



**Response by Energia to SEM Committee
Consultation Paper SEM-16-051**

***I-SEM Capacity Requirement and De-Rating Factor
Methodology Detailed Design Consultation Paper***

5 October 2016

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1. Introduction

This document sets out Energia's comments in response to the Consultation Paper on the I-SEM Capacity Requirement and De-Rating Factor Methodology dated 23 August 2016 ("the Consultation Paper")¹, including answers to the questions posed within that paper and observations from the industry workshop in Dundalk on 29 September. Energia would be happy to answer any questions about this response, should the regulatory authorities (RAs) require any clarification of our comments.

Energia wishes to endorse the Electricity Association of Ireland's (EAI) submission to the Consultation Paper and would particularly note the estimated shortfall reported therein of c1,066MW to meet the 8hr LOLE standard (before any uplift for operational reserves), based upon a reconciliation of the latest Generation Capacity Statement (GCS) and the indicative capacity requirement proposed in the Consultation Paper. This substantial discrepancy raises fundamental questions about the accuracy of the proposed methodology in the Consultation Paper, which risks significantly understating the capacity requirement and therefore threatens security of supply given the binary nature of exit signals generated under the I-SEM capacity mechanism.

In support of this response, we submit a Memo from NERA (the "NERA Memo")², giving an independent expert assessment of the interconnector de-rating methodology produced by ESP Consulting. The NERA Memo constitutes an integral part of this response and should therefore be read in full by the RAs. However, it is worth noting here the summary of its key findings³:

- *"[T]he level of detail in the Consultation paper makes it difficult for market participants to appraise its results;*
- *ESP's assumptions about how power flows will respond to the relative supply and demand balance in BETTA and I-SEM overstate the availability of the Moyle interconnector and EWIC;*
- *ESP's approach understates the frequency of scarcity events in Ireland and GB because it incorrectly assumes that wind and temperatures are uncorrelated at peak times;*
- *ESP relies upon a supply and demand forecast that is not a reliable basis for forecasting scarcity in GB; and*
- *ESP is overstating the availability of the interconnectors at time of system scarcity in Ireland, by excluding periods of prolonged outages on the Moyle interconnector and EWIC".*

Energia therefore recommends a re-evaluation of ESP's interconnector de-rating methodology and its assumptions with a view to producing a less optimistic and more conservative view of the security of supply contribution from interconnectors in I-SEM.

¹ Consultation Paper "Capacity Requirement and De-Rating Factor Methodology Detailed Design", SEM-16-051, 23 August 2016.

² NERA Memo (2016), "Derating Methodologies for Interconnectors: I-SEM", 5 October 2016.

³ NERA Memo, page 1.

The remainder of this response is structured as follows. Section 2 provide general comments considering, inter alia, some of the key risks and uncertainties to consumers and security of supply moving from the scheme we have today to the new capacity regime under I-SEM. This establishes the context within which Energia responds briefly in section 3 to the questions in the Consultation Paper.

2. General Comments

2.1 Concerns about an 8 hour security standard in I-SEM

The SEM Committee has decided to adopt an 8 hour LOLE security standard for I-SEM notwithstanding the evidence based concerns raised by respondents to CRM Consultation 1 (SEM-15-044) and the clear preference of the TSOs for a tighter security standard, consistent with GB and France⁴.

The security standard chosen has far more significant implications in I-SEM than it does in SEM because it directly determines the volume of capacity procured through the capacity auction and sends a sharp exit signal to any units that fail to clear the auction – i.e. sets their capacity revenue to zero. In SEM this effect is dampened because the mechanism reduces the capacity payment received by each generator as available capacity increases. Therefore, if you set an 8 hour security standard under the I-SEM CRM design, *assuming your assumptions are accurate*, you will get an 8 hour security standard on average. If your assumptions prove inaccurate – e.g. you underestimate demand or take an overly optimistic view of the contribution of interconnectors to capacity adequacy – the achieved security standard will be lower than 8 hours.

This represents a significant departure from the status quo where consumers and businesses on the island of Ireland have become accustomed to a high standard of reliability in supply despite an official lower security standard. This is partly due to the current capacity mechanism, which adjusts capacity revenues based upon the level of available capacity socialising the increase or decrease in payments but does not deliver a binary exit signal. The all-island market also has a track record of paying for an 8 hour LOLE standard but then achieving a tighter standard through other means, including “out of market” contracts to account for issues such as localised system constraints. Furthermore, Northern Ireland’s tighter security standard of 4.9 hours LOLE necessarily means that the all-island reliability is better than 8 hours. A detailed validation of these points is provided by Poyry in their June 2015 report for EAI previously submitted to the RAs⁵.

As Poyry state “...it is not realistic that the all-island unconstrained GSS could drop below 4.9 hours at equilibrium”. Even when the Northern Ireland standard of 4.9 hours lost load was exceeded by more than 200MW in the

⁴ EirGrid and SONI point out in their June 2015 report to the SEM Committee, “As Ireland and Northern Ireland are already using similar assessment methodologies to those used in Great Britain and France, applying a coordinated regional generation adequacy standard is arguably a prudent next step ...DECC has selected an adequacy standard of 3 hours LOLE to be used in Great Britain. France also uses an adequacy standard of 3 Hours LOLE”.

⁵ Poyry Management Consulting, June 2015, ‘Review of Consultation on Proposed Annual Capacity Payment Sum for 2016’.

