these in our review of the regime. We will engage with the Delivery Body, Ofgem and industry to develop proposals for consultation in due course.

Co-ordination of capacity during a System Stress Event (SSE)

160. Respondents to the CFE highlighted ways in which the co-ordination of capacity during a SSE could potentially be improved, particularly capacity that does not operate in the Balancing Mechanism (BM) (see Glossary in Annex C), is duration limited or intermittent. The main suggestions made were that the CM should incorporate a dispatch signal and/or the Delivery Body should provide better information on SSEs ahead of prequalification and in the run-up to an actual SSE. A number of responses also felt that the 4-hour notice period favoured inflexible capacity and should be reduced to a minimum, whereas others believe that this arrangement was fair to all capacity. Concerns were also raised about the potential of storage recharging in lead up to a SSE.

161. We recognise that there is a need to consider the co-ordination of capacity during a SSE in more detail. We will work with the Delivery Body and National Grid ESO to improve our collective understanding of the challenges in co-ordinating different types of capacity through different markets and identify and assess potential solutions to mitigate these

[72] https://gbcmn.nationalgrid.co.uk/
[73] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2

issues, so that the CM remains robust for future market evolution. Options may include, for example, better information on the likely nature of the SSE in the run-up to an actual event. Recent and ongoing developments, such as Project TERRE, may also provide a way forward.

3.2 Cost-effectiveness

162. The second objective of the CM is to ensure the most efficient level of capacity is secured at minimum cost to consumers. We have considered performance against this objective under three themes:

- Procuring the right amount of capacity
- Auction design
- Liquidity and competition

3.2.1 Procuring the right amount of capacity

163. The CM is designed to ensure that there is adequate capacity available to National Grid ESO to maintain the GB reliability standard, set at 3 hours LOLE per year (see Glossary in Annex C). Each year National Grid ESO prepares an Electricity Capacity Report (ECR)[74]. The ECR sets out their recommendations of the amount of capacity to procure at each capacity auction scheduled to be run in the upcoming auction window to ensure that the reliability standard is met. The PTE also review the work undertaken by National Grid ESO and provide their views on the ECR in an independent report. As well as scrutinising and quality assuring the specific target recommendations, they make suggestions for improving the methodology and evidence-base in future, and have a specific focus on considering any risk that conflicts of interest arising from National Grid ESO's position as system operator that might influence the analysis. National Grid ESO's recommendations in conjunction with the views of the PTE are considered by the Secretary of State when taking the decision on the final capacity auction parameters.

164. For each auction, the auction parameters include not only a target amount of capacity to procure but also a tolerance around the capacity target. To date the tolerances have been ±1.5GW for the T-4 auctions and ±1GW for the T-1 auction. The use of the tolerances has the effect of allowing for the procurement of up to an additional 1.5 or 1 GW of capacity (in T-4 and T-1 auctions respectively) above the capacity target if the auction clearing price is below the value of net CONE (the net cost of new entry - currently set at £49/kW) (see Glossary in Annex C) or the procurement of 1.5 or 1GW less capacity if the auction clearing price is above net CONE. They enable the amount of capacity that is purchased through the auction to be adapted based on the auction clearing price, thus ensuring best value for money for the consumer. Table 9 shows that for all the auctions held so far, the clearing price has been well below net CONE. The auction outcomes have therefore led to more capacity being purchased than the recommended target in all auctions held to date, as the structure of the auction deems this the most cost-effective outcome for the consumer. For delivery year 2018/19, 0.7GW of capacity was purchased beyond the target in the T-4 auction and 0.9GW in the T-1 auction (the amount of capacity purchased at T-1 takes into account any over or under-procurement in T-4). This contributed to a LOLE in 2018/19 that was significantly lower than our reliability standard of 3 hours per year. The primary reason for very low LOLE has been plants without capacity agreements staying open for longer

[74] https://www.emrdeliverybody.com/Lists/Latest%20News/AllItems.aspx

than was expected, with additional procurement through the capacity auctions making a minor contribution.

165. The presence of significant amounts of capacity in the GB energy market which does not benefit from capacity agreements (or any other form of Government support) is of interest. The presence of some capacity outside the CM is always to be expected, but if large amounts of resources continue to operate or come forward without any need for capacity agreements in the longer term, this might pose questions around the optimum design or operation of the CM. Our initial view is that the current relatively large "surplus" is likely to be a limited and temporary phenomenon, due in part to the continued presence of some large plant (e.g. coal) which have very restricted future lives, and in part to the accelerated commissioning of new-build plant with future capacity agreements (whose existence is thus still dependent on the CM). However, we remain interested in understanding more about the economics of all plant currently operating in the energy market.

166. Table 10 sets out forecasts of LOLE for the last 5 delivery years. This indicates that the electricity system in GB is very secure, however, we do not intend or expect to maintain such low levels of LOLE into the future, as the reliability standard represents the most cost-effective amount of LOLE for consumers. Therefore, we expect LOLE to rise over the coming years (but remain below three hours), as plants without capacity agreements close. The level of LOLE in GB is influenced by the amount of capacity secured in the capacity auctions. Therefore, it is reviewed each year as part of our annual auction parameter setting process.

Table 9. Clearing prices in the T-4 capacity auctions to date

	Delivery year			
	2018/19	**2019/20**	**2020/21**	**2021/22**
Clearing price (£/kW)	19.4	18	22.5	8.4

Table 10. Loss of load expectation in Great Britain over the last five years[75]

	2014/15	**2015/16**	**2016/17**	**2017/18**	**2018/19**
LOLE (hours per year)	1.6	1.1	0.5	0.01	0.001

167. Although we have consistently purchased more capacity than the recommended target, CM costs remain lower than expected. The 2014 IA estimated gross capacity revenues going to capacity providers to be between £0.7bn and £1.8bn per annum (in 2012 prices). Gross capacity revenues have turned out to be at the lower end of that range, about £1bn per annum (in nominal prices). See Table 11 below. The deployment of a range of technologies through the CM, including flexible technologies, has also helped to minimise the whole costs of our electricity system. It should be noted that revenues for delivery year 18/19 are currently not being paid out during the standstill period.

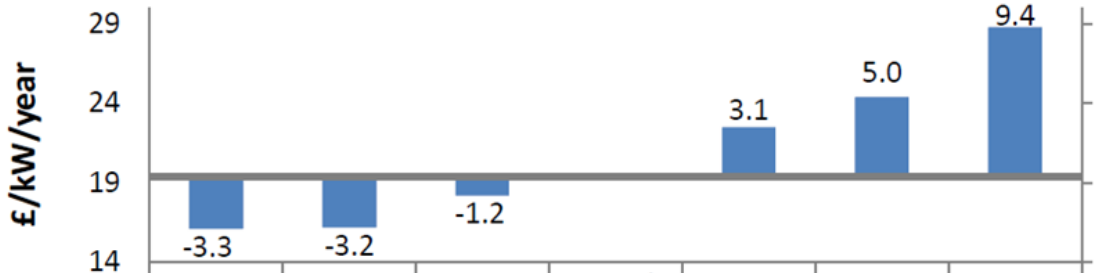
[75] https://www.nationalgrideso.com/insights/winter-outlook

Table 11. Projected gross costs of the CM[76]

Financial Year	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Cost of the capacity market (£bn, nominal prices)	0.0	0.7	1.0	1.3	1.0	0.9	1.2

168. Clearing prices and therefore CM costs can be highly sensitive to changes in the capacity target. It is therefore important that sufficient safeguards are in place to prevent over-procurement. Ofgem's 2015 Annual Report on the Operation of the Capacity Market[77] following the 2014 T-4 auction showed that a capacity target 1GW higher would have increased the total capacity auction cost from £956m to £1,134m, a 19% increase. A capacity target 1GW lower would have reduced the total capacity auction cost from £956m to £885m, a 7% reduction. See Figure 2 below.

Figure 2. Potential impact of changes to the capacity target on clearing price in the 2014 T-4[78]



	-3GW	-2GW	-1GW	Actual	+1GW	+2GW	+3GW
Clearing Price	16.1	16.2	18.2	19.4	22.5	24.4	28.8
Change	-3.3	-3.2	-1.2	0	3.1	5	9.4

169. Some respondents to the CFE were concerned about the risk of over-procurement. Suggestions were made to reduce the risk, including greater transparency in the setting of auction parameters, increasing the amount of T-1 set-aside and improvements to some of the technical aspects of auction parameter setting.

170. We want to make sure that an amount of capacity is secured through the CM which minimises overall costs to the consumer. We believe that our target setting process is robust and transparent, and we note the importance of the independent PTE in this regard. For example, in their report this year[79] the PTE have highlighted what they see as a consistent pattern of over-inflated demand forecasts by National Grid ESO, potentially leading to unnecessarily high targets, and have made recommendations as to how to correct demand forecasts in the short term, and on how to improve access to information that will provide a better evidence base in future. We also note the importance of the T-1 set-aside in helping to mitigate the risk of over-procurement and risks to security of supply. We retain the flexibility to change the proportion of set-aside from one year to the next, as part of our auction parameter setting process. We have in the past, and will continue to,

[76] https://obr.uk/download/october-2018-economic-and-fiscal-outlook-supplementary-fiscal-tables-receipts-and-other/
[77] https://www.ofgem.gov.uk/publications-and-updates/annual-report-operation-capacity-market
[78] https://www.ofgem.gov.uk/publications-and-updates/annual-report-operation-capacity-market
[79] https://www.gov.uk/government/publications/national-grid-electricity-capacity-report-2019-findings-of-the-panel-of-technical-experts

utilise this flexibility to balance the risks of structural over-procurement, which would impose unnecessary consumer costs, against the need to mitigate all plausible risks of delivery failure across the full range of technology types on which we now rely.

171. We agree with respondents to the CFE that some of the technical aspects of auction parameter setting (e.g. net CONE) require review, which could for example lead to changes to the auction demand curve and thus the extent to which we procure beyond the recommended target where prices are low enough that this is deemed to be the most cost effective auction outcome for the consumer. We will carry this out as part of our requirement to review of the reliability standard.

172. Finally, as noted above, under-estimating the amount of capacity available in the GB outside of the CM may have been one of the main drivers of recent over-procurement. We are therefore working with industry stakeholders and the PTE over the coming months to ensure National Grid ESO can get access to a more comprehensive dataset of distributed generation on the GB energy system. When this becomes available, it will allow us to ensure that the annual capacity auction parameter setting process more accurately reflects the amount of capacity that is required via the capacity auctions.

173. It is important to note that while we recognise that some of the components of the reliability standard may have changed since they were determined in 2012/13, we believe that the standard itself (3 hours LOLE per year) is within a suitable range. This is supported by an international review of reliability standards carried out by National Grid ESO, in which GB was found to have a lower than typical reliability standard[80]. The review will ensure that the components of the reliability standard, such as net CONE and the value of lost load (VoLL) (see Glossary in Annex C), are set and applied correctly in the parameter setting process. In April 2018, Ofgem introduced a new regulatory and incentives framework for National Grid ESO[81], including an incentive for accurate demand forecasting. This will help to ensure that the demand forecasting produced by National Grid ESO (on which the capacity target to be procured at auctions is based) remains accurate and robust.

3.2.2 Auction design

174. The capacity auctions use a “descending clock”, pay as clear format, consisting of multiple rounds of bidding. The auction starts at the price cap (currently set at (£75/kW/year) (see Glossary in Annex C). In each bidding round, the price (£/kW/year) reduces. Bidders submit exit bids to retract a CMU from the capacity auction at a particular price. As the price descends and exit bids are submitted, the total remaining capacity decreases. The auction ends when a price is reached at which the total remaining capacity is equal to the capacity demanded – the ‘clearing price’. Successful CMUs (those that have not submitted exit bids above the clearing price) are awarded a capacity agreement which provides a right to capacity payments at the clearing price, i.e. the ‘pay as clear’ format. The auctions are managed by the Delivery Body and conducted via a web-based auction system.

175. In the past the Government has done considerable research on the design of the capacity auction, to ensure that it is optimal and delivers the best value to consumers. This has included the consideration of several alternative designs, such as a split auction (in which a proportion of the capacity target is auctioned for new build only), a pay as bid auction (in which successful bidders receive a capacity agreement at the price they bid rather than the clearing price) and a price duration equivalence (PDE) auction (in which

[80] http://sites.ieee.org/pes-rrpasc/working-groups/wg-on-lole-best-practices/
[81] https://www.ofgem.gov.uk/publications-and-updates/independent-review-eso-regulatory-and-incentives-framework

bids are adjusted according to the agreement length bid for). Some of the responses to the CFE requested that we revisit certain auction designs.

