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RE: Forward Looking Transmission Loss Factors Consultation Issues Paper

ERM Power Limited (ERM Power) welcomes the opportunity to respond to the Australian Energy Market Operator's (AEMO) consultation on AEMO's Forward Looking Transmission Loss Factors Issues Paper (the Paper).

About ERM Power

ERM Power (ERM) is a subsidiary of Shell Energy Australia Pty Ltd (Shell Energy). ERM is one of Australia's leading commercial and industrial electricity retailers, providing large businesses with end to end energy management, from electricity retailing to integrated solutions that improve energy productivity. Market-leading customer satisfaction has fuelled ERM Power's growth, and today the Company is the second largest electricity provider to commercial businesses and industrials in Australia by load[1]. ERM also operates 662 megawatts of low emission, gas-fired peaking power stations in Western Australia and Queensland, supporting the industry's transition to renewables.

http://www.ermpower.com.au
https://www.shell.com.au/business-customers/shell-energy-australia.html

Load forecast data

The choice of time period on which the selection of the historical reference year for use as the input assumption for the target year in the forward looking loss factor (FLLF) methodology is in our view to a degree irrelevant in that altering the time period will have at best a minor impact on the accuracy of the calculated FLLF when compared to actual system losses at Dispatch.

Following selection of the reference year, the regional half hourly demand values are then subject to scaling to meet AEMO's regional maximum demand and energy consumption forecasts. In addition, significant variations in half hour demand outcomes between the scaled modelled reference year and actual demand outcomes in the target year have been generally observed. The practical reality is that there will always be a degree of inaccuracy associated with any forecasting process and its unclear that changing the time period for selection of the historical refence year would meaningfully improve this level of inherent inaccuracy. In our view, the accuracy of AEMO's forecast for regional maximum demands and energy consumption has a greater impact on the accuracy of modelled FLLF's compared to actual system losses, than the choice of reference year time period.

In addition, AEMO has indicated in the Paper that changing the time period from the latest full financial year to the latest full calendar year would add significant and ongoing costs to their process. Based on these facts, it is unclear to us that the proposed change is warranted.

[1] Based on ERM Power analysis of latest published information.

Controllable network element flow data

ERM Power agrees the current process, where flows across a market network service provider's (MNSP) network assets are considered as "invariant" from the reference year flow data in the methodology except in some limited circumstances, may lead to a degree on inaccuracy in the FLLF calculation. However, to date AEMO have provided no data which quantifies the level of inaccuracy due to this input assumption.

Basslink is currently the only MNSP in the National electricity Market (NEM). AEMO have proposed a change which would model Basslink as a series of loads and generators, Basslink would be adjusted in line with thermal generation at the same level in the supply and demand balancing hierarchy. No details have been provided in the Paper regarding the decision process to determine when Basslink would operate as a load, or a generator.

We recommend that prior to publication of the Draft Determination and Report, that AEMO provide additional details regarding their proposed process, including supporting analysis of the benefits and disbenefits of the proposed change. Stakeholders could then more thoroughly review the proposed change and offer supplementary comments to AEMO.

Generator capacities

The current methodology limits generator capacities during the summer period (1 November to 31 March) based on summer regional reference temperature conditions. As the FLLF methodology is based on AEMO's 50% probability of exceedance demand forecasts, the use of generator capacities based on the higher temperature regional reference temperatures artificially limits the capacity of generators that would be routinely available to supply demand on 95% of summer days.

AEMO in the 2020 Electricity Statement of Opportunity reliability forecasting methodology implemented a change to use a lower temperature threshold to represent the typical capacity of generators on all except the top 5% of summer demand days. AEMO has proposed that this typical summer capacity of generators be applied to all summer days in the FLLF calculation. ERM Power supports this change.

New generator profiles

The current methodology prescribes that generation profiles for new generating units are to be produced by scaling of the historical reference year data of similar technology generation. The current methodology also assumes the output of generators prior to their advised commercial operation date is zero, this excludes the impact of generator output during any commissioning period.

