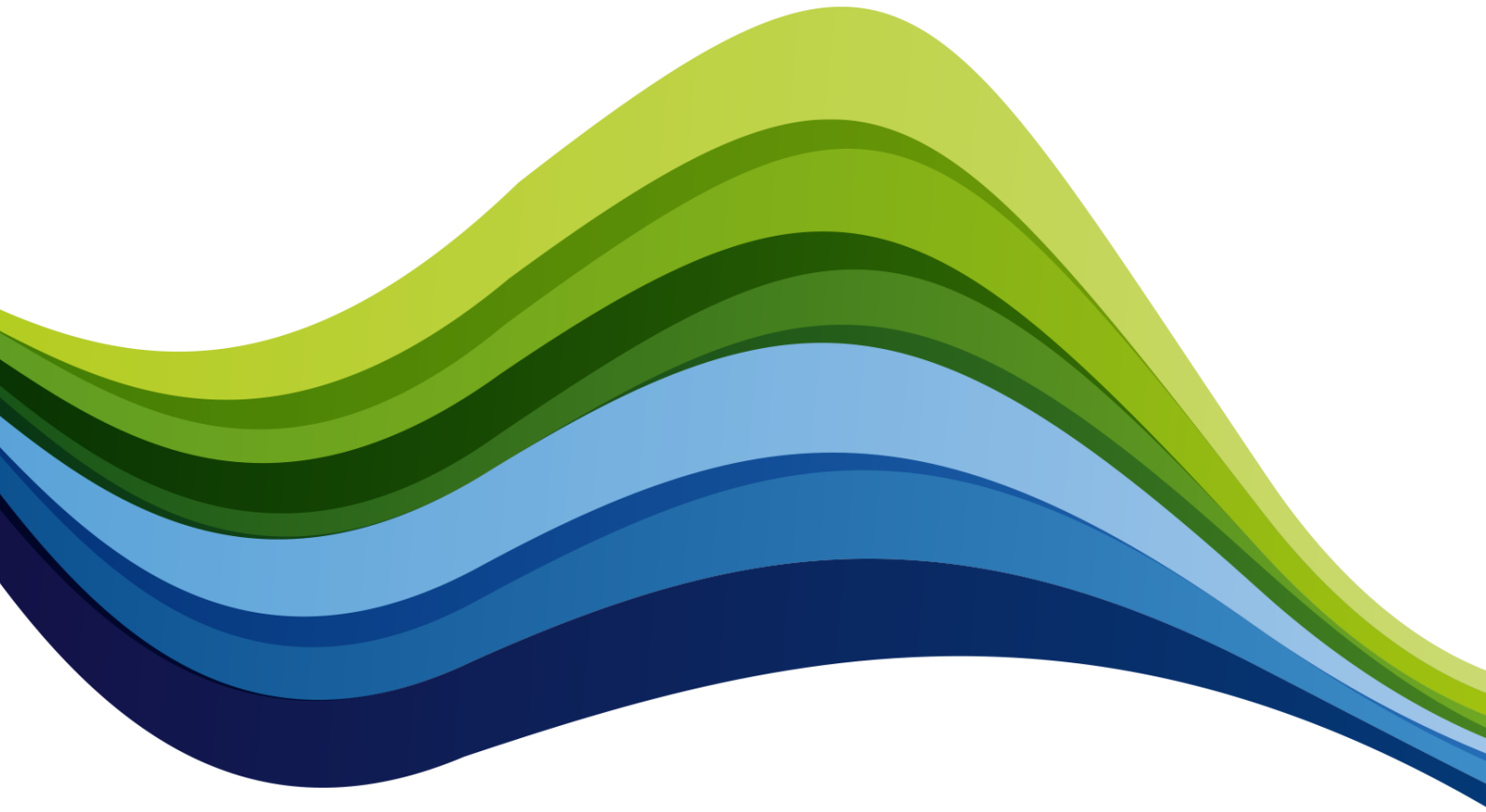
I-SEM

Capacity Requirement & De-Rating Factor Methodology

SEM-16-051

If you have any questions in relation to our response, please don't hesitate to contact Connor Powell (connor.powell@sse.com)



Response/**October 2016**

Executive Summary

Thank you for giving SSE the opportunity to comment on the SEM Committee's consultation on the Capacity Requirement and De-Rating Methodologies for capacity providing units and cross-border transmission lines under I-SEM.