176. A few respondents to the CFE felt that the CM was only partially successful (or was unsuccessful) at supporting investment because its design favours existing capacity or new build with low capital expenditure such as gas and diesel engines. Concerns were expressed as to whether sufficient amounts of large new plant will be able to come forward under current arrangements. A split auction was suggested as a solution this problem.

177. The idea of a split auction was first considered by Charles River Associates, as part of their 2013 report on gaming in the CM for DECC[82]. In their view, price discovery/efficiency would be improved by allowing bids simultaneously from existing and new plant in the same auction (as in the current arrangements). In addition, splitting the capacity auction will reduce liquidity, increasing the risk that a single participant is able to affect the outcome of the auction unilaterally. Therefore, they recommended not splitting the capacity auction. DECC also undertook research in early 2014 to model the outcome of split and combined auctions which suggested that the clearing price for both existing and new-build plant (under a 'split auction' scenario) would be higher than in the 'single-auction' case.

178. A pay as bid auction was considered in recent years but was rejected in favour of a pay as clear auction for several reasons. Because a pay as clear auction provides suppliers with stronger incentives to bid their true economic cost of providing capacity, it limits strategic bidding and gaming which can lead to inefficiency, establishes long-term signals for innovation and creates the right incentives for maintenance of capacity.

179. Regarding PDE, in 2016 we conducted extensive research and published a report summarising the evidence base[83]. In 2016 we consulted on the proposal to not take the inclusion of PDE in the CM any further, on the basis that there was no robust evidence that PDE would improve auction outcomes, but it would add complexity and associated uncertainty. The majority of respondents agreed with the proposal. We committed not to review the methodology to avoid introducing unnecessary uncertainty about the future design of the CM. We maintain this commitment and will not be considering PDE again.

180. Overall, none of the alternative designs could be demonstrated to be more cost effective than the existing design. At this time, we therefore remain satisfied with the current design of the capacity auction and believe that contracting for overall capacity leaves the market to determine the optimal plant mix at lowest cost to the consumer. The arguments for not splitting the auction between new and existing plants made in 2014 seem still to have strength, and we want to avoid making any changes to the auction structure that could destabilise investor confidence and in turn increase costs, unless there is compelling evidence that it would produce more efficient overall results.

181. Nonetheless, it is important both that overall CM costs are as low as possible, and that it remains an effective vehicle for bringing forward the new capacity we need as and when it is needed. We will therefore continue to monitor the outcomes of the capacity auctions, including prices and new build volumes, and analyse whether the current model is likely (as we currently expect) to continue to produce the most efficient results under all likely future market scenarios. This will involve refreshing our past analysis on split auctions using data on previous capacity auction outcomes, as well as considering the outcomes of a split auction compared to a single auction under a range of future scenarios. Our intention is to check that our past conclusions on split auctions remain robust and that, going forward, the

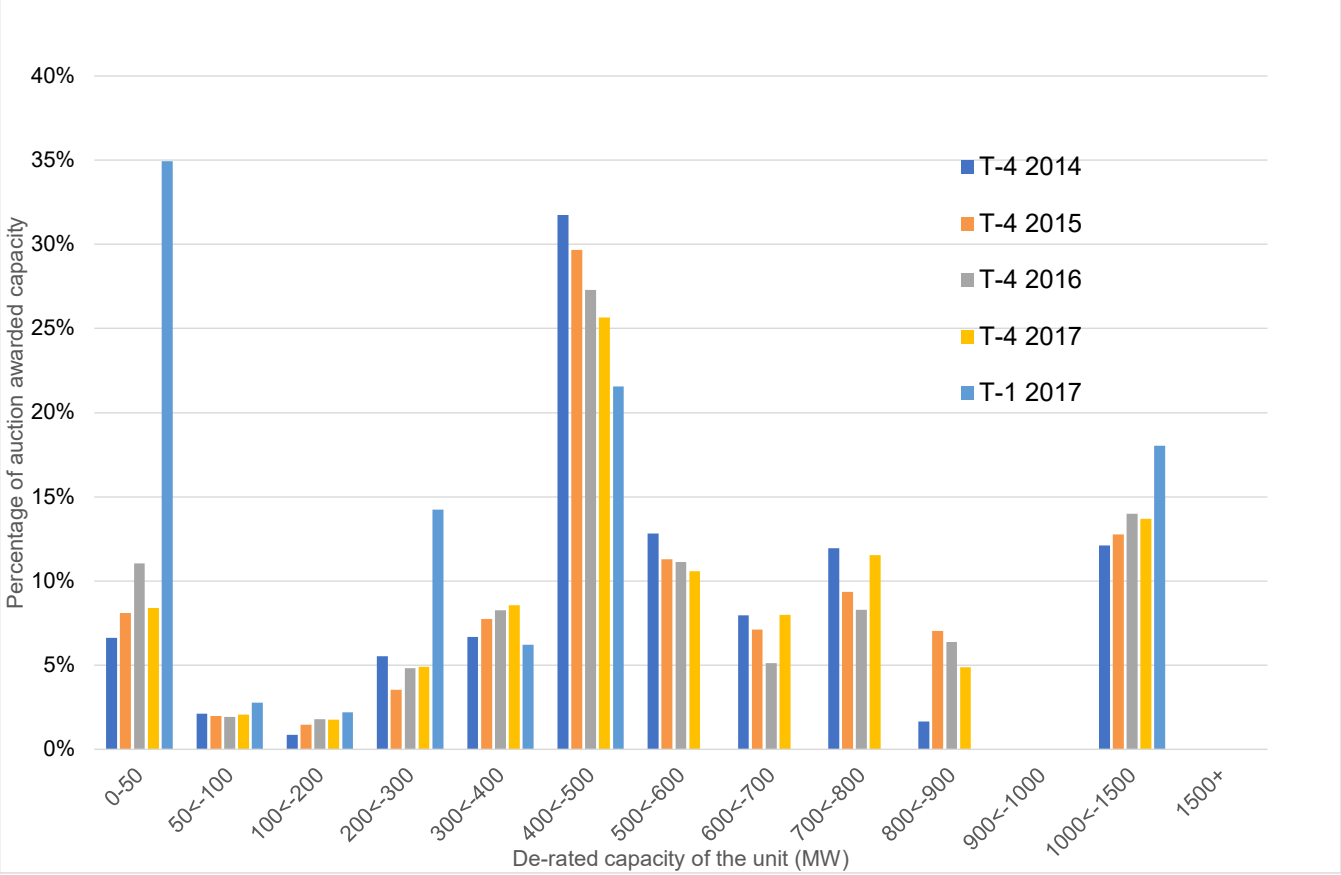
82 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/252746/CRA_Report_on_the_Capacity_Market_Gaming_Risks.pdf

83 https://www.gov.uk/government/publications/price-duration-equivalence-report

capacity auctions are designed such that overall CM costs are minimised, particularly as the proportion of new capacity winning capacity agreements is likely to rise in the future.

182. We recognise the concerns raised in the CFE about the balance of small and large plants brought forward by the auctions. We understand that the CM has an important influence on the whole costs of the electricity system in GB and we will continue to monitor the size distribution and technology mix of CMUs winning agreements and the amount of capacity secured through the auctions in light of this (see Figure 3 below for a breakdown of the sizes of CMUs observed in capacity auctions to date). We believe that securing an optimal technology mix to minimise whole system costs is best achieved through ensuring, as far as possible, that competition in the capacity auctions is based on a level playing field, and that collectively, energy policies enable assets to monetise the range of benefits they provide to the system but also bear any costs for which they are responsible. We will continue to work across Government to achieve these goals.

Figure 3. Size distribution of capacity market units[84]



183. The Delivery Body has made a one minor operational change to the auction process since its implementation in 2014. Auctions up to and including those held in 2018 took place over three days. As a result of feedback from participants, this will now be a maximum of three days. For auctions held over less than three days, the number of rounds will remain constant, but the length of the rounds will be reduced.

3.2.3 Liquidity and competition

184. Maintaining high liquidity and competition in the capacity auctions is important for ensuring efficiency and best value to the consumer. So far, the capacity auctions have been highly liquid. 30% to 50% more capacity entered the T-4 auctions than the capacity

[84] Source: EMR Delivery Body CM Registers 30 April 2019

target, and more than twice the capacity target entered the 2017 T-1 auction. See Table 12. This has contributed to healthy competition and low clearing prices.

Table 12. Amount of capacity entering the capacity auctions compared to capacity target[85]

Auction	Delivery year	Capacity target (GW)	Prequalified capacity (GW)	Entered auction (GW)	Capacity secured (GW)	Capacity entered auction as a percentage of the capacity target
T-4 2014	2018/19	48.6	65.7	65.0	49.3	134%
T-4 2015	2019/20	44.7	57.7	57.7	46.4	129%
T-4 2016	2020/21	51.7	70.0	69.8	52.4	135%
T-4 2017	2021/22	49.2	75.8	74.2	50.4	151%
T-1 2017	2018/19	4.9	11.8	10.7	5.8	218%

185. Regarding competition, in general participation in the capacity auctions has reflected participation in the wholesale electricity market. In the 2017 T-4 auction, the top five parent companies held about 58% of the capacity awarded and the top eight parent companies held about 72%. The 2017 T-1 auction was slightly more concentrated, with the top eight parent companies holding 80% of the capacity awarded. For comparison, in the wholesale electricity market the eight largest electricity companies provided 71% of the metered volumes in 2017 that are associated with Balancing Mechanism Units or individual power stations and interconnectors[86] (see Glossary in Annex C).

186. A common measure of market concentration that is used to determine competitiveness is the Herfindahl-Hirschman Index (HHI). The HHI for the 2017 T-4 auction is 923 and 1,281 for the 2017 T-1 auction. The Competition and Markets Authority regard a market as concentrated if the HHI is above 1,000. Therefore, the CM is somewhat concentrated, but not significantly more concentrated than the wholesale electricity market, which had a HHI of 1,034 in 2017[87].

187. Most respondents to the CFE agreed that the auctions to date had been highly liquid, although some expected liquidity to decrease as larger amounts of existing plant closed. Suggestions to further improve liquidity were put forward, including simplifications to the prequalification and improvements to secondary trading (see Glossary in Annex C). More generally, it was noted in the CFE that there are several issues with the simplicity and user-friendliness of the CM's administrative and operational procedures. We recognise these concerns and agree that simplicity in these processes is a strong driver of efficient participation, healthy liquidity, and therefore competitive outcomes. These procedures are generally determined by the Rules and/or the processes and procedures of the Delivery

[85] Sources: EMR Delivery Body CM Auction Guidelines, EMR Delivery Body CM Final Auction Results reports, EMR Delivery Body CM Registers 30 April 2019, Ofgem Annual Reports on the Operation of the Capacity Market
[86] https://www.ofgem.gov.uk/publications-and-updates/state-energy-market-2018
[87] https://www.ofgem.gov.uk/publications-and-updates/state-energy-market-2018

Body. We have therefore shared the concerns raised in response to our CFE with Ofgem, so that they may be reflected in their parallel Five-year Review of the Rules. We will continue to support them with simplification wherever possible (as discussed in Section 3.3.1 below and Section 3.1.3 above).

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188. We recognise the importance of simplifying prequalification for ensuring healthy liquidity and competition in the capacity auctions and regarding the aim of this review to assess whether the objectives of the CM can be achieved in the future in a way that imposes less regulation. We refer to Ofgem's Five-year Review of the Rules[88], which highlights the simplification of prequalification as a key priority area, which they intend to address through future rule changes. Regarding Regulation 69(5) specifically, we are not currently intending to remove the requirement but will continue to monitor the need for it in the future.

Secondary trading

189. The CFE did not explicitly seek feedback on secondary trading arrangements as this is covered by Ofgem's Five-year Review of the Rules[89]. However, it was raised in numerous responses to our CFE, particularly in terms of its importance in mitigating participants' exposure to financial risks (especially if the non-delivery penalties are increased) and mitigating security of supply risks (especially now that non-dispatchable renewables are permitted to participate in the CM). For example, the removal of the five-day notice period[90] was considered necessary if secondary trading was to work effectively for non-dispatchable renewables. A number of potential improvements to the trading arrangements were put forward by respondents, which we have shared with Ofgem. As part of their Five-year Review of the Rules, Ofgem have outlined a future plan of work to better facilitate and simplify the secondary trading arrangements. As part of this, we intend to support Ofgem in the development and communication of the policy intent for secondary trading.