AEMO have observed that use of an output profile from an existing generator of a similar technology, for a new generator may not be a reasonable approximation of the new generator's output. AEMO also notes that AEMO's process as detailed in the Market Modelling Methodologies have been revised and as such the process used in the FLLF methodology no longer aligns with other AEMO modelling processes.

AEMO have proposed that the process for modelling the forecast output for new generation be changed to;

> Include a commission period profile based on generation technology
>
> The use of location specific wind and solar irradiance data to model output profiles for new wind and solar generators. This output data is then supplied to the relevant proponent for review and comment.
>
> For new thermal generators, hydro generators and storage (batteries and pumped hydro), AEMO will obtain forecast profiles from the relevant proponent.
>
> Where proponents provide AEMO with advice, or a generation profile is provided by a proponent, AEMO will perform an assessment to ensure the information provided is suitable.

ERM Power supports the proposed changes.

Minimum stable operation levels of thermal plant

We note AEMO's concern that the current methodology for the balancing of supply and demand in the FLLF calculation does not contain a mechanism to ensure thermal plant are operating at or above stable minimum load. With the forecast of future increases in low marginal cost variable renewable energy generation, thermal generation output may be reduced in the modelling to levels below the minimum stable operation levels. We also note that AEMO has advised that the current FLLF calculation engine does not have the capability to enforce minimum stable levels of generation and as such, any process to manage this would need to be performed outside the engine.

AEMO has proposed that a process be developed to allow this, however, no details have been provided to date regarding proposed amendments to the methodology. We recommend that prior to publication of the Draft Determination and Report that AEMO provide additional details regarding the proposed change. Stakeholders could then more thoroughly review the proposed change and offer supplementary comments to AEMO.

We note that AEMO has proposed that minimum stable generation levels that have been identified in the Input and Assumptions Workbook published as a supporting document to the ESOO be used in the FLLF calculation. We question the use of what would generally be rear looking estimates provided by consultants for this purpose and consider a better source of data would be by direct enquiry to the relevant registered participant to provide forward looking minimum stable generation levels for the target year.

Minimal extrapolation theory

The FLLF calculation process in calculating the output of individual generation sites to be used in the modelling has for many years relied on the use of a "minimal extrapolation theory", where the generation output for the target year is based on the individual generation sites output in the reference year, which is then subjected to the most minimal adjustment to achieve demand and supply balancing. Whilst this was reasonably successful in a NEM where little if any year on year supply side changes occurred, the NEM is experiencing rapid supply side changes and AEMO has questioned if the current minimal extrapolation theory remains fit for purpose.

AEMO has also advised that any revision to the supply and demand balancing process will require a revised FLLF calculation engine, or the development of a separate engine, and that AEMO does not anticipate that a viable alternative could be identified and implemented for the 2021-22 FLLF study.

We support AEMO's view that the current process requires review and believe that the current minimal extrapolation theory calculation process is no longer fit for purpose.

AEMO has proposed that either a revised minimal extrapolation theory process be implemented, or a more sophisticated supply and demand balancing process, based on short run marginal costs (SRMC) bidding be investigated. We consider that the second option may also allow for the easier implementation of minimum stable loads for thermal generation as part of the modelling process and remove the need for post FLLF modelling adjustments in this area.

We note AEMO currently employs SRMC modelling as part of the ISP and other regulated transmission investment test processes. This current AEMO modelling process could be used to calculate half hour dispatch and consumption outcomes for all generators, loads and interconnectors which could then be fed into the existing FLLF calculation model to calculate the FLLF values. This would remove the need to develop a separate engine as indicated by AEMO and result in lower costs to participants. We believe use of a SRMC bidding based dispatch model would also improve the forecast of dispatch outcomes for controllable network elements (MNSP's).

We also note that no specific details have been provided to date regarding the two proposed options for amending the methodology. We recommend that prior to publication of the Draft Determination and Report that AEMO provide additional details including supporting analysis of the benefits and disbenefits of each of the proposed options. Stakeholders could then more thoroughly review the proposed options and offer supplementary comments to AEMO.

Extrapolation capping

The announced closure of Hazelwood Power Station on 3 November 2016 resulted in a large disconnect with regards to the suitability of the "minimal extrapolation theory" in calculating FLLF's for the 2017/18 financial year.

