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CAPACITY MARKET AUCTION DESIGN

Section 1: Scope

1. This paper sets out how plant will be expected to participate in the Capacity Market auction design. It deals particularly with how the capacity level for each plant is determined, whether participation in the auction should be mandatory, and under what terms plants should be able to set the price or receive long term contracts.
2. This paper is a background paper to inform the discussion at the upcoming Expert Group workshop on 19th February. The agenda is attached as Attachment '1'.
3. The views of the Expert Group are particularly sought on the following three questions:
 - i. Who should de-rate capacity providers according to their reliability?
 - ii. Will the current auction design and penalty regime lead to plants opting out? Is this a problem? If so, how can this best be mitigated?
 - iii. What do you think the consequences should be if a plant is unsuccessful at auction?

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Section 2: Objectives of Auction design

4. The proposals for auction design have been made with a number of key objectives in mind:

- i. ***Procuring the right level of capacity at the right price:*** The demand curve impounds the trade-off between price and volume. However an important consideration will be what adjustment ought to be made in respect of plant that elects to stay out of the Capacity Market. It is assumed that such plant will continue to participate in the energy market and therefore the question arises as to what reliance can be placed on their capacity (particularly in absence of a requirement for GB generators to notify the SO four years ahead of closing). It is proposed that the de-rated capacity of existing plants electing to stay outside the market will be netted off to avoid overprocurement.
- ii. ***Administrative Simplicity:*** It is desirable that the auction design seeks to minimise the extent and complexity of the administered parameters and/or procedures so as to de-risk the delivery programme for auctions (especially the 2014), mitigate unintended consequences and avoid asking the SO to exercise discretion.
- iii. ***Market Power Mitigation:*** It is presumed that the vast majority of suppliers in Capacity Markets will have relatively low or no marginal/incremental costs and that these markets will by their nature confer a large degree of market power on incumbents which must be mitigated. The market design must therefore be accompanied by a suite of market power mitigation measures which suit the circumstance.

For example, market power could permit an entity to withhold capacity and thereby successfully raise the market clearing price. This strategy is well known in competition law and often profitable where an entity has other holdings that can benefit. A further well known strategy is to offer prices above the “going forward” cost in years in which new capacity is not needed in order to raise price up to the cost of new entry. Neither of these stratagems are necessarily illegal unless it can be proven they are abuses as opposed to uses of market power. This paper is not intended to re-cap on competition economics or law but to note that well targeted and designed market power mitigation measures will be a key feature.

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Section 3: The volume contracted in the auction

Reliability Standard

5. As part of the draft EMR delivery plan to be published in July, Government will be setting a Reliability Standard for Great Britain's electricity market. This will be consulted on with the aim of setting an enduring standard in the final Delivery Plan to be published at the end of the year.
6. The Reliability Standard provides clarity over the Government's long-term security-of-supply objective as it represents an explicit desirable trade-off between the costs and benefits of additional security of supply for society. The Reliability Standard is likely to be expressed in terms of a Loss of Load Expectation, being the long term average of a count of number of hours per year in which there will be a failure to supply. The Reliability Standard will be crucial in informing the amount of capacity to procure in a Capacity Market.

