

MEMO

TO: Kevin Hannafin (Viridian)
DATE: 22 September 2016
FROM: Graham Shuttleworth; George Anstey (NERA)
SUBJECT: Review of the Capacity Remuneration Mechanism Local Issues Paper
COPY: Mark Alexander (Viridian)

1. Introduction

The SEM Committee published a Consultation Paper on Locational Issues in the Capacity Remuneration Mechanism (henceforth CRM LI Paper).¹ Its publication follows the concern expressed by respondents to the Third Consultation on the CRM detailed design that there was a “disconnect” between the market-wide CRM and the locational need for capacity in the I-SEM. In the Paper, the SEM Committee sets out its proposals for “taking locational considerations into account for the efficient management of exit and entry of capacity resources”.² This Memorandum contains our initial comments on the SEM Committee’s Proposals.

The proposed set of options (A-E) are under-defined in the CRM LI Paper because they do not specify clearly how the SEM Committee will identify units that must not exit and provide them with incentives to remain operational. This makes it difficult for market participants to distinguish between the various options and to appraise them in detail. As a general comment that applies to all of the options, the desire to deliver a market-based solution provides no criterion for distinguishing between the options, because the ability to operate a market is equally limited under any option:

- The constraints on the transmission system depend crucially on the precise combination of plants on the system as well as the evolution of demand, neither of which can be known in full before conducting a capacity auction. No simplified system of constraints will guarantee that all system-critical plant remain operational. Accordingly, under any option for the CRM, the TSOs will need to conduct a full system security analysis (of the type specified under Option E) following the auction to identify whether the combination of plant on the system will meet operational constraints. The need for discretionary intervention after the auction, no matter what option is chosen, undermines any case for selecting any option on the basis that it allegedly offers competitive market outcomes based on pre-specified constraints; and

¹ SEM Committee (2016), *Capacity Remuneration Mechanism Locational Issues -Consultation Paper*, SEM-16-052, 24 August 2016.

² CRM LI Paper, paragraph 1.2.6.

- The RAs will inevitably regulate the bids of some system-critical plant, which will make the outcome of the “market” the consequence of regulatory controls on bidding, rather than competitive behaviour.

The presence of a fragmented physical transmission system means that any system-wide market is necessarily fictitious and its market-clearing price is only a logical construct, not the outcome of true competition. However, options that produce no unconstrained schedule offer no basis for defining a single, objective market-wide reference price for capacity. Any market price resulting from a constrained auction would be distorted by the inclusion of specially selected plant in constrained locations.

The SEM Committee’s initially-favoured positions may deny cost recovery for constrained-off and constrained-on plant, and reduce efficiency. Compensating constrained-off plants may be necessary if these plants have a legal right to firm transmission access (either contractually or based on a concept like legitimate expectations), or it may be required to deliver efficient investment in the transmission system. Failure to compensate constrained-off plant may distort bidding incentives and reduce efficiency, depending on the method chosen to model constraints and select winners. Capping prices at Net Going Forward Costs for constrained-on plant with local market power may not only deny cost recovery, but may also threaten security of supply and may be discriminatory.

This Memorandum proceeds as follows:

- Section 2 comments on the SEM Committee’s proposals for identifying locational constraints;
- Section 3 discusses the proposed rules for setting clearing prices;
- Section 4 describes the proposed arrangements for compensating constrained-off plant;
- Section 5 discusses the inclusion and definition of transmission constraints in the T-4 auction; and
- Section 6 discusses the SEM Committee’s approach to market power mitigation.

2. Commentary on Evaluation of Options

Paragraphs 3.2.6 summarises the options for auction design as follows:

- “Option A: Ex-ante identification of “must not exit” units. These units would be taken out of the market and treated separately before the CRM auction is run. Their capacity contribution would be netted from the capacity requirement, and the residual requirements secured using a simple sealed bid option;
- Option B: CRM Auction Format Option 1 (simple sealed bid) with additional capacity being secured after the auction if required to meet locational constraints;

- Option C: Simple sealed bid, but with a “heuristic-based” second step which applies some rules to reduce capacity secured in surplus capacity regions to offset additional capacity secured to meet locational constraints, while at the same time addressing the lumpiness issue;
- Option D: CRM 3 Auction Format Option 3 (i.e. combinatorial). This option would find the optimal combination of bids to accept, subject to the locational capacity delivery and bid inflexibility constraints; and
- Option E: TSO system security analysis to identify must-not exit units after an initial unconstrained CRM auction run (simple sealed bid).”

Paragraph 3.2.7 notes the need for a “limited combinatorial element” (i.e. consideration of bid size and perhaps other non-price characteristics) when selecting the marginal unit in options A, B, C and E. It suggests the problem might be complicated in options B, C and E by the presence of more than one binding locational constraint. Option D is said to “solve the combinatorial problem” by using a “full optimisation process”.

We comment on these descriptions of the options in section 2.1, and then in section 2.2 we comment on the evaluation of each option set out in the CRM LI Paper.

2.1. Incomplete Specification of the Options

Even leaving aside the auction design questions raised in the CRM LI Paper (on finding a clearing price, compensating “constrained off” units and market power mitigation), there are significant gaps (or possibly overlaps) in the descriptions of these options which invalidate their evaluation as separate choices.

The problem is apparent from the description of Option E. Paragraph 3.2.24 explains that the TSO would carry out a system security analysis after constructing a list of (in-merit) winners. It suggests that the plants identified as “must-not exit” would be “deemed to be winning bids also – and paid as bid”. However, it is unclear from the SEM Committee’s description whether “must-not exit” plant identified after the auction would displace or augment the list of (in-merit) winners.

