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## CAPACITY MARKET'S PENALTY REGIME

### Section 1: Introduction

1. This paper presents a critique of two main penalty options – annual liability caps versus monthly caps – in order to address stakeholder representation about mitigating penalty exposure, increasing likelihood of investment and to mitigate potential unintended consequences. The option recommended mitigates this exposure through the introduction of a monthly cap, a lower penalty rate, expanded definition of system stress events and the linking of performance to future years' de-rating.

### Section 2: Recommendation

2. The Expert Group is invited to agree with Option two on the grounds of investability, increased competition and consumer value for money, whilst noting the implementation risks.

### Section 3: Background

3. The role of the penalty regime is crucial in maintaining the CM's overall integrity. In the model participants are effectively asked to bid in the auction how much they will charge for performing at the System Operator's de-rating of their capacity **at times of system stress**. Capacity Providers will be free to include premia for their perceived penalty risks in their auction bids, assuming price maker status, which will be subject to the competitive pressure of the auction process.
4. Providers will receive monthly capacity payments (effectively up front peak energy rents) in proportion to their average expected performance (i.e. de-rating level), with their revenue levels being fine-tuned on the basis of their actual performance through penalties and overdelivery payments.
5. In this context some stakeholders have questioned the need for the CM to have a financial penalty mechanism, especially given Ofgem's proposed reforms to the cash out price signals under their Electricity Significant Code Review - whereby performance incentives would spike to £6,000/MWh at times of system stress. Incentives of such a level would indeed provide sufficiently high signals for delivery at times of stress. However the purpose of the CM's incentive regime is to enable the correction of the de-rating factor, applied by the System Operator, on the basis of actual delivery performance (as per the previous paragraph). In this context the combination of the energy market's reformed performance incentives and the capacity market's incentives should provide for efficient entry and exit into the CM – whereby reliable resources should expect greater capacity payments than less reliable ones.
6. In addition it is a requirement of state aid clearance that the intervention provides an incentive effect on recipients and that the aid is proportionate. The absence of a financial-based penalty regime, or the adoption of a weaker regime whereby participants

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could fail to perform yet still receive net capacity payments, is likely to make obtaining such clearance significantly harder.

7. Feedback from the consultation process indicates strong opposition to the current design and calibration of the penalty regime, primarily from independent generators that rely on “project finance” arrangements and which require the certainty of sufficiently ring-fenced revenues<sup>1</sup> to raise sufficient debt and allow the project to take off.
8. From their perspective, a significant drawback emerging from the current penalty regime design is that a project could lose in excess of a full year’s capacity revenue for poor performance, which is likely to result in the project defaulting on their debt repayments. Even if such extremely costly events were to occur with very limited probability, lenders’ current risk aversion is such that they are potentially unwilling to lend to projects subject to such a foreseeable risk profile unless it can be efficiently managed and passed-through to other parties to the project finance deal.
9. While it is not the policy intention to encourage inefficient entry to the CM, it is recognized that operating in such risky environments might be challenging even for very efficient entrants, especially in the context of a vertical integrated industry and the potential for low liquidity in the CM secondary trading market in which to transfer risk.
10. In this context, the key challenge is to review the current CM design such that it further de-risks participating in the market by reducing the potential volatility of the CM revenue stream while maintaining incentives for efficient entry, investment, exit and operation in the CM – and therefore delivering consumer value for money. There is also the key trade off of inefficiency versus high risk premia, whereby decreasing capex and maintenance costs associated with an increasingly tough penalty regime are balanced against increased risk premia paid to banks and investors.
11. There are further constraints to take into account when devising options to balance this trade-off:
  - We cannot depart substantially with respect to the penalty design that was consulted on.
  - The implementation risks associated with any amendments at this relatively late stage of policy development.
  - It does not artificially favour one technology over the other.
12. Previous decisions have discounted an availability-based penalty regime, primarily on the grounds that relating payment to the declaration of availability rather than the verifiable delivery of energy introduces gaming incentives to overstate/misstate availability, potentially through plant dynamics or high offer prices. In addition there was no specific incentive to be available at times of system stress (effectively when most

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<sup>1</sup> Note that this requirement depends on technology.