The paper requests quantitative analysis, but SSE believes that the 6 week period allocated to a consultation running in parallel with a number of other critically important I-SEM design consultations is insufficient for market participants to produce robust alternative methodologies. This decision will play a crucial role in securing sufficient capacity for all-island consumers and ensuring the delivery of the Reliability Standard selected by the SEM Committee. If the RAs would like a comprehensive counterfactual to the work produced by the TSO and ESP Consulting, we believe that they need to better phase design consultations at I-SEM project level.

Echoing our comments on the locational capacity consultation (SEM-16-052), we are concerned by the compressed timescale and lack of challenge to the TSO and ESP Consulting methodologies in the SEM Committee's consultation paper. These issues need to be given sufficient scrutiny, given that they will determine the selection of the future generation portfolio.

The SEM Committee has opted for an 8 hour Loss of Load Expectation which is less conservative than the Reliability Standards selected in neighbouring markets, SSE believes that it is important that the methodologies for deriving the capacity requirement and central de-rating factors are not comparably aggressive. We have some concerns with the approaches outlined in the supplementary papers.

Our response is split into three parts, looking at the Capacity Requirement, Capacity De-Rating and Interconnector De-Rating.

Capacity Requirement

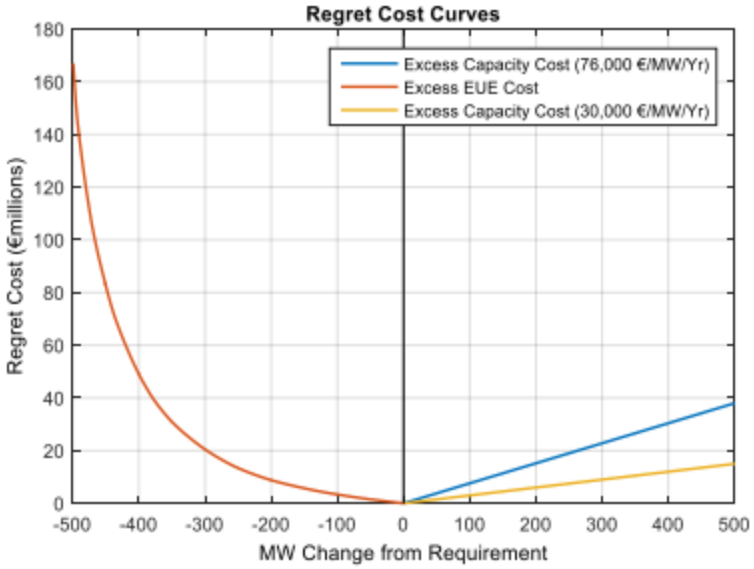
There are a number of items that we think are worth further consideration under the Capacity Requirement:

- Ensuring that the Least Worst Regrets Analysis doesn't systematically under procure capacity in an oversupplied system.
- Ensuring that the TSO procures sufficient capacity to deal with operational reserve requirements.
- Reconciling the derived Generation Capacity Statement System Requirement to meet the 8 hour Reliability Standard with the new I-SEM methodology[1].

Least Worst Regret Analysis

[1] We assume that the large difference between the figure in the consultation (8012MW) and the figure derived from the GCS (9066MW) is a result of locational issues (constraints). If so, this would allow the RAs to calculate the requirement for non-CRM locational energy and services in order to price them separately and appropriately

As shown in the CRM workshop, customers face an asymmetric regret cost profile under the I-SEM CRM:



In an oversupplied system, running a Least Worst Regrets Scenario that uses a net CONE value will systemically under procure plant at the margin because the TSO is forced to assume that existing plant at the offer cap is unavailable. In a system with a substantial capacity overhang, this could be very expensive for customers as when existing plant receives a clear exit signal, it will no longer be available in subsequent auctions or delivery years. If demand growth turns out to be greater than expected, customers may have to procure new plant at a higher cost or pay scarcity rents.

SSE would suggest that a simple refinement is made to the approach whereby the offer cap is used rather than net CONE to value the excess capacity cost if:

$$\textit{Prequalifying MW of Existing Plant subject to the Offer Cap} > \textit{Central Capacity Requirement}$$

Operating Reserve

With regard to Operating Reserve, we are unsure why the TSO has selected a value of 444MW given that this is an unconstrained capacity mechanism. The largest single infeed for the Irish system is unlikely to be subject to firm access restrictions during scarcity events, so the TSO will need sufficient headroom to cover it.

