I-SEM
Capacity Requirement and De-Rating Factor Methodology
Detailed Design
Consultation Paper
SEM-16-051

Moyle Interconnector Ltd Response

General

Moyle Interconnector Ltd ('Moyle') welcomes the opportunity to review and comment on the Capacity Requirement and De-Rating Methodologies presented in these papers. The methods used to determine parameters associated with the CRM are critical in ensuring the success of the CRM in meeting its objectives, particularly in securing an appropriate quantity of capacity and in doing so in a cost-effective fashion.

As an interconnector owner, our primary focus is on the de-rating methodology that will apply to the interconnectors. However, we also offer remarks on other aspects.

A key theme in our response is that the accuracy of the outputs depends not just on the general approach, but also very much on the numbers that have been input to the model. Our own analysis suggests higher values for interconnector de-rating.

We note any approach to setting the capacity requirement and de-rating factors will be imperfect. What is required is a straightforward, fair approach that will provide the required remuneration, entry and exit signals.

Capacity Requirement

A. The determination of Capacity Requirement

We agree that the least worst regrets method is a generally satisfactory approach to setting the capacity requirement, using a portfolio of demand scenarios within the range determined in the Generation Capacity Statement and variations on today's available capacity. However, some aspects require special care to be taken:

- Application of net CONE as the cost of procuring more capacity than is required. In practice, with significant surplus capacity on the SEM system, the value of procuring excess capacity, at least in the early years of I-SEM, is likely to be very much lower than net CONE. We recommend that a lower metric is used, at least in the initial period, so that the costs of over-capacity are more realistically represented. This matters especially in a scenario of the style of 'Gone Green' (as in National Grid's Future Energy Scenarios), where required generating capacity starts to ramp up within a few years. Under that scenario if in the I-SEM CRM capacity requirement calculation the cost of procuring excess capacity was net CONE we should expect significant plant closures, before then needing to increase capacity that

genuinely requires net CONE investment a few years later, at greater cost to consumers. Rather, a more efficient scenario would be to accept a certain volume of excess capacity for some years before it was required. This suggests looking further forward than the T-4 delivery year. Setting a realistic cost of excess capacity in the least worst regrets method would also enable this approach. Should such a high demand scenario not result, excess plant would receive an exit signal through lower capacity payments and lower energy revenues over the medium term.

- We agree that for each demand scenario, the largest resulting de-rated capacity requirement should be selected, not least to ensure robustness against a range of possible auction outcomes, which might be affected by the 'lumpiness' and locational issues that are under consideration separately.

B. The treatment of operational reserves in the determination of Capacity Requirement

We agree with the TSOs that operational reserves should be included in the capacity requirement, since that operational reserve is a genuine need for available capacity. We do query the figure of 444 MW for the single largest infeed, since EWIC at least is operating to 500 MW and the paper states that 100% of largest single infeed is appropriate. We note that the enduring plan is for interaction between the CRM and the DS3 system services work streams.

De-Rating – General

C. The technology groupings

Our only comment on technology categories is to agree that interconnectors should be treated separately from generating units, due to their distinct attributes which include a dependency on energy from the interconnected market and scheduling that is explicitly determined by prices in the connected markets.

D. Determination of the marginal de-rating curves

We acknowledge the need for marginal de-rating curves, due to the different effect on the system that non-availability of different sizes of unit cause.

For interconnectors, we recommend further consideration of the multi-pole nature of the unit. For example, the Moyle Interconnector uses an arrangement of two separate poles, each of 250MW capability. A disturbance causing a trip of one pole will not automatically cause a trip of the second pole so will only result in a capacity reduction to 250MW.

Therefore, the approach used for interconnectors should reflect the size of the poles rather than the size of the whole unit, leading to a higher overall de-rating factor[1].

The multi-pole nature of Moyle is discussed further in section F, which considers outage rates, below.

[1] Moyle is currently limited to flowing 450MW and 410MW into Northern Ireland in Summer and Winter respectively. This means a single pole outage only causes a loss of 200MW or 160MW of capacity.

De-Rating - Interconnectors

E. The determination of Effective Interconnector Capacity

We are broadly content with the concept of analysing coincident scarcity in the interconnected market as a way to determine the effective capacity of an interconnector. However, some aspects do require comment and an adjusted approach.

- We agree that it is appropriate to exclude cases where cross border trade above the I-SEM strike price sets the I-SEM imbalance price, since we agree that such a scenario is very unlikely.
- In response to oral comment on intraday arrangements at the recent workshop, we note that the fundamental I-SEM design is that market coupling will be implemented. Since there will be day ahead and intraday coupling, there can be confidence that the interconnector will flow in the 'correct' direction. Risk is limited to occasions where multiple within day plant trips/outages cause scarcity, and where there was no evidence of reduced margin before the day ahead or intraday market coupling, while the cross border market is closed and the interconnector is flowing in the 'wrong' direction. If this unlikely scenario occurs the time until the market, and thus the interconnector, can respond will be limited and this is mitigated by the ability of the system operator to change the flow through countertrading. Furthermore, this risk will be effectively removed with the implementation of XBID and continuous cross border intraday trade.
- We note the sensitivity of interconnector de-rating to capacity in GB and observe that only the slow progression scenario from the FES was used in the analysis. Although the paper states that the FES scenarios are similar over the period, there is still a 6 GW spread with different mixes of generation[2], which would have a consequent effect on de-rating in I-SEM. With this in mind, we suggest that the least worst regrets analysis ought to be expanded to include a range of possible GB scenarios.
- While our comments above relate to the high level approach described in the paper, it is impossible fully to validate the approach without access to the model itself and its inputs.

