Proposal for a Capacity Market Rules Change

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Reference number*(to be completed by Ofgem)*:
CP124

Name of Organisation(s) / individual(s):	**Date Submitted:**
Energy UK	15 January 2016

Type of Change:

✓**Amendment**

☐**Addition**

☐**Revoke**

☐**Substitution**

If applicable, whether you are aware of an alternative proposal already submitted which this proposal relates to:

We are not aware of any alternative proposal which this proposal relates to.

What the proposal relates to and if applicable, what current provision of Rules the proposal relates to *(please state provision number)***:**

This proposal is to allow assessment of performance across a portfolio of CMUs so as to allow more cost-effective and reliable participation by aggregations of demand-side resources and small generators. The current rules already allow for this aggregated assessment during System Stress Events; this proposal adds similar provisions for DSR Tests and Satisfactory Performance Days. It involves changes to provisions 13.2, 13.2A, and 13.4.

Description of the issue that the change proposal seeks to address:

The Electricity Capacity Regulations limit the size of CMUs consisting of aggregations of multiple components on different sites to 50 MW. Regulation 4(4)(c) does this for Generating CMUs; 5(3)(d) does the same for DSR CMUs. This means that larger portfolios must be split into multiple CMUs, each of at most 50 MW.

There is a good reason to limit the size of a CMU: it increases the granularity of the supply curve in the auction. If an aggregator were to offer a portfolio of 400 MW as a single CMU, then, under current auction arrangements, that CMU would need to be offered at a single price, and would either clear or not in its entirety. The auction can be more efficient at price discovery and at matching supply and demand curves if divisible portfolios are offered in smaller blocks.

However, apart from encouraging auction granularity, there seems to be no other good reason to limit the size of aggregated portfolios. This issue does not seem to have been explored during the capacity market design process: the 50 MW threshold has special significance for BMUs, but seems to have been applied to aggregated non-BM CMUs somewhat arbitrarily.[1] This arbitrary limit means that the 400 MW portfolio from the above example would have to be offered as 8 separate CMUs of 50 MW each.[2]

[1] The affected CMUs cannot be BMUs under current arrangements.

[2] Or as a greater number of smaller CMUs, but we will assume 8 x 50 MW for this example.

Chapter 10 of the current rules allows for reallocation of volumes between CMUs during System Stress Events. This means that, during a System Stress Event, it does not matter if one of the CMUs provides, say, 40 MW, rather than its nominal 50 MW: so long as some of the other CMUs provide more than their nominal capacities, such that the total response is at least 400 MW,[3] the capacity provider can reallocate volumes so that no shortfall occurs.

This makes sense, as it does not matter to the physical power system – and hence should not matter to the capacity market – which CMU provides which part of the response, so long as the aggregate response is as large as expected. Only the aggregate response is relevant.

It may seem that the ability to reallocate volumes means that it does not matter how the 400 MW of capacity is split between the 8 CMUs. However, this is not the case. This is because volume reallocation cannot be used when demonstrating Satisfactory Performance Days, or in DSR Tests.

This means that, rather than having to develop a portfolio that will reliably deliver 400 MW (which is what the system actually needs), the capacity provider is required to develop 8 separate portfolios, each of which will reliably deliver 50 MW.

This is a problem, because there are significant scale advantages in aggregation of customer demand-side response capabilities and small generating units: the larger the aggregated portfolio, the lower the cost at which a given level of reliability can be provided. Limiting the size of portfolio across which aggregation is allowed – in this case, to 50 MW – leads to higher costs, lower reliability, or some combination of the two. There are several reasons why imposing an arbitrary size limit on a portfolio causes increased costs and/or reduced reliability:

1. **Divisibility.** The capacity available may come in relatively large chunks that are not easily divisible into chunks of the required size.
2. **Redundancy.** An aggregator cannot rely on all customers responding as expected every time they are dispatched, as providing demand response is not any customer's core business. Aggregators must therefore make provision for customers delivering less than expected, or not responding at all. This is complex, and one of the key skills of an aggregator. A simple example of how this could be applied is through an "N-1" approach, where the portfolio is oversubscribed so that the rated capacity can still be delivered if the largest customer fails to respond.
3. **Estimation error.** At the time that customers must be allocated to CMUs (before the DSR Test), the aggregator will only have estimates of the capacity reliably available from each customer, based on their initial assessment of the customer's processes and capability. The actual reliable capacity may prove to be higher or lower. Aggregators take extreme care to ensure that their estimates are unbiased, so, across a large portfolio, the errors largely cancel. Across a smaller portfolio, however, they may not, and so the aggregator has to further de-rate all the customers to allow for this error.

To give a simplistic example of the first and second causes listed above, imagine that each customer was able to deliver 12 MW. 34 such customers would be sufficient to provide 400 MW (34 x 12 = 408). Making "N-1" provision for failure of the largest customer takes this up to 35 customers, with a total capability of 420 MW, being used to provide 400 MW reliably to the market.

[3] For simplicity, we are ignoring derating and load-following adjustments in this example. The same principles continue to apply if these scale factors are incorporated, but the numbers become harder to follow.

