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The Clean Energy Council welcome the opportunity to provide this submission to AEMO's consultation on the forward looking loss factor (FLLF) methodology.

The CEC considers the degree of change in the NEM power system warrants a more holistic rethink of how transmission marginal loss factors (MLFs) are calculated and applied. A more accurate and forward-looking approach to MLFs will help reduce uncertainty for investors and enable further clean energy investment.

The CEC considers a holistic review of the MLF framework is needed, separate to this targeted FLLF methodology consultation. Nevertheless, the CEC also encourages AEMO to find opportunities wherever possible to provide increased transparency and certainty within the existing FLLF methodology.

The CEC therefore recommends AEMO convene an industry reference group and undertake a collaborative MLF problem definition and codesign process, to determine the best way to deliver more stable and predictable MLFs. This group should have scope and resourcing from within AEMO to consider more fundamental changes to the MLF framework, up to and including rule change requests, as well as mapping those areas where changes could be made to existing methodologies and other AEMO processes.

What is needed is a clear forward pathway for MLF values at each connection point in the NEM. Investors will make use of this information to make more effective investment decisions, ultimately reducing the total cost of the transition for customers.

The current minimal extrapolation approach, utilising a single generator output reference year, is unlikely to remain fit for purpose in this rapidly changing market and power system. While we acknowledge the improvements AEMO has proposed in this consultation – such as moving to the NEMLF software and splitting generation from demand forecasting – we nevertheless consider a more robust approach to MLF calculation is needed.

We consider the following elements should be included in a fit for purpose MLF framework. Such a framework could:

- utilise a full system / market model to determine MLFs, utilising the sophisticated modelling capability that informs the ISP and the ESOO. While we recognise not all of AEMO's current suite of modelling processes account for strategic bidding behaviour, we also understand such a modelling approach would not be beyond AEMO's capabilities. More generally, we also recommend AEMO consider whether the MLF calculation process can be more closely integrated into the ESOO and ISP process, to provide greater certainty for investors and developers.

- publish forward pathways of MLFs at each node, covering at least a five year period and longer if possible. These forward pathway estimates would be changed to an actual value each year, with pathways also extended and adjusted, as part of AEMO's regular MLF assessment process.

  MLFs would not necessarily be locked in ahead and/or prevented from changing year on year. These pathways would instead be akin to a centrally determined forecast, developed and published by AEMO, subject to the ability for AEMO to change them at any time as new information came to light. As a starting point, we consider the Enhanced Locational Information resource could provide this information.

  An alternative design could impose more robust limitations on the degree of change of MLFs from year to year. The concept of a 'side constraint' – imposing a hard percentage limit on the degree of downward change in MLF values year on year – would provide even further certainty for investors.

- Using scenario and sensitivity analysis, determine likely upper and lower bounds for these pathways. This scenario analysis would account for major changes in the power system, such as potential changes in thermal unit operation, as well as REZ or interconnector energisation. Sensitivities could explore different timeframes for these major events. Pathways and upper/lower bounds would be adjusted in accordance with these scenarios. We consider that the recent movements in SW NSW MLFs, reflecting energisation of new network infrastructure and subsequent congestion relief, are a case in point that illustrates the need for this kind of scenario analysis.

We recognise there is some ambiguity in the current NER as to the degrees of freedom available to AEMO regarding whether it has scope to move beyond the current MLF methodological approach. We therefore support further work to consider whether changes to the NER are needed. The Clean Energy Council is ready to work with AEMO through an industry codesign process to explore these options.

More generally, we recognise that specific larger scale reforms, such as a move to average over marginal loss factors, or reallocation of intra-regional residues, are outside the scope of this review. However, the CEC welcomes the opportunity to include consideration of these reforms through the industry codesign process.

The rest of this submission addresses some of the issues raised in the submission.

Do stakeholders consider there would be benefit in updating the treatment of new generators in the MLF calculation process? If so, why?

In line with our general suggestion that AEMO undertake more detailed scenario analysis and account for changes in the power system, we recommend AEMO give some consideration to projects that fall outside of the committed status in its assessment of likely future MLF movements. If necessary, the final energisation of these less developed projects could be probability weighted.

We acknowledge however that inclusion of less developed projects could potentially increase uncertainty of modelled results. On this basis we encourage AEMO to exercise its discretion to limit this expansion of consideration of new generation to be consistent with approaches taken in other AEMO processes, perhaps limiting inclusion to anticipated projects as per the generator information page definition.

Do stakeholders agree that the current configuration of minimal extrapolation levels needs to be changed? • If so, how should levels be expanded, re-ordered and/or re-defined? − How should AEMO account for minimum stable generation in minimal extrapolation? − Where in the hierarchy of levels should AEMO consider regulated DC interconnectors, if at all?

The CEC generally agrees with AEMO's proposed approach, particularly increased granularity recognising the very different operational behaviours of assets such as hydro and solar. We suggest that further disaggregation

might be warranted to recognise the different generation profiles of wind and solar generation. As seen in the most recent QED, these patterns can differ markedly in different periods of the year, which should be accurately accounted for in minimum extrapolation approaches.

Do stakeholders agree that AEMO should consider how clusters with small constraint distribution factors are represented in constraints in the supply-demand balancing engine (NEMLF)?

The CEC has no specific suggestions to make in regard to the clustering approach, other than to note the complexity and potentially arbitrary nature of the manual adjustments made under this approach bring with them a risk of significantly distorting actual operation of the system. We consider this is further evidence of the benefits likely associated with moving to a modelling based approach to assessing likely outcomes. Such approaches are more likely to capture the intersection of congestion with strategic bidding and subsequent changes in flows on the power system.

What are stakeholders' views on the merits of the options presented to handle storage in MLF calculations, including when they ought to be implemented? Are there other options AEMO should consider?

The CEC acknowledges the complexity of accurately accounting for energy storage assets. However, given the increasingly central role of storage technologies in the NEM, we strongly encourage AEMO to explore options that most accurately capture the likely behaviour of these assets. Again, we expect that a move to full forward looking market and system modelling would better account for energy storage behaviour.

The CEC welcomes further engagement with AEMO on this complex area. Please direct further questions to myself on czuur@cleanenergycouncil.org.au

Kind regards,

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