2014 GAR a market intervention was initiated to ensure greater security of supply resulting in the award of a 3 year capacity contract to AES. Poyry conclude that *“[o]n average a significantly more cautious approach to system security appears preferred such that the average targeted LOLE across years is materially less than the GSS [all-island Generation Security Standard of 8 hours LOLE]”*⁶.

The analysis interpreted in SEM-15-044 justifying no change to the security standard from its current level of 8 Hours LOLE is therefore invalid unless the system operators are prepared to apply the standard and put in place system operation protocols consistent with this. In practice this would result in:

- a) Customer in NI and ROI being subjected to a significantly lower standard of reliability in supply than they currently experience; and
- b) Customers in Ireland being disconnected before customers in Northern Ireland (as implied by a 4.9 hour standard in NI).

Furthermore, as Poyry have noted, *“[g]iven the ‘blocky’ nature of power sector investments, periods with much greater than 8 hours LOLE would be needed to balance out the greater levels of security provided by the entry into the market of large generating sets in order to achieve an average of 8 hours LOLE”*.⁷

However, Poyry find no evidence consistent with the above being applied in practice. *“Rather, each individual year appears to be assessed individually, with interventions targeted at any year where a deficit is projected. As such years of deficit would most likely be required to deliver an average LOLE of 8 hours, we conclude that the average LOLE across years is likely to be materially less than the GSS”*.⁸

The TSOs are also concerned about the 8 hour security standard under I-SEM and are requesting inclusion of reserves in the capacity requirement, which we support.

*“While not a feature of the current approach in the CPM, the inclusion of a provision for reserve in the new capacity requirement methodology in our view is an important consideration. In the context of the new Capacity Market, only capacity providers that clear in the auction will receive capacity payments (unlike the current mechanism where all eligible available capacity is remunerated). In tandem with the increased role of system services, setting the capacity requirement at a level that ensures a secure system is of greater importance.”*⁹

Adopting an 8 hour LOLE standard furthermore implies a “constrained” LOLE expectation that is materially greater than 8 hours. This is clearly not acceptable to the TSOs given the highly constrained nature of the all-island system which gives rise to the significant risk of inappropriate exit and that is

⁶ Ibid, page 8.

⁷ Poyry Management Consulting, June 2015, ‘Review of Consultation on Proposed Annual Capacity Payment Sum for 2016’, page 8.

⁸ Poyry Management Consulting, June 2015, ‘Review of Consultation on Proposed Annual Capacity Payment Sum for 2016’, pages 8-9.

⁹ EirGrid (2016), ‘I-SEM Capacity Remuneration Mechanism: Proposed Methodology for the Calculation of the Capacity Requirement and De-rating Factors’, 22 August 2016, page 15.

identified by the TSOs to be an enduring problem and not just transitional in nature.

*“[A] CRM auction result that satisfies the de-rated capacity requirement will not necessarily allow the TSOs to operate the power system within its operational limits while still satisfying the LOLE standard.”...[T]he loss of load expectation could be higher than predicted if the theoretical available capacity from a portfolio of generators cannot be delivered due to transmission or security limitations”.*¹⁰

The RAs have consulted separately on how best to address the risk of inappropriate exit (and we have responded to this) but this problem cannot be divorced from the important issues under consideration in the current Consultation Paper. Namely, if an overly optimistic view is taken with regards to fundamental assumptions underpinning the calculation of the capacity requirement – e.g. the security of supply contribution from interconnectors – this will further exacerbate the already significant locational issues problem acknowledged by the SEMC and result in the additional de-selection of plant needed for system security via the capacity auction.

In light of the above, and the decision to adopt a security standard which is worse than other markets (i.e. 8 hours versus 3 hours), it would seem prudent to adopt a more conservative approach when estimating both the capacity requirement for I-SEM and the security of supply contribution from interconnectors (which, as evidenced by the process undergone in GB, is notoriously difficult to accurately quantify). The need to be prudent is further underlined by the significant uncertainties associated with the introduction of new market arrangements in not just capacity, but also energy and ancillary services, under the I-SEM and DS3 programmes. In the face of such radical and comprehensive market change being implemented within the context of such a small and highly constrained market, the potential risks to security of supply are significant. The costs of over-procuring capacity therefore need to be carefully weighed against the costs of under-procuring capacity, recognising, as the TSOs have pointed out at the workshop on 29 September that under-procurement leads to very high costs, and will result in frequent load shedding, which will be more acute in a small system. To mitigate the risk to security of supply (which, for example, could more easily arise at a local level), and the widespread reputational damage that would result, it would therefore seem prudent to employ a degree of conservatism in assumptions, which can be revisited after I-SEM go-live once there is operational experience of the new market arrangements. Overly optimistic assumptions, on the other hand, have a high regret cost that cannot be easily remedied.

2.2 Risk of overstating security of supply contribution from interconnectors

Under the I-SEM capacity market design, interconnectors that secure capacity contracts effectively displace domestic alternatives. They therefore displace one form of ‘capacity’ with another rather than adding an additional layer of

¹⁰ EirGrid (2016), ‘I-SEM Capacity Remuneration Mechanism: Proposed Methodology for the Calculation of the Capacity Requirement and De-rating Factors’, 22 August 2016, page 36.

security. Given that the availability of interconnectors is influenced by very different factors than domestic generation, this replacement may actually reduce overall system resilience, at a very high cost.