3.3 Avoiding unintended consequences

190. The third and final objective of the CM is to minimise design risks and complement the decarbonisation agenda. We have considered performance against this objective under three themes:

- Simplification
- Complementing decarbonisation
- Possible wider market distortions and interactions

3.3.1 Simplification

191. In order to avoid unintended consequences, there was a broadly held view in many responses to the CFE that the CM would benefit from simplification and clarity in a number of areas. For example, simplification of the Regulations and Rules, simplification of the prequalification process, greater clarity of information on SSEs and greater clarity about the

[88] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
[89] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
[90] At present, trades may not occur less than 5 days ahead of the period being traded.

roles of delivery partners, BEIS and Ofgem (the institutional framework behind the CM). See the Glossary in Annex C for a description of these terms. References were also made to overseas capacity mechanisms that use different models for governance and administration.

192. We agree with many of the concerns raised and in line with the requirement in Regulation 81 to review the functions conferred on the Authority (Ofgem) by the Rules as part of this Five-year Review, we will consider the case for simplifying the institutional framework of the CM. This may help to reduce barriers to entry and minimise operational costs of the scheme, as well as lead to even higher levels of certainty for participants. We need to ensure that the balance of responsibilities and performance of Ofgem, the delivery partners and ourselves remain fit for purpose. We also want to assure ourselves that the mechanisms for minimising the possibility of fraud and error occurring within the CM are as strong as they need to be.

193. As discussed in Sections 3.1.2 and 3.1.3 and in line with the theme of simplification, we intend to review termination events and fees and consider in more detail the co-ordination of capacity during a SSE. Ofgem's Five-year Review of the Rules is considering ways to simplify prequalification and secondary trading (discussed in Section 3.2.3). As part of their review, Ofgem are also considering amendments to the Rules change process framework, with the potential for greater involvement of industry parties in policy development, to increase the transparency of the process and ensure the Rules remain fit for purpose.

3.3.2 Complementing decarbonisation

194. As discussed in Section 2.2.2, although the CM is not intended in and of itself to drive decarbonisation, it has been designed to be compatible and consistent with decarbonisation policies. Capacity providers are required to comply with emission limits enshrined in other policies and regulations, such as the EU-ETS and EPS (see Glossary in Annex C). This is an approach that we continue to support and was also advocated by a number of respondents to the CFE.

195. It is worth noting that some of the changes already implemented as part of the Five-year Review (e.g. the inclusion of further renewable technologies[91] and a carbon emissions limit for new plants) will further support decarbonisation. Additionally, we intend to launch a consultation in July 2019 which considers proposals on how to implement a carbon emissions limit for existing and refurbished plant, in line with the requirements of the EU's Clean Energy Package[92], which came into force on 4 July 2019.

196. The annual capacity auctions have provided an opportunity to reflect on and address any unintended consequences when they have emerged. For example, concerns were raised about the air quality impacts caused by small (in terms of capacity) but significantly higher than expected numbers of diesel reciprocating engines that won capacity agreements in the early auctions. It was determined that this type of generation was unfairly benefitting from a loophole in emission control regulations and a potentially disproportionate revenue stream arising from the transmission charging arrangements. Some diesel generators were also benefitting from taxpayer-funded risk finance schemes like the Enterprise Investment Scheme (EIS), Venture Capital Trust (VCT) and Seed Enterprise Investment Scheme (SEIS) which the Government set up to incentivise investment in high risk businesses. This raised concerns about overcompensation of State aid.

[91] Although we do not believe CM revenues in themselves will have a material impact on the amount of new renewable projects coming forward.
[92] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search

197. In line with our stance not to amend the CM to address possible market distortions arising from elsewhere, in 2017 we worked with Ofgem, Defra and the Environment Agency to remove these distortions at source. In 2016, we also consulted on and implemented a solution via changes to the Regulations and the Rules to prevent overcompensation through EIS/VCT/SEIS and reviewed funding of individual capacity providers to ensure the Rules were met[93]. As a consequence, the level of success of new diesel generation in the more recent capacity auctions has significantly reduced.

198. This example demonstrates that we are able to react quickly, effectively and in a joined-up manner to address unintended consequences arising from the CM. Furthermore, as the capacity auctions are run annually, this has provided an opportunity to continually refine and improve the process such that unintended consequences have been minimised from one year to the next.

199. Responses to the CFE and other interactions with stakeholders has raised three potential issues related to decarbonisation, for us to consider:

- That small capacity (<20MW) is not exposed to the EU-ETS. This provides a competitive advantage to such capacity, which is likely to increase as the carbon price rises.
- The Carbon Capture and Readiness (CCR) requirement to demonstrate the technical and economic feasibility of retrofitting carbon captured and storage (CCS) may effectively prevent the deployment of peaking capacity above 299MW, compelling the use of smaller, more expensive and higher-emitting technologies. In parallel, through our Five-year Review of the Emissions Performance Standard, stakeholders also raised the issue that small capacity is not exposed to CCR requirements (see Glossary in Annex C).
- The proliferation of BTMG as DSR (see Glossary in Annex C). Such generation may not be subject to emissions controls. Based on the results of the TA auctions[94], we believe that up to 70% of DSR may currently be BTMG.

200. We recognise the possible distortions to the CM that may be caused by CCR and the EU-ETS, as well as the potential for high emissions from BTMG. We will work across Government to better understand the impact of the issues raised and whether intervention is required. Regarding BTMG, we refer to the methodology for the supplier charge, discussed in Section 3.1.1, which may have the potential to create market distortions for DSR that favour BTMG.

3.3.3 Possible wider market distortions and interactions

201. The CFE acknowledged that competition within the auctions can be influenced unfairly by market failures external to the CM. Some respondents also queried whether the CM was securing the optimal mix of projects and technologies in terms of minimising the whole costs of the electricity system in GB. In particular, the potential for better alignment with ancillary services. Possible market distortions created by TNUoS and BSUoS charges (creating benefits for some capacity and disadvantages for others) were discussed. It was also suggested that aligning timings between the CM delivery year and the annual cycles associated with Transmission Entry Capacity (TEC) charges and carbon pricing would provide greater certainty of costs going into the auctions (see Glossary in Annex C).

202. As stated in Section 2.2, we do not believe the CM should be amended to offset the impact of possible marking distortions arising in other policies or schemes. We therefore

[93] https://www.gov.uk/government/publications/selective-overcompensation-in-the-capacity-market
[94] https://www.gov.uk/government/collections/transitional-arrangements-auction

intend to discuss the issues raised in the CFE with others across Government to raise awareness of the potential impacts on capacity auction outcomes and push for change where appropriate and practicable. In this regard, we note that there are significant proposed changes forthcoming to ancillary services (Project TERRE[95]) and network charging arrangements (such as Ofgem's TCR[96] and Network Access and Forward-looking Charges Review[97]). We also refer to National Grid ESO's System Needs and Procurement Strategy, which seeks to address long-term issues with ancillary services[98], as well as their Wider Access to the BM Roadmap[99].

[95] https://www.flexitricity.com/blog/project-terre/
[96] https://www.ofgem.gov.uk/electricity/transmission-networks/charging/targeted-charging-review-significant-code-review
[97] https://www.ofgem.gov.uk/electricity/transmission-networks/charging/reform-network-access-and-forward-looking-charges
[98] https://www.nationalgrideso.com/document/84261/download
[99] https://www.nationalgrideso.com/sites/eso/files/documents/Wider%20BM%20Access%20Roadmap_FINAL.pdf

4. Next steps

203. Overall, there is a strong need for continuation of the CM and performance against its objectives in the last five years has generally been good. Responses to the CFE and other engagements with stakeholders have highlighted several areas of the scheme which would benefit from refinement. In addition, we are required by the legislation to consider ways in which the CM can meet its objectives whilst imposing less regulation. Making too many changes too quickly to the CM could have a destabilising effect on the market so we need to strike the right balance between stability and improvement, by sequencing changes over a suitable timeframe.

204. In March 2019, we consulted on proposals to address two priority issues raised in the CFE. These were changes to interconnector de-rating and the inclusion of further classes of renewable technologies in the CM. These changes help ensure that the CM is as open as possible to all technologies, and that they are assessed and rewarded fairly for their contribution to security of supply. In May and July 2019, following broad support from stakeholders, we implemented these changes via the Capacity Market Amendment (No. 3) Rules 2019 and the Capacity Market Amendment (No. 4) Rules 2019.

205. The EU's Clean Energy Package Electricity Regulation (Recast)[100] entered into force on 4 July 2019. It introduced the requirement to phase out, starting with new build capacity, capacity agreements and payments for generation capacity that emit more than 550g of CO_2 of fossil fuel origin per kWh of electricity. In July 2019, through the Capacity Market Amendment (No. 5) Rules 2019, we implemented the limit for new build capacity in the CM. We intend to launch a consultation in July 2019 which considers proposals on how to implement a carbon emissions limit for existing and refurbished plant in relation to upcoming auctions in early 2020 and future auctions.

206. Emerging from this review, there are three key themes under which we intend to make further improvements to the CM, described below (subject to State aid approval for the CM, which will affect any proposals we bring forward and associated timescales). These improvements will take the form of a series of consultations, evidence gathering exercises and legislative changes (if necessary).

207. Futureproofing and maintaining technology neutrality. While we are confident that the CM as implemented in 2014 was appropriate for the conditions at that time, we recognise that the energy market is constantly evolving. Therefore, to ensure the CM continues to remain fit for the future, we intend to:

- Review potential issues related to DSR (especially delivery assurance, agreements lengths, de-rating & component transparency and the 2MW minimum capacity threshold). See the Glossary in Annex C for an explanation of these terms.
- Monitor agreement lengths for all technologies.
- Review and simplify de-rating for all technologies where appropriate.
- Strengthen the penalty regime.
- Address issues related to connection capacity for co-located projects (see Glossary in Annex C).

[100] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search

- Work across Government to understand and address (if appropriate) possible distortions arising from outside the CM, including the EU-ETS and CCR.
- Continue planning for the forthcoming requirement to implement the direct participation of foreign plants, as part of the EU's Clean Energy Package[101].
- Implement a carbon emissions limit for existing and refurbished plants, as part of the EU's Clean Energy Package[102].
- Gather evidence on battery augmentation (see Glossary in Annex C).
- Gather evidence through a review of overseas capacity mechanisms, to support the improvements we are making to the CM. In particular our review will focus on non-delivery penalties, DSR delivery assurance, agreement lengths, models for the participation of foreign capacity, governance and administration. We intend to review the French, Italian, New England (ISO-NE), Pennsylvania-New Jersey & Maryland (PJM), Irish and Polish capacity mechanisms, as well as possibly others.
- Consider the case for moving the T-1 and T-4 auctions back so that, as far as possible, a full 4 years/1 year is available between the T-4/T-1 and the delivery year.

208. Simplification. To reduce complexity, barriers to entry and regulation, and to give participants further certainty, we would like to consider the case for simplifying the institutional framework behind the CM and the roles and responsibilities of delivery partners. In addition, Ofgem's Five-year Review of the Rules[103] is considering ways to simplify prequalification, secondary trading and the rule change process, which we will support. And we are also intending to simplify fees and events termination events and fees (which will result in less burdens) and consider the co-ordination of capacity during a SSE (see Glossary in Annex C).