Option A, described in paragraph 3.2.8 as a “non-market approach”, requires the TSO to award contracts to “must-not exit” units before the auction takes place. The description of this option is incomplete because the SEM Committee does not describe what constraints the TSO would take into account or what steps the TSO would take if the auction outcome was infeasible. For instance, the TSO will incorrectly identify “must-not exit” units before the auction, if it only takes into account thermal constraints, but not voltage or security constraints, or if it does not correctly anticipate the precise combination of eventual winners. In such circumstances, the TSO would need to ensure losers did not exit after the auction had taken place. In practice therefore, the TSO would need to conduct a full system security analysis after the auction, just as it would under option E.

Option B, as described in paragraph 3.2.12, also stipulates that “must-not exit” plant would be identified (and given additional contracts) after an unconstrained auction had been run. The description of the process followed under Option B is ambiguous: it does not specify whether the TSO would specify the constraints for identifying “must-not exit” plant before or after the auction takes place.

If the TSO were to identify the constraints before the auction process, then the same critique would apply to Option B as to Option A: a full system security analysis would be necessary after every auction to resolve problems caused by any simplifications or inaccuracies in the TSO’s assumptions about the likely constraints. The SEM Committee does not specify the use of a system security analysis as part of Option B and its description of the option is therefore incomplete.

If the TSO were to identify the constraints and “must-not exit” plant after the auction, the only observable difference between the SEM Committee’s descriptions of Options B and E is the wording used to describe the TSO’s actions to ensure the auction outcome is feasible. The CRM LI Paper specifies the use of a “system security analysis” to identify the additional capacity under Option E, but does not mention it under Option B. Instead it states that “any constraint infeasibilities” would be solved by accepting additional bids. It is difficult to see how the TSO (or anyone else) would identify “constraint infeasibilities” without analysing the network to identify constraints violated because of load flows, voltage problems and/or concerns over system security. Thus, if there is a difference between Options B and E (e.g. in the range of constraints considered in the ex post analysis), the CRM LI Paper does not make clear what that difference is, which prevents any separate appraisal of them.

Evaluation of Options C and D is similarly hampered by a different type of oversight, i.e. reference to an undefined set of constraints that would be used to identify auction winners. Option C would use “heuristic”, i.e. ad hoc, rules. Option D would use a combination of linear constraints (arithmetic inequalities) and integer constraints (yes/no choices). In neither case is there any explanation as to the source of these rules or constraints, how they would be selected, or what standards the outcomes would have to meet. In paragraph 3.2.45, the CRM LI Paper reports the advice from the TSO that it is likely to be possible to implement Option C in time for the first transitional auction, but not Option D. The SEMC therefore adopts Option C, albeit only as a “logical interim solution”.

An undefined option, like Option C, always has an advantage over an option that is better understood, because the problems it will face are also undefined. For instance, the undefined nature of the constraints used in Option C gives an apparent advantage over Option D, because the difficulty of implementing integer programmes (“MIP solvers”) are well known. In practice, which constraints the TSO will model, and how, are equally uncertain in both Options. In Option D the principle of relying on an algorithm to find the system-wide optimum is at least clear, whilst Option C provides no details on how the heuristic algorithm will work. However, relying on the difference in depth of explanation of different options (in other words, their relative vagueness) is not a sound basis for decision-making. There are certainly no grounds for favouring Option C just

because all the other options seem to face known problems whilst Option C is so poorly specified that its problems are unknown. Unfortunately, that seems to be the sole basis of the RAs' preliminary view (as set out paragraph 3.2.49).

As long as the “heuristic” rules in Option C remain undefined, it is impossible to say whether or not the outcome from the process would be at all useful or acceptable (by the criteria of feasibility, stability and predictability, transparency or non-discrimination). Option C may produce a positive outcome or it may face severe problems (such as counter-intuitive outcomes, or the software not being delivered on time due to persistent problems with the outcomes). However, one cannot conclude that Option C might be “a logical interim solution” just because its problems have not yet been identified.

Any meaningful appraisal of the options spelled out in the CRM LI Paper would therefore have to begin with a much fuller explanation of each option and/or explicit recognition of the substantial risks inherent in adopting an undefined option.

2.2. Partial Evaluation of the Options

The section of the CRM LI Paper covering paragraphs 3.2.27-3.2.48 is headed “Evaluation of the Options”, but at best it contains only a partial and selective evaluation of the options. At worst, by not applying some criteria to some options, it gives a misleading view of their relative merits.

2.2.1. Partial application of new “Internal Market” criterion

This section of the CRTM LI Paper introduces the criterion of the “internal market”, meaning the risk of (non-)compliance with State Aid Guidelines. This criterion has not arisen in previous consultations. Paragraph 3.2.29 provides some explanation of this criterion in relation to Option A, noting that it takes some units out of the market (*ex ante*) and awards them contracts. It acknowledges that “clear and objective criteria would be put in place” to determine which plants received such contracts, but argues that further discussion with the EC would be required – “given the lack of a full competitive process”. This criterion therefore seems to be synonymous with the “competition” criterion, or else to concern only the need for “further discussion with the EC”. The RAs then commit an error by applying this criterion to the parts of the system that they have defined, but not to the whole process implied by each Option.