The extent to which interconnection could be relied upon in an all-island stress event is statistically more complex to calculate than for domestic generators, for which historic data gives a relatively reliable indication of availability. If, for example, an I-SEM stress event was triggered by cold weather and low wind speed, there is a higher than average probability that GB would also be experiencing cold weather and low wind speed, potentially leading to higher prices in GB and no interconnector flows to I-SEM at the very time they were most needed.

Over the longer term, changes in energy policy or other unanticipated events could also result in I-SEM being less able to rely on GB for imports during scarcity events. This would result in a pressing need to rapidly replace domestic capacity as the de-rating factors applied to interconnectors are revised downwards. Forcing the TSO to act as a distressed buyer of capacity will not deliver optimal outcomes for consumers over the long term

While none of these events can be predicted with any certainty, it is the mere possibility of their occurrence that makes the estimation of interconnector de-rating factors a difficult and risky endeavour in a way that is not the case for domestic generation. A conservative approach to de-rating interconnectors is therefore warranted, especially when, as acknowledged by ESP at the workshop on 29 September, the methodology employed “*relies on a range of estimations, simplifications and a view of the future*”¹¹.

Another important consideration is that interconnector owners in I-SEM do not have to make difference payments on the same basis as other holders of ROs, but still receive the same capacity payment – i.e. their participation is “availability based” as opposed to the “performance based” approach that applies to other capacity providers and therefore they face lower commercial risk. This is clearly tantamount to unfair discrimination but also exacerbates the ‘hole-in-the-hedge’ problem associated with ROs in I-SEM¹². This further underscores the importance of ensuring that the de-rating factors applied to interconnectors are not overstated.

Notwithstanding the need for conservatism due to the factors outlined above, the ESP analysis tends to over-state interconnector capacity, as explained and evidenced in the NERA Memo. In summary,

“[ESP’s] assumptions about how power will flow during periods of individual or coincidental scarcity in the I-SEM and BETTA... tend to overstate the likely contribution of interconnectors to meeting scarcity within the I-SEM”.

[NERA Memo, p2]

¹¹ SEM-16-058b, ‘CRM Workshop – Interconnector De-rating Methodology’, 29 September 2016, slide 16.

¹² The ‘hole-in-the-hedge’ under ROs is a major issue. To maintain a 100% hedge level on the demand side (suppliers) consumers will have to fund any shortfall in payments between revenues collected from RO contracted capacity and difference payments made to suppliers (e.g. due to ineligibility, out of contract generation, interconnector exemptions, etc.). This effectively removes the cap on consumer prices provided by ROs, undermining one of the original perceived benefits of this mechanism.

This contrasts with GB which adopted a significantly more conservative philosophy to de-rating interconnectors, producing a range of de-rating estimates based on different methodologies. The process was subject to oversight from a Panel of Technical Experts (PTE) and Ofgem, and explicitly took into account transmission constraints and the evolving trading arrangements in I-SEM¹³. It also expressly recognised if there were reported concerns about the security of supply outlook in connected markets¹⁴.

The optimistic approach taken in I-SEM by comparison is highly imprudent given that interconnector capacity into I-SEM represents a much larger proportion of peak demand than in GB where the aggregate interconnector capacity represents a much smaller proportion, and GB interconnectors interconnect to a number of countries¹⁵.

Furthermore, it is imperative that the de-rating of interconnectors is informed by robust analysis and conservative assumptions with the objective of estimating a prudent range of de-rating factors for future and existing interconnectors, taking into account the risk of protracted interconnector outages, as exemplified by the historic forced outages on the Moyle interconnector, and the more recent experiences of forced outages on EWIC, which is currently on a 6 month forced outage over the peak winter period until the end of February 2017. As NERA observe:

Given the relatively small size of the Irish market and the combined nameplate capacity of 950MW for Moyle and EWIC, excluding prolonged outages when assessing interconnector availability would impose a even bigger risk for security of supply than in Great Britain. It would therefore be wise for the SEM Committee to be at least as prudent in setting the de-rating factors for the interconnectors as DECC has in Great Britain, by allowing for long term outages. [NERA Memo, p8]

It is also important to properly consider that the direction of flows on interconnectors is not simply determined by the likelihood of a system stress event in interconnected markets, as has been assumed by ESP, but also depends upon the relative price differential that will apply between I-SEM and BETTA at such times (e.g. the relative levels of administered scarcity pricing) and the effectiveness of the market coupling arrangements.

Energia would observe that the efficiency of market coupling is highly questionable under the interim intra-day arrangements for I-SEM given the infrequency of intra-day auctions (there are only two auctions within day), the uncertainty regarding whether such auctions will be coupled with GB, and the fact the continuously traded intra-day market will be limited to I-SEM participants. Therefore trade in this market will not impact upon IC flows. The arrangements for cross border trade in the balancing timeframe are also

¹³ The PTE “advise[d] caution on the expected market response of Ireland to a stress event in GB until it is clear that the North-South interconnector will be built and commissioned on time and until the intraday trading arrangements between Ireland and GB are settled”. [EMR Panel of Technical Experts’ Final Report on National Grid’s Electricity Capacity Report, June 2016, paragraph 80].

¹⁴ DECC (February 2015), ‘Electricity Market Reform: Announcement of de-rating methodology for interconnectors in the Capacity Market’.

¹⁵ Peak demand in the all-island market is c7GW. The combined capacity of EWIC and Moyle comprises about 15 per cent of this but less than 2% of GB’s peak demand.

unclear. SO-SO trading to deliver appropriate flows at times of scarcity cannot be relied upon given uncertainty in relation to relative VOLL pricing and is unclear in practice if National Grid would actually schedule a flow into I-SEM if this also threatened security of supply in GB.