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needed by consumers), meaning that the market may fail to provide signals for plant brought forward in a Capacity Market to be flexible and reliable when needed. Thus there is a risk that investors would bring forward whatever capacity is cheapest and meets the testing regime, regardless of whether it is sufficiently reliable under scarcity conditions, although the full reform of the cash out price signals should help mitigate this. Whilst it is acknowledged the availability concept is more in line with traditional measures of assessing project finance performance, it is not proposed to revert to such a design given the gaming concerns and delivery timescales.

#### **Section 4 – capping penalty liability on a monthly or annual basis?**

13. The Expert Groups views are sought on the desirability of capping penalty exposure on either an annual or monthly basis. Representation from independents and the investment community has suggested that a monthly cap would be a way of smoothing a provider's risk exposure over the entire year, and thereby mitigating the risk of significant penalty exposure resulting from one failure. In isolation such a proposal would significantly weaken the penalty regime and reliability incentives, given there would have to be stress events in each month of the year in which the provider completely fails to deliver in order to entirely lose their annual capacity revenue. However this reduction in exposure should in theory be accompanied by a reduction in providers' risk premia in the auction. In example A on the following page, a failing provider subject to a monthly cap at the level of their monthly payments (option 1), would be exposed to penalties of c. 21% of their annual capacity revenue for the nine hours of stress, whereas the same provider with an annual cap of 100% (option 3) would be exposed to c. 67% of their revenue. This would significantly increase the risk of inefficient entry and exit in the CM, resulting in a less reliable capacity mix.
14. Under such a proposal there would be reduced pressure to amend the consultation position on force majeure exceptions and maintenance windows.
15. In contrast, the use of a cap set at 100% or more of a provider's annual capacity revenue would provide stronger incentives and reduce the risk of inefficient entry into the mechanism (as cardboard plant would not receive 'free money'). However such an approach would present investment difficulties to potential providers, as detailed in previous paragraphs. These investment challenges could be mitigated through specifying an annual cap lower than 100% of revenue and/or introducing a per event cap – a move which would be especially welcomed by the DSR and storage community given their limited ability to deliver across longer duration events.

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Comparisons of options considered in this paper

Parameter	Option 1	Option 2	Option 3	Option 4
Cap type & level	Monthly revenue	Monthly revenue	100% annual revenue	70% annual revenue
Penalty rate	£3k/MWh	£0.5k/MWh	£3k/MWh	£5.5k/MWh
System stress definition	Current (load shedding)	Expanded – operational margin	Current	Current
Force majeure	Current (no)	Current (no)	Current (no) but could be amended	Current (no) but could be amended
Maintenance windows	No	No	Yes	Yes

Example A - penalty exposure under the four different options

	Option 1	Option 2	Option 3	Option 4
<b>Stress event 1 (Feb)</b>				
Penalty in 6 hours of warning	0	0	0	0
Penalty (£) in 2 hours of load shedding	1,487,500	425,000	2,550,000	4,675,000
<b>Stress event 2 (Mar)</b>				
Penalty in 8 hours of warning	0	850,000	0	0
Load shedding 0 hours	0	0	0	0
<b>Stress event 3 (Aug)</b>				
Penalty (£) in 9 hours of warning	0	212,500	0	0
Penalty (£) in 4 hours of load shedding	1,289,167	850,000	5,100,000	7,225,000
<b>Stress event 4 (Oct)</b>				
Penalty (£) in 10 hours of warning	0	637,500	0	0
Penalty (£) in 3 hours of load shedding	1,388,333	637,500	3,825,000	0
Total in-year penalties (£)	4,165,000	3,612,500	11,475,000	11,900,000
Revenue reduction for DY2 (£)	1,700,000	1,700,000	0	0
<b>Total CM performance incentive (£)</b>	<b>5,865,000</b>	<b>5,312,500</b>	<b>11,475,000</b>	<b>11,900,000</b>