209. Procuring the right amount of capacity. To ensure cost-effectiveness in the capacity auction outcomes, we intend to review the reliability standard. Although we believe that the reliability standard itself lies within the right range and is suitable in an international context[104], we recognise that some of the components that make up the standard may require an update (e.g. net CONE and VoLL). Additionally, whilst we remain satisfied with the design of the auction at this time, we intend to refresh our past analysis on split auctions now that more data is available on previous capacity auction outcomes, as well as carry out analysis that considers the outcomes of a split auction compared to a single auction under a range of future scenarios. Our intention is to check that our past conclusions on split auctions remain robust and that, going forward, the capacity auctions are designed such that overall CM costs are minimised. Particularly as the proportion of new capacity winning capacity agreements is likely to rise in the future. More generally, we will continue to consider the design of the capacity auction, and decisions taken within it (such as the amount of capacity set-aside for the T-1 auction) to balance the risks of structural over-procurement, which would impose unnecessary consumer costs, against the need to mitigate all plausible risks of delivery failure across the full range of technology types on which we now rely. Furthermore, in April 2018 Ofgem introduced a new regulatory and incentives framework for National Grid ESO[105], including an incentive for accurate

[101] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search
[102] https://publications.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search
[103] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
[104] http://sites.ieee.org/pes-rrpasc/working-groups/wg-on-lole-best-practices/
[105] https://www.ofgem.gov.uk/publications-and-updates/independent-review-eso-regulatory-and-incentives-framework

demand forecasting. This will help to ensure that the demand forecasting produced by National Grid ESO (on which the capacity target to be procured at auctions is based) remains accurate and robust.

210. As discussed above, we intend to launch a consultation in July 2019 which considers proposals on how to implement a carbon emissions limit for existing and refurbished plant. We then plan to hold another consultation process on issues raised during the Five-year Review and associated CFE before the end of 2019, following the conclusion of the approval process under State aid by the European Commission later in 2019. This consultation will be comprised of two sections. The first section will likely cover proposals on the following:

- Strengthening the penalty regime.
- Reducing the 2MW minimum capacity threshold.
- Addressing issues related to connection capacity for co-located projects.

The second section will seek to gather further evidence and information on the other issues we have committed to considering as part of this Five-year Review but are not yet ready to consult on proposals for. This may cover (but not be limited to):

- DSR related issues.
- De-rating for all technologies.
- Termination events and fees.

211. Following this consultation and evidence gathering process, we intend to implement any agreed solutions swiftly. We expect to have completed our analysis on split auctions by the end of 2019. We will then look to come forward as soon as is appropriate with further consultations during 2020. Similar to the first consultation, we may split some of these consultations into two sections to gather further evidence on some issues at the same time as bringing forward proposals on others. Following the series of consultations in 2020, we expect to have taken a decision on the large majority of issues raised during the Five-year Review and associated CFE, and completed our review of the reliability standard. A few of the longer-term issues, such as the direct participation of foreign plants, will likely require further consultation and stakeholder engagement beyond this point. See Table 1 below for an overview of timescales.

212. In taking forward any proposals which we intend to consult on, we will ensure that any changes we propose are consistent with the principles derived from State aid rules of technology neutrality and the efficient use of resources. We expect to engage with the State aid regulator early on in the process of policy development. When determining the exact timeframes of the consultations we will also take into consideration the need to maintain stability in the market, and the significant evidence base and development of legislative alterations that may be needed for some changes.

213. Finally, we intend to carry out an evaluation as part of the ten-year review of the CM, which will be following six full delivery years of the scheme. We will develop and share plans for the evaluation and monitoring process that will inform this evaluation in due course.

Table 13. Overview of proposed timescales for future consultations

	2018						2019				2020		2021		2022
	July	Aug	Sept	Oct	Nov	Dec	Q1	Q2	Q3	Q4	Q1 – 2	Q3 - 4	Q1 - 2	Q3 - 4	
Call for evidence (CFE)															
Standstill period															
First consultation on CFE issues															
Implementation of solutions															
Publication of Five-year Review report															
Consultation on the carbon emissions limit for existing and refurbished plants, and all future auctions															
Second consultation on CFE issues															
Implementation of solutions															
Further consultations on CFE issues															
Implementation of solutions															
Final consultations on longer-term CFE issues															
Implementation of solutions															

Annex A
List of Capacity Market consultations and evaluations

A.1 List of Capacity Market consultations

214. September 2014 Consultation[106] (response[107] January 2015). Changes implemented through the Electricity Capacity (Amendment) Regulations 2015 (SI 2015/875)[108] and the Capacity Market (Amendment) Rules 2015 (see Table 16 below). Summary of changes implemented (not proposals consulted on):

- Agreement of terms and methodology for the participation of interconnectors.
- Establishment of rules and provisions for the TA auctions for DSR and small-scale distribution connected generation.
- Modification of eligibility criteria for 15-year agreements to expand the definition of new build to include equipment and infrastructure that has been refurbished to a level equivalent to new build standards, and to establish that standard in line with the EU BREF[109]. This allowed for the repurposing of existing sites, and use of rebuilt equipment, provided it meets EU standards (as well as other criteria for 15-year agreements, including capital expenditure threshold). Also added a requirement that an Independent Technical Expert certify the CMU as meeting the fifteen-year eligibility criteria.
- Introduction of technical requirements for bespoke metering.
- Addition of a provision to ensure that Metering Test Certificates remain valid for all subsequent auctions.
- Introduction of adjustments to calculations to payments and obligations, in order to allow for obligation trading (secondary trading) among CMU holders.
- Amendment of definition of prequalification decision to enable appeals by secondary trading entrants.
- Amendment of General Eligibility Criteria to include minimum capacity threshold of 2MW.
- Provision that generating units with an output below 2MW should be able to aggregate with units owned by different parties.

[106] https://www.gov.uk/government/consultations/consultation-on-capacity-market-supplementary-design-proposals-and-transitional-arrangements

[107] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/396566/Government_Response_to_CM_Supplemetary_Design_Consultation_v.pdf

[108] https://www.legislation.gov.uk/uksi/2015/875/contents/made

[109] http://eippcb.jrc.ec.europa.eu/reference/lcp.html

BREF – Best available techniques Reference document for Large Combustion Plants (issued by the European Commission)

215. February 2015 Consultation[110] (response[111] March 2015). Changes implemented through Electricity Capacity (Amendment) (No. 2) Regulations 2015 (SI 2015/1974)[112] and the Capacity Market (Amendment) Rules 2015 (see Table 16 below). Summary of changes implemented (not proposals consulted on):

- Exclusion of capacity in receipt of financial support under NER 300 and Carbon Capture and Storage (CCS) grant scheme.
- Introduction of a required statement for refurbishing CMUs to demonstrate the need for an agreement beyond 1 year.
- Extension of deadline to post credit cover from 5 days to 15 days.
- Introduction of provision to allow unproven DSR CMUs, that have previously posted credit cover for components contained within their CMU, to forego posting additional credit cover for those same components for subsequent auctions/delivery years.

216. October 2015 Consultation[113] (response[114] March 2016) and March 2016 Consultation[115] (response[116] May 2016). Changes implemented through the Electricity Capacity (Amendment) Regulations 2016 (SI 2016/742)[117] and the Capacity Market (Amendment) Rules 2016 (see Table 16 below). Summary of changes implemented (not proposals consulted on):

- Implementation of the Rules, process and parameters for running the supplementary capacity auction[118]: capacity target, eligibility, agreement length, secondary trading, and other aspects requiring changes or clarification.
- Implementation of further tightening of delivery incentives for new build CMUs by raising and adding new categories of termination fees, increasing credit cover requirements, and to disqualify terminated CMUs from participating in auctions for 2 years following termination.
- Refinement of eligibility criteria (exclusion of generation CMUs) for the TA auctions to support the development of the nascent parts of the DSR sector (i.e. turn down DSR) and lower the minimum capacity threshold for entry into the second TA auction from 2MW to 500kW. As well as an amendment to the rules to allow unproven DSR capacity

[110] https://www.gov.uk/government/consultations/consultation-on-capacity-market-supplementary-design-proposals-and-changes-to-the-rules

[111] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/412934/Government_Response_to_Feb_2015_consultation_on_amendments_to_the_CM_Reg.pdf

[112] https://www.legislation.gov.uk/uksi/2015/1974/contents/made

[113] https://www.gov.uk/government/consultations/2015-consultation-on-capacity-market-supplementary-design-proposals-and-changes-to-the-rules-and-regulations

[114] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/504050/Govt_response_to_the_consultation.pdf

[115] https://www.gov.uk/government/consultations/consultation-on-reforms-to-the-capacity-market-march-2016

[116] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/521301/Govt_response_to_March_2016_consultation_FINAL.pdf

[117] https://www.legislation.gov.uk/uksi/2016/742/contents/made

[118] This auction had a separate State aid approval by the European Commission (Decision SA.44475 (2016/N) http://ec.europa.eu/competition/state_aid/cases/265707/265707_1850846_123_2.pdf)

with an agreement from the first TA auction to participate in the main CM T-4 auctions for delivery year 2020/21.

- Revision of timings for finalisation of the prequalification results to accommodate Tier 1 appeals process.
- Addition to Chapter 15 of the Rules outlining the Authority's (Ofgem's) responsibilities in undertaking its regular reviews of the Rules.
- Introduction of a test for recipients of funding under the EIS or VCT schemes, to ensure that no cumulation of State aid can occur (full description above).

217. September 2016 Consultation[119] (response[120] November 2016). Changes implemented through the Capacity Market (Amendment) (No.3) Rules 2016 (see Table 16 below). Summary of changes implemented (not proposals consulted on):

- Implementation of arrangements for recipients of funding under the EIS or VCT schemes, to ensure that no cumulation of State aid can occur.

218. October 2016 Consultation[121] (response[122] March 2017). Implemented through the Electricity Capacity (Amendment) Regulations 2017 (SI 2017/1053)[123] (these amended both the Regulations and the Supplier Payment Regulations) and the Capacity Market (Amendment) (No. 2 and 3) Rules 2017 (see Table 16 below). Summary of changes implemented (not proposals consulted on):

- Changes to the basis of supplier charging arrangements from a net to a gross demand basis, to remove a potential double payment that could have created a market distortion.
- Amendment of deadlines related to metering assessments to help participants navigate the metering regime and simplify the DSR Test and Metering Test process to provide clarity and create sufficient time ahead of the delivery year for DSR aggregators to secure components in an unproven DSR CMU.
- Adjustment of delivery milestones for one-year-ahead (T-1) auctions, which were previously applicable only to four-year-ahead (T-4) auctions.
- Changes to allow credit cover to be held until the CMU achieves their financial completion milestones and obtains a Transmission Entry Capacity (TEC) agreement, and to remove any double liability on participants regarding credit cover loss and termination fee exposure.
- Changes to ensure figures for de-rated capacity for DSR are used consistently across the framework.

[119] https://www.gov.uk/government/publications/selective-overcompensation-in-the-capacity-market

[120] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/555593/Selective_overcompensation_in_the_CM_letter.pdf

[121] https://www.gov.uk/government/consultations/capacity-market-proposals-to-simplify-and-improve-accessibility-in-future-capacity-auctions

[122] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/601209/Government_Response.pdf

[123] https://www.legislation.gov.uk/uksi/2017/1053/contents/made

- Introduction of a requirement for the Settlement Body to make available a 6-monthly report on the cumulative amount of aid paid to each beneficiary under the CM scheme (in excess of €500,000).
- Introduction of a new termination event and termination fees to ensure metering assessments are undertaken by the relevant deadlines.
- Changes to the name, but not the substance, of a CMN.

219. July 2017 Consultation[124] (response[125] December 2017). Implemented through the Capacity Market (Amendment) (No. 4) Rules 2017 (see Table 16 below). Summary of changes implemented (not proposals consulted on):

- Amendment of generation technology classes and the de-rating methodology related to storage CMUs: dividing the technology class into several classes based on duration for which a storage CMU can generate at its full connection capacity without recharging, and de-rating each duration band based on Equivalent Firm Capacity (EFC) methodology.
- Strengthening of the Satisfactory Performance Day (SPD) arrangements and addition of the requirement to complete three SPDs during winter of the relevant delivery year, with at least one falling between January and April.
- Changes to allow capacity providers to amend a metering assessment.

220. December 2018 Consultation[126] (response[127] February 2019). Implemented through the Electricity Capacity (No. 1) Regulations 2019 (SI 2019/862)[128], the Capacity Market (Amendment) Rules 2019 and the Capacity Market (Amendment) (No. 2) Rules 2019 (see Table 16 below). Summary of changes implemented (not proposals consulted on):

- Amendments to allow a replacement T-1 auction to be conducted during the standstill period.
- Modifications to forthcoming milestones for capacity providers affected by the standstill period.
- Modifications to enhance the Secretary of State's discretion with regard to dealing with termination and non-completion notices.
- Inclusion of an appropriate mechanism to ensure that that suppliers are invoiced promptly and in full once the standstill period is over, and to enable suppliers to make payments to the Electricity Settlements Company in the meantime.