A conservative de-rating of interconnectors is therefore required because:

- Their availability is less predictable than for other forms of capacity (being governed by a wider range of factors, including network characteristics);
- The predicted direction of interconnector flows during system stress events is highly unpredictable, and subject to market arrangements, with the potential for exports adding to demand during such events;
- Interconnectors into I-SEM represent a relatively high proportion of peak demand (which should also be considered in the context of a system with a high penetration of wind); and
- GB is facing scarcity over the coming years and should therefore be considered a less reliable source of imports, as evidenced by increasing exports from SEM to GB over recent months and recent price spikes in GB of £1,000/MWh.

It should also be noted that the consequences of overestimating the capacity contribution of the I-SEM interconnectors would be that:

- Interconnector capacity distorts the cross-border capacity market to the detriment of other capacity providers and to the detriment of security of supply; and
- Remuneration for over-stated availability would represent a subsidy towards the inefficient construction of interconnection which makes little contribution to system security.

If GB judged the risk to security of supply to be sufficient to justify adopting a conservative approach to the de-rating of the all-island interconnectors it is unclear why I-SEM would not also take a conservative approach, at least initially until sufficient operational experience of the new market arrangements has been accrued.

Energia therefore recommends a re-evaluation of ESP's interconnector de-rating methodology and its assumptions with a view to producing a less optimistic and more conservative view of the security of supply contribution from interconnectors in I-SEM.

2.3 Comments on process

As a general, but important, comment on process, Energia would like to register its concern about the limited time of just 6 weeks in which to respond to this fundamentally important and technically complex Consultation Paper, which ran in parallel with an equally important policy consultation on Locational Issues with a deadline for responding of only 4 weeks, coupled with the ongoing intensive and overly compressed I-SEM rules development process. These contracted consultation timelines, which fall substantially short of the standard set by the Utility Regulator's (UR) own policy for

consultations of this nature and significance¹⁶, further demonstrates that the I-SEM timetable is unrealistic and is not conducive to meaningful stakeholder engagement. We did appreciate however efforts made by the RAs, TSOs and ESP to facilitate a better understanding of the current consultation proposals at the industry workshop on 29 September, notwithstanding the close proximity of this to the consultation deadline.

We note the SEM Committee's desire for evidence and quantitative analysis to support respondents' views. Energia has consistently provided evidence based responses and independent expert input to inform the decision making process, and the current response is no exception. However, it is important that the evidence submitted is fully analysed, understood and taken into account. It is not always clear this is the case based on the reasoning articulated in SEM Committee Decision papers.

At the same time, the SEM Committee should provide sufficient detail in consultation papers, including assumptions, evidence and quantitative analysis where appropriate, to explain and promote understanding of design options and their implications¹⁷. The TSO and ESP reports accompanying the current Consultation Paper do not provide sufficient information to enable a complete assessment and industry workshops, whilst most definitely welcome, cannot substitute for the level of detail required. This critique is borne out in the NERA Memo with respect to the interconnector de-rating methodology:

*“ESP has not provided the details of its calculations and has left several terms undefined. The Consultation does not provide any intermediate results, such as its coincident probabilities. These omissions make it difficult for market participants to review ESP's method or to assess the likely impact of ESP's assumptions”*¹⁸

Given the lack of transparency and sufficient detail in the ESP report; the need for further work identified in the TSO report¹⁹; and the parallel development of both methodologies which interact in important ways (as mentioned on 29 September); it would be appropriate to further consult when these issues are addressed and taking into account responses to this consultation.

¹⁶ See paragraph 5 of 'UR consultation standard', published 23 May 2013 which states that the UR “will set limits for the length of consultations:

- i. regulatory policy consultations, such as our consultation on the development of the retail energy market, will last for a minimum of 12 weeks;
- ii. more regulatory (non-public policy) consultations, such as in respect of price control decisions, will last a minimum of 8 weeks;
- iii. technical regulatory matters (for which prescriptive consultation times are stipulated by statute), such as those relating to the granting of a licence, will last a minimum of 4 weeks”

¹⁷ We would also observe where the RAs request evidence from respondents to justify a change in their proposals, but yet the RAs do not provide sufficient evidence to justify the proposals in the first place. For example, the RAs have provided no evidence to justify a proposed tolerance band of +-0% and have not explained their understanding of “legitimate technical variation” therefore it is unclear what evidence participants are being asked for to justify an alternative view of tolerance bands.

¹⁸ NERA Memo, page 2.

¹⁹ For example it states that the indicative results are calculated using a test version of the analysis tools and that further work is required during the consultation process to finalise the marginal de-rating approach to storage.

In response to CRM Consultation 3 (SEM-16-010), Energia emphasised the importance of the capacity mechanism being stable and predictable in order to provide incentives for efficient long term investment. We pointed out that arbitrary changes to the rules will undermine its ability to provide efficient incentives and increase regulatory risk. We argued that the scheme must therefore – from the very outset – comprise well defined rules for defining all its procedures and parameters, and for making any required subsequent changes to them, including (but not limited to):

- A commitment to transparency and consultation;
- The identification of a capacity requirement for each T-1 and T-4 auction;
- The conversion of this capacity requirement into a sloping demand curve, using public data on real plant sizes and costs to define the gradient;
- The de-rating of capacity and the definition of capacity for demand-side resources;
- The targeting of market power mitigation measures;
- The selection of the marginal bid and the derivation of the auction price for other (“inframarginal”) bids;
- The calculation of the RO Strike Price by reference to the total costs of the most expensive generator that could be required to run during a short-lived period of system stress;
- Definition of stop-loss limits;
- The definition of any price caps, including the calculation of Net CONE for the relevant type of plant (not in current conditions, but for the date of the auction in 1 to 4 years’ time).