Initial outputs from the FLLF calculation for Financial Year 2017/18 process failed at the time to include for the announced return to service of two generating units at Tarong Power Station in Queensland and included for planned and unplanned outages of generating units based on what had occurred in the reference year. This resulted in outcomes where a number of relevant registered participants raised questions regarding the efficacy of AEMO FLLF modelling process.

AEMO constituted a technical working group at the time to consider and provide advice to AEMO regarding potential changes to the FLLF methodology. Following discussion with the relevant registered participant, changes implemented included, the removal from the historical reference year data of any long duration unplanned outages and the use of the medium term projected assessment of system adequacy (MT PASA) availability bids to more accurately reflect forecast unit availability for the target year. These outcomes resulted in significant improvements to the minimal extrapolation theory outcomes.

In addition, the working group recommended a secondary check process where, in the event that a large forecast change in power station output was observed from the FLLF calculation process, AEMO would discuss with the relevant registered participant the reasonableness of such a change in forecast output. To achieve this secondary check, the first pass FLLF calculation included a percentage cap on change of output for all thermal generators from the average output from the previous five years. Where the supply demand balance remained in deficit, further adjustments to thermal unit outputs were made.

ERM Power notes and agrees with AEMO view that this secondary check process may not be required for the FLLF calculation process for the 2021/22 financial year. However, retention of this secondary check process for future years may be warranted depending on the outcomes of the review of the "minimal extrapolation theory" as discussed above. Should a suitable SRMC bidding methodology be implemented, we believe the secondary check process could be removed.

Modelled flows on parallel AC/DC interconnectors

The current methodology locks the direction of flows on parallel AC and DC interconnectors in the same direction and sets a flow relationship based on the capacity ratio of the parallel interconnectors. As observed from historical outcomes of flows on the Heywood AC and Murraylink DC interconnectors between Victoria and South Australia, it's not unusual to see these interconnectors flow in different direction at Dispatch, under "system normal" conditions based on prevailing conditions at the time[2]. Based on the same historical data, AEMO has determined that whilst the resultant relationship between the Heywood AD and Murraylink DC interconnectors is linear, it is not driven by capacity and there is an offset (Murraylink flow is not zero when Heywood flow is zero). AEMO has also verbally confirmed that circular flows between Murraylink and Heywood do occur for a large number of dispatch intervals.

[2] AEMO public market data for FY2019/20 indicates that the Heywood and Murraylink interconnectors flow in opposite directions for 41% of trading intervals

AEMO has proposed that the methodology be changed to reflect the actual relationship which existed in the historical reference year. We note that AEMO has identified a process to calculate this relationship, the details of which have been set out in the Paper.

The Paper indicates that the relationship formula has been developed excluding the impact of network constraints. We agree that the development of the relationship formula should exclude any periods of outage constraints which directly impacted flows on either interconnector, however, as the FLLF methodology is based on "system normal" conditions, all trading intervals where "system normal" conditions applied should be included in the calculation of the relationship formula including periods where a "system normal" constraint is binding.

Subject to AEMO's verification that the relationship formula will be developed based on all trading intervals where "system normal" conditions applied, ERM Power supports the proposed change to the methodology to model flows on parallel AC/DC interconnectors. Similar to our comments on the extrapolation capping process above, should a suitable SRMC bidding methodology be implemented, we believe this need for the tying of flows between parallel AC and DC interconnectors could be removed.

Intra-regional constraints

We note that historically the impact on generation output of intra-regional network constraints were not included in the FLLF calculation. Further, we note that in the calculation of the FLLF's for the 2020/21 financial year, based on an internal review of outcomes from other AEMO modelling, a total of nine intra-regional constraint equations were used in the FLLF calculation[3].

We support the inclusion by AEMO of intra-regional constraints in the FLLF calculation. We see merit in the addition of a section in the Methodology to cover the process for management and selection for inclusion of intra-regional constraints

We recommend that prior to publication of the Draft Determination and Report that AEMO provide additional details regarding the proposed amendment to the methodology. Stakeholders could then more thoroughly review the proposed change and offer supplementary comments to AEMO.