As we briefly pointed out in section 1 above, each of the options requires detailed, discretionary and non-transparent interventions from the TSO – in some cases to identify *ex ante* the constraints to be modelled, and in all cases to correct *ex post* any infeasibility in the location of capacity selected. Interventions of this type are an inevitable part of any CRM option. They cannot be avoided by referring to the (as yet undefined) selection process for “DS3” ancillary services, since exactly the same problems will arise there. Whether it covers CRM or DS3 processes or both, no auction or allocation algorithm can encapsulate all of the operating concerns of the TSO (which are themselves unlikely to be captured in any single model). Differences between these algorithms and the TSO's operational requirements create a need for *ex post* interventions in every option. Every

option will therefore require “further discussion... with the EC to determine whether such an approach would receive State aid approval - given the lack of a full competitive process.”³ The “internal market” criterion therefore provides no basis for distinguishing between the options.

In relation to the options, the RAs note that Options A, B and E all involve explicit contracting by the TSO outside the market (and, in the case of Option B, in addition to it). In contrast, paragraph 3.2.32 says that Options C and D “could be more compatible with the State aid guidelines”. That conclusion can only be based on the view that an automated process (i.e. the constrained solution algorithms used in these options) would be more acceptable to the EC than contracting outside the market. However, there is no reason why the EC would look more favourably on selective interventions in an algorithm (especially the “heuristic” kind used in Option C) than on direct negotiations with selected generators carried out in accordance with “clear and objective criteria”. Furthermore, this conclusion overlooks completely the *ex post* interventions that would be required to address inaccuracies in the outputs of these algorithms (even those augmented by the DS3 process).

This new “internal market” criterion has therefore been applied partially and selectively within the CRM LI Paper. Applying this criterion consistently, to a complete view of each option, shows that every option faces the same difficulties with the “internal market”, and that this criterion provides no basis for distinguishing between them.

2.2.2. Selective application of appraisal criteria

Table 2 provides an overview of the appraisal criteria behind the RAs’ preliminary view in favour of Option C. It highlights the selective way in which the RAs applied these appraisal criteria, and the distorting effect of failing to consider the *ex post* corrections required under every option.

The “internal market” criterion is discussed under Options A and E, but not under Options B, C and D. As discussed above, a complete appraisal would recognise the same problems in each Option. The “competition” criterion suffers from a similar problem; although the appraisals look at the scope for running a single auction, they take no account of the difficulties for competition that will occur – under every option – from the segmentation of the market by actual transmission constraints (not just those modelled in the algorithm) and the resulting need for “out of market” contracts.

The “transparency” criterion is counted only against Option A, where the TSO’s discretionary interventions are acknowledged (particularly for those units “taken out of the market”), and Option D, where it is argued that a combinatorial auction may lack transparency. The SEM Committee also counts lack of transparency against Option E, albeit that it lists the lack of transparency as a potential problem with competition in the auction. However, no mention is made of the (potentially even greater) lack of transparency of “heuristic” rules under Option C, contributing to

³ CRM LI Paper, paragraph 3.2.29.

an overly optimistic view of that option. In any case, the TSO will intervene in every option (except Option B) to constrain off plant. Hiding the interventions in “heuristic” or “MIP” algorithms does not make them any more transparent. The same criticism should therefore have counted against Options C, D and E (and against them all, to the extent it applies to the identification of “must-not exit” units).

The “efficiency” criterion is applied to every option, but only to that part of the auction process that has been defined. It overlooks the likelihood that the outcome of any simplified algorithm will be inaccurate and inadequate for operational purposes, requiring some *ex post* correction by the TSO. In principle (except in the case of Option B, which only allows capacity to be added⁴) these corrections could arrive at exactly the same selection of capacity (i.e. the requirement as defined by the TSO’s operational procedures). Therefore, differences in efficiency might conceivably arise in Options A, C, D and E at an interim stage in these processes (such as the output of the auctions), or from differences in the TSO’s choice of plant in the final *ex post* corrections. However, the efficiency of final outcomes would not differ between the Options *in principle*, providing no basis for distinguishing between these options.

Precisely the same point applies to the “security of supply” criterion, which is mentioned in the table only in relation to Options B and E, and not at all in the accompanying text.⁵ All options will require an *ex post* assessment of the outcome of the auction and whether it complies with the need to operate the transmission system in a stable manner. Any option which results in the same capacity mix (i.e. potentially any of options A, C, D or E) would have the same consequences for security of supply.

Even if the outcomes of A, C and D were ultimately different, due to path-dependence in the decision-making of the TSO, the SEM Committee’s conclusion that D would likely result in the most efficient solution is unsound. Inefficiency in the final capacity mix selected by the TSO will reflect both:

- the inefficiency of the solution algorithm; and
- the extent to which the input constraints in the solution algorithm depart from real system constraints.

Option D, if correctly specified, would meet the constraints that the TSO enters into the solution algorithm more efficiently than Options A or C. This argument forms the basis of the SEM Committee’s observation that it is “likely to deliver the most efficient solution”.⁶ However, Option D may require more simplified transmission constraints as inputs to the algorithm than Option C in order for the algorithm to find a solution, whilst Option A might allow the TSO to model a more

⁴ We discuss another aspect of Option B that is relevant to the efficiency criterion in section 5 below.

⁵ Except in paragraph 3.2.41 in relation to lumpiness, a problem that applies to all the options.

⁶ CRM LI Paper, Table 2.

sophisticated range of constraints. Even if the input constraints were the same in Options C and D, there is no guarantee that optimising based on approximated constraints (Option D) would be better than applying heuristic rules to those same constraints (Option C). Therefore, given the current degree of detail, it is not possible to rank the Options by efficiency.