Having previously made these representations, Energia is concerned that no commitment has yet been given to consult annually on the de-rating methodology/process, capacity requirement and definition of the demand curve for auctions. The key data input and assumptions to the de-rating and capacity requirement process should be consulted upon annually for upcoming T-4 and T-1 auctions. Without being exhaustive, key elements should include:

- a) Demand scenarios
- b) Selection of portfolios of capacity adequate generation
- c) Time period for historic outage data
- d) Categories for unit types
- e) Treatment for new unit types
- f) Value of VOLL
- g) Value of CONE

There should also be the opportunity for participants to comment upon and trigger reviews of the associated methodologies. Such an approach would allow for a regular reassessment to ensure the methodologies were appropriately managed and revised as operational experience of the new I-SEM capacity market (and wider market arrangements) becomes available.

3. List of Consultation Questions

Below we set out our response to the questions in the Consultation Paper. This should be read in conjunction with our general comments in section 2 above and the NERA Memo accompanying this response.

2.2.1 The SEM Committee welcomes views on all aspects of the methodology proposed and the historic and forecasts inputs used including:

A) The determination of Capacity Requirements;

As discussed in section 2.1 Energia would emphasise that the design of the I-SEM CRM will, subject to the accuracy of the assumptions employed to determine de-rating factors, the capacity requirement and other relevant parameters, only secure sufficient capacity to meet the security standard. To the extent that any assumptions employed in the methodology used to set the capacity standard prove overly optimistic compared to the actual situation that outturns a lower security standard than the 8 hours LOLE will be achieved. This results in an increased risk to security of supply under the CRM design that is further exacerbated by the small size of the market and the highly constrained nature of the power system. This has been clearly acknowledged by the SEMC in their recent consultation on locational issues.

It is within this context that Energia is raising its concerns regarding the assumptions being employed to determine the I-SEM security standard. In particular we are concerned that a number of the assumptions being employed will result in an under estimate of the capacity required to meet the security standard. Some of our main concerns include:

Inconsistency between the Capacity Requirement in the TSO De-rating Paper and the GCS

The capacity requirement stated in the TSO de-rating paper does not align with the capacity requirement indicated by the latest Generation Capacity Statement (GCS). Based upon a simple analysis of the 2017/18 capacity year (and assuming a 25%:75% ratio between GCS calendar years to adjust to the I-SEM capacity year) the stated capacity requirement in the TSO de-rating paper of 7,312MW, equating to 8,012MW of installed capacity, is c1,066MW less than the capacity requirement derived from the surplus capacity reported in the GCS. We would further note that if the figure presented in the TSO de-rating paper were adjusted to remove the reserve margin (the GCS makes no provision for the reserve margin) the discrepancy would be even greater than the figure reported above.

The difference in the capacity requirement figures in the TSO de-rating paper and the GCS seriously undermines confidence in the accuracy of the proposed methodology and, assuming the information in the GCS is accurate (as it is used for planning purposes), represents a serious risk to security of supply because of the digital exit signals that will be provided to generators under the I-SEM capacity mechanism (discussed in detail in section 2.1. above).

Setting VOLL

The outcomes of the least-worst regret analysis will be heavily influenced by the values set for VOLL. To the extent that VOLL is underestimated it will skew the outcome of the least-worst regret analysis toward under procurement of capacity. The process for setting of VOLL therefore needs to be robust and the costs must accurately reflect the actual value of lost load on the system to ensure the integrity of the least-worst regret analysis is not undermined and the correct capacity requirement is selected to ensure the required level of system security is achieved.

Application of a tolerance band when estimating Capacity Adequacy

The TSO paper indicates that a tolerance band is used when determining the capacity adequacy of a given generation portfolio.

“If the LOLE is within a set tolerance of the adequacy standard then the portfolio is accepted as capacity adequate”.

This would seem to suggest that the methodology employed does not strictly target an 8 hours LOLE and that a higher LOLE would be tolerated despite the delivery of a poorer security standard for customers. This seems imprudent given the risks to security of supply already highlighted throughout this response, particularly when one also considers the fact that less than the capacity requirement may actually be purchased at auction, subject to the parameters set for the demand curve. Energia therefore recommends the removal of this tolerance band and implementation of the 8 hour LOLE as a minimum requirement for a portfolio to be considered capacity adequate.

Use of Average Demand rather than Instantaneous Peak Demand

Energia is concerned that the average peak demand across either an hour (or half-hour) has been used rather than the instantaneous peak demand level, which will be higher than the average level, and that will need to be met to maintain system security. If the actual peak demand that needs to be met by the system is underestimated then the LOLE will be understated and consequently the capacity requirement will be set at too low a level.

Treatment of ‘Out-of-Market’ Generation

Care should be taken in the treatment of ‘out-of-market’ generation. Overestimating the contribution of ‘out-of-market’ generation will underestimate the capacity requirement. As the level of ‘out-of-market’ generation continues to increase the impact of any overestimation of its contribution to capacity adequacy will also increase, exacerbating the risk that the capacity requirement will be understated, and therefore increasing risks to security of supply. We note that there is a relationship between low temperatures, high demand and low wind generation levels, that means that application of a fixed profile or a flat reduction scaled by a wind capacity credit is likely to overestimate the contribution of de-minimus wind generation at

peak demand times resulting in an underestimate of the LOLE and therefore the Capacity requirement²⁰.