The correct addition for Operating Reserve should correspond to the largest single infeed, rather than the largest single firm access connection.

Capacity De-Rating

Tolerance Bands

While we agree with the selection of zero tolerance bands for go-live, the paper notes that the basis for removing the tolerance bands is that:

"The technology groupings proposed by the TSOs for determination of De-Rating Factors are such that the "legitimate technical variation" between plant within each grouping is very limited."

This is unsupported by the TSOs paper, **given that the steam turbine categorisation includes units with very different fuel types, mechanical characteristics and historical availability data**. In fact, the TSO states that:

*"In determining a proposed set of technology categories a range of alternative groupings were considered. **The selected approach was adopted as it provides a reasonable trade-off between homogeneity of units and sample size**. The homogeneity of units is reflected by grouping them based on their primary turbine technology (gas, steam, water, wind) or as demand response or storage units."*

We think that the primary reason zero tolerance bands should be selected for I-SEM go-live is in order to ensure consistency between the Capacity Requirement Methodology and De-Rating methodology. As the TSO is selecting a system portfolio to meet an 8 hour Reliability Standard, giving individual generator units a tolerance band could give participants discretion to force the TSO to either over or under procure total system capacity.

Given the focus on market power mitigation within the CRM workstream, we believe that a zero tolerance band is a better fit for the selected Capacity Requirement methodology. Some downward discretion against a central de-rating is available to generators through capacity offer data (subject to the offer cap) and secondary trading. However, zero tolerance bands also require improvement in the technology groupings in order to better capture the real characteristics of units.

Technology Groupings

As previously stated, the technology groupings have been selected for one primary reason by the TSO:

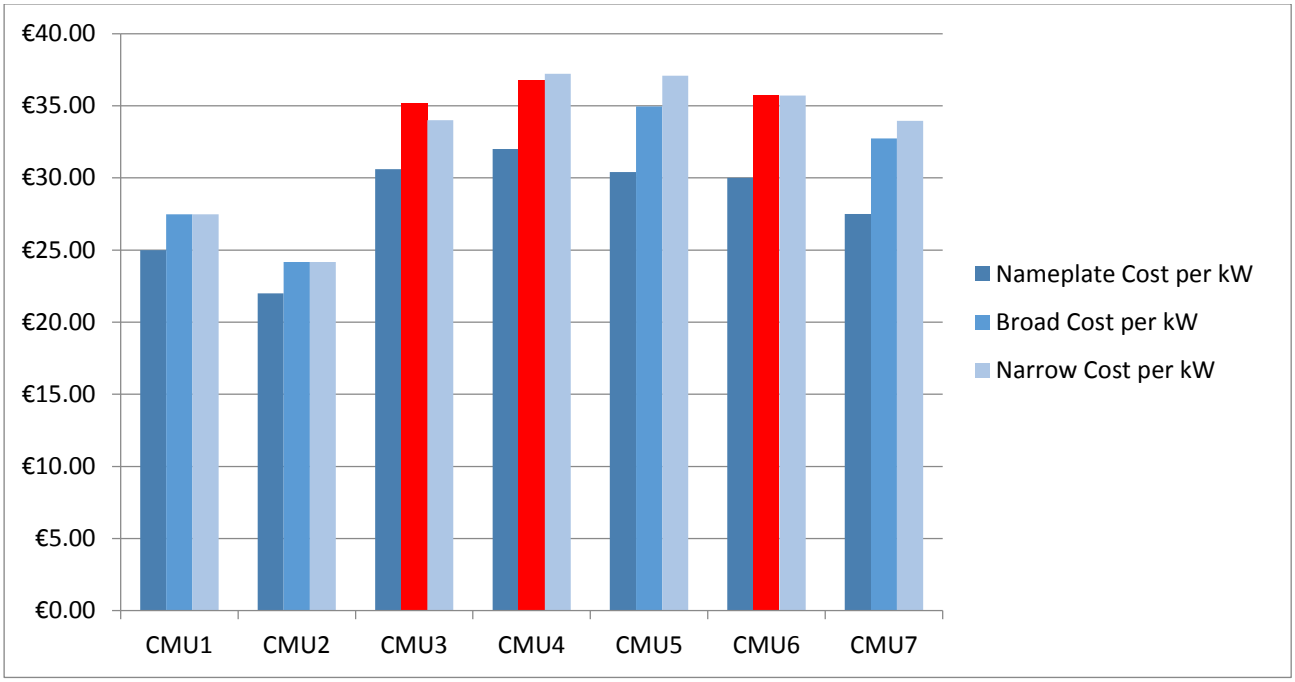
[A]veraging serves to make the data more consistent, smoothing out random variability within a technology category, and making the data more stable between auctions.