Central Target Volume to contract

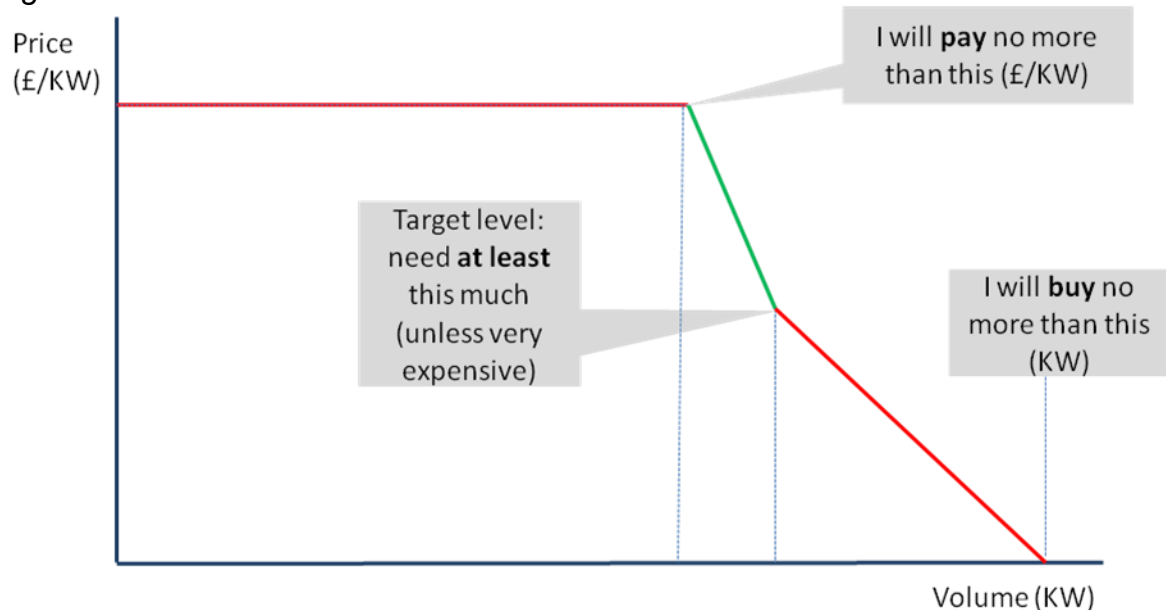
7. The Government will set a central volume of capacity to contract for at each auction. This decision will be based on advice from the System Operator on the quantum of capacity needed to meet the reliability standard. The volume contracted will be expressed in terms of *derated* capacity – i.e. capacity that is adjusted for its level of reliability.

Demand curve

8. Government will also establish a demand curve which sets out the willingness-to-pay for various levels of capacity.
9. A demand curve goes some way to mitigating market power by expressly reducing the quantity that will be procured in the face of high prices. It also helps to ensure greater value for money where supply in the auction is "lumpy" (i.e. plants come in large units, so delivering at least a particular volume of capacity could lead to overprocurement).
10. As part of the draft EMR Delivery Plan we will also be consulting on the methodology for generating the demand curve in the Capacity Auction. Further work is needed on the precise shape of the demand curve and the process by which it is updated. The diagram below shows an indicative demand curve which has two notable features:
 - i. *Price cap*: This can be set according to the cost of new entry (CONE), or a multiple thereof. The use of a price cap puts a hard limit on the exercise of market power.
 - ii. *Linear "Kinked" demand curve*: The demand begins to slope downward (reflecting elasticity of demand) and has a 'kink' at the target level of capacity. This elasticity reflects the different tradeoff between reliability and affordability.

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Figure 1: Illustrative Demand Curve



Cost of New Entry

11. The Cost of New Entry is estimated administratively and used to inform the reliability standard, price cap in the auction and the cap on annual liabilities.
12. Estimating CONE can depend on an administrative process to obtain estimates and assumptions for a range of variables such as choice of the technology of the best new entrant, capital costs, fuel prices, the decarbonisation trajectory, and revenues from the ancillary services and energy markets (which can depend on cash out reform).
13. The least subjective way of estimating CONE is to select an OCGT as the best new entrant and to ascribe little or no energy or ancillary service revenue and to calculate its levelised cost. This is the approach adopted in US capacity markets, including PJM.
14. Further work will be carried out to set CONE and determine how it will be used in the demand curve and liability cap. An indicative estimate however is £74/KW. ¹ This (or some multiple of CONE) is a conservative manner to set a price cap as in practice the cost of new entry in a capacity auction should be lower if the marginal unit in the auction expects to make revenue in the energy market.

¹ Assuming a 7.5% cost of capital, a 40 year lifetime, and central estimates of capital and operating expenditure from Arup.