Potential change to de-minimus treatment

Potential change to the commercial treatment of de-minimus generation, currently under consultation, may result in some 'Out-of-Market' generation explicitly participating in the capacity market, or may result in slowed growth of de-minimus generation or even a decline in the level of 'out-of-market' generation. Any such change could lead to an overestimation in the forecast of 'out-of-market' generation and would result in a direct underestimation of the capacity requirement. This needs to be taken into account if a policy change, notwithstanding its highly negative impacts, is implemented in this area.

Treatment of 'In-Market' Wind

The treatment of 'In-Market' wind under the proposed methodology is subject to the same concerns as discussed in relation to de-minimus wind – i.e. the proposed approach is likely to overestimate the contribution from wind on peak demand days due to the relationship between low temperatures, high demand and low wind generation levels²¹. The proposed approach is likely to overestimate the contribution of 'In-Market' wind generation at peak demand times resulting in an underestimate of the LOLE and therefore the Capacity requirement.

Relevance of older Load Duration Profiles

Care should be taken to ensure that the proposed use of historic demand profiles from the period 2007 to 2014 does not skew results. This period encompasses a sharp economic downturn and is therefore less likely to be representative of future consumption and growth trends. Such factors could have an impact on the resulting LOLE estimates and therefore capacity requirement.

Approach to estimating Plant Availability

Energia has a number of concerns in relation to the approach taken to determining availability data for capacity market units. These are discussed in more detail below:

Use of Historical Data

The TSOs indicate concern that the historical availability characteristics of older, less efficient plant is unreliable, and will tend to be overstated, because the current capacity margin means that such units rarely operate. Nevertheless availability from retiring plant is used to calculate average availability for technology types, which therefore may skew the outcomes and lead to overly optimistic results.

Approach to New Technologies

²⁰ ESP acknowledge “[t]he tendency for wind to be lower than ‘expected’ at times of highest demand”, slide 16, Dundalk workshop presentation, 29 September 2016. However, the NERA Memo provides a much more detailed evidence based analysis of this trend.

²¹ See NERA Memo for details.

Applying the system average availability to new unproven technologies seems overly optimistic and could put security of supply at risk. Energia would recommend a more prudent approach where the system average acts as a maximum cap to availability for new unproven technologies with a qualitative assessment being carried out on a case by case basis, referencing experience of their operation in other markets if applicable.

Averaged Availability Statistics for Technology Categories

The TSOs state that using a run-hours weighted average forced outage rate *“has the advantage of reducing the contribution of units that have rare but very long outages, limiting the impact these have on the category weighting”*.²²

However, care should be taken to ensure that the risk to security of supply of prolonged outages in a given technology class, even if rare, are not underestimated; a case in point being the prolonged outage on the Moyle interconnector and the ongoing current prolonged outage on EWIC.²³ In a small system such as the I-SEM long forced outages increase the probability of scarcity. Therefore not appropriately reflecting such risks will result in underestimation of the capacity requirement and thereby risk security of supply for customers.

B) The treatment of operational reserves in the determination of Capacity Requirement;

As discussed in section 2.1 above, Energia supports the TSO’s recommendation to include operational reserves in the determination of the Capacity Requirement. Given the concerns articulated earlier in section 2.1, it would seem prudent to adopt this approach to ensure sufficient provision of reserves when it is most needed – i.e. at times of system stress.

However, we do not believe the quantum of operational reserves to be incorporated (i.e. 444MW) – based on the largest firm generation capacity – is correct when the largest infeed is EWIC at 500MW. Furthermore, non-firm capacity, including Great Island at 462MW, can complete in the I-SEM CRM.

C) The technology groupings;

The need for ‘adaptive’ rules

The technology categories proposed by the TSOs for de-rating purposes seem to be based on the characteristics of a particular technology. We suggest that there is a need for a more adaptable approach.

For example, developers might want to combine wind farms with other technologies (such as storage or solar PV) and then claim that they are able to provide guaranteed capacity at times of system stress. Rules defined for wind technologies would then be outdated and inadequate. A new rule for the technology of “wind+other technology” would be required. This rule would have to measure capacity contribution of such plant, taking into account the combined capacity of both technologies combined. ‘Adaptive’ rules would accommodate these factors by focusing on the likely ability of the plant to

²² Section 5.4 of the TSO’s report

²³ A case in point being the Moyle interconnector.

provide energy at times of system stress, based where possible on actual experience, rather than on the supposed characteristics of a particular technology. Consideration should also be given to facilitating the linkage of storage facilities and wind farms (or other intermittent generation) which is not located on the same site. The current market arrangements incentivises the location of storage facilities at the same site as the intermittent generation which may not be the optimum site for the storage (for example maintenance of remotely located plant and apparatus). If the same capacity / system service requirement can be achieved with the storage and generation assets geographically separated then this should be accommodated under “adaptive rules”.

DSUs and AGUs

The empirical analysis which has been completed by the TSOs in relation to average availability statistics is flawed. Before grouping demand side units and aggregated generating units into one category, the availability statistics for each, materially different technology, should have been assessed. This would have demonstrated that the availability of AGUs, running on gas or diesel, is significantly different from DSUs. AGUs are similar to conventional generators and have reasonably high availabilities. DSUs are completely different as they may or may not have generation and usually have no export capacity. Northern Ireland, in particular, has relied on diesel AGUs for many years, as part of its generation capacity as they make a material contribution to the NI generation portfolio. Diesel generators can also help alleviate short term localised generation capacity issues and therefore it is important to set the de-rating factor which reflects the performance reality of these units. DSUs and AGUs should not be grouped into one de-rating. This distinction has been recognised in other capacity markets and must be recognised in I-SEM.

