I-SEM
Capacity Market:
Proposed Amendment to the Methodology for the Calculation of the Capacity Requirement and De-rating Factors

13 April 2017

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1 Introduction

The TSOs are required to calculate the Capacity Requirement for the Capacity Market and also to recommend the De-rating Factors that will be applied to units participating in the auction and secondary trading. The methodology being used to calculate these is outlined in decision paper SEM-016-082 and associated appendices.

This paper proposes an amendment to the methodology described in SEM-016-082a that is designed to improve stability of De-rating Factors from year-to-year. SONI and EirGrid welcome feedback on these proposed changes.

For information, Section 4 of the paper provides an update on the indicative De-rating Factor values that were provided in the SEM-16-051a consultation document.

2 Calculation of De-rating Factor Curves and Capacity Requirement

The methodology described in SEM-016-082a specifies that the Capacity Requirement and the final De-rating Factor Curves for each Technology Class will be those that are calculated for the specific Demand Scenario selected by the Least-Worst Regrets analysis.

A Demand Scenario is a combination of an annual demand forecast level (both peak MW and total MWh) and a demand profile which describes how to allocate that demand across all the hours in a year. The demand profile is based on the profile of actual demand from a historical year.

Under the current methodology, each historical profile year will provide different De-rating Factor Curves for each Technology Class, since the marginal benefit of a unit to the system will to some degree depend on the demand profile used.

Based on testing to assess the behaviour of the methodology we have observed that variability can occur in the De-rating Factors as a result of the least-worst regrets analysis selecting demand scenarios with different historical profile years.

Given that in the Least-Worst Regrets analysis, a number of Demand Scenarios may have similar 'Worst Regret' costs, it is likely there would be some variation in the demand profile selected from year-to-year and this would lead to variation in De-rating Factor results (outside of the variation expected from any changes to availability statistics).

3 Amendment to Methodology

We propose the following change to the methodology to improve stability of De-rating Factors from year-to-year:

- Take the demand forecast level that applies to the Least-Worst Regret demand scenario
- The final De-rating Factor Curves will be formed by **averaging the De-rating Factor Curves from all the demand scenarios at this demand forecast level (i.e. average across all historical profile years at that demand level)**

- The final Capacity Requirement will be formed by **averaging the Capacity Requirements from all the demand scenarios at this demand forecast level (i.e. average across all historical profile years at that demand level)**

The approach used for determining final De-rating Factors is the same as currently used for calculating the De-rating Factors for variable resources such as wind.

It is our view that this improved stability will be beneficial to the market. As is it also proposed to use the selected De-rating Factors as part of the locational constraints methodology this change would also be beneficial to that methodology.

Illustrative example:

- Assume that eight profile years are used in the calculation (2008-2015 inclusive) and ten demand forecast levels ranging from low to high
- The Least-Worst Regrets analysis has selected the demand scenario with the 2012 historical yearly profile and the 3rd highest Demand forecast (i.e. demand level 8).
- The amendment proposes that the TSOs would take the De-rating Factor Curves calculated for each of the eight demand scenarios in demand level 8.
- These would then be averaged to give the final De-rating Factor Curves for each Technology Class.
- The Capacity Requirement would also be the average of all the demand scenario capacity requirements at that the selected demand level

4 Update on Indicative De-rating Factors for the first Transitional T-1 Auction

In August 2016, SEM Consultation SEM-16-051a contained indicative De-rating Factors and Capacity Requirement results for the first Transitional T-1 Auction. These values were for guidance purposes only and were calculated using analysis tools developed before the SEM Committee decision had been made and the methodology finalised.

Some changes have been made to the calculation inputs since then, namely:

- Expansion and improvement of the data set used to create outage statistics for each Technology Class
- Reclassification of generators (e.g. AGUs)
- Finalised decisions by the SEMC relating to the process, such as the demand forecast year to be used in the first Transitional T-1 Auction
- Expectations regarding external parameters (e.g. Net-CONE, the External-Market De-rating Factor to be applied to Interconnection)

While final de-rating results are not yet available, quality-assurance testing using this updated information has indicated likely changes to the De-rating Factors relative to the figures provided in SEM-16-051a, with a reduction in De-rating Factors seen across most Technology Classes.

Test results indicate that the De-rating Factors for the Gas Turbine, Steam Turbine, and Hydro Classes will be around 3% to 5% lower (depending on size) than the indicative values in SEM-16-051a. De-rating Factors for DSUs increase significantly due to the switch to system outage statistics for that Technology Class. Also, as indicated in SEM-17-022, the indicative De-rating Factors for Interconnectors have changed. Please note that the final results may change from the indications provided above.

It should be pointed out that these changes are not related to the proposed change in methodology described in the previous section of this document, and are driven by changes to the calculation inputs.

The Capacity Requirement will be consistent with the final De-rating Factors and the SEM Committee decision paper on Parameters and Auction timings has stated that the Net-CONE (and hence the Auction Price Cap and Existing Capacity Price Cap) will be adjusted to take account of changes to the Best New Entrant reference plant De-rating Factor.