Finally, considerations of “practicality” only exclude Option D, based on the advice of the TSO that only some version of Option C can be implemented in time. However, the RAs do not consider the possibility that the version available in time might be so simple or arbitrary as to lack all credibility or usefulness, if it produces outcomes that are unstable (i.e. affected by small changes in input data), unpredictable (if no-one understands how the “heuristic” rules will perform) or discriminatory (because some of the rules are clearly intended to include or exclude certain units, without any clear justification). In these circumstances, mere “practicality” (i.e. having some sort of algorithm in time) would be a hollow victory.

2.2.3. Conclusion on appraisal of options

The options set out in the CRM LI Paper are not fully specified and the omissions from certain options give a misleading impression of the way in which they work, e.g. of the competitiveness or transparency of the overall process, or the efficiency of the outcome. This lack of the required detail, or of any recognition of the risks inherent in the lack of detail, make it impossible to conduct any meaningful appraisal of the options as spelled out in the CRM LI Paper.

Furthermore, because the appraisal criteria have not been applied on a consistent basis to all the options as described in the CRM LI Paper, the RAs’ stated (“preliminary”) preference for Option C as a “logical interim solution” is not soundly based.

3. Commentary on Clearing Price Rules

3.1. Clearing Pricing Rules and Options for the Auctions

Section 3.3 of the CRM LI Paper discusses how the clearing price should be set in any future CRM auction. Except where quoting from the CRM LI Paper, we will refer to the different methods of setting a clearing price as “pricing rules”, to distinguish them from the auction model “options” discussed above.

The discussion of pricing rules in the CRM LI Paper stands alone, i.e. it is intended to apply whichever form of auction is adopted. However, both the “remaining options under consideration” set out in paragraph 3.3.3 rely on the existence of an unconstrained merit order:

- “Option [i.e. pricing rule] 1: The highest-priced bid accepted in the unconstrained merit order.
- Option [i.e. pricing rule] 2: The highest-priced bid which is both: (a) accepted in the unconstrained merit order; and (b) selected as a winning bid after lumpiness and locational considerations have been resolved.”

The reliance of both pricing rules on an unconstrained merit order limits their applicability, or requires further amendments to some of the options for auction algorithms. Option D would not produce any unconstrained merit order, since it is a one-step process of optimisation around constraints. As currently specified, Option D only produces a constrained merit order; under Option D, any unconstrained merit order would have to be produced separately, solely for the purpose of price-setting. Applying either of these price rules would then require decisions about how to apply the price derived from the unconstrained run of the algorithm to quantities accepted in the constrained run, and what prices to apply to any differences in the quantities observed between unconstrained and constrained outcomes (i.e. how to remunerate units that are constrained on or off).

Option C would only produce (and record) an unconstrained merit order if it were the starting point for the “heuristic” rules (which is suggested in paragraph 3.2.24, but by no means certain). Option A would produce a merit order that was “unconstrained” within the auction algorithm, but which would be distorted (downwards) by the pre-selection and exclusion of “must-not exit” units, implying the need to set prices on a different basis such as an unconstrained run. Again, it is not immediately obvious how to use the price taken from such an unconstrained run, i.e. whether this unconstrained price would apply directly to units in the constrained run (with the “must-not exit” units receiving a different price), or whether it would apply to all the units selected in the unconstrained run (with an additional adjustment in the payments to units that don’t appear in the constrained run).

Thus, the only options that can obviously accommodate these pricing rules are those where the unconstrained merit order is an explicit part of the auction process, namely Options B and E (which are in many respects identical and may only differ in that the TSO will identify some constraints before the auction in Option B). The other options would require the addition of an unconstrained run, a feature missing from their current specifications (and potentially affecting their appraisal).

3.2. Advantages and Disadvantages of Each Pricing Rule

Paragraphs 3.3.8-3.3.11 of the CRM LI Paper set out advantages and disadvantages of each pricing rule (1 and 2). Most of this discussion is comprehensive and informative, subject to the following caveats.

A supposed “advantage” of pricing rule 2 is that “it results in lower customer bills”. However, this supposed advantage is immediately described also as a disadvantage because of the “systematic downward bias in the clearing price resulting in a price which does not reflect long run marginal cost.”⁷ This disadvantage would adversely affect future investment and therefore harm efficiency, security of supply and competition. It is therefore hard to see how it represents any kind of advantage. If the short term effect on bills to consumers were ever a valid appraisal criterion (and

⁷ CRM LI Paper, paragraph 3.3.11.

it has not been listed previously by the RAs during the I-SEM design process), it would also be possible to claim a supposed advantage by setting prices below the competitive market level – in every market. However, recognising the adverse impact of such decisions, simply lowering prices has never been an objective of good regulatory practice, for sound reasons of social policy.

That leaves as the only supposed advantage of pricing rule 2 its ability to avoid certain gaming incentives under pricing rule 1. However, the SEM Committee concedes that pricing rule 2 introduces incentives for bidders to embark on a different game: the SEM Committee states that under pricing rule 2 infra-marginal plants have an incentive to increase their bids and to exaggerate their costs.⁸ These concerns are largely addressed by the market power mitigation measures considered in chapter 5 of the CRM LI Paper. Moreover, pricing rule 2 is open to abuse by the TSO, which will be able to use its discretion over selecting plants to combat constraints in order to lower prices and/or costs in a discriminatory manner. For instance, if the TSO can “constrain off” more of the higher cost marginal units in any unconstrained schedule, it will lower the price taken from the remaining units that meet conditions (a) and (b) in pricing rule 2. It would be naïve to discount the incentive for a TSO to carry out such actions (in the face of strong public and political pressure to reduce prices to consumers), since the TSO will still be able to operate the system securely, albeit at higher total cost to society.⁹

3.3. Conclusion and Consequences for the CRM Design

For the sake of transparency and efficiency, it would be better to adopt a pricing rule that is insulated from the effects of such discretionary interventions, such as some variant of pricing rule 1.