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Interaction of Year-Ahead and Four Year-Ahead Auction

15. Government will set the volume to contract for a given delivery year and procure that over two auctions – four and one year ahead. A quota will be determined for the year-ahead auction by considering what is a prudent procurement strategy given the uncertainty in forecasting. A separate policy is seeking to incubate DSR and the quota will be informed by a prudent estimate of the level of cost-effective DSR capacity materialise .
16. This quota will be revised in advance of the year-ahead auction based on up-to-date information. However, in order to provide certainty to DSR in the early years of the auction, Government will commit to contracting for a minimum amount of capacity in the year ahead auction. We recognise that this could lead to a risk of over-procurement in some years but it avoids the risk of “boom/bust” cycles in the DSR market caused by sharply changing levels of demand at the year-ahead stage.

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Section 4: Participation in the Auction

How derating factors are set

17. Derating factors for all generating capacity will be set administratively by the System Operator. There are three reasons why derating factors will be set administratively, rather than letting market participants choose the level of capacity:

- i. ***Mitigating market power:*** *Capacity withholding is a significant concern and accordingly central de-rating means that a fair and consistent reckoning is made of all existing capacity. The bid volume of plant who opt-in is determined or equivalently the volume to procure is netted off for those who elect to opt-out.*
- ii. ***Incentives for derating:*** In a fair system the incentives and penalty ought to result in a true disclosure and permit self-derating. However the incentives in the penalty regime can never be perfect, so plants nominating their own derating factor will inevitably lead to the production of too much or too little reliable capacity compared with target.
- iii. ***Procuring the right level:*** It is easier to set derating factors at an aggregate level than to expect generators to derate their individual plants. For instance a 90% derating factor for plants implies that in a particular stress event, 90 out of 100 plants will be fully operating (rather than each plant will be able to provide 90% of its maximum output). Derating across the fleet therefore makes it easier to ensure that the right total level of capacity is contracted.

18. Further work is needed to establish the algorithm that will be used to estimate a plant's derating factor based on its history. The algorithm will have to be mechanistic to avoid the System Operator having to exercise discretion.