[124] https://www.gov.uk/government/consultations/capacity-market-consultation-improving-the-framework-detailed-proposals
[125] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/664272/capacity-market-consultation-improving-framework-response.pdf
[126] https://www.gov.uk/government/consultations/capacity-market-technical-amendments
[127] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/782657/capacity-market-technical-amendments-consultation-government-response.pdf
[128] https://www.legislation.gov.uk/uksi/2019/862/contents/made

221. March 2019 Consultation[129] (response[130] May 2019). Implemented through Electricity Capacity (No.2) Regulations 2019 (SI 2019/1139)[131] and the Capacity Market (Amendment) (No. 3, 4 and 5) Rules 2019 (see Table 16 below). Summary of changes implemented (not proposals consulted on):

- Replacement of the planned T-4 auction, postponed because of the standstill period, with a T-3 auction for delivery in 2022 to 2023 and modifications to milestones for capacity providers awarded a T-3 agreement.
- Inclusion of certain renewable technologies in the Capacity Market.
- Removal of the historical floor from the interconnector de-rating methodology.
- Corrections to the Rules to make sure they are clear and operate as intended.

A.2 List of Capacity Market evaluations

222. Evaluation of the transitional arrangements for demand-side response – phase 1[132] (February 2017). Summary of outcomes:

- Interview evidence suggested that participation of DSR in future CM auctions may be limited by low awareness of the TAs and CM, and by the complexity of guidance and rules, especially for direct participants.
- Interview evidence suggested that the second TA auction, which is restricted to turn-down DSR only, may have limited liquidity as some DSR providers reported that they would choose to contract mixed DSR portfolios (including back-up generation) in the supplementary capacity auction instead of the TA. While a few TA aggregators welcomed the reduction in minimum CMU size to 500 kW, some were concerned about the shortened time between auction and delivery compared to the first TA.
- Many TA participants reported that they sought to 'stack' TA revenue with revenue from at least one other source (e.g. Triad, balancing services), but some were concerned about the future of Triad revenues, given Ofgem's review of embedded benefits.
- Some TA aggregators reported that they would like to see greater certainty about the future policy environment for the DSR sector. They cited examples of policy uncertainty, like the last-minute reduction in volume of the first TA auction, and the announced changes to the Rules (e.g. removal of guaranteed volumes in some future T-1 auctions and eligibility criteria changes for the second TA auction).

223. Evaluation of the transitional arrangements for demand-side response – phase 2[133] (January 2018). Summary of outcomes:

[129] https://www.gov.uk/government/consultations/capacity-market-further-technical-amendments
[130] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/805554/capacity-market-further-amends-consultation-response-2019.pdf
[131] https://www.legislation.gov.uk/uksi/2019/1139/contents/made
[132] https://www.gov.uk/government/publications/evaluation-of-the-transitional-arrangements-phase-1
[133] https://www.gov.uk/government/publications/evaluation-of-the-transitional-arrangements-for-demand-side-response-phase-2

- TA impacts were constrained by the short timescale between the auction and start of the delivery year, by CM metering accuracy and by the complexity of Rules.
- CM metering accuracy requirements made it difficult for complex sites with renewable energy generation to participate in the CM. The metering accuracy required by the CM is more demanding than the accuracy required for other flexibility services or for Feed-in-Tariff or Renewable Heat Incentive projects. This was a source of frustration for industry and acted as a barrier to participation of DSR in the CM.
- Aggregators reported that it was more challenging to recruit turn-down rather than back-up DSR capacity, because turn-down was perceived as potentially conflicting with an organisation's main business activity. Aggregators suggested that turn-down assets suitable for the CM, rather than frequency services, need to tolerate longer turn-down but need not be capable of fast, automatic dispatch.

224. Evaluation of the transitional arrangements for demand-side response: phase 3[134] (August 2018). Summary of outcomes:

- Early findings from Phase 3 suggested that the second TA stimulated learning about turn-down DSR for some participants and also encouraged some aggregator clients to expand from 'self-despatch' of turn-down DSR for Triad to delivery of flexibility for the CM – at least on a trial basis.
- Withdrawal of capacity before the auction contributed to low liquidity in the second TA, which led to a high clearing price of £45/kW. Pre-auction drop-out was caused by changes in the circumstances of specific aggregator clients and downwards revisions in the capacity that aggregators and direct participants thought they could realistically contract in the second TA.
- There was little drop-out of capacity during the testing stage, after the auction. This was partly because of learning from the first TA and partly because the high price helped aggregators to attract clients.
- Most participants overfilled their CMUs (i.e. lined up more capacity than strictly needed) as a precaution against losing capacity during testing or delivery. The high level of overfilling was driven largely by learning from the first TA (in which many aggregator CMUs failed to demonstrate their proven capacity) but was also enabled by the high clearing price for the second TA (which facilitated recruitment by aggregators and provided an incentive for participants to demonstrate their full capacity).

225. Independent evaluation of EMR[135] (October 2015). Summary of outcomes:

- While stakeholders pointed to possible revisions to the arrangements and highlighted design decisions that they would have made differently, there was generally an over-riding desire for system stability.
- The DECC process during the development of the CM was generally consultative but with some shortcomings.

[134] https://www.gov.uk/government/publications/evaluation-of-the-transitional-arrangements-for-demand-side-response-phase-3

[135] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/468257/Independent_evaluation_of_Electricity_Market_Reform_-_Final_report_-_14_....pdf

- Expedience of the process prevailed over details during final stages, so there is a need to continue industry engagement.
- The demand curve pricing parameters lacked a transparent methodology and supporting justification.
- There were mixed opinions on appropriateness of differentiated agreement lengths for new generation projects.
- The non-availability of longer-term agreements for DSR attracted criticism, but there was some evidence to support the adoption of one-year agreements to DSR.
- The refurbishment category increased complexity and there were weaknesses in the eligibility criteria.
- The prequalification process was hampered by several issues.
- The auction systems performed well and preparations supported participants.
- There was no firm evidence to suggest that the CM has had either an upward or downward effect on the overall cost of capital for new build.
- There is a need for regular monitoring and communication of non-delivery risk to allow performance in respect of delivery to be assessed.
- The impact of reciprocating engines is uncertain and may be counter to policy aims.

Annex B
Review of relevant Capacity Market Rules

226. As set out in Section 1.4.4, as part of our Five-year Review we are required by rule 15.1 to, in summary, set out the objectives of the Rules, assess the extent to which those objectives are achieved and assess whether those objectives remain appropriate and if so, can they be achieved in a less burdensome way. This review is additional to Ofgem's Five-year Review of the Rules[136]. This requirement applies only to rules that confer functions on the Secretary of State or the Authority (Ofgem), and those rules made or amended by the Secretary of State since 30 June 2015. These rules are listed below in Table 14, Table 15 and Table 16.

227. The Rules set out the technical and operational details for the implementation of the CM, therefore we have determined the objectives of the Rules to be the same as the those of the CM. This is consistent with Ofgem's Five-year Review of the Rules[137], which has taken the same approach. The CM objectives are:

- *Security of supply:* to incentivise sufficient investment in capacity to ensure security of electricity supply;
- *Cost-effectiveness:* to ensure the most efficient level of capacity is secured at minimum cost to consumers; and
- *Avoiding unintended consequences:* to minimise design risks and complement the decarbonisation agenda.

228. We believe that the existing objectives of the CM remain suitable and do not require amendment, this is detailed in Section 2.2. We also do not intend to include any additional objectives for the CM at this time. We believe that the objectives of the Rules should remain the same as the CM and therefore conclude that the objectives of the Rules remain appropriate and do not require amendment.

229. In Table 14, Table 15 and Table 16 below we have set out, for each of the relevant rules, an assessment of the extent to which their objectives are achieved and whether they could be achieved in a less burdensome way. This assessment has been carried proportionately, taking into consideration that the Rules provide further technical detail to implement the Regulations, and the Regulations have been reviewed extensively in Section 3 of this report. Ofgem are also already carrying out an assessment of the Rules against the objectives for the Rules as part of their Five-year Review of the Rules. We have cross referenced Section 3 of this report and Ofgem's review where relevant in Table 14, Table 15 and Table 16 below.

230. Our assessment has found that the objectives of the rules reviewed have been achieved to a satisfactory extent. We did not identify any changes which could be made to these rules to achieve the objectives of the Rules in a less burdensome way. The full assessment is set out below in Table 14, Table 15 and Table 16.

[136] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
[137] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2

Table 14. Rules that confer functions on the Secretary of State

Rules section and description	Relevant Rule/s and summary of function/s	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
2.2 Capacity Auction timetable and guidelines	2.2.2: determining timetable for Capacity Auction.	This rule contributed to the achievement of security of supply and avoidance of unintended consequences in Summer 2019 when it was used to determine a different timetable for the T-1 capacity auction as a consequence of the standstill period[138].	The objectives of this rule cannot be achieved in a less burdensome way as the rule is essential for enabling the Secretary of State to respond to unforeseen circumstances. For example, when the rule was used to determine a different timetable for the T-1 capacity auction in Summer 2019 as a consequence of the standstill period[139].
2.3 De-rating of CMUs	2.3.1A, 2.3.1B: determining a de-rating factor for interconnector CMUs. 2.3.5A: determining EFIC for interconnector CMUs. 2.3.8: requesting the Delivery Body to consult on de-rating calculation methodologies.	Accurate de-rating factors have helped ensure that contributions to security of supply are assessed and rewarded accurately, which has achieved both security of supply at the least cost to consumers. Consulting on de-rating methodologies has helped to minimise the risk of any unintended consequences arising from changes. This process has worked well to date, for example regarding the recent consultation on changes to de-rating for interconnectors[140]. See Section 3.1.1 for details of plans to review de-rating approaches for all technologies and potential changes to the way that interconnectors participate in the CM.	Although interconnector participation in the CM could change once direct foreign plant participation is implemented, they will still need to be de-rated and any changes to the de-rating methodology consulted on. So, the objectives of these rules cannot be achieved in a way that imposes less burden as their functions are all essential. See Section 3.1.1 for details of plans to review de-rating approaches for all technologies.

[138] Following the direction made by the Secretary of State to rearrange the postponed T-1 Auction for the delivery year commencing in October 2019. https://www.gov.uk/government/publications/capacity-market-determination-letter-from-beis-to-national-grid-eso-april-2019

[139] Following the direction made by the Secretary of State to rearrange the postponed T-1 Auction for the delivery year commencing in October 2019. https://www.gov.uk/government/publications/capacity-market-determination-letter-from-beis-to-national-grid-eso-april-2019

[140] https://www.gov.uk/government/consultations/capacity-market-further-technical-amendments

Rules section and description	Relevant Rule/s and summary of function/s	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
5.5 Capacity auction format	5.5.4: advising the auctioneer (the Delivery Body) if the conclusion of the Capacity Auction is delayed after it has started. 5.5.8: issuing instructions to the auctioneer as to the price decrement in each bidding round price spread.	These rules have contributed to the avoidance of unintended consequences and to cost-effectiveness by ensuring that the auction process is smooth and efficient, the Delivery Body can notify the Secretary of State in the event of a delay and the price decrements in each bidding round are set correctly.	The objectives of these rules cannot be achieved in a less burdensome way because they are both necessary to ensure smooth running of the capacity auctions and enable the Secretary of State to respond to unanticipated circumstances e.g. if the conclusion of the capacity auction needs to be delayed after it has started. Regarding rule 5.5.8, whilst we have no current intention to change the bidding round decrements, we have recently (in the 2019 T-1 auction) changed the length of both the capacity auction and the individual rounds to trial an approach that we hope will have reduced the administrative burden on bidders. Lessons from this change may lead us to consider changing the round decrements.
5.10 Capacity Auction results	5.10.4: directing the Delivery Body to award a Capacity Agreement as a result of circumstances in Rule 5.10.3. 5.10.5: requiring the Auction Monitor to notify the SoS in relation to issues arising under 5.10.4	These rules enable CMUs that would've been successful in the capacity auctions, had bids from disqualified bids been removed, to be awarded capacity agreements. They make an important contribution to security of supply by ensuring that the capacity target is still met by the auctions in the event of disqualifications. These rules have been used three times. Once in the T- 4 for delivery year 2018/19 and twice in the supplementary capacity auction for delivery year 2017/18.	The objectives of these rules cannot be achieved in a less burdensome way because both rules are necessary to ensure that capacity agreements are awarded appropriately, as rule 5.10.5 enables the delivery of 5.10.4.
5.11 Capacity	5.11.3: instructing the Delivery Body to suspend	This rule was used and contributed to the avoidance of unintended consequences and cost	The objectives of this rule cannot be achieved in a less burdensome way because the rule is

Rules section and description	Relevant Rule/s and summary of function/s	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
market auction suspension or cancellation	or cancel a Capacity Auction.	effectiveness of the CM by enabling the T-1 capacity auction for delivery year 2019/20 to be suspended as a result of the standstill period. This power was also used to first suspend and then cancel the T-4 for delivery year 2022/23.	necessary to enable the Secretary of State to respond to changing and sometimes unanticipated circumstances.
5.14 Auction monitor and audit of capacity auctions	5.14.3 (b): requesting the Delivery Body to report on any specific issue related to Capacity Auction process.	Whilst we have not yet had to use this rule, it is an important tool to ensure that the CM is operating lawfully and allows us to respond to any unforeseen circumstances.	The objectives of this rule cannot be achieved in a less burdensome way because, even though the rule has not been used to date, it remains necessary in case it is needed to respond to any unforeseen circumstances.
15.1 Review by the Secretary of State	15.1.1 reviewing the Rules	This rule has facilitated this assessment of certain rules against their objectives and has therefore contributed to the achievement of the objectives, by ensuring that the Government is able to recognise and react to any issues within the Rules.	The objectives of this rule cannot be achieved in a less burdensome way as the review function is essential for ensuring that the objectives of the Rules are being met and provides an important formal opportunity for ongoing monitoring and evaluation of certain rules. The review will be repeated every five years.