We note that it may be possible to address the problem of lumpiness within the unconstrained merit order that does not include locational or other transmission constraints, and that such possibilities are missing from the pricing rules currently under discussion.

4. Commentary on Compensation Rules for Constrained-Off Plant

4.1. Options for Compensating Constrained-Off Plant

Section 3.4 of the LI Paper sets out the proposed arrangements for plant in the capacity market auction whose bid is below the market-clearing price for capacity but fails to win a contract either due to locational constraints or due to lumpiness. The SEMC sets out the following high-level options:

- “Option 1: No compensation;

⁸ CRM LI Paper, 3.3.11.

⁹ The difference between the higher total cost to society and the lower prices to consumers is borne by generators as a lower rate of profitability and a higher level of regulatory risk.

- Option 2: Compensation based on “lost profit”. This option may, at first sight, appear similar to that which applies in the energy market, although as we discuss below, the parallels are limited. In the existing SEM energy market, any bidder who is constrained-off is paid the unconstrained market price minus the bid price. For instance, in the above example in Figure 2, if Clearing Price Option 1 (unconstrained price) was used then Bid 6 would receive compensation of €5/kW-year.
- Option 3: Compensated by “pay-as-bid”. Under this option, Bid 6 would be paid €35/kW/year, and Bid 7 would be paid €40/kW/year.”¹⁰

The SEM Committee does not examine how these rules for compensating unsuccessful in-merit plant would apply to the options for selecting winning bids. In principle, the rules proposed above would only apply if the SEM Committee selected options C, D or E. The SEM Committee may not be able to identify unsuccessful in-merit plant in option A, because it would separately identify “must-not exit” units in advance of the auction. Option B already explicitly provides remuneration for all in merit plant at the *market price* and pays for constrained-on plant in addition to capacity that clears in an unconstrained auction.

The SEM Committee’s list of options for remunerating unsuccessful in-merit plant is incomplete: Option B offers a fourth option for the remuneration of unsuccessful but in-merit capacity –at the market price – which the SEM Committee does not consider for options C, D and E. (In practice, as discussed above, the distinctions between Options B and E are not entirely clear. Option B may merely be a variant of Option E, in which unsuccessful in-merit bidders earn the market price and take on the obligations of the RO and in which some constraints are specified in advance of the auction.)¹¹

4.2. The SEMC’s Evaluation of the Proposed Options

The CRM LI Paper sets out two arguments which the SEM Committee presents as possible support for compensating a constrained-off bid. Firstly, its criterion of *equity* may suggest a need to compensate constrained-off generators because “arguably, it is not an existing generator’s fault that it is located in an area with excess capacity.”¹² Secondly, paying constrained-off plant its bid (i.e. option 3) may better meet the SEM Committee’s criterion of *efficiency*, by retaining the option of relying on low-cost plant to provide capacity, if constraints are likely to be temporary.¹³ However, the SEMC concludes that it currently favours option 1 (no compensation). It bases its preliminary evaluation on its view that costs would be lower for consumers, at least in the short term, since option 2 would impose costs without necessarily increasing security of supply if the payment were

¹⁰ CRM LI Paper, para 3.4.1.

¹¹ CRM LI Paper, para 3.4.4.

¹² CRM LI Paper, para 3.4.2.

¹³ CRM LI Paper, para 3.4.2.

insufficient to cover the costs of keeping the capacity available, and option 3 would impose “a certain and significant cost on consumers, which is not guaranteed to payback [sic] in subsequent years”.¹⁴

The SEM Committee’s consideration of its *equity* criterion is incomplete. Whether or not it is a generator’s “fault” that it is located in an area with excess capacity, generators, especially those who have paid deep connection charges, may have invested in the legitimate expectation of having firm (or at least peak-time) access to the transmission network. Whether it is then equitable to deny generators such access subsequently may be largely a legal, rather than an economic, question.

The SEM Committee’s analysis of the *efficiency* of compensating constrained-off bidders is inherently biased by the selection of an inefficient design for that compensation. Specifically, the SEMC’s description of options 2 and 3 appear to suggest that constrained-off market participants would face no obligations to keep plant open in exchange for receiving a payment. The SEM Committee also states that, in option 3, constrained-off generators would not “be subject to difference payments” under the RO and that “arguably Option 2, based on ‘lost-profit’ would be insufficient to allow the relevant capacity to cover its missing money, and may lead to closure anyway”.¹⁵

The SEM Committee is correct that option 2 (compensation for “lost profit”) provides no guarantee that constrained-off plant would be able to cover its costs if it were to remain on the system. However, such plant would be free to close, and might well do so, but would still keep their compensation payment.

Similarly, under option 3, generators who were constrained off would receive their bid price, whether or not they kept their capacity on the system. Accordingly, some may choose to close, but that outcome seems to be inconsistent with the decision to pay their bid price. Option 3 therefore seems to require some consideration, at least, of obligations to retain the availability of constrained-off plant if the generator accepts the compensation payment.