New capacity – new category

In the case of new capacity that does not conform to the existing categories, generic, factual data, based on the performance of that technology in other markets should be used where possible rather than simply the system average outage rates. This would help to ensure the desired conservatism in setting the initial de-rating factors. Also see discussion on ‘adaptive’ rules above.

New capacity – new or existing category

It is proposed that if a new unit accepts a multiple-year reliability option contract the de-rating factor could be increased over time as actual performance data becomes available, but it cannot be decreased.

Energia supports the principle of grandfathering de-rating factors to reduce the perception of regulatory risk and to provide the conditions required to support investment. However, grandfathering should take the form of a right to maintain a fixed de-rating factor (capacity contract level) over an agreed duration of time, *subject to performance*.

To promote the efficiency of the CRM scheme we accept that a mechanism may be required that increases the de-rating (capacity contract level) of long term capacity holders. However this should be combined a mechanism

whereby the capacity market can readjust for under performance against benchmarks for long-term capacity contract holders.

Storage

It is stated on page 29 of the Consultation Paper that “[t]he marginal de-rating of storage units is complex... [and that] [f]urther work will be required during the consultation process to finalise the marginal de-rating approach to storage”. We assume that the proposed treatment of storage when finalised will be consulted upon.

D) Determination of the marginal de-rating curves;

An aggregate de-rating of wind is appropriate given its common fuel source and hence strong interdependence of availability²⁴. A generic de-rating for wind that does not distinguish by size class is also appropriate for similar reasons and is pragmatic given the unnecessary complexity that would be involved in trying to apply a more granular approach to wind de-rating.

We understand the rationale for the determination of marginal de-rating curves for other technologies but would caution that this approach may penalise (reward) reliable (less reliable) generators because of their size and hence diminish incentives to improve performance. This underlines the need for flexibility to adjust de-rating factors within a meaningful tolerance band above or below the relevant benchmark, as discussed further below.

E) The determination of Effective interconnector Capacity;

Energia’s views and concerns in relation to this question are discussed in detail in section 2.2 above and are evidenced in the accompanying NERA Memo. In summary:

- It is notoriously difficult to quantify the security of supply contribution from interconnectors with any precision or reliability.
- A conservative approach to de-rating interconnectors is therefore warranted, especially when, as acknowledged by ESP at the workshop on 29 September, the methodology employed “*relies on a range of estimations, simplifications and a view of the future*”²⁵.
- A conservative de-rating of interconnectors is required because:
 - Their availability is less predictable than for other forms of capacity (being governed by a wider range of factors, including network characteristics);
 - The predicted direction of interconnector flows during system stress events is highly unpredictable, with the potential for exports adding to demand during such events;
 - Interconnectors into I-SEM represent a relatively high proportion of peak demand (which should also be considered in the context of a system with a high penetration of wind); and
 - GB is facing scarcity over the coming years and should therefore be considered a less reliable source of imports, as evidenced for

²⁴ An exception that should be catered for however is when wind is combined with other technologies. We discussed this above in the context of providing adaptive rules.

²⁵ SEM-16-058b, ‘CRM Workshop – Interconnector De-rating Methodology’, 29 September 2016, slide 16.

example by increasing exports from SEM to GB over recent months and recent price spikes in GB of £1,000/MWh.

- Notwithstanding the need for conservatism, the ESP analysis tends to over-state interconnector capacity, as explained and evidenced in the NERA Memo.
- This contrasts with GB which adopted a more conservative philosophy to de-rating interconnectors.
- The optimistic approach taken in I-SEM by comparison is highly imprudent given that interconnectors into I-SEM represent a much larger proportion of peak demand than the total interconnection in GB, and GB interconnectors come from a wider range of countries.
- The consequences of overestimating the interconnectors' contribution would be that:
 - Interconnector capacity distorts the cross-border capacity market to the detriment of other capacity providers and to the detriment of security of supply; and
 - Remuneration for over-stated availability would represent a subsidy towards the inefficient construction of interconnection which makes little contribution to system security.
- To the extent that I-SEM interconnector capacity is overstated, this also exacerbates the 'hole-in-the-hedge' problem associated with ROs.
- We therefore recommend a re-evaluation of ESP's interconnector de-rating methodology and its assumptions with a view to producing a less optimistic and more conservative view of the security of supply contribution from interconnectors in I-SEM.
- It is imperative that the de-rating of interconnectors is informed by robust analysis and conservative assumptions with the objective of estimating a prudent range of de-rating factors for future and existing interconnectors taking into account:
 - The risk of protracted interconnector forced outages which should not be discounted, as exemplified by the historical experience of the Moyle's forced outage record and the more recent experience of EWIC which is currently on a 6 month forced outage until the end of February 2017.
 - The I-SEM interim intra-day arrangements will deliver limited, if any, effective market coupling²⁶ – i.e. the intra-day continuous market will be de-coupled, with no guarantee that cross-border intra-day auctions will be coupled (subject to discussions with GB power exchanges, National Grid and Ofgem).
 - SO-SO trading to deliver appropriate flows at times of scarcity cannot be relied upon given uncertainty in relation to relative VOLL pricing and is unclear in practice if National Grid would actually schedule a flow into I-SEM if this also threatened security of supply in GB.