Application of daily cap (20% revenue)

N/A

N/A

£9,350,000

£10,200,000

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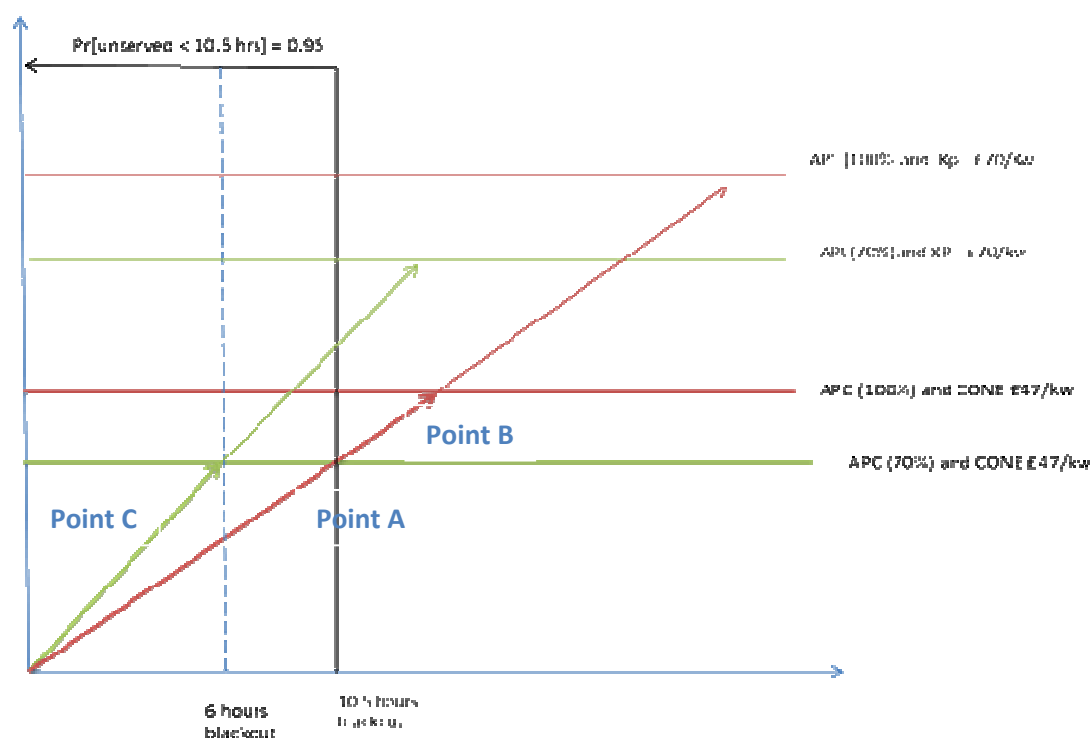
- **Stress event 1** – operational margin drops below the critical threshold for six hours, with load shedding being experienced in the last two hours.
- **Stress event 2** - operational margin drops below the critical threshold for eight hours but no load shedding is experienced in this period.
- **Stress event 3** - operational margin drops below the critical threshold for nine hours, with four hours of load shedding being experienced five hours after the warning's publication.
- **Stress event 4** – operational margin drops below the critical threshold for ten hours with three hours of load shedding being experienced in hours five through to seven.