Table 15. Rules that confer functions on the Authority (Ofgem)

Rules section and description	Relevant Rule/s and summary of function/s	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
2.3 De-rating of CMUs	2.3.8: requesting Delivery Body to consult on de-rating calculation	Consulting on de-rating methodologies has enabled both Government and Ofgem to minimise the risk of any unintended consequences arising	The objectives of this rule cannot be achieved in a less burdensome way as consultation on de-rating methodologies is

Rules section and description	Relevant Rule/s and summary of function/s	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
	methodologies.	from changes, as well as to ensure that the methodologies are robust and therefore contributions to security of supply are accurate. This process has worked well to date, for example regarding the recent consultation on changes to de-rating for interconnectors[141]. See Section 3.1.1 for details of plans to review de-rating approaches for all technologies and potential changes to the way that interconnectors participate in the CM.	an essential function for ensuring accurate de-rating factors and therefore cost-effectiveness and security of supply.
4.8 Provision of a price-maker memorandum and certificate by applicants	4.8.2: providing a receipt when an applicant lodges a price-maker memorandum. 4.8.4: retaining price-maker memoranda.	Recording and monitoring of price-maker memoranda ensures that we can keep track of which CMUs are price-makers in the auctions, which in turn ensures a cost-effective auction outcome and cost-effectiveness for the consumer. The system has worked well to date.	The objectives of this rule cannot be achieved in a less burdensome way at the moment, as both the providing of receipts and the retaining of price-maker memoranda are essential functions for keep track of price-makers within each capacity auction. We will consider if any future upgrades to the Delivery Body's system would allow this to be achieved in a less burdensome manner.
15.2 Review by the Authority	15.2.1 reviewing the Rules	This rule has facilitated Ofgem's assessment of the Rules against their objectives and has therefore contributed to the achievement of the objectives, by ensuring that the Authority is able to recognise and react to any issues within the Rules. Ofgem will soon publish their first report under this rule[142].	The objectives of this rule cannot be achieved in a less burdensome way as the review function is essential for ensuring that the objectives of the Rules are being met and provides an important formal opportunity for ongoing monitoring and evaluation of the Rules. The review will be repeated by Ofgem every five years. We will consider if any potential future simplifications of the CM institutional

[141] https://www.gov.uk/government/consultations/capacity-market-further-technical-amendments
[142] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2

Rules section and description	Relevant Rule/s and summary of function/s	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
			framework could allow the objectives to be achieved in a less burdensome manner.

Table 16. Rules made or amended by the Secretary of State after 30 June 2015

Year and Rules Chapter amended	Rules amendment instrument/s	Amendment summary	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
2015 All Chapters except Chapter 10.	The Capacity Market (Amendment) Rules 2015[143]	Rules made to align with amendments to the Regulations by the Electricity Capacity (Amendment) Regulations 2015 and Electricity Capacity (Amendment) (No. 2) Regulations 2015, and in respect of interconnector CMUs, and eligibility conditions for fifteen-year agreements. Rules amended in respect of metering and credit cover, aggregation of generation units and miscellaneous corrections to align with policy intent.	As these rule changes were made to align the Rules with the Regulations, see Sections 3.1.1 and 3.1.2 which assess the performance against objectives of the relevant regulations, including agreement lengths, interconnector arrangements, termination events and fees and delivery assurance.	The burden of these new rules and rule amendments cannot be reduced as they provide important technical detail to implement and supplement the relevant regulations.
2016	The Capacity Market	Rules made to align with amendments made to the Regulations by the Electricity	The rules made to facilitate the transitional arrangements (TA) auctions and supplementary capacity auction	The rules that facilitated the TA auctions and supplementary capacity auction are no longer

143 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/431843/Capacity_Market_Rules_Amendments_2015_Signed.pdf

Year and Rules Chapter amended	Rules amendment instrument/s	Amendment summary	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
All Chapters except Chapter 2.	(Amendment) Rules 2016[144]	Capacity (Amendment) Regulations 2016 and in respect of the supplementary capacity auction, transitional arrangements auctions and review of the Rules. Rules amended in respect of requirements for new build capacity providers, termination fees, secondary trading and volume reallocation, and miscellaneous corrections to align with policy intent.	made important contributions to security of supply by ensuring that GB had enough capacity in the delivery years 16/17 and 17/18. For the rule changes that were made to align the Rules with the Regulations, see Sections 3.1.2 which assess the performance against objectives of the relevant regulations, including termination events and fees. Also see Ofgem's Five-year Review of the Rules[145] which assesses secondary trading arrangements and highlights a future programme of work aiming to simplify the secondary trading arrangements.	needed but it is not necessary to remove them as they do not create any burdens. For the rule changes and new rules that were made to align the Rules with the Regulations, the burden of these rules and rule amendments cannot be reduced as they provide important technical detail to implement and supplement the relevant regulations.
	The Capacity Market (Amendment) (No.3) Rules 2016[146]	Rules amended in respect of accounting for State aid received under additional support schemes. Rules amended in relation to funding declarations and provision of independent technical expert reports.	These rules ensured that unintended consequences related to overcompensation under State aid were avoided. See Section 3.3.2 which discusses these changes and their impact in detail.	The burden of these rules cannot be reduced as they provide essential functions that enable Government to prevent and correct incidences of overpayment of State aid, and they cannot be simplified any further. We will consider if any future upgrades to the Delivery Body's system would allow this to

[144] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/538293/Capacity_Market__Amendment__Rules_2016.pdf
[145] https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
[146] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/572058/Capacity_Market__Amendment___No3__Rules_2016.pdf

Year and Rules Chapter amended	Rules amendment instrument/s	Amendment summary	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
				be achieved in a less burdensome manner.
2017 All Chapters except for Chapters 4, 10, 11, 12 and 13.	The Capacity Market (Amendment) (No. 2) Rules 2017[147]	Rules made in respect of delivery milestones for T-1 auctions, and total project spend declaration. Rules amended in respect of metering requirements, termination, prequalification and additional changes accounting for state aid received under additional support schemes.	These rules achieved security of supply by ensuring that Government has sufficient assurance that capacity is on track to deliver in time for the delivery year. They also contributed to the avoidance of unintended consequences by avoiding overcompensation under State aid. See Sections 3.1.1 and 3.1.2 which sets out our plans to review termination events and fees and to review delivery assurance for DSR. Also see Ofgem's Five-year Review of the Rules[148], which highlights a future programme of work aiming to simplify prequalification.	The objectives of these rules and rule amendments cannot be achieved in a less burdensome way because they provide important assurance that capacity will be delivered on time and cannot be simplified any further. They also support essential measures that enable Government to prevent and correct incidences of overpayment of State aid.
	The Capacity Market (Amendment) (No. 3) Rules 2017[149]	Rules made to align with amendments to the Regulations by the Electricity Capacity (Amendment) Regulations 2017. Amendments made in respect of DSR capacity, de-rating and	As these rule changes were made to align the Rules with the Regulations, see Sections 3.1.1 and 3.1.3 which assess the performance against objectives of the relevant regulations, including DSR arrangements, de-rating and CMNs.	The burden of these rules and rule amendments cannot be reduced as they provide technical detail to implement and supplement the relevant regulations.

147 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/629950/capacity-market-amendment-2-rules-2017.pdf
148 https://www.ofgem.gov.uk/publications-and-updates/decision-statutory-consultation-amendments-capacity-market-rules-2
149 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/656817/The_Capacity_Market__Amendment___No._3__Rules_2017.pdf

Year and Rules Chapter amended	Rules amendment instrument/s	Amendment summary	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
		renamed capacity market warnings to Capacity Market Notices (CMNs).		
	The Capacity Market (Amendment) (No. 4) Rules 2017[150]	Amendments made in respect of satisfactory performance days and extended performance, batteries (storage generating technology classes) and metering assessments.	These rule amendments achieved security of supply by ensuring capacity providers can provide sufficient assurance that capacity would be available during the delivery years and that arrangements for storage technologies were suitable. See Sections 3.1.1 and 3.1.3 which assess the performance against objectives of the relevant regulations.	The objectives of these rules cannot be achieved in a less burdensome way because the functions are essential for providing delivery assurance and suitable arrangements for storage technologies. They cannot be simplified any further.
2019 Chapters 1, 3, 4, 5, 6, 8, 9, 13 and new Chapter 16 added.	The Capacity Market (Amendment) Rules 2019[151]	Rules made to introduce Chapter 16 to the Rules in respect of capacity agreements which existed on 15 November 2019 and the T-1 auction for the delivery year commencing on 1 October 2019. Amendments made in respect of total project spend to clarify policy intent.	These rules achieved security of supply during the standstill period by taking initial steps to facilitate the replacement T-1 auction and modifying the application of the Rules in respect of milestone obligations due from capacity providers with capacity agreements which existed on 15 November 2019.	The objectives of these rules cannot be achieved in a less burdensome way because the measures are essential for facilitating the operation of the CM to the extent possible during the standstill period, in particular the meeting of milestone obligations by capacity providers with capacity agreements which existed on 15 November 2019. New Rules were made to deal with the

[150] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/670438/20171218_CM_Amendment_Rules_4_2017.pdf

[151] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/783554/The_Capacity_Market__Amendment__Rules_2019.pdf

Year and Rules Chapter amended	Rules amendment instrument/s	Amendment summary	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
				consequences of the standstill period and are therefore of limited temporal application. But once they are no longer needed, they will not present a burden and so it will not be necessary to remove them.
2019 Chapters 1, 3, 4, 5, 6, 8, 9, 13, and 16.	The Capacity Market (Amendment) (No. 2) Rules 2019[152]	Rules made to provide further technical detail to supplement the Electricity Capacity (Amendment) (No. 1) Regulations 2019. Amendments made to Chapter 16 of the Rules in respect of capacity agreements which existed on 15 November 2019 and the replacement T-1 auction for the delivery year commencing on 1 October 2019. Miscellaneous corrections to align with policy intent.	These rules achieved security of supply during the standstill period by facilitating the replacement T-1 auction for the 2019 delivery year and providing certainty for capacity providers around the operation of rules in relation to applicant credit cover after the standstill period ends.	The objectives of these rules cannot be achieved in a less burdensome way because the measures are essential for facilitating the operation of the CM to the extent possible during the standstill period, in particular the replacement T-1 auction and the award and operation of conditional capacity agreements. New Rules were made to deal with the consequences of the standstill period and are therefore of limited temporal application. But once they are no longer needed, they will not present a burden and so it will not be necessary to remove them.

