Australian Energy Markets Commission

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AEC Submission to AEMC Efficient provision of inertia rule 2025 – Directions paper

The Australian Energy Council (AEC) welcomes the opportunity to make a submission in response to the AEMC Efficient provision of inertia rule 2025 – Directions paper (Directions paper).

The Australian Energy Council is the peak industry body for electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. AEC members generate and sell energy to over 10 million homes and businesses and are major investors in renewable energy generation. The AEC supports reaching net-zero by 2050 as well as a 55 per cent emissions reduction target by 2035 and is committed to delivering the energy transition for the benefit of consumers.

As the NEM transitions to more inverter based resources and less synchronous generators, many uncertainties surround how the technical envelope for the operation of the NEM will evolve. As we enter these uncharted waters one would expect the market operator would like to have as many options as feasibly possible at its disposal, to manage this uncertainty. The AEC believes real time inertia market (to provide inertia above the minimum level) is one such feasible option that should be made available to the market operator.

Recent research by University of Melbourne (UoM paper) provides an insight into the complexities and uncertainties regarding inertia both now and in a high inverter low synchronous NEM.[1] It focussed on real time measurement of actual inertia as opposed to AEMO's theoretical inertia measure. In this context they discovered that actual inertia was significantly higher than theoretical inertia and labelled the difference as residual inertia. The paper infers most of the residual inertia is provided by demand side inertia but noted some of the difference may be due to other factors. With respect to inertia ancillary services markets the paper states:

> *"In the future, it is expected an inertia ancillary services market, which could address potential inertia shortfalls while improving efficiency in procuring inertia… Measurements of inertia would support effective developments of inertia markets and regional inertia allocation to avoid potential imbalances and instability which could lead to system-wides disturbances."*[2]

Directions paper Section 8.2.2

We have concerns with the proposal to attempt to co-optimise inertia with 1 second FCAS. From our understanding these two services are not perfect substitutes and trying to do this would be extremely complex and would also ruin the integrity of the 1 second FCAS market, which is performing well.

[1] Bastian Moya and Pierluigi Mancarella, Evaluation of Reactive Technologies Inertia Measurement and Techno-economic Modelling, Technical Knowledge Sharing Report, August 2024. Available at: https://arena.gov.au/assets/2024/09/Reactive-Technologies-System-Inertia-Measurement-Demonstration-Project-Technical-Knowledge-Sharing-Report.pdf

[2] Ibid, p58.

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Houston Kemp analysis (HK Report)

The HK Report notes that implementing the 1-second FCAS market cost $4.3 million. Their estimate for an inertia market, is $5-10 million. The HK Report justifies the higher cost range on the basis of:

> *"The complex nature of inertia services presents unique technical challenges that will require careful consideration and system development."*[3]

The HK Report then estimates ongoing AEMO costs and participant costs to produce a 10-year PV of $20-50 million for the implementation and operation of an inertia market. We find it somewhat curious that:

- When justifying the higher implementation costs, no mention is made that some of the costs associated with gaining a better understanding of and measuring power system inertia and inertia needs are likely to be incurred by AEMO irrespective of a market being implemented or not. Hence, they are not additional costs to AEMO's operations.
- No 10-year PV estimate is provided for the 1-second FCAS market.
- A net present value (NPV) including both benefits and costs would be helpful.
- The choice of a ten year discount period which does not align with the life of a synchronous condenser (synchon) with fly wheel in a TNSP's RAB, which is more likely to be 40 years.

In spite of its shortcomings, the HK Report's estimates for the cost of establishing an inertia market seems to represent a very small insurance premium when compared with other costs in the NEM. For example, the HK Report in Table A2.8 appears to indicate a "high scenario" with 42 new synchons by 2034, which based on Table A2.3 cost, $80-135 million each.[4] Assuming the average cost is $110 million and each one has a flywheel that costs $2 million, TNSPs will have added $4.7 billion of new regulatory asset base (RAB). If recent transmission project cost blow outs are an indicator of TNSP capex forecasting, this number could be a lot larger.

The cost of an inertia market according to the HK Report represents 0.4 to 1.1 per cent of the $4.7 billion synchon RAB. If an inertia market reduced the need for 0.4 to 1.1 per cent of the forecast TNSP capex, it pays for itself.

We do not consider TNSP capex as efficient in the true sense of its economic meaning. TNSPs are natural monopolists and as such are subject to relatively intrusive economic regulation. The purpose of this is to try and make the TNSPs operate as efficiently as possible, in the knowledge they cannot achieve a truly competitive efficient outcome. Major reasons for the limitations of regulation are:

- The regulator must err towards conservatism so as not cause a TNSP to be bankrupted if it is following the regulatory model assumptions;
- The TNSPs have the advantage of asymmetric information;
- The TNSPs are better resourced than the regulator; and
- TNSPs are incentivised to undertake capex because increasing the RAB is the only way to increase the value of the regulated business ie, a key valuation metric for TNSPs is a multiple of RAB.

With respect to an inertia market, HK Report states:

> *"Looking ahead, while there are clear benefits from introducing operational top-up and additional inertia services in the NEM, our analysis suggests these benefits may not be large in the near term. That said, there is the potential for these benefits to be higher in the future as synchronous inertia from energy dispatch falls as a result of synchronous generators' retirement."*[5]

[3] Evaluating market designs for inertia services, p43.
[4] The low scenario has 20 synchons.by 2034.
[5] HK Report, p45.

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The HK Report draws the conclusion that maybe an inertia market is something for the future. Based on our research and consideration of the HK Report's analysis we do not draw this conclusion. As described above we consider some of the HK Report's analysis to be lacking. The more we have looked at this issue, the clearer it has become that an inertia market represents a prudent and very cost effective form of insurance/risk management for the NEM and to delay any further runs counter to the NEO. Establishing an inertia market ahead of the forecast critical need represents little costs for either the market or consumers and sends the appropriate market signals to investors in new plant to take into account the inertia market in investment choices. Waiting until the need is apparent will be too late for the efficient supply of inertia services to be achieved and increase costs to the market and consumers.

We strongly suggest that the marginal cost of ensuring new resources have the technical capability to supply inertia services as and when required would be significantly lower than the costs of the provision of these services by synchronous condensers as part of the TNSP's RAB. Accordingly, we urge the AEMC to develop rules that would create an inertia market at the next iteration of the this consultation process. Because, even if the AEMC does this then it is unlikely there would be a functioning inertia market until 2028 and the need for this critical service, just lie other essential system service have, may develop before current expectations.

Finally, the AEC would like to thank the AEMC for all of its efforts and the resources it has expended on this project to date.

Any questions about this submission should be addressed to peter.brook@energycouncil.com.au or by telephone on (03) 9205 3116.

Yours sincerely,

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