**Question - Does the Expert Group agree that a monthly cap approach is preferable to an annual cap model?**

### **Section five - annual cap model**

16. Should an annual cap be recommended by the Expert Group, the following step is to calibrate the level of the cap. Feedback from investors and stakeholders has indicated that the total penalty level would be a critical factor in deciding whether to invest in a project, and if so the investment terms applied. This is irrespective of the likelihood of the actual penalty cap being reached, based on the probability of system stress events. Therefore the risk exposure associated with a penalty cap in excess of 100% is considered a material issue for investment, despite the fact it may take 20 hours plus of stress, under a reliability standard of three hours, in which to reach this level. It is therefore proposed to factor in the probability of having a stress event in any year into the penalty cap and rate calibration.
17. Modelling suggests that there is a 95% probability that the number of stress event hours will be less than 10.5 hours in any one year. Focusing and capping the CM's incentives to this period would limit a provider's risk exposure to extremely unlikely events whilst still enabling capacity revenue to be reclaimed from poorly performing providers.
18. Under a penalty design of 100% annual cap and a £3k/MWh penalty rate (red line in graph below), a unit failing to deliver in 10.5 hours of stress events would have incurred penalties equating to c. 70% (point A) of their annual capacity payments.

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19. The annual cap could therefore be applied at the 70% level (shown by point C), meaning that both models would have recouped the same quantum of penalties from a unit which fails to deliver up to the 10.5 hour point. It would be only after this point, at a 5% probability, that the 100% cap model would apply additional penalties to failing units.
20. From a consumer perspective there is an argument that the lower penalty cap should be accompanied by an increased penalty rate so that the capacity revenue is reclaimed from a failing provider as soon as possible. It is therefore proposed to accompany a sub-100% cap with a penalty rate of £5,500/MWh (option 4).
21. In order to increase the investability potential for an annual cap approach, irrespective of the level, it is proposed that providers should be able to access designated periods in which to undertake essential scheduled maintenance tasks ('maintenance windows'). This is especially important given widespread stakeholder concerns about over the liquidity of the secondary trading market. Providers with operational units would therefore be able to take maintenance windows for as long as they want between 1<sup>st</sup> May and 30 September as long as they notify the EMR Delivery Body in advance of the start of the relevant delivery year to this affect. Such providers would not receive capacity payments for the period in which their obligations were suspended nor would they have delivery obligations or penalty liabilities. There would be a simple restriction to prevent more than a specified volume from taking maintenance in the same period – with the EMR delivery body effectively drawing lots to determine any such tie-break situation.

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22. Stakeholder engagement has also raised the potential for a 'per-event' cap to further mitigate their risk exposure. This was a position expressed by some stakeholders on account of their limited ability to deliver over a sustained period of time and to effectively mitigate the risk of their 'having a bad day' – which is not fully mitigated by the annual cap approach. It is recognised that a per event or daily cap would distort the market in favour of parties which are unable to fully deliver, thereby impacting on the objective of ensuring efficient entry into the mechanism. However in order to bring forward the required investment it is proposed that a daily cap should be considered to mitigate the risk of failing providers having significant penalty exposure – up to their cap level – in any one day of poor performance. It is therefore proposed that a daily cap of 20% of annual revenue, within the context of the relevant annual cap, could be included within this model.
23. Stakeholder representation has indicated that the current consultation package with an annual cap would require expansion of the force majeure provisions in order to make it investable. The current position is aligned with that of an energy only market – where generators receive peak energy rents based on their performance in peak periods. Generators unable to generate in such periods because of gas shortages or any other 'force majeure' issues would not receive such peak rents – a position which the market is happy with. It is noted that other markets do not generally socialise performance risks (e.g. parcel delivery trucks delayed in roadworks, airlines unable to fly due to air traffic control strikes).
24. It is proposed that the reality check of 'what would an energy-only market do' should be central to the CM's approach to force majeure events and fuel supply issues. Participants should be provided with the incentives to make optimal investments to secure their delivery performance, with an associated level of risk as per an energy-only market and an ability to buy private insurance should they need it. This will incentivise the development of innovative solutions to ensure business continuity, for example through improved equipment, tighter contracts, storage investment and consideration of interruption potential when siting new plant.
25. All other elements of the penalty regime design would remain as per the consultation proposals.