This is an important design choice that we do not think the SEM Committee has adequately considered – aggressive averaging inherently degrades the Reliability Standard. We have used a stylized example below to illustrate this. Some sample de-ratings for the different CMUs are below:

Capacity Market Unit	Broad De-Rating (Aggressive Averaging)	Narrow De-Rating (Accurate Averaging)
CMU1	91%	91%
CMU2	91%	91%
CMU3	87%	90%
CMU4	87%	86%
CMU5	87%	82%

CMU6	84%	84%
CMU7	84%	81%

When you run the auction, both the allocation and pricing of Reliability Options are distorted. Under an aggressive approach, where the TSO has to select 4 CMUs, the TSO will allocate contracts to CMU 1, 2, 5 and 7, rejecting offers from CMU 3, 4 and 6.



In this stylized example, by favouring year on year stability rather than accuracy of data, the TSO has effectively selected a portfolio with a reliability of 86.5% rather than 88.25%. The clearing price is also higher with the TSO paying an additional ~€1 per kW[2] for the less reliable portfolio. With the exit signal generated for the remaining units, the TSO is subsequently locked into a less reliable portfolio for future auctions too.

Given that the TSO retains some discretion under the Sloping Demand Curve, they may be tempted to bolster the Reliability Standard by procuring additional plant – contracting with CMU 3 regardless of the fact that it was given an exit signal through the auction run with an 8 hour LOLE standard.

Averaging may be justified if the data available in the selected historical time period for a technology category exhibits substantial volatility, but the TSO has not attempted to produce evidence demonstrating this. In particular, we are concerned that the 'Steam Turbine' category is very broad – the very different HFO, Distillate, Coal, Peat and Biomass units are all combined in a category that covers 3321MW of generation.

In contrast, to recognise the very different fuel types, mechanical characteristics and historical availability data National Grid split these technologies out into the following categories:

[2] This would be an additional €8,000,000 cost across a ~8000MW Capacity Requirement

	GB De-Rating
Oil Steam Turbine	85.44%
OCGT and Recip Engine	94.77%
Hydro	86.16%
Storage	96.29%
CCGT	90.00%
CHP	90.00%
Coal & Biomass	86.92%

This illustrates the wide range of availability within this category. The EirGrid methodology attempts this through differential de-ratings by unit size, but this is imprecise – the correlation between availability and fuel types/mechanical characteristics is stronger than correlation between availability and unit size.

The RAs should ensure that EirGrid clearly justify their aggressive averaging approach for the Steam Turbine category in the final methodology. We believe that a more precise set of technology groupings derived from Steam Turbine and Gas Turbine categories is both possible and preferable – it also supports the selection of 0% tolerance bands.

Interconnector De-Rating

The two I-SEM/GB interconnectors are unique capacity units in that they:

- Are economically regulated rather than merchant assets;
- Are able to both produce and consume energy;
- Depend on underlying supply and consumption units response to price signals;
- Share technical characteristics with transmission lines rather than generators;

Furthermore, in I-SEM, they receive unique treatment – while they receive the same price for capacity as other units they are not subject to the same penalty regime. The quantity of Reliability Option that suppliers end up paying for from interconnectors will provide them with a very limited, rather than absolute price hedge – ultimately, a different product.

It is very important for the RAs to get the de-rating of these units right – if the methodology is too aggressive, customers will be forced to pay double for capacity, through both scarcity premiums and reliability option fees. Other economic regulators have recognised the unique nature of interconnectors and adopted a conservative approach to de-rating by:

- Applying a range of methodologies
- Applying conservative assumptions
- Testing multiple operational scenarios

While we think that the ESP Consulting paper has produced a strong central methodology[3], we are concerned that it incorporates aggressive assumptions about interconnector and

[3] We recognise that the use of a GB/SEM flow based methodology is problematic during the transition to I-SEM

market performance, does not produce a conservative range of outcomes and does not fully test realistic scenarios. In turn:

Conservative Assumptions

Market Coupling

The paper states that:

"Otherwise, it has been assumed, in line with the current interconnector agreements, ***which at times of scarcity in the I-SEM energy will flow across the interconnector unless there is simultaneous scarcity in GB.*** *It is assumed that the scarcity pricing being implemented in the I-SEM will also provide suitable economic signals for such flow: however, the full detail of scarcity pricing is part of the Parameters Consultation process which has not yet been published"*

"Given the above, the RAs do not intend reducing the de-rating factor for the interconnectors to try and capture those rare events where a GB unit, priced above the RO strike price, sets the price for an I-SEM trade at a time when the interconnector is exporting."