Similar to our comments on the extrapolation capping process and modelled flows on parallel AC/DC interconnectors above, should a suitable SRMC bidding methodology including a NEMDE style dispatch engine be implemented to perform the unit dispatch modelling, this would include all the "system normal" intra-regional constraint equations, as opposed to a selective inclusion process and significantly improve the forecast dispatch outcomes for all generators in the FLLF methodology.

Transparency of MLF's

ERM Power supports the proposed change to provide and additional sensitivity report which will examine FLLF sensitivity to potential changes in commissioning dates for committed generation and also potential changes in consumption at nominated locations. AEMO should also consider if a sensitivity case is warranted if significant changes in hydro generation water inflows are forecast for the target year.

We also support the proposed change to issue a preliminary MLF forecast report in November each year prior to the release of the Draft FLLF report in March each year.

[3] Page 57 AEMO Regions and Marginal Loss Factors: FY 2020-21

Intra-year revisions

ERM Power supports the proposed changes to increase the frequency of review by AEMO for conditions that may warrant issue of an intra-year revision and the proposed change to require AEMO to transparently advise the Market that a FLLF revision has occurred.

Energy generation forecast study

We believe the release of the generation forecast study report for review and comment by participants is a critical component of the FLLF process. We recommend that this report also set out forecast output, on at least a monthly basis, for wind and solar farm generation output the same as data released for thermal and hydro generation output.

We also recommend that AEMO amend the FLLF methodology to proactively seek confirmation from participants that the forecast data released in the report has been reviewed and is acceptable to the relevant participants.

Unexpected and unusual system conditions

Whilst ERM Power supports the use of Section 5.9 of the FLLF methodology to review and amend when required data which in AEMO's view reflects unusual system conditions, Section 5.9 set out little in the way of any detail with regards to;

- process for the identification of unusual system conditions by AEMO,
- the ability for participants to submit periods that participants consider to be unusual for consideration by AEMO,
- the process by which AEMO will engage with participants during the data review process, and
- the requirement for AEMO to publish any information regarding their determinations in this area prior to release of the annual Final Transmission Loss Factor Report.

We recommend that AEMO engage further with participants with regards to this area of the FLLF methodology prior to issuing the Draft Determination and Report and revised Draft FLLF Methodology.

MLFs for connected loads in close proximity to borders and interconnectors

We note concerns raised by stakeholders that where interconnectors are commissioned, that existing loads and generators, which may have existed in their location for a significant period of time, can be severely impacted by large and unforecastable swings in the year on year FLLF calculation outcomes. We do not believe this to be an acceptable outcome.

We note that AEMO does not consider the issue of the volatility of MLFs of loads and generators in close proximity to interconnectors can be practically addressed within the current methodology. Therefore, we urge AEMO to commence further discussions with interested stakeholders regarding this issue as a matter of urgency to develop options to amend the methodology or if needed the National Electricity Rules to reduce this impact we can arise due to the addition of network elements and/or changes in flows on interconnectors. We believe there may be amended methodologies for the allocation of the annual transmission loss factor to a designated volatile loss factor connection point, this may include allocation of a smoothed FLLF or a natural FLLF calculated with zero flows on the interconnector causing the connection point FLLF volatility. We look forward to further discussion in this area with AEMO and other participants.

Conclusion

We commend AEMO for the establishment of a collaborative engagement process via a technical working group prior to development of the Issues Paper and recommend that this form of collaborative engagement process be continued in future.

AEMO has set out a number of well-considered amendments to the current Methodology. However, it needs to be recognised that whilst considerable effort is made by AEMO and registered participants to create a methodology for compliant half hour generation output and consumer demand profiles for use in the FLLF calculation, actual system losses will invariably be different to that calculated as actual generation output and consumer demand will vary, sometimes significantly, from that used in the modelling. For this reason, we recommend AEMO continue to undertake analysis which compares forecast to actual losses and provide detailed reports in this area to enable stakeholders to better understand the magnitude and reasons for these differences.

Please contact me if you would like to discuss this submission further.

Yours sincerely

[signed]

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