**Question - What are your views on the level of the penalty cap, the proposed penalty rate, maintenance windows and the concept and level of a daily cap?**

## **Section six - monthly cap model**

26. The alternative proposal is to introduce a system of ring-fenced monthly soft-caps where a failing performer could at most lose 100% of their monthly capacity payment in any one month. The current structure for the soft-cap would be maintained, thereby incentivising

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continuous performance throughout the month, but changed to reflect a monthly cap rather than an annual cap.

27. Please note that monthly capacity payments include a weighting factor whereby payments increase more in winter periods and less in summer periods.
28. This approach would almost entirely mitigate the risk vocalised by many stakeholders of a participant forfeiting their total annual CM revenue on the basis of one period of poor performance. In isolation however this would significantly weaken the penalty regime and reliability incentives, as shown in example A on page 4, whereby the cardboard plant/failing provider under option 1 would have effectively lost c.25% of their annual revenue, whilst an equivalent provider would have lost 68-70% under the annual cap options 3 and 4. It should however reduce the penalty premia applied by providers to their auction bids.
29. In this context it is proposed that the monthly caps in isolation are insufficient to deliver the aforementioned objectives of the penalty regime. It is therefore proposed to include some consequential amendments to support the consumer value proposition.
30. It is worth noting that this monthly ring fencing approach would simplify the settlement process, which previously had to accommodate potential rebates to capacity providers who reduced their penalty liability by subsequent good performance over the course of the delivery year. This introduced revenue uncertainty to providers, with consequential impacts on secondary trading potential.

#### **Amendment 1 - broadening the definition of a stress event**

31. It is proposed that the definition of a stress event is expanded so that such events happen more frequently during a delivery year and that a greater number of hours fall within the definition of a stress event (option 2). This is analogous to providers recovering their missing money over a larger number of hours and would effectively smear their performance risk over more of the delivery year, making providers less exposed to penalties than if the current definition of low probability, high impact events was retained.
32. The system stress event definition is expanded to whenever a CM warning is live<sup>2</sup> (i.e. a forecast or realisation of low operational margin).
33. Under this proposal it would be possible for a CM warning based stress event to be triggered on the basis of the insufficient operational margin and for penalties to be applied for non-delivery, but where there is no actual load shedding.

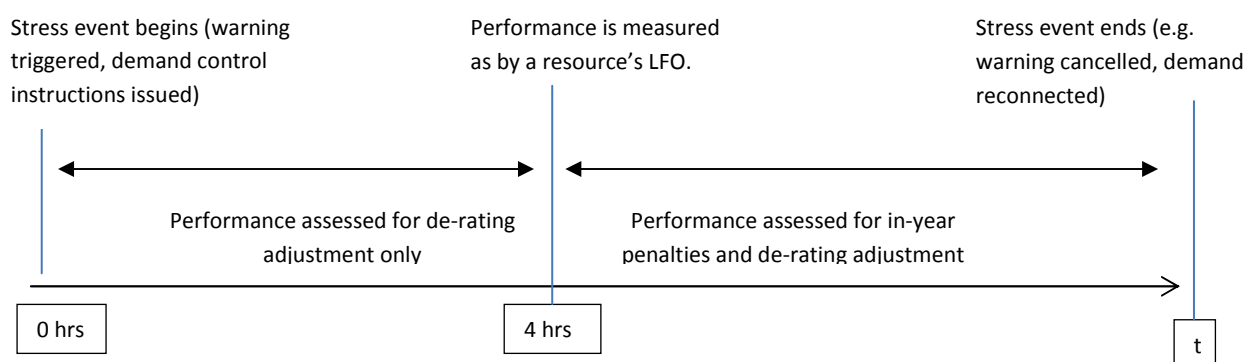
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<sup>2</sup> i.e. the period between warning's publication, by National Grid once system conditions meet the mechanistic trigger level, and warning cancellation, again by National Grid once system conditions have exceeded the mechanistic cancellation level.