Moreover, the design of option 3 rewards market participants for the obligations that the SEM Committee fails to impose. If the market were perfectly competitive, generators’ bids would be equal to their costs of assuming a reliability option. Those costs consist of the missing money required to keep their capacity operating and available *plus* any rebates that generators would have to make in the energy market at times when prices were above the reference price, *plus* any risk premium that market participants would demand for taking on an RO.¹⁶ Accordingly, consistency and equity seem to imply that generators should take on the obligations under the ROs in return for

¹⁴ CRM LI Paper, para 3.4.6.

¹⁵ CRM LI Paper, para 3.4.2.

¹⁶ We have noted in previous submissions that it is hard to distinguish between a genuine cost of risk and a premium required to cover expected future costs that have not yet arisen (such as the probability of scarcity prices occurring in future).

receiving full compensation at bid price (option 3), or else they would be compensated for the cost of rebates and of assuming risks that they will not have to bear.

Regardless of these observations, the designs of options 2 and 3 both create further inefficiency by distorting bidding incentives. Paying constrained-off bidders on a pay-as-bid basis (option 3), rather than paying the market clearing price creates an inefficient distortion in bidding incentives. Market participants with costs below the market clearing price, but in danger of being constrained off, may submit bids lower than their costs in order to avoid being constrained off and to earn the market clearing price, which is a more remunerative outcome under option 3; alternatively, they may inflate their bids to earn a higher pay-as-bid price when they are eventually constrained off. Under option 2, bidding lower than their costs would ensure bidders were either more likely to be selected and to earn the market clearing price or that they would receive a larger payment if they were eventually constrained off. Providing incentives for market participants to distort their bids and to depart from cost-based bidding is unlikely to result in an efficient mix of plant on the system. Compensating constrained-off plant at the market price, equivalent to running an auction that ignores transmission constraints as proposed in option B, removes this incentive to distort bids.

Moreover, the CRM LI Paper wrongly suggests that option 2 would necessarily be less expensive than option 3 and discounts option 3 on the basis of cost. In the SEM Committee's simplified example, with a bid of £35/kW and a clearing price of £40/kW, option 2 is indeed less expensive (at £5/kW) than option 3 (at £35/kW). In practice, depending on the option chosen for the overall auction design to take account of lumpiness and local constraints, the constrained-off plant could be a long way from the margin and the infra-marginal rent could therefore be higher than its bid.

After overstating the inefficiency of both option 2 and option 3 and incorrectly asserting that option 3 would necessarily be more expensive than option 2, the CRM LI Paper fails to discuss at least one category of potential efficiency improvement that could stem from compensating constrained-off plant. Compensating constrained-off bidders for their "lost profit" gives the TSO a clear and transparent economic signal (when combined with the extra cost of constrained-on plant) of the opportunity cost of the current transmission constraints. That opportunity cost is useful for directing expenditure on investment and maintenance to relieve constraints in the longer term. The absence of that signal (if constrained-off plants are not compensated) may lessen the efficiency of investment in the transmission system over time – although that depends on how the signal is used to incentivise the TSO and its expenditure.

4.3. Conclusions

The SEM Committee does not consider the full set of options in considering how to remunerate constrained-off plant. In particular it does not consider compensating constrained-off capacity at the (unconstrained) market price.

Overall, the SEM Committee's evaluation of options 2 and 3 are arguments against a particularly inefficient form of compensation for constrained-off bidders rather than compensation for constrained-off bidders per se. The SEM Committee's evaluation also ignores potential benefits

for the efficiency of investment in the transmission system resulting from compensation for constrained-off plant.

5. Longer Term Considerations

The SEM Committee devotes a short section of the CRM LI Paper to the question of whether it should represent transmission constraints in the T-4 auctions as well as in the T-1 auctions. The SEM Committee sets out three options for consultation:

- **“Option 1 (Constraints in T-4):** Do apply locational capacity delivery constraints in the CRM for the initial and enduring T-4 auctions.
- **Option 2 (No constraints in T-4):** Do not apply locational capacity delivery constraints in the CRM for the T-4 auctions.
- **Option 3 (Constraints in T-4 on transitional basis only):** Do apply locational capacity delivery constraints in the CRM for the T-4 auctions, but transition them out over time.”¹⁷

Consideration of transmission constraints is required subsequent to any auctions (*ex post*) to ensure that the CRM results in a pattern of generation capacity which is feasible and will allow the system to operate. As our discussion above indicates, it is not clear that there is anything to gain from including constraints in any auction process, particularly the T-4 auction which will occur four years before the period of delivery. The TSOs may be able to identify cheaper solutions than procuring additional capacity from the bidders in the T-4 auction, such as reinforcing the network.

Moreover, current knowledge of future constraints is subjective and imperfect. A generator that appears to be unnecessary now may turn out to be valuable in the future, for reasons that cannot be envisaged at present (for example: the catastrophic failure of another generator or a transmission facility; unexpected growth or decline in a major demand; changes in transmission operating standards.) Thus, the information on current or forecast constraints used in auctions may give a sense of spurious accuracy that has unfortunate commercial consequences, if it rejects (“constrains off”) plant without appropriate compensation, when that plant is needed later because of a change in circumstances, or it is procures plant to manage constraints that subsequently disappear.

Therefore, should it be decided to incorporate constraints into the T-4 auction, efficient plant selection would require the TSO to reflect uncertainty over the future evolution of demand and transmission constraints, to avoid sending inefficient exit signals to capacity that is constrained-off and over-procuring out-of-merit capacity. That may require the TSO to procure additional capacity out-of-merit (as in Option B) or to specify a higher demand for capacity and to ensure that the extra demand is met by a diverse set of sources.