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.

We note the SEM Committee's decision that interconnector de-rating should be based on suitable historic and forecast data. It is clear, as the SEM Committee has acknowledged, that historic data will not be representative of future interconnector flows.

Mutual Energy engaged Baringa Partners to carry out a similar analysis to that undertaken by ESP, primarily to support achieving a higher de-rating factor in the GB capacity market. This work looked at the correlation of capacity margins in the GB and SEM markets and also the demand, wind and 'demand net wind' correlations to determine how much the two markets could rely on interconnection at times of system stress. It reached similar conclusions to the ESP analysis but the results suggested a slightly higher 'effective capacity' than ESP. This may be because Baringa assumed a likely 'state of the world' rather than selecting the 'slow progression' FES to inform their GB capacity assumptions. We also note the ESP work used I-SEM peak demand as the input driver to

[2] Data from the 2016 FES for year 2020, volume of installed capacity.

GB demand, rather than temperature which was used for I-SEM. This sort of approach seems like it would introduce correlation bias that may not be there if, for example, GB temperature was the input driver. We note the statement 'the level of GB wind production was forecasting taking account of SEM wind production' also appears to suggest that forecasts for GB have not been carried out wholly independently.

It is not completely clear to us whether Moyle's long recent outages have been included in the analysis of availability. The RA's paper by ESP states that the outage was not included in the analysis, but at the workshop in Dundalk on 29th September, a comment was made that the outages had been considered. The Moyle FOR quoted in the paper of 9.8% is well in excess of Moyle's historic forced outage rate of <1% when the effect of the recent cable issues are stripped out.

While Moyle has experienced outages in recent years, it is clear that these are not representative of future availability. In the case of outages due to cable failures, these were due to a specific issue and the risk of further faults for the same reason has been eliminated through a project to lay new return cables, completed in 2016. The FOR figure quoted possibly includes outages due to works on the Scottish system which are scheduled outages (we are making this inference purely on the number and the statement that the recent cable faults were not included). In the case of outages on the Scottish Power network these have been in order to connect wind farms in Scotland and most recently in summer 2016 to replace the overhead lines. None of these events are indicative of Moyle's future availability as they are discrete planned events that are complete – Moyle has not been notified of any future work on the Scottish system that would affect its availability.

The key feature to bear in mind is the ability of a unit, in this case an interconnector, to be available (as opposed to delivering) to the level of its load following capacity obligation. For reasons of reliability interconnectors are typically designed with multiple independent poles, that is separate cable systems and AC/DC converter units. In this way an outage affecting one pole does not necessarily have any effect on operation of the second pole.

For example the Moyle Interconnector, which has a nominal 500 MW capacity, is a 2 x 250MW dual monopole design consisting of two separate (pairs of) 250 MW cables running between the stations, each of which host two parallel converter units. When Moyle experienced cable failures it is this arrangement that provided flexibility for reconfiguration to continue providing service using half the full nominal power on just one pole.

Further, in the case of Moyle a flow over 100 MW (not a fixed parameter) uses both live poles. In the event of an unscheduled outage affecting one pole, any flow below 250 MW will continue uninterrupted on the remaining pole. (Any flow above 250 MW will be curtailed to 250 MW.)

Similarly, maintenance is typically scheduled on a 'per pole' basis where this is possible, so that half of the nominal capacity remains available.

Therefore in order fully to consider the effect of an outage on the availability of Moyle to the level of its capacity obligation in the I-SEM CRM, one needs to consider how forced and scheduled outages have affected one or both poles, and how much capacity remains available, rather than a simple fully available/not available approach. It is not clear to us that the presented methodology takes this multi-pole arrangement into account.

In an example where a two pole interconnector received a de-rating factor of 70%, a forced outage of one pole would only affect the availability of the interconnector to deliver its load following obligation in periods when demand was more than 71% (50/70) of the capacity requirement. Even

then it would still be available at times of peak demand to deliver 71% of its obligation. While a single generating unit might either be fully available or out of service, a multi-pole interconnector can, in the event of an outage affecting one pole, remain available to a useful extent. While this example applies to Moyle, the principles may apply to other interconnectors also.

Bearing in mind the comments above, we do not recognise the data in the TSOs' paper for forced and scheduled outage data for Moyle. We suggest that a figure of less than 1% is appropriate for both forced and scheduled outages. We would be happy to engage with the TSOs' or the TSOs' consultants to more fully explore the reasons for the divergence of data on outage rates.

Tolerance Bands

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

Mandatory participation in the CRM and de-rating parameters set centrally mean that a unit has no flexibility to adjust its position in response to anticipated levels of availability, except for bidding itself out of the capacity auction altogether. Our view is that a unit should be able to opt-out of the CRM although we recognise the rationale for not allowing this. In any case, a degree of tolerance would provide some means for a unit to adjust its position based on its own information and, especially in the absence of other levers, tolerance bands should be implemented, not set to zero.

Other Comments

As an interconnector owner we have a keen interest in the capacity mechanisms not just of I-SEM but also the GB Capacity Market. It is our observation that in general arrangements in I-SEM are more complex than those in place in GB. While some additional consideration does need to be given to matters such as auction winner determination in a smaller, constrained system, other aspects such as calculating the load following capacity obligation for each ISP rather than setting it monthly in advance, add significant additional administrative complexity and participant risk to the I-SEM model. We encourage the SEM Committee to create, as far as possible simple, and transparent arrangements, with complexity and unmanageable risk only being introduced to address specific and pressing I-SEM concerns.

We stand by to provide further assistance to the RAs, TSOs and their consultants as they refine the de-rating process.