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34. Once a stress event had been triggered in-year penalties and overdelivery payments would apply to a provider's performance, relative to their load following obligation, **only in the period four hours after the start of the settlement period after the one in which the event was triggered** (warning, demand control instructions or low frequency demand disconnection) **until its cancellation**. There will be no in-year penalty implications for performance in the period zero to four hours after the commencement of the stress event.
35. However a provider's flexibility and performance in the zero to four hours period would be assessed for the purposes of adjusting their de-rating factor for the subsequent delivery year – further detailed in paragraph 38. This scope of what constitutes a stress event is therefore proposed to ensure that the de-rating adjustment can reflect performance and flexibility in both expected and unexpected events.



36. In both cases the warning would be cancelled on a mechanistic basis where the likelihood of not meeting demand reaches the cancellation point, meaning that the stress event could be cancelled before the timeline for in-year penalties are applied.

## Amendment 2 - penalty rate

37. The expansion definition of system stress events, as proposed in the previous paragraphs, is likely to result in an increased number of stress hours within any one delivery year. As such it is proposed to revisit the associated penalty rate, so that the total incentives for a provider are broadly in line with the consultation proposals but comprised of a lower penalty applied on a more frequent basis. Given the Value of Lost Load is estimated to be £17,000/MWh and cash-out expected to spike to £6,000 in periods of tight system stress, the penalty rate can be set at:  $PR = (VoLL - \text{cash out})/N$ , where N is the number of hours that fall within the expanded stress event definition, excluding the first four hours (to which the penalty rate does not apply). The objective is to calibrate the capacity market warning such that we can reduce the penalty rate to circa £500/MWh (c. 22 hours of stress after the four hour warning period). Options one and two in example A (page 4) show the relative implications of a £3,000 and £500/MWh

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penalty rate. The calibration of warning levels should be resolved with data from National over the course of the next couple of weeks.

38. It should be noted, however, that under the expanded definition of stress events, cash out prices may not be at the fully reformed level at the time CM penalties applied (for example where the CM warning has been triggered but load is not shed).

### Amendment 3 - de-rating

39. Monthly soft-caps, even if in the context of a broader stress event definition and reduced penalty rates, can potentially limit the capacity to reallocate capacity payments among capacity resources and dull the incentives for efficient entry into the market. Therefore it is proposed to measure a capacity provider's performance across the entirety of all stress events in a delivery year (rather than from four hours onwards as per in-year penalties) and to update the System Operator's centrally de-rated factor assigned for that particular resource for the subsequent delivery year. The de-rating adjustment would occur within maximum and minimum absolute bands – plus or minus 10% of the System Operator assigned figure. This adjustment to the subsequent year's de-rating, and therefore capacity payments, would apply to all providers irrespective of their agreement length. Introducing this explicit link between performance and the future de-rating factor would reduce the volatility of annual revenue whilst retaining strong incentives.

40. Under this approach the provider's net performance across all stress event hours (SPPi – ODPi) is calculated and divided by the total net penalty that it would have incurred had it produced nothing and had the penalties not been capped or softened (maxP). This gives the fraction of current de-rating capacity relative to the estimated (System Operator applied) de-rating capacity ('performance factor'), which can then be applied to the band (+/- 10%) to give the adjustment which is applied to the subsequent year's System Operator centrally adjusted figure.

41. Formulaically this performance factor (PF) equals 
$$\frac{SPPi - ODPi}{MaxPi}$$

The de-rating adjustment for the subsequent delivery year (DY) would therefore be:

De-rating for DY2 = System Operator's de-rating for DY2 \* (1 – PF \* 0.1)

42. Under the example A (page 4), the cardboard plant which completely failed in all stress events, and therefore which would have been penalised 21% of its annual revenue (£3.6m of £17m) under the option 2 monthly caps proposal, would have its de-rating factor for the subsequent year reduced by 10% and its capacity revenue for the next delivery year reduced from £17m to £15.3m.