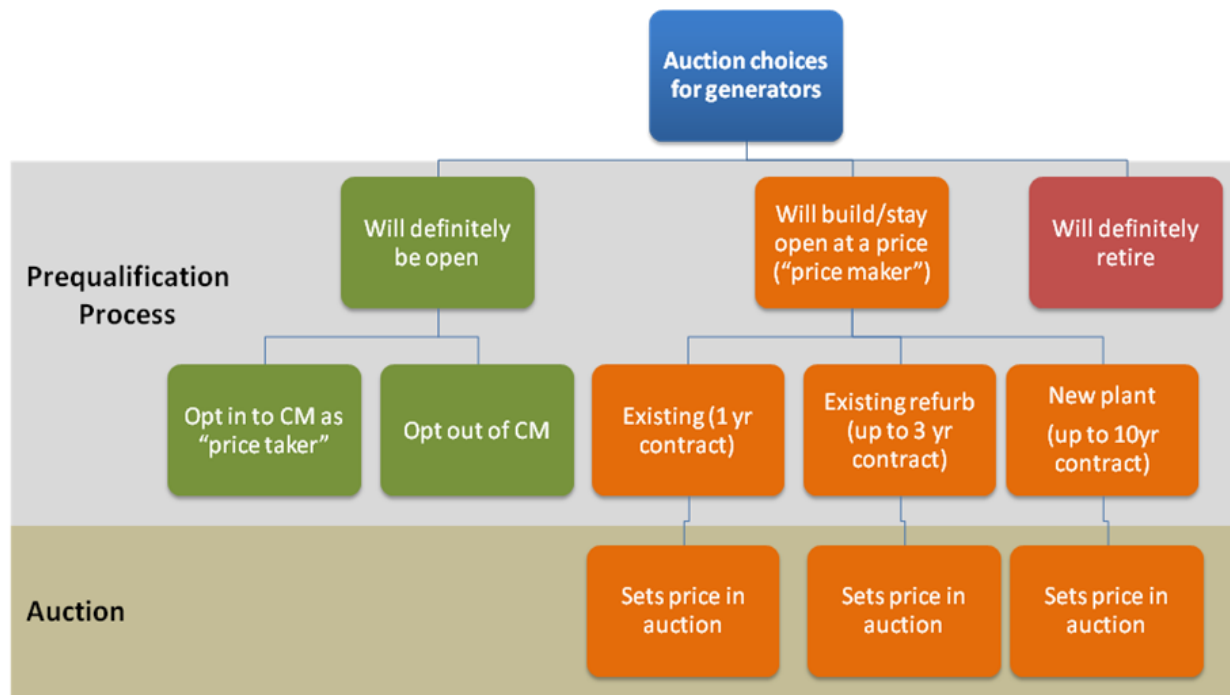
Participation in the Auction

19. Participation in the auction is voluntary. However, all existing licensed generators will be mandated to participate in the pre-qualification process for the Capacity Market. This involves having their capacity derated by the System Operator and indicating whether their capacity will be available in the delivery year.

20. The diagram below illustrates the options that generators must choose between at prequalification phase:

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Figure 2: Auction choices for generators



Price Makers and Takers

21. If an existing plant wishes to be a price maker in the auction it has to provide a Board certificate and Board-approved business case setting out why their "going forward" costs are material and that otherwise they expect to retire the plant if they do not receive a contract which can cover these costs. This information is submitted to Ofgem, who may use this information as the basis for a competition investigation.
22. New plant and DSR will be eligible to participate as price makers without having to justify having material "going forward" costs. There are separate requirements on new plant which are designed to provide reasonable surety that they can perform on a capacity commitment in the corresponding delivery years.

Contract lengths

23. New plant (including new storage) will be eligible for long- term contracts of **up to 10 years** in the auction four years ahead. This facilitates competitive new entry by allowing greater certainty about revenue for investors and so should reduce the costs of new entry and maximise the contestability of the Capacity Market..
24. Existing plant default to single year contracts. However they can receive a contract for up to three years if quality as a price setter (above). .

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25. Parties eligible for a multi-year contracts participating in the auction have to nominate their desired contract length prior to the auction (i.e. they will not be able to see the auction price and then decide how long to lock into that level of payment for).
26. The auction will select the least cost capacity available based on the annual capacity price alone and will not take account of the fact that some plant will have longer contracts than others. This standardises the products and allows for a single auction to be run, rather than segmenting the market into new and existing plant (where it is difficult to know *a priori* how much of each is needed).

Opting In

27. The philosophy behind a pay-as-clear auction is that a generator will make an honest bid of the go-forward costs in the knowledge that if successful he will receive at least that price. To the contrary, if unsuccessful, the consequence is that he will not supply capacity (i.e. close). In this sense, the pay-as-clear auction merely echoes the inherent message in the generator's bid i.e. "pay me £X/KW or I will not supply (i.e. I will close)".
28. The issue we must confront is whether a rule ought to be introduced which mandates closure for unsuccessful plant, as occurs in US capacity markets. Existing plant that participates in an auction and is unsuccessful but sticks around regardless is revealing that he did not bid honestly and accurately. A mandate for such a plant would force such a plant to do what it said it would do anyway – and it would mitigate market power in the process.
29. The views of the Expert Group is sought on this issue.

Opting Out: Plants on Varying Incentives

30. Participation in the prequalification process is mandatory – this is to enable an orderly reckoning of the total capacity on the system and to establish the full demand curve. However parties will not be mandated to take on capacity obligations: they can "opt out" of participating in the market. This can give lead to plant with varying incentives.
31. The Capacity Market is a level playing field giving rise to equality of opportunity for new/old plant, DSR and storage. The Capacity Market provides a payment for the provision of capacity and furthermore a bonus for over-delivery at time of stress. However, it also provides for a penalty in the event of a failure to perform at time of system stress. On balance, we believe that the Market is a well balanced package of costs, benefits and risks and that accordingly, opting out will not be a strategy exercised by many. Opting out would mean no capacity payment, no payment for over delivery, no penalties at times of system stress and importantly no firm commitment to provide capacity. Fewer participants in the primary market will of course mean fewer participants in the secondary market.