[152] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786989/capacity-market-amendment-no2-rules-2019.pdf

Year and Rules Chapter amended	Rules amendment instrument/s	Amendment summary	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
2019 Chapters 1, 6, 9, 16, Schedule 3 and 3B	The Capacity Market (Amendment) (No. 3) Rules 2019[153]	Rules made to introduce certain renewable technologies to the CM. Amendments made in respect of de-rating of interconnector CMUs and miscellaneous corrections to align with policy intent.	These rules achieved security of supply and cost effectiveness by ensuring that intermittent renewables are appropriately rewarded for their contributions to security of supply and that interconnectors are de-rated accurately. See Section 3.1.1 for a detailed assessment of these new rules and amendments.	The objectives of these new rules and rule changes cannot be met in a less burdensome way as technologies must be listed in the Rules to be able to participate in the CM. These Rule changes were made in response to some the issues raised by respondents to the CFE, discussed in Section 3.1.1.
2019 Chapters 1, 2, 6, 8, 14 and 16 and Exhibit J.	The Capacity Market (Amendment) (No. 4) Rules 2019[154]	Rules made to introduce a requirement for providers with new build technologies from certain renewable technology classes to declare State aid granted under other low carbon support schemes, so that it can be accounted for under the methodology in the Regulations as amended by the Electricity Capacity (Amendment) (No. 2) Regulations 2019 (in order to avoid overpayment of State aid). Rules amended to clarify interconnector derating and derating of renewables.	These rule changes contributed to the achievement of the objectives by supplementing the changes made by the Capacity Market (Amendment) (No. 3) Rules 2019 to avoid unintended consequences of the inclusion of certain renewable technologies in the Capacity Market.	These rules are necessary for the achievement of the objectives and their burden cannot be reduced as they provide an essential framework to prevent and correct the overpayment of State aid granted to the renewable technologies added to the capacity market, with the State aid granted by capacity market. They cannot be simplified any further and need to be in place for when renewables begin to obtain agreements.

[153] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807137/capacity-market-amendment-3-rules-2019.pdf
[154] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/809813/The-Capacity-Market-Amendment-No.4-Rules-2019.pdf

Year and Rules Chapter amended	Rules amendment instrument/s	Amendment summary	The extent to which the objectives of the Rules have been achieved	Can the objectives be achieved in a less burdensome way?
2019 Chapters 1, 3, 4, 7, 16 and insertion of new Chapter 17 and Exhibit ZA.	The Capacity Market (Amendment) (No. 5) Rules 2019[155]	Rules made to provide further technical detail to supplement the Electricity Capacity (Amendment) (No. 2) Regulations 2019 in respect of the auctions to be held in early 2020, and applicant credit cover. Rules made to require a carbon emissions limit for new build and unproven DSR CMUs which contain a fossil-fuel component in respect of the auctions to be held in early 2020.	These rules achieved security of supply by facilitating the T-3 auction and T-4 auction to be held in early 2020 and complemented decarbonisation by implementing a new carbon emissions limit for new build CMUs and unproven DSR CMUs with a fossil-fuel component of a CMU that commences commercial production on or 4 July 2019.	The objectives of these rules cannot be achieved in a less burdensome way because the functions are essential for facilitating the upcoming auctions and the ongoing operation of the CM to the extent possible during the standstill period, and to enable the initial implementation of an emissions limit for any fossil-fuelled component of a CMU that commences commercial production on or after 4 July 2019 as required by the recast Electricity Directive in the EU's Clean Energy Package[156]. New Rules were made to deal with the consequences of the standstill period in respect of upcoming auctions in early 2020 and are therefore of limited temporal application. But once they are no longer needed, they will not present a burden and so it will not be necessary to remove them.

155 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/818851/Capacity_Market__Amendment___No._5__Rules_2019.pdf

156 https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans

Annex C
Glossary

Abbreviation	Definition
Aggregator	An aggregator provides an intermediary service of aggregating DSR capacity from a range of other organisations for the purposes of National Grid ESO Balancing Services or the CM, in return for a share in the revenues generated by those organisations.
Ancillary services	Ancillary services refer to functions that help National Grid ESO maintain a reliable electricity system. Ancillary services maintain the proper flow and direction of electricity, address imbalances between supply and demand, and help the system recover in the event of a black out. They include Balancing Services, as well as other services such as Black Start.
Auction clearing price	The price at which the supply of capacity offered by bidders at that price is equal to the volume of capacity required to be secured in the auction.
Auction parameters	The parameters of the capacity auction, which are determined by the Secretary of State. This includes the capacity target, net-CONE, the price-taker threshold, price cap, the capacity margins and the capital expenditure thresholds.
Balancing Mechanism Unit (BMU)	A unit of capacity that participates in the Balancing Mechanism.
Balancing Services / Balancing Mechanism	The services procured by / mechanism used by National Grid ESO to balance electricity demand and supply across the national transmission network.
Balancing Use of System (BSUoS) charge	A charge levied by National Grid ESO on suppliers in order to balance the electricity system and recover the costs incurred as system operator.
Baseload	Electricity generation that is at the bottom of the merit order, i.e. tends to have low short run marginal costs and a high load factor.
Battery augmentation	The process of enhancing a battery to increase its storage capacity partway through its lifetime.
Behind the meter generation (BTMG)	DSR that reduces electricity demand on the distribution network or transmission network by starting up on-site generators to provide electricity. Also known as generation derived DSR.

Abbreviation	Definition
Cap and floor	A scheme designed to incentivise investment in interconnectors between GB and other countries by reducing uncertainty in electricity prices for interconnectors.
Capacity	An amount of electrical generating capacity or DSR capacity, usually expressed in megawatts (MW) unless stated otherwise.
Capacity agreements	The rights and obligations accruing to a capacity provider under the Regulations and the Rules in relation to a CMU for one or more delivery years.
Capacity auction	An auction held under Part 4 of the Regulations, as a result of which successful bidders are awarded capacity agreements.
Capacity committed CMU	A CMU that is subject to a capacity obligation.
Capacity Market Notice (CMN)	A signal issued by National Grid ESO four hours in advance that there may be less generation available than expected to meet national electricity demand on the transmission system.
Capacity Market Rules/ CM Rules ("the Rules")	The Capacity Market Rules provide the technical detail for implementing the operating framework set out in the Regulations.
Capacity Market Unit (CMU)	A unit of electricity generation capacity or DSR capacity that can be put forward in a capacity auction. It is the product that forms the capacity to be purchased through the CM.
Capacity obligation	An obligation awarded pursuant to a capacity auction, applying for one or more delivery years, to provide a determined amount of capacity when required to do so in accordance with Capacity Market Rules.
Capacity payment	A payment to a capacity provider under the Regulations for its commitment to meet a capacity obligation during a delivery year.
Capacity provider	A person who holds a capacity agreement or a transferred part in respect of a capacity agreement.
Capacity target	The target capacity recommended to secure through each capacity auction. This is decided by the Secretary of State, based on recommendations from the PTE and analysis by the Delivery Body.
Capital expenditure thresholds	Auction parameters that determine whether a CMU can access a multi-year agreement (either as a refurbished CMU or a new build CMU) based on their amount of capital expenditure (in £/kW).

Abbreviation	Definition
Carbon capture and storage (CCS)	A technology which enables carbon emissions from power stations to be captured and stored in geological formations, rather than emitted to the atmosphere.
Carbon capture readiness (CCR)	A policy which ensures that that power stations can be retrofitted with carbon capture and storage (CCS) equipment at some point in the future when it is technically and economically viable.
Cash-out price	The process used to settle differences between contracted generation or consumption and the amount that was actually generated or consumed in each half hour trading period. Cash out prices are intended to reflect the costs the National Grid ESO incurs when balancing the system.
Central Meter Registration Service (CMRS)	The service for registration of data relating to grid connected metering systems.
Clean Energy Package	A package of EU legislation concerning the EU electricity market adopted by the Council of Ministers of the EU on 22 May 2019.
CM Register	The register which is required to be maintained by the Delivery Body. It records, among other things, each capacity provider's capacity obligation for each delivery year, including whether any secondary trading of a capacity obligation.
Co-located projects	Projects where a CMU and a non-CM unit are connected to the same section of the distribution or transmission network.
Combined heat and power (CHP)	An electricity generating unit that also supplies heat.
Commission Guidelines	The European Commission's "Guidelines on State aid for environmental protection and energy 2014-2020" published in 2014 (sometimes also referred to as EEAG).
Connection capacity	The capacity available to a CMU on the distribution or transmission network.
Contracts for Difference (CFDs)	CFDs are 15 year private law contracts between low carbon generators and the Low Carbon Contracts Company. CFDs stabilise revenues for generators at a fixed price level, set by the Government (the 'strike price'). Generators receive revenue from selling their electricity into the market as usual, but when the market reference price is below the strike price they receive a top-up payment. If the reference price is above the strike price, the generator must pay back the difference.

Abbreviation	Definition
Credit cover	A letter of credit or cash deposit required to be provided by a person (a prequalification applicant, a capacity provider or a supplier) to the Settlement Body. The Settlement Body may draw down on credit cover in certain circumstances set out in the Regulations and the Supplier Payment Regulations, e.g. if the person must pay the Settlement Body a termination fee in relation to the termination of a capacity agreement.
Delivery assurance	An umbrella term that refers to the framework of checks and balances that are used to ensure that CMUS are available to deliver their capacity obligation at start of and during the delivery year. This includes processes in the lead up to the delivery year, such as termination events and the posting of credit cover, as well as processes within the delivery year such as satisfactory performance days.
Delivery Body	The national electricity system operator (i.e. National Grid ESO).
Delivery milestones	Milestones imposed on new build CMUs and DSR, such as the Financial Commitment Milestone (FCM), the Substantial Completion Milestone (SCM) and the DSR tests to ensure that they are on track to deliver their capacity committed CMU by the start of the relevant delivery year.
Delivery partners	Refers to Ofgem, the Settlement Body and the Delivery Body.
Delivery year	In relation to a capacity auction, this means the year for which a one year capacity obligation is awarded, or the first year of the period for which a multi-year capacity obligation is awarded. Delivery years run 1st October-30th September of each calendar year. The delivery year 2019/20 commences on 1st October 2019.
Demand control event	A period during which National Grid ESO had to curtail electricity demand.
Demand curve	The demand curve shows how the total amount of capacity that will be secured in a capacity auction varies depending on the auction clearing price. It is set at the capacity target to be secured through a capacity auction, plus or minus 1.5GW.
Demand side response (DSR)	DSR is a method of reducing electricity demand. This can be achieved by either reducing demand by switching off assets (see turn-down DSR), or by starting up on-site generators to provide electricity in place of drawing it from the distribution network or transmission network (see behind the meter generation).

Abbreviation	Definition
Demand side response (DSR) component	A constituent component of a DSR CMU. DSR CMUs are typically made up of multiple components that are aggregated together to form a single CMU.
De-rated capacity	The capacity that a CMU is likely to be technically available to provide at times of peak demand, which is specific to the CMU's technology type and individual characteristics.
De-rating factor	A factor that is applied to a CMU's capacity to derive its de-rated capacity.
Dispatch signal	A signal that could be provided by National Grid ESO to signal to operators when their CMU(s) should provide their capacity. Currently there is no dispatch signal for the CM.
Distribution network	This consists of smaller and lower-voltage 'local' networks (compared to the high-voltage transmission network). It is used to carry electricity from the high voltage transmission network to industrial, commercial and domestic users.
DSR Tests	Tests carried out to ensure that DSR capacity providers are on track to deliver their capacity obligation before the start of the delivery.
Electricity demand reduction (EDR)	Energy efficiency projects that deliver lasting electricity savings at peak.
Electricity Market Reform (EMR)	A programme created by BEIS (formerly DECC) to deliver secure electricity supply and new low carbon generation. It consists of four mechanisms: Contracts for Difference, the Capacity Market, Carbon Price Support and an Emissions Performance Standard.
Electricity Settlements Company / ESC / Settlement Body	Referred to in the CM legislation as the "Settlement Body". A private limited company owned by the Secretary of State for the Department, established to oversee the settlement of payments to and from suppliers and capacity providers such as the supplier charge and capacity payments.
Emissions Performance Standard (EPS)	A policy that was implemented as part of EMR. It limits carbon dioxide emissions from new fossil fuel power stations.
EU Emissions Trading Scheme (EU-ETS)	The EU's scheme for trading carbon emissions.
European Commission/Commission	The Commission of the European Union.

