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Dear Commissioners,

ESSENTIAL SYSTEM SERVICES AND INERTIA IN THE NATIONAL ELECTRICITY MARKET

EnergyAustralia (EA) welcomes the opportunity to comment on the Australian Energy Market Commission's (AEMC's) and the Australian Energy Market Operator's (AEMO's) joint consultation paper on Essential System Services (ESS) and inertia in the National Electricity Market (NEM). EA is one of Australia's largest energy companies with around 2.4 million electricity and gas accounts in NSW, Victoria, Queensland, South Australia, and the Australian Capital Territory. EA owns, contracts and operates a diversified energy generation portfolio that includes coal, gas, battery storage, demand response, pumped hydro, solar and wind assets. Combined, these assets comprise 4,500MW of generation capacity.

EA is dedicated to building an energy system that lowers emissions and delivers secure, reliable and affordable energy to all households and businesses. This requires being a good neighbour in the communities we operate in. We, therefore, recognise the value in working with Aboriginal and Torres Strait Islander peoples as the traditional custodians of this land. We acknowledge and respect their continued connection to all aspects of Country.

We Must Be Ready From 2026

The joint paper highlights that there is much ESS work currently on foot and required in the future. A full understanding of the many interdependencies and coordination of all the different workstreams will be crucial to delivering a robust, efficient and orderly energy market transition. EA is, therefore, highly supportive of AEMO's and the AEMC's efforts to investigate how and when inertia markets might best be developed to achieve this.

On timing, we note that AEMO's most recent system security report[1] did not declare any new inertia shortfalls. However, we stress that it did forecast large declines in inertia below secure operating levels in both New South Wales and Victoria over the 5-year horizon to 2026. This is in addition to existing shortfalls declared in South Australia and Tasmania, with further possible shortfalls identified for Queensland beyond 2026.

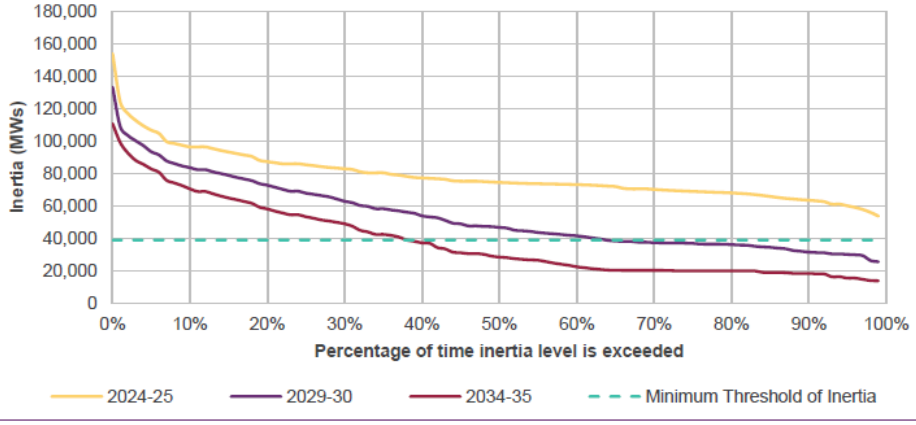
[1] Available from https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/planning-for-operability

Table 1 System strength and inertia outcomes in this report, 2022 to 2026, under *Step Change* scenario and other relevant updates

	System strength	Inertia
	The ability of the power system to maintain voltage waveform at any given location in the power system, both during steady state operation and following a disturbance.	A fundamental property of power systems such that the power system can resist large changes in frequency arising from an imbalance in power supply and demand caused by a contingency event.
New South Wales[B]	Shortfall ranging from 1,190 to 1,092 mega volt amperes (MVA) at Newcastle, and from 1,026 to 944 MVA at Sydney West, from mid-2025. AEMO will request services be available from 1 July 2025.	No shortfall declared with New South Wales unlikely to island, but strong decline in projected inertia observed.
Queensland[B]	Shortfall at Gin Gin for the full period, ranging from 33 to 90 MVA. AEMO will request services be available from 31 March 2023.	No shortfall declared, and previous shortfall rescinded, but possible future shortfall of 8,384 MWs from July 2026 in Queensland, subject to market assessments.
South Australia	No shortfall, with four new synchronous condensers now delivered by ElectraNet.	Shortfalls remain consistent with the declarations in the original 2021 *System Security Reports*.
Tasmania[A]	Shortfalls remain consistent with the declarations in the original 2021 *System Security Reports*.	Shortfalls remain consistent with the declarations in the original 2021 *System Security Reports*.
Victoria[B, C]	Shortfall of 203 MVA at Hazelwood from mid-2026. Shortfall of 31 MVA at Moorabool from mid-2026. Shortfall of 279 MVA at Thomastown from mid-2026. AEMO will request services be available from 1 July 2026.	No shortfall declared with Victoria unlikely to island, but strong decline in projected inertia observed.
Legend:	No shortfall	Possible future shortfall / Shortfall

AEMO's most recent modelling for the 2022 Integrated System Plan is even more concerning. It shows system inertia falling below the Minimum Inertia Threshold by 2030 under the Step Change scenario. This is seen as the most likely scenario by the industry with faster than expected coal retirements resulting in a large inertia decline. However, we highlight that low inertia periods will become increasingly frequent even before each plant exits. That is, as full-time operation gives way to narrower viable operating windows in both daily and seasonal timeframes.