¹⁷ CRM LI Paper, para 4.3.1.

6. Commentary on Market Power Mitigation

6.1. Market Power Mitigation Options Considered

The market power mitigation framework for controlling local market power in the I-SEM fits within the wider framework of market power mitigation. Chapter 5 of the CRM LI paper lists possible controls as:

- “An Auction Price Cap, to apply to all bidders, including new build plant;
- A Price-taker Offer Cap which would apply to all existing generators. This Price-taker Offer Cap would generally be uniform, but individual generators could bid to be allowed to have a higher unit specific price cap on the grounds of higher Net Going Forward Costs;
- A sloping demand curve, which would also serve to mitigate market power.”¹⁸

The SEMC observes that, where a generator has local market power due to constraints on the system, the controls proposed for the market as whole may be less effective because it is not restrained by competitive pressure.¹⁹ Accordingly, the SEM-Committee proposes to adopt one of following price caps on plant “required for local security of supply reasons”:

- “At its individual Net Going Forward Cost, i.e. below the Uniform Price-taker Offer Cap if its individual Net Going Forward Costs are lower than the Uniform Price-taker Offer Cap; or
- At the Uniform Price-taker Offer Cap adjusted for any specific ancillary service payment it may receive.
- Any individual plant could be required to have an evaluation of its Net Going Forward Costs due to fear of economic or physical withholding, at the discretion of the SEM Committee.”²⁰

6.2. Evaluation of Proposed Options

The only difference between the first and third of the SEM Committee’s proposals appears to be that the SEM-Committee has discretion in applying an offer cap at Net Going Forward Costs in the third case and not in the first case. It may be necessary to exercise discretion to ensure that any intervention is proportionate and does not stifle competition. However, transparency will require the SEM Committee to set out objective principles by which it would exercise that discretion when intervening to encourage competitive bidding. In the following, we assume that the SEMC will publish and consistently apply such principles.

¹⁸ CRM LI Paper, para 5.1.11.

¹⁹ CRM LI Paper, para 5.2.4.

²⁰ CRM LI Paper, para 5.2.5.

Nevertheless, the SEM Committee's first and third proposals are flawed because:

- they include imposing NGFC as a contract price;
- they may undermine cost recovery; and
- and they fail to provide incentives for existing plant to invest.

The SEM Committee's second proposal, to reduce the Uniform Price-taker Offer Cap by ancillary service revenues, provides no guarantee that the offer cap will cover the forward-looking costs of the plant and as currently designed it may systematically understate those costs. Moreover, none of the SEM Committee's proposals tackle predatory conduct.

6.2.1. SEM Committee applies NGFC as a contract price, rather than offer cap

Both the SEM Committee's first and third proposals suggest that Net Going Forward Costs will form an offer cap, rather than a fixed price for generators with local market power. Such generators could therefore earn the higher of its Net Going Forward Costs or the market price. This approach to mitigating market power is common (albeit not specifically for constrained generators) in other capacity markets, such as those in Great Britain and the US.

However, in the text of the CRM LI Paper, the SEM Committee suggests that Net Going Forward Costs (NGFC) could set the prices of capacity, rather than provide the basis for setting offer caps, in at least some of its options. Reliability Must Run (RMR) generators could be forced to sign contracts at their NGFC. For instance, under option A, the SEM Committee states:

“It should be noted that it could be commercially advantageous to be designated as an RMR unit if the unit would otherwise not recover its costs. Alternatively it could be a commercial disadvantage if the unit would lose the ability to receive market revenues in excess of its costs. Whether it was an advantage or disadvantage would depend in part on the cost structure of the unit concerned. In any event, the designation would be commercially significant and would be an administrative decision as opposed to a market outcome.”²¹

This proposed method has perverse outcomes: generators necessary for system stability would be prevented from obtaining infra-marginal rent above their costs in the capacity market. The rewards for generators in the locations where they are most valuable would therefore be *lower* than for the wider set of generators. Such methods discriminate against plant in constrained locations and deny them the recovery of sunk costs even when the plant in question has lower costs than the marginal unit.

The SEM-C relies on comparisons with US markets to justify preventing RMR generators from earning at least the market price for capacity. These comparisons are misleading: US markets

²¹ CRM LI Paper, para 3.2.10.

have locational energy pricing and capacity markets with different zones, both of which provide higher rewards for locating in areas of the network where power plants are required for system stability; RMR contracts are only required where these market prices are too low or are not detailed enough to identify very local shortages of capacity. The I-SEM by contrast will have a national market price for both energy and capacity, creating a widespread reliance on such contracts and the investment signals they provide.

6.2.2. Capping Offers at NGFC May Deny Cost Recovery

Even capping bids (rather than prices earned) at NGFC may threaten cost recovery for plant with local market power. Capping bids at NGFC replaces market participants' commercial judgement with the SEM Committee's own. Forecasting NGFC is necessarily a challenging exercise, requiring the SEM Committee to take a view on the future costs of plant that it cannot recover from the energy and ancillary services markets. Given the uncertainty around the calculation of NGFC, especially in the T-4 auction four years ahead of delivery, the SEM Committee's estimate may be wrong. The risks of error, however, are asymmetric because generators will be able to bid below the offer cap but not above. For some plant at least, overestimating NGFC and setting too high an offer cap would have little effect, if the generator bids below the cap in order to be in-merit or constrained on within a competitive part of the market. If the SEM Committee underestimates NGFC, however, plant would be forced to bid below its anticipated costs, which might encourage such plant to close.