Abbreviation	Definition
Fast frequency response (FFR)	One of the balancing services procured by National Grid ESO.
Financial Commitment Milestone	A milestone that must be met by a generating CMU that has not yet become fully operational at the time of the auction (a prospective generating CMU). By the milestone date, the capacity provider must be able to demonstrate they have committed substantial financial expenditure in relation to the relevant CMU. Failure to meet this milestone may result in the termination of the capacity agreement for the CMU.
Gas and Electricity Markets Authority	The governing body of Ofgem, ensuring consumers get good value and service from the energy market.
General Court Judgment	The judgment of the General Court of the European Union on 15 November 2018 in Case T-973/14 *Tempus Energy Ltd and Tempus Energy Technology Ltd v European Commission*.
Generator	(i) Any equipment that produces electricity, including equipment which produces electricity from storage; and (ii) A business which operates such equipment.
Gigawatt (GW)	A unit of capacity (1000 Megwatts)
Half Hourly Data Aggregators (HHDAs)	A data aggregator which carries out the aggregation of metering data received from HHDCs.
Half Hourly Data Collectors (HHDCs)	A data collector which retrieves, validates and processes metering data from half hourly meters and equivalent meters.
Hybrid projects	Multiple energy technologies on a single site, typically non-dispatchable renewables coupled with storage.
Interconnector	(i) A physical link that allows for the transmission of electricity across GB's borders; and (ii) A business which operates such equipment.
Kilowatt (kW)	A unit of capacity (1000 Watts)
Load factor	The proportion of total hours that an energy generation resource runs throughout the year.
Loss of load expectation (LOLE)	the number of hours/periods per annum in which it is statistically expected that electricity supply will not meet demand.
Megawatt (MW)	A unit of capacity (1000 kilowatts)
Merit order	A way of ranking available sources of energy, especially electrical generation, based on ascending order of price (which may reflect the order of their short-run marginal

Abbreviation	Definition
	costs of production) together with amount of energy that will be generated.
Mid-merit	Refers to plants that fall in the middle of merit order (i.e. plants that tend to have short-run marginal costs and load factors that are neither relatively low nor high).
Minimum capacity threshold	The capacity threshold that must be met or exceeded by any CMU applying for prequalification to be eligible to prequalify to bid in a capacity auction. The requirements are set out in regulation 15(4) of the Regulations. The threshold is currently set at 2MW.
Missing money problem	The lack of financial incentive to build new generators or refurbish existing generators to provide capacity caused by generators' and investors' uncertainty about whether the prices they would eventually receive for generating electricity and selling it in the wholesale electricity market would cover the costs of those activities.
National Grid Electricity System Operator (ESO)	The organisation operating the national electricity transmission network for GB.
Net cost of new entry (net CONE)	Net CONE represents the additional revenue that a new generation resource would need to recover to funds its capital investment and fixed costs, given reasonable expectations about the amount of money it is expected to make from energy markets over its economic life. In GB the value of net-CONE is currently based on a combined cycle gas turbine (CCGT).
New build capacity / New build generator/ New build generation	Generators that are to be or are being constructed.
New build CMU	A generating CMU that is not built at the time of the relevant capacity auction.
Obligation trading	The transfer of part or all of a capacity obligation from one capacity provider (the transferor) to another (the transferee).
Ofgem	A non-ministerial Government Department and an independent regulator, governed by the Gas and Electricity Markets Authority. Ofgem's powers and duties in relation to the CM are provided for in Chapter 3 of Part 2 of the Energy Act 2013 (c. 32), the Regulations and the Capacity Market Rules, in which it is referred to as "the Authority".
Panel of Technical Experts (PTE)	An independent panel of experts that are appointed by the Secretary of State to oversee the development of auction parameters and de-rating methodologies.

Abbreviation	Definition
Pay as bid	An auction model in which all successful providers will be paid their bid price.
Pay as clear	An auction model in which successful providers will be paid the auction clearing price set by the most expensive bid submitted by a successful provider (as opposed to their bid price). This is the auction model used in the capacity auctions.
Penalty regime	The regime of financial penalties that are applied to capacity providers who do not provide their committed capacity during a system stress event.
Prequalification	The process set out in the Capacity Market Rules for the Delivery Body to confirm whether a CMU may bid in a capacity auction. A CMU must meet the requirements specified in the Regulations and the Capacity Market Rules to be prequalified.
Price cap	The starting price of the capacity auction. Currently set at £75/kW/year.
Price duration equivalence (PDE)	An auction design in which bids are adjusted according to the length of agreement bid for.
Price-maker	A prequalified CMU who is allowed to bid into a capacity auction above the Price-taker threshold. New build generators and DSR capacity are automatically able to participate as price-makers without justification, but existing generators must justify why they should be allowed to be registered as price-makers.
Price-taker	A prequalified generating CMU is automatically a price-taker unless they are registered as a price-maker.
Price-taker threshold	Existing generators, who are only eligible for one year capacity agreements, are not allowed to bid in a capacity auction as if their costs are like those of a new build generator unless they apply for special permission to do so. Those existing generators must bid below a price taker threshold set annually ahead of each capacity auction: to date the price has been £25/kW. This £25/kW is half the cost of the cost of a new gas generator to build capacity, as this was thought to be the most likely type of new build capacity to just clear the auction when the net cost of new generating plant entering the market (known as the net “cost of new entrants” or CONE) was determined in 2013. Net CONE is reviewed periodically.
Private wire	Electricity transmission wires that are privately owned e.g. not part of the distribution or transmission networks but may be connected to those networks.

Abbreviation	Definition
Project TERRE (Trans European Replacement Reserve Exchange)	Project TERRE is a project developed by a group of European TSOs (including National Grid) to allow providers connected in those TSOs regions to offer Replacement Reserve in the trans-European market.
Pumped storage hydropower (PSH)	PSH is a storage technology that stores energy in the form of gravitational potential energy of water, pumped from a lower elevation reservoir to a higher elevation.
Reliability market / reliability option	An alternative energy security measure in which capacity payments are funded by suppliers through cash-out prices.
Renewables Obligation Scheme	A support scheme for renewable electricity projects, introduced in 2002, which was closed to all new entrants in April 2017 and has been replaced by the Contracts for Difference Scheme. It provided participants with financial support per MWh of renewable electricity generated at a fixed rate for 20 years. It also required suppliers to buy an increasing proportion of their electricity from renewable sources.
Satisfactory performance days (SPDs)	Days within the delivery year in which capacity providers must demonstrate that they are able to deliver their capacity obligation.
Secondary trading	Trading by capacity providers in respect of the capacity obligations they hold. Takes the form of obligation trading or volume reallocation.
Settlement Body	The body tasked with overseeing the settlement of payments to and from supplier and capacity providers. The Electricity Settlements Company (ESC) is currently appointed to be the Settlement Body.
Settlements Costs Levy	A charge imposed on suppliers to fund the administrative costs of imposing the supplier charge.
Smart meters	A smart meter automatically sends information about energy usage to suppliers and collects data on consumption on a more regular basis that a traditional electricity meter.
Split auction	An auction design in which different types of capacity are auctioned separately e.g. new build and existing or different capacity types.
Standstill period	The period beginning on the annulment of the State aid approval for the CM on 15th November 2018 by the General Court Judgment and ending on the earlier date of: the date on which State aid approval is obtained for the CM scheme; or the date on which the Court of Justice of the European Union sets aside the General

Abbreviation	Definition
	Court Judgment annulling the State aid approval for the CM scheme.
State aid	State aid is any advantage granted by public authorities through state resources on a selective basis to any organisations that could potentially distort competition and trade in the European Union (EU). The definition of state aid is very broad because 'an advantage' can take many forms. It is anything which an undertaking (an organisation engaged in economic activity) could not get on the open market.
State aid approval process	The process that the European Commission undertakes to verify whether a scheme meets their guidelines on State aid.
Strategic reserve	An alternative energy security measure that involves setting aside a pool of generation from the main electricity market, to be deployed during times of system stress.
Supplementary capacity auction	A one-off capacity auction held in February 2017 for the delivery year 2017/18.
Supplier	A person supplying electricity to a premises who holds a supply licence granted or treated as granted under section 6(1)(d) of the Electricity Act 1989. Suppliers buy electricity and sell it on to customers. Suppliers work in a competitive market and customers can choose any supplier to provide them with electricity.
Supplier charge	A charge paid by suppliers to fund capacity payments. It is invoiced monthly based on a supplier's share of demand for electricity from the transmission network and the distribution network during periods of high demand in the delivery year, multiplied by the total amount of capacity payments payable for the relevant delivery year. The amount of the charge is initially based on forecasted data from suppliers until actual data is available.
Supplier Payment Regulations	Refers to The Electricity Capacity (Supplier Payment etc.) Regulations 2014 – the legislation that sets out the calculations for payments required to be made by Suppliers to fund the CM and related functions of the Settlement Body, capacity payments, and financial penalties payable by capacity providers.
System stress event (SSE)	A SSE occurs when demand for electricity outstrips supply; it is defined in Rule 8.4.1 of the Rules.

Abbreviation	Definition
T-1 auction	This is the capacity auction held one year ahead of the delivery year, which 'tops up' any capacity secured in the relevant T-4 auction.
T-1 set-aside	The amount of capacity set aside from the T-4 auction for the auction one year ahead of the delivery year (T-1).
T-4 auction	This the capacity auction held four years ahead of the delivery year, which secures the large majority of capacity needed in the relevant delivery year.
Termination	In order to prevent speculative bidding and create strong incentives for new build CMUs to deliver new capacity on time, new build capacity and unproven DSR that is not on track to deliver in time for the delivery year may have its capacity agreement terminated, resulting in termination fees.
The Department for Business, Energy and Industrial Strategy (BEIS)	"The Department" means the Department of Energy and Climate Change if referring to a period before 14 July 2016, or the Department for Business, Energy and Industrial Strategy (BEIS) if referring to a period on or after that date. The Department of Energy and Climate Change (DECC) merged with the Department for Business, Innovation and Skills to form the Department for Business, Energy and Industrial Strategy on 14 July 2016.
The Electricity Capacity Regulations ("the Regulations)	This refers to the Electricity Capacity Regulations 2014, S.I. 2014/2043, the principal regulations underpinning the CM.
The reliability standard	The decision on how much capacity to secure in each capacity auction is informed by the statutory reliability standard. This is an objective level of security of electricity supply representing the trade-off between the cost of providing additional back up capacity and the level of reliability achieved. It is expressed as LOLE i.e. the number of hours/periods per annum in which it is statistically expected that supply will not meet demand. For the GB electricity market, the reliability standard required is 3 hours LOLE per year (providing a system security level of 99.97%). The reliability standard is defined in regulation 6 of the Regulations.
Transferred part	The rights and obligation accruing in respect of the part of the capacity obligation that has been transferred by one capacity provider to another.
Transitional Arrangements (TA) auctions	Two standalone capacity auctions designed specifically to support, and open only to, nascent DSR participants (and distribution connected generators) to prepare them for competition in the main capacity auctions. They were

Abbreviation	Definition
	held in January 2016 for the delivery year 2016/17 and March 2017 for delivery year 2017/18.
Transmission entry capacity (TEC)	The total amount of capacity that a transmission connected energy resource requires on the network.
Transmission network	This is the high-voltage electricity network that transmits large quantities of electricity over long distances across the country (cf. distribution network).
Transmission Network Use of System (TNUos) charge	A charge levied by the transmission network operator to recover the cost of installing and maintaining the transmission system.
Triads	Triads are the top three half-hour peaks of energy demand across the GB electricity transmission network between November and February (the most energy intensive period of the year). Triads are not forecast by National Grid ESO and are not known in advance. Instead, they are calculated using settlement data during the March following the Triad season.
Turn-down DSR	DSR that reduces electricity demand by temporarily switching off generators.
Unproven DSR	DSR that has not yet demonstrated it has the necessary metering in place or demonstrated it can deliver a specified level of capacity.
Value of lost load (VoLL)	VoLL is a monetary indicator expressing the costs associated with an interruption of electricity supply (in other words, the average value that electricity consumers attribute to additional capacity needed to maintain security of electricity supply).
Volume reallocation	(See secondary trading) Where over-delivery by a CMU during a SSE (relative to the CMU's capacity obligation) is reallocated to another CMU that has under-delivered during the SSE.
Wholesale electricity market	The market in which generators sell electricity to suppliers.

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