Inertia projections (*Step Change* scenario)				
	2024-25	2029-30	2034-35	Comments
Available inertia 99% of the time (MWs)	53,950	25,700	13,850	The projections show that the NEM mainland inertia is expected to decline significantly by 2029-30 compared to 2024-25, decreasing below the minimum threshold of inertia.



These outcomes are also consistent with a recent GHD[2] report on frequency performance. It foreshadowed NEM frequency degradation below levels seen before the introduction of mandatory Primary Frequency Response (PFR) by the mid to late 2020s. That is, unless other measures, such as inertia spot markets, are put in place.

[2] GHD, Enduring Primary Frequency Response – Power System Operation and Strategic Regulatory Advice.

As noted in the joint paper, properly developing and implementing inertia markets could take up to four years. Unfortunately, the recent history of regulatory reform suggests this may be a minimum. Even if delivered on time, however, this runs squarely into the timeframes where inertia could prove to be scarce. This leaves very little tolerance for deviations from current forecasts, thus making inertia markets a key priority to progress.

Other ESS Solutions Will Not Be Sufficient

It might be argued that other ESS developments will mitigate these risks. A closer examination reveals this is unlikely to be so. As previously highlighted by both the AEMC[3] and AEMO[4], Primary Frequency Response (PFR) and Fast Frequency Response (FFR) while related to, are no substitute for, inertia.

An Operational Security Mechanism (OSM) may promote better operational decision-making than the status quo. If so, this could help to better support secure operating levels of inertia into the future. However, we note the necessary design work is far from complete with net benefits, if any, yet to be quantified.

Even if these are appropriately demonstrated, we question using the OSM as an interim inertia procurement measure. The OSM takes an 'essential generator' rather than an 'essential service' approach. This will not deliver on the Energy Security Board's (ESB's) stated desire to move to a fully unbundled, real-time spot market for inertia[5].

Moreover, if inertia markets are shown to have net benefits, there would seem little additional value in delaying their implementation in favour of an OSM. In particular, given the duplicative implementation costs and greater likelihood that inertia markets will achieve the National Electricity Objective (NEO). That is, via a robust, decentralised, real-time price signal rather than a day ahead, centralised procurement approach that relies on perfect operator foresight in an increasingly uncertain and variable generation environment.

The Reliability Panel is considering the merits of a Rate of Change of Frequency (RoCoF) standard. Although not addressing the root cause of low and declining system inertia, it may promote better aggregate plant performance under low inertia conditions. The form of the standard and how it will be applied is, however, yet to be determined. For example, it is unclear whether it should or will apply to all existing plant.

Application to all plant may be unfair and make significant remediation costs a distinct possibility. That is, given the investment decisions around technical plant specifications were made at a time when no RoCoF standard existed. However, if only applied to new connecting plant, it will do little to ameliorate the impacts of low system inertia until new plant comes to make up a significant proportion of the generation fleet. This could be far beyond the timeframes indicated above.

Work On Inertia Markets Must Begin Now

The key insight from the foregoing is that inertia market implementation risks are highly asymmetric. Much like arriving at one's own wedding, being early will be far less costly than being late. This is a result of the combination of:

- avoided system security issues,

[3] AEMC, Draft Rule Determination - Fast Frequency Response Market Ancillary Service.
[4] AEMO, Primary Frequency Response Incentive Arrangements – Discussion Paper.
[5] ESB, Post 2025 Market Design Consultation Paper – September 2020.

- inefficient inertia provision by other means,
- timely and efficient investment in solutions to support inertia and other ESS, and
- earlier delivery of benefits to customers.

Given other measures are unlikely to be sufficient in managing the risks of low inertia outcomes in the meantime, our view is that work to develop inertia markets should begin as soon as possible. This includes prioritising Engineering Framework Action A13[6] concerning inertia monitoring, which EA and AEMO have been co-designing. The provision of both historical and real-time inertia data and reporting will be vital for:

- informing inertia spot market development,
- underpinning future inertia investment business cases, and
- supporting more efficient operational outcomes.

The sooner such information is available, the sooner these benefits can be realised.

In terms of resourcing, we note the FFR rule change is complete with the PFR rule nearly so. Both still require additional implementation work which will require continued attention. Despite this, it would seem there will be at least some AEMC resources freed up as a result of final determinations having been delivered. If so, we support this being redeployed to attend to initial inertia market investigations later this year.

As always, EA stands ready to assist both AEMO and the AEMC with this undertaking. To discuss this submission further or to arrange a meeting, please contact me on 0435 435 533 or via email at bradley.woods@energyaustralia.com.au.

Regards,

Bradley Woods
Regulatory Affairs Lead

[6] See NEM Engineering Framework Priority Actions Report.