The consequences of the SEM Committee underestimating NGFC will be most problematic for constrained-on plant. If the SEM Committee underestimates NGFC for plant that is in-merit in the capacity market, it will bid less than its cost but it will still earn the market price for capacity. However, plant that is constrained on will only earn its bid price. If the SEM Committee caps that bid price at its estimate of the plant's NGFC and that estimate is below its true costs, the plant will be given a signal to close. That would be highly undesirable for plant that is presumably constrained on precisely because of its high value to system security.

Requiring bidding at NGFC will also exacerbate the impact of allowing ten-year contracts for plants whose costs are typically above the capacity market clearing price and constrained on. In the presence of ten-year contracts for new plant, capacity market prices may never rise high enough to allow existing plant in constrained areas to earn sufficient infra-marginal rents to recover sunk costs or prospective investment costs.

6.2.3. Capping Offers at NGFC Undermines New Investment by Existing Plant

Fixing offer caps or prices at NGFC, defined by reference to forward-looking costs and revenues, will undermine the incentive for efficient investment by existing plant which cost less than the threshold for access to long term contracts. The annual contract in the capacity market presents an artificial time constraint on the remuneration of existing generators' costs. In order to remain available, existing generators will have to invest in maintenance and in major refurbishments, the benefits of which last for several years. The cost of these investments would appear as very high

“Net Going Forward Costs” if they were assigned to the year when they are incurred (and would place the generator out of merit in a capacity auction). However, if the generator made the investment and tried to cover these costs in subsequent auctions, the costs would immediately be disallowed as sunk costs in the calculation of “Net Going Forward Costs”.

Offering generators the prospect of earning a return on investment, in addition to short-run operating costs, is therefore essential for encouraging existing plant in constrained areas to remain on the system. In the absence of any return on past investment (a sunk cost), the SEM Committee’s estimate of Net Going Forward Costs puts plant closure decisions on a knife edge: plant would remain open if the estimate was adequate; if the SEM-Committee underestimated Net Going Forward Costs for a particular plant by any amount, however small, the plant would have an incentive to close. Such closures would be irreversible (or only reversible at prohibitively high cost). To ensure system security, consumers would then have to pay for long term contracts with costly new plant – an outcome that is simply inefficient.

6.2.4. Capping offers at the Uniform Price-taker Offer Cap may understate the costs to be recovered and may be impractical to estimate

The SEM Committee’s second proposal is to set the offer cap for each market participant with local market power at the Uniform Price-taker Offer Cap, adjusted for any specific ancillary services payment it might receive. It is not clear why the SEM Committee would impose a Uniform Price-taker Offer Cap at this level on generators with local market power and the SEM Committee provides no rationale for the proposal in the CRM LI Paper. In particular, if the Uniform Price-taker Offer Cap adjusted for ancillary services payments were below a generator’s Net Going Forward Costs, the generator would fail to recover its costs and may suffer financial difficulties, leading to closure and undermining security of supply. In any case, the SEM Committee’s second proposal may systematically understate the costs that a generator needs to recover and may be impractical to estimate.

We assume that the Uniform Price-taker Offer Cap would reflect the maximum level of unrecovered costs that price-takers need to recover from the Capacity Remuneration Mechanism. In principle, price-takers’ unrecovered costs would already include a deduction for their expected revenue from the sale of energy *and ancillary services*. The proposed rule therefore deducts ancillary services revenue twice over, once in the calculation of unrecovered costs, and once in the calculation of the price cap. A more consistent approach would take the Uniform Price-taker Offer Cap, and deduct any *difference* between the ancillary service revenues of the generator with local market power and the ancillary services revenue of the price-taker plant used to define unrecovered costs. However, such fine-tuning seems to be impractical, given the uncertainty over future ancillary service revenues.

6.2.5. The SEM Committee’s Proposals Do Not Address Predatory Conduct

None of the proposed local market power controls in the capacity market prevent predatory bidding. Local, constrained markets are likely to be even more concentrated than the market as a whole. In

some cases, only two generators may be able to meet a locational constraint. In such circumstances, one of the generators may bid below cost in order to force its rival to close. Capping bids at Net Going Forward Costs may limit cost recovery and prevent predators from earning excess profits, thereby diminishing the value of driving out rivals. However, ESB is likely to be present in constrained areas. As a state-owned generator, it may not face the same commercial pressures as its privately-owned rivals, and may therefore be able to engage in predatory conduct, meriting its consideration by the SEMC.

6.3. Conclusion

Capping *bids* at Net Going Forward Costs will prevent low cost plant in constrained areas from bidding up to the Uniform Price-taker Offer Cap. There are risks in such a policy of limiting bids, due to the difficulty of estimating this cost concept accurately. Limiting bids to Net Going Forward Costs will substitute the SEM Committee's view of future costs and revenues of the plant in question for commercial judgement of the operators. Given the uncertainty surrounding future costs and revenues, the SEM Committee may force anticompetitive under-recovery of costs, leading to inefficient closures, especially of constrained-on plant which is paid-as-bid and needed to manage the system.

There are also (and potentially even more serious) problems with the proposal to cap *prices* for participants in constrained areas at their Net Going Forward Costs and below the Uniform Price-taker Offer Cap. The resulting prices will not allow the affected plants to earn revenues that contribute to the sunk costs of efficient investment. The result may also be inefficient closure and threats to security of supply. The policy of applying a lower cap than the general one also appears to be discriminatory.

Finally, the proposed market power mitigation rules do not prevent predatory conduct in highly concentrated local markets and offer no protection against non-commercial incentives.

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