²⁶ The PTE "advise[d] caution on the expected market response of Ireland to a stress event in GB until it is clear that the North-South interconnector will be built and commissioned on time and until the intraday trading arrangements between Ireland and GB are settled". [EMR Panel of Technical Experts' Final Report on National Grid's Electricity Capacity Report, June 2016, paragraph 80].

- If GB judged the risk to be sufficient to take a conservative approach in relation to de-rating of the all-island interconnectors it is unclear why I-SEM would not also, at least initially until operational experience has been accrued, take a conservative approach.
- F) The use of the TSO De-Rating Model in conjunction with the RA-determined values of Effective Interconnector Capacity and the outage rates for the interconnector Technology Class to determine the marginal de-rating factors to be applied to the interconnectors.**

The interaction between methodologies is unclear and there is a risk of circularity that is impossible to assess based on the information provided. (We note from the workshop on 29 September that the TSO and RA methodologies were determined in parallel, so inputs from the TSO methodology were estimated for the purposes of the consultation paper). More information and robust governance is therefore required, akin to the function of the Panel of Technical Experts in GB.

2.2.2 The Committee would particularly want to receive evidence supporting any alternative to the methodology proposed, where possible supported by quantitative analysis.

It has not been possible to undertake quantitative analysis supporting an alternative to the methodology proposed within the limited timelines of this consultation, especially when consulted in conjunction with other significant I-SEM consultations (e.g. Locational Issues) and in parallel with the I-SEM TS&C and CMC rules development process.

However, we have provided evidence in the NERA Memo in support of the concerns raised herein about the propensity for the proposed methodology to overstate the security of supply contribution from interconnectors.

3.2.1 The SEM Committee welcomes views on all aspects of this section [TOLERANCE BANDS] including:

Do respondents agree with the minded to decision to set the tolerance bands to zero?

No. This is not justified and effectively obviates the decision in SEM-15-103 to include a tolerance band, which must be greater than 0% by definition to have any meaning.

In response to CRM Consultation 1 (SEM-15-044), Energia recommended that a plant specific approach to de-rating should be adopted (with few qualified exceptions, e.g. for wind) to maintain incentives on CRM units to improve availability and therefore deliver a more efficient outcome for consumers²⁷. This argument was accepted by the SEM Committee in its subsequent Decision SEM-15-103

“4.7.21 The SEM Committee agrees that it is appropriate to have certain plant specific de-rating factors. In particular the SEM Committee is convinced by the following arguments:

²⁷ We also argued that this would ensure more equitable treatment for CRM participants given the reasonably large discrepancies in the performance of units within technology categories and the high concentration of the same technologies in the all-island market.

- *That it provides the right incentives for plant owners to invest to maintain or improve plant performance; ...*

4.3.30 *The SEM Committee has decided on the following principles:*

- *Existing dispatchable plant will need to bid within a tolerance band of the centrally determined de-rating factor for that plant... This band will be tight, and will not exceed the lower of:*
 - *A threshold as set periodically by the SEM Committee (e.g. +x%, -y%);*
 - *Variation that, is sufficient to encompass legitimate variations in the technical characteristics of relevant plant”.*

Setting the percentage tolerance bands to zero as proposed in the Consultation Paper, will effectively mute incentives on individual CRM participants to outperform their allocated benchmark, thereby creating a systemic inefficiency in the capacity market.

The inherent difficulties in setting an appropriate benchmark for each technology category should also be recognised in this context. If the benchmark is set on average historic performance, and historic performance has been poor, it may “lock in” that trend of underperformance. If it is set too high (based on aspiration) it may result in under procurement of capacity and increase costs for consumers, due to higher energy market prices and / or higher load shedding and hence VOLL costs. If the benchmark is set too low it results in the over procurement of capacity, again increasing costs for consumers, albeit at the much lower cost of CONE.

Energia therefore recommends that meaningful tolerance bands be reinstated as per the Decision made in SEM-15-103. The claimed justification for setting the tolerance band at +-0% at I-SEM go-live is entirely lacking substance or satisfactory explanation. It is simply stated in paragraph 3.1.3 of the Consultation Paper that “[t]he 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”. However it does not define what is meant by ‘legitimate technical variation’ and neither could this be explained at the industry workshop on 29 September. In our view, there is sufficient variation between the performance of units within technology categories to warrant a meaningful tolerance band.

How the banding is utilised must of course be robustly governed to ensure that only legitimate (i.e. objectively verifiable and clearly defined) de-rating above or below the central benchmark is applied.

3.2.2 The Committee would particularly want to receive evidence supporting any alternative view on tolerance bands, where possible supported by quantitative analysis.

In Decision paper SEM-15-103, the SEM Committee have clearly accepted the argument on the merits of plant specific de-rating for incentive reasons but, contrary to this, are now proposing that the tolerance bands be set at +-0% from I-SEM go-live on the basis of very limited “legitimate technical variation” between plant within each grouping.

We do not accept this poorly explained justification that is without substance in our view and therefore maintain that a meaningful tolerance band should be implemented. The RAs have provided no evidence to justify a proposed tolerance band of $\pm 0\%$ and have not explained their understanding of “legitimate technical variation” therefore it is unclear what evidence participants are being asked for to justify an alternative view of tolerance bands. However, we would be happy to discuss this further with the RAs with a view to providing evidence if required.