To provide 50 MW, the aggregator would need 5 such customers (5 x 12 = 60). "N-1" provision takes this up to 6 customers. To provide 8 separate 50 MW CMUs, as necessary under current rules, would therefore require 48 such customers, with a total capability of 576 MW.

The market is only being provided with 400 MW of capacity, and therefore paying for 400 MW, but the payments for this capacity have to be split between 576 MW of customers instead of 420 MW. If the customers and aggregator require a payment of £Y/MW/year for participation to be worthwhile, then the lowest capacity price they would accept in the single-portfolio case is 1.05 x Y (as 420/400 = 1.05). The arbitrary 50 MW limit raises this to 1.44 x Y (as 576/400 = 1.44): a 37% increase.

The third cause has a similar effect, and may be the most significant in practice.
In each of these ways, limiting the size of portfolio across which aggregation is allowed makes provision of capacity from aggregated resources appear needlessly expensive compared to other resource types. This will lead to fewer such resources clearing in the auctions, and to capacity prices being higher than necessary.

All three causes of unnecessarily increased costs or reduced reliability can be resolved, without any negative consequences, by allowing performance to be assessed on an aggregated basis across CMUs for the purposes of DSR Tests and Satisfactory Performance Days, as well as during System Stress Events.

This approach preserves the 50 MW granularity of the supply curve in the auction.

If applicable, please state the proposed revised drafting *(please highlight the change)***:**

We do not yet have specific wording to propose, but we do have details on how the change should be implemented:

- In rules 13.2 and 13.2A, specify that multiple Unproven DSR CMUs can be presented for a Joint DSR Test. In this case, each CMU is tested as normal, and the sum of the Proven DSR Capacities of all the CMUs is calculated. If this Aggregate Proven DSR Capacity is at least as great as the sum of the Unproven DSR Capacities of the CMUs, then the Aggregate Proven DSR Capacity is split between the CMUs in proportion to their Unproven DSR Capacities. If the Aggregate Proven DSR Capacity is less than the sum of the Unproven DSR Capacities, then the results are treated as if each of the CMUs had been submitted for separate tests.
- Add a rule such that, if a CMU that has a DSR Test Certificate derived from the Aggregate Proven DSR Capacity in a Joint DSR Test successfully undergoes another DSR Test with respect to the same Delivery Year – either individually, or jointly but with some different combination of CMUs – then the DSR Test Certificates from the previous Joint DSR Test are replaced with DSR Test Certificates giving each CMU's individual Proven DSR Capacity, as if the original tests had not been joint. (This prevents the possibility of gaming by repeatedly testing one large reliable CMU paired with different under-sized or unreliable CMUs.)
- Add to rule 13.4.2 that a Capacity Provider can notify the Delivery Body that it wishes to demonstrate Satisfactory Performance Days of a group of CMUs in aggregate.[4] The requirement in this case is that those CMUs must demonstrate aggregated capacity at a level equal to or greater than the sum of their Capacity Obligations. If this is done successfully, then those CMUs cannot

[4] Note that this is assuming the implementation of the rule changes proposed by DECC in their 15 October 2015 consultation paper to harmonise the treatment of satisfactory performance days for all types of CMU.

be presented in any different combinations for other Satisfactory Performance Days during the same Delivery Year.

Analysis and evidence on the impact on industry and/or consumers including any risks to note when making the revision- including, any potential implications for industry codes:

As shown in the worked example, the requirement for aggregated portfolios to be split into small chunks, each of which must separately pass a DSR Test and demonstrate Satisfactory Performance Days, leads to aggregated resources being unnecessarily expensive. This has two effects:

1) Where such resources clear in an auction, it leads to unnecessary costs being incurred by participating customers.

2) Because the minimum acceptable capacity price for such resources is higher than it need be, this will lead to fewer such resources clearing in the auction – either because they exit when the price falls below their unnecessarily inflated minimum bid, or because potential capacity providers realise that they are unlikely to clear in an auction, and hence choose not to prequalify.

The first effect affects those current consumers who participate: they incur greater costs in making capacity available than is necessary for the amount of capacity that the market recognises, and they earn less capacity market revenue than they otherwise would, as it has to be shared out amongst more customers.

The second effect is more important, as it can affect all current consumers and future consumers, by causing the auction to be less competitive than it could be, resulting in a capacity price that is higher than it need be. This leads to current consumers paying more than necessary for capacity. If any multi-year obligations are awarded in the auction, then future consumers will also be locked into paying more than necessary.

Making this change should therefore benefit current participating consumers by reducing costs incurred, and benefit current and future consumers by reducing the capacity prices, while still delivering the same level of security of supply.

In addition, this will allow proponents of aggregated resources to split them across multiple small CMUs without suffering increased costs due to loss of scale advantages. At the moment, such proponents have a tension between scale advantages and granularity. By removing this tension, they can offer their resources at a range of capacity prices, providing a smoother supply curve, resulting in better price discovery and allowing the auction to clear nearer to the intersection of the supply and demand curves: a more efficient auction outcome.

Details of Proposer*(please include name, telephone number, email and organisation)***:**

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