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32. Nonetheless, opt out is a course some plant may take. The effect of the Capacity Market is to create a system of rights and obligations for successful contestants which would not be conferred on plant who opt-out. The nature, extent, materiality and effect of these different incentives is unknown at this time, nonetheless what follows is conceptual evaluation.
33. Recently, we made a provisional determination that penalties will be **standardised** based on a VOLL-CO formulation (a hybrid administrative and market determined quantity). This broke the explicit link which had hitherto existed between the penalty formulation and the price obtained at auction – recall the **plant specific** penalty per event was the quotient of the market determined price and the administrative set reliability standard (also a hybrid administrative and market determined quantity).
34. This break in the explicit link between payment and penalty means the reward obtained at auction may not be adequate compensation for the risk of penalties (VOLL-CO) *for many participants*. *In extremis*, and for the purposes of argument, suppose the auction clears at zero (£/kW/year) a successful provider will nonetheless be required to carry the risk of VOLL-CO penalties. It is plausible in this scenario, that many plants will foresee this and choose to opt-out prior to the auction. In this case there could be a number of plants who had opted in and would be holding sizeable performance incentives, while other plants that had opted out would not be holding the same incentives – potentially creating distortions to dispatch incentives.
35. A discussion of the penalty regime is beyond the scope of this paper but suffice it to say that at various stages in the development of the penalty regime, modifications were proposed which sought to both standardise the penalty and keep the link with the auction price for all plants regardless of vintage, albeit imperfectly. Given the holistic nature of the Capacity Market, it will be necessary to visit this topic at the upcoming Auction Workshop.

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Section 5: Role for a Market Maker

36. In US capacity markets, there is an “Independent Market Monitor” body that is separate to the Regulator and System Operator but is contracted by the Regulator. This section consider whether a similar form of Market Monitor would be needed in the GB market following introduction of a Capacity Market.
37. In order to address the question of whether a Market Monitor is needed in GB one must first determine if Ofgem’s and the System Operator’s current powers and responsibilities are sufficient and fit for purpose. This is a difficult question to answer. The market is evolving in a number of important forums:
- i. EMR will result in large changes in the domestic energy market – and the effect is still uncertain as EMR is still partly in the design process
 - ii. Progress towards implementing the Single Internal Market on a European level;
 - iii. The effect of REMIT and how it covers Capacity Market contracts is still uncertain.
38. If existing powers and responsibilities were not sufficient and fit for purpose then it would be prudent to look at the what new measures are necessary. This involves exploring the gaps and tasks to be undertaken, which are largely uncertain at present. This exploration may show that additional powers are necessary in more places than just the capacity market – CfDs or retail tariffs are other possible areas. The extent of such desirable new measures may highlight the breadth of the undertaking. This may make such an undertaking difficult and its potential implications highly significant. Presumably, amendments would be needed in primary legislation to implement any new measures.
39. Importantly, new powers could fundamentally change the way in which Ofgem, the System Operator or other parties carry out their functions. Ofgem currently operates its enforcement functions in a largely reactive way. A shift towards a more proactive and potentially intrusive manner could create potential uncertainty amongst industry participants and a higher perception of regulatory risk. This could be viewed as an additional regulatory risk.
40. Part of identifying what new measures are necessary involves thinking through who is appropriately placed to undertake those functions given present and future responsibilities. A Market Monitor – i.e. an independent new body – is one possible option. Alternatives include extending Ofgem or the System Operator remits. The 3rd package and the conflicts of interest piece of work are vital considerations here.
41. Overall, it is therefore critical that any decision to proceed with exploring and or implementing any new measures is made after careful evaluation of the full implication of such actions. We propose to take no further action on a market monitor at this time but keep this under review as EMR is implemented.