43. Whilst it is expected that the negative adjustments would broadly equal the positive adjustments, from a settlement perspective there is a requirement for the annual costs to

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be specified in legislation several months in advance of the start of a delivery year. The timelines for adjusting de-rating, and therefore the implications for payment levels for the subsequent delivery year, do not fit into this regulatory timeline, given the need to have performance data for the entire delivery year. Therefore for this de-rating adjustment to work there would need to be a formulaic cap applied to ensure that the overall net adjustments are revenue neutral and therefore do not require legislative adjustments. Work is on-going over the next couple of weeks as to how such a mechanism could operate.

44. Under the current consultation proposal applicants can specify a lower de-rating factor, based on their risk appetite, from the System Operator's de-rating factor range. It is proposed that the monthly cap approach mitigates a provider's penalty exposure to such an extent that this ability to select a de-rating factor is no longer appropriate, given the incentives to bid as high as possible, and should therefore be removed. CMUs will therefore have the de-rating figure specified by the System Operator, on the basis of the current technology type (TCWAA/AABSDSR) methodology detailed in CM rule 2.3.

#### **Determination of load following obligation**

45. Stakeholder representation has highlighted concerns over the consultation proposal to determine providers' load following obligations (LFO) on an ex-post basis. Representation has suggested this will force providers to inefficiently operate their plant to cover the risk of last minute changes from forecasts of either demand or capacity contributions from non-CM plant – both of which would affect their LFO. Representation has also suggested this uncertainty will negatively impact on secondary trading potential.
46. It is proposed that the ex-post determination of LFO (i.e. an appropriately calculated half-hourly incentive) will ensure the capacity offered by CM providers is both maximised and optimised. For example should the output of non-Capacity Market plant be higher than forecast at the time of the CM warning, or demand be lower, using an outturn figure will ensure that extra, unnecessary capacity will not be incentivised by the LFOs of CM plant. Similarly if the output of non-Capacity Market plant is lower than forecast, or demand is higher, the LFOs of Capacity Market plant will incentivise the shortfall to be met by the Capacity Market plant.
47. Fixing the LFO ex-ante of any stress period, for example at the publication of the CM warning, would present balancing challenges to the System Operator, given the forecast of both non-CM contribution and demand will be never match actual outturn. This would either incentivise too much capacity to deliver or too little, depending on whether the forecast was too conservative or too optimistic, thereby leading to sub-optimal plant dispatch. This could increase over time as the contribution of CfD capacity increases.
48. It is therefore proposed to retain the current position – with the SO's non-binding forecast of both non-CM contribution and demand being published alongside any CM warning, but that a provider's actual LFO is determined on an ex-post basis.

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49. All other details of the penalty regime would remain as per the consultation version. It is proposed that per event caps, maintenance windows and expanded force majeure provisions are not required under a monthly cap approach on account of a provider's penalty exposure being mitigated to a sufficient degree.

**Question –what are your views on the proposed package of measures?**

**Section 7 - assessment of options**

Issue	Option one (monthly, current stress def.)	Option two (monthly, expanded stress def.)	Option three – (annual 100%)	Option four (annual 70%)
Efficiently adjusts payments to reflect performance	x	x	✓✓	✓
Efficient allocation of risk	x	x	✓✓	✓
Manageability and investability	✓	✓✓	x x	x
Implementability	x	x x	✓✓	✓
State Aid clearance	x	x	✓✓	✓

It is proposed that the impact on consumer value for money are broadly consistent across the options, with the ability to reclaim capacity payments under options three and four being offset by reduced risk premia under options one and two.

**Section 8: Recommendations and next steps**

50. Two conceptual models have been presented for the Expert Group's consideration based around annual or monthly caps. The annual capped approach is more effective at paying for performance, whilst the monthly cap model presents a better investability package for providers, leading in turn to reduced risk premia and increased competition in the auction.

51. Option two is proposed for the Expert Group's consideration and discussion.