

Capacity Market De-rating Methodology

Introduction

1. The purpose of this paper is to provide an update to the CM Expert Group on the proposed de-rating approach and the status of determining a de-rating algorithm.

Background

2. Under the consultation version of the CM rules¹ the Delivery Body is required to publish in the auction guidelines a de-rating factor range for each fuel type specified in schedule 4 of the rules². The de-rating factor range will extend from the Technology Class Weighted Average Availability ('TCWAA') or Average Availability of Balancing Service DSR CMUs ('AABSDSR'), to minus two standard deviations.
3. For type 1 and type 2 Capacity Market Units (CMUs) – CMRS transmission and CMRS distribution connected CMUs respectively – the Technology Class Weighted Average Availability ('TCWAA') will be calculated for each fuel type from the mean average of all Balancing Mechanism Units' (BMUs) average availability. The average availability for each BMU will be calculated from the sum of its declared Maximum Export Limits (MELs) at real time in high demand settlement periods over the seven immediately preceding core winter periods, divided by the sum of the BMU's highest declared MEL figures from each core winter period.
4. For type 3 and 4 CMUs (DSR CMUs), the Average Availability of Balancing Service DSR CMUs ('AABSDSR') will be determined from the mean average of all Balancing Service DSR CMUS at real time in high demand settlement periods over the seven immediately preceding core winter periods, divided by their contracted volume. For the purposes of this calculation Balancing Service DSCR CMUs are defined as DSR CMUs which provide the System Operator with STOR, Frequency Control by Demand Management, Firm Frequency Response or Fast Reserve balancing services.
5. All applicants are required as part of their pre-qualification submission to select a de-rating factor for their CMU, from the de-rating factor range published by the Delivery Body, along with specifying their unit's connection capacity to which the selected de-rating factor will be applied. The volume for which the unit will be credited for at the auction will be the TCWAA or AABSDSR figure multiplied by the declared connection capacity – irrespective of which de-rating factor an

¹ CM Rule 2.3

² Coal, Demand side response, gas, hydro, nuclear, OCGT, oil and pumped storage

applicant had selected. However the volume for which a Capacity Agreement would be awarded to a CMU successful at an auction, and for which they would be liable to deliver at times of system stress at peak demand, would be based on their connection capacity multiplied by their selected de-rating figure.

6. The CM Rules³ also direct that the Delivery Body review and consult on the methodology for calculating the de-rating range after the T-4 auctions for the first, second and third delivery years, as well as post the inclusion of a new fuel type by the SofS. The aim of any review is to determine the most reliable method of determining the mean average availability to generate on a fuel type basis.
7. Following the review and consultation period the Delivery Body may propose a revised calculation methodology for the SofS/The Authority's consideration, which if approved would be applied for subsequent delivery years.

Update

8. Some stakeholders have raised questions on the methodology as described, to ensure they are testing the impact on their own capacity correctly. National Grid has prepared answers to questions received which have been shared with DECC; they are included as an annex to this paper.
9. DECC have an ambition that this methodology be translated into a formulaic algorithm which would be set out in the CM Rules. This could further increase clarity on the method and its application. DECC have asked National Grid to consider developing such an algorithm, potentially in sufficient time to share with industry ahead of the end of Consultation to support development of consultation responses.
10. National Grid has explored this. The methodology developed has 3 key steps:
 1. Prepare the data to remove errors in submissions to National Grid
 2. Calculate average availability per year for the last seven years and then average
 3. Calculate ranges around the average in (b)
12. Some views had been expressed that a single algorithm may already be available or easily developed. However, much of the work involved relates to preparing the data to remove obvious errors. As such, there are effectively a number of sub-processes which are run to gather data, prepare data and then derive the ranges. Developing this into a single clear algorithm is thus a

³ CM Rule 2.3.6

significant piece of work; given competing priorities for resources, it will not be possible to start such work until early in 2014.

13. The Panel of Technical Experts recommended that DECC commission an independent technical review of de-rating factors developed by National Grid. Work to engage consultancy support to carry out this review has started; the review is expected to complete mid March 2014. This review could recommend a significant change to de-rating factors used or the methodology to derive these. It is not expected that any potential new methodology could be described algebraically, particularly if the factor or ranges suggested are based on international experience or technical capability rather than historical performance in the GB market.

Annex - Questions on the De-rating Methodology set out in the Capacity Market Rules (2.3)

1. The Average availability is calculated over the seven preceding core winter periods. Is this used to calculate 7 annual rates or a single rate using all 7 years of data?

A single value is calculated for each winter and these 7 values are then averaged.

2. In section 2.3.4(a) How does the calculation for AA deal with:

- a. Plant Commissioning
- b. Plant Decommissioning (for example if a non LCPD coal plant ran out of hours earlier than anticipated does this reduce TCWAA for coal
- c. Plant Mothballing

For each BMU the 95th percentile of MEL used is taken from high demand periods, therefore if a BMU submits no MEL data for winter high demand days, due to being mothballed or closed, this will not affect the calculation. The MEL for a plant which is commissioning could vary significantly, and if a plant specific de-rating factor were derived from this data the availability of that BMU would be understated. However when included in the scaling these variations have minimal impact.

Mothballed plant returning was a generation scenario considered in the Capacity Adequacy report; this does not impact the de-rating factors derived on a fuel type basis.

- d. Technology changes (e.g. capacity being decreased on Drax units converted from Coal to biomass?

Coal and biomass are treated the same manner as there is very limited historical data available on biomass.

3. In Section 2.3.4(a)(i)(bb) When weighting the CMRS CMU's is the unit "Max MEL"

- a. the maximum MEL in all periods,
- b. The maximum MEL in all high demand settlement periods or
- or c. does it exclude those periods when the MEL exceeds the 95th percentile?

The weighting factor is applied in Section 2.3.4 (a)(ii). This is the BMU 'Max MEL', which is set out in 2.3.4 (a) (i) (bb).

This is the highest declared MEL, between December 1st and last day of February of following year 'Core Winter Period', excluding those declared MELs which exceed the 95th percentile.

The exclusion of MELs which exceed the 95th percentile is focused on removing errors in data submissions (for example a 50MW unit submitted a MEL of 500MW) rather than focusing on high demand periods. The Core Winter period takes account of demand.

4. Into which technology class do the following types of generator belong or are they dealt with separately as they do not appear in schedule 4:

Biomass (both those built as biomass and those converted from coal) – Treated as coal.

Wind – own model so dealt with separately.

CHP – falls under the gas fuel type.

5. In Section 2.3.4 (b) is the AABSDSR calculated by getting the availability of each DSR BMU and taking the average (if so is it weighted) or taking the availability rate in each relevant period and taking the average?

AABSDSR is calculated by getting the declared availability of each DSR component (as based on balancing services providers which are not in the BM) and taking the average without weighting applied.

6. The range min in Section 2.3.3 is classed as “minus two standard deviations” is this the standard deviation standard deviation of the CMUs in that technology class (plus DSR CMUs) or is it the standard deviation of each year’s (or period’s) TCWAA (or AABSDSR) or something else?

The standard deviation is also derived here from the spread of the 7 values.

7. How are CCGT treated, given the potential for differing modes of operation?

The factor derived for gas generation is applied to the BMU capacity.