This is a very aggressive series of performance assumptions that ignores the differences between the I-SEM and GB balancing arrangements[4] and assumes that the interconnectors are effectively the most flexible capacity providing units[5] available. If these assumptions were true, the interconnectors would be subject to parity with other CMUs under the penalty arrangements. Unfortunately they are not, and the assumptions are therefore over-simplifying interconnector operation and over-stating their capacity contribution.

We believe that the methodology must incorporate a discount that accounts for inevitable market and TSO dispatch inefficiency that characterises the actual participation of cross-border transmission lines in resolving scarcity.

Historical Performance

The second aggressive assumption is that:

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[4] I-SEM has five minute imbalance pricing periods in which administered scarcity pricing can be automatically triggered and contribute to 30 minute imbalance settlement periods. BETTA has 30 minute imbalance pricing periods in which administered scarcity pricing can only be triggered if a system warning is issued.

BETTA also applies pay-as-bid pricing which incorporates any expectations of scarcity rent whereas I-SEM has a uniform clearing price which incentivises SRMC bidding.

GB generators can also move their units around without transacting in physical markets – they are not dependent on the timings and delivery periods of intraday auctions to change their unit positions. I-SEM generators are.

Finally, GB generators have not foregone their scarcity rent under the GB Capacity Arrangements. Many I-SEM generators contracted through Reliability Options have.

[5] As the Interconnector Owners would explain, the flexibility of the interconnectors can only mirror that of the underlying generation units on the neighbouring system and the cooperation of the neighbouring TSO, with a slight lag.

"The small number of interconnectors (2) and the limited history, including a very long term outage on Moyle, necessitates some minor variation to the standard methodology applied to conventional generator units."

This effectively means that interconnectors will be subject to a different penalty regime and a radically different capacity assessment regime – we cannot see any reason why actual historical outages should not be incorporated into the assessment of interconnector units. Other generation units have similarly small unit portfolios and similarly limited history – they have not received positive discrimination under the TSO methodology.

The current outage on EWIC and the extended return to service time should adequately illustrate the reason for selecting a consistent methodology that does not dismiss actual availability data. As previously stated, interconnector units are not generation units – they more closely share the technical and operational characteristics of transmission lines – **dismissing the data that illustrates this will inevitably overstate their contribution to the Reliability Standard.**

Conservative Methodologies and Scenarios

The unique characteristics and treatment of interconnectors mean that the RAs should apply conservative methodologies and scenarios to derive a range of interconnector de-ratings. While the methodology outlined by ESP Consulting is comprehensive, the only way to produce a range from it is to introduce multiple scenarios. We believe that the most conservative scenario should then be selected.

SSE would note that the sensitivity results on page 28/29 of the report illustrate the close dependence on GB capacity margin. We believe that the National Grid FES being used as an input to the GB supply function may not be giving an accurate picture of the actual de-rated margin available to the I-SEM because it doesn't clearly account for:

- Contingency Balancing Services like the SBR and DSBR contracts[6]
- Transmission Constraint Management Services[7]
- Ancillary Service Contracts[8]

As National Grid note, their current de-rated capacity margin:

"[I]ncludes the contingency balancing reserve services that we procured for the winter, following the conclusion of the SBR tender on 30 November 2015. If we had not procured these services, the de-rated capacity margin for winter 2016/17 would have been 0.1%, with a LOLE of 13.7 hours/year."

The RAs cannot assume any access to these contingency balancing reserve services procured by National Grid on behalf of GB consumers in their methodology – they should only be assuming access to in-market units. The final methodology should fully account for in and out of market units in GB, including all those with contracts that restrict running or those, like DSBR/SBR that trigger scarcity pricing if activated.

[6] In the Winter 2016/17 outlook, these account for 3.5GW of system margin
[7] Unit potentially restricted from market running to meet locational requirements
[8] Unit potentially restricted from market running to meet system requirements