

31 March 2023

John Kim
Project Leader
Australian Energy Market Commission

Submitted electronically

Dear Mr. Kim,

PIAC submission to Efficient provision of inertia consultation paper

The Public Interest Advocacy Centre (PIAC) welcomes the opportunity to respond to the *Efficient provision of inertia* consultation paper (the Paper).

PIAC agree with the Australian Energy Council's (AEC's) characterisation of the potential operational challenges arising from the existing inertia framework, namely:

- Declining inertia may pose a future threat to power system security. Further technical work is needed to better understand the long-term needs of the power system and inform the development of an updated approach for inertia.
- Inertia is not efficiently procured or allocated in real-time. The existing framework relies on static annual inertia requirements and does not allow co-optimisation of inertia with energy and other system services.
- Clearer investment signals are required to meet long-term inertia needs. Valuing inertia and providing transparency on inertia needs could help incentivise efficient investment and promote innovation.

We share the AEMC's view that further work is needed to better understand the power system's technical inertia requirements. This work should include:

- Defining system inertia needs, including:
 - the level of inertia that will be required for secure system operation in the interconnected National Electricity Market (NEM) during normal operation;

- considering whether the future system needs should be defined in terms of rate of change of frequency (RoCoF) requirements as a measure of, or proxy for, inertia levels;
- defining the relationship between rotational inertia and other technologies: assessing how other technologies (e.g. synthetic inertia) can contribute to more efficiently meeting the current and future system needs, and the relationship of these with rotational inertia; and
- determining interactions with other security services: investigating technical interactions between inertia and other synchronous services, such as system strength and fast frequency response (FFR), to assess the feasibility of unbundling inertia and the locational impacts of different resource dispatches.

These technical findings should be delivered through the Australian Energy Market Operator's (AEMO's) existing and planned work programs and reflected in the revised inertia framework. As noted in our previous submission¹, this work should take into account that: (1) the need for inertia may not increase indefinitely and could conceivably be lower again when there are fewer large mechanical generating units in the energy system; and (2) the distribution of benefits of inertia services may substantially change over time.

We support defining and procuring inertia requirements dynamically in operational timeframes. This would allow for more efficient procurement and co-optimisation of inertia with energy and other services. The existing approach to procurement relying on annual assessments tied to static minimum levels of inertia has resulted in over-procurement and higher than necessary costs to consumers. Likewise, the lack of a mechanism to procure inertia above minimum levels in the current framework is a missed opportunity to unlock lower-cost energy and/or reduce the need for other market ancillary services which could further reduce costs for consumers.

We are particularly concerned that investment signals for inertia in the current framework fail to promote efficiency. This results in Transmission Network Service Providers (TNSPs) favouring capital-intensive options that yield better returns for them, over more efficient options such as procuring services from generators and batteries. This is exacerbated by the lack of transparency around financial incentives to provide inertia, with public information on TNSP procurement that is limited and bespoke. The current framework also undermines long-term incentives, innovation, and investment in emerging inertia technologies because it excludes synthetic inertia from contributing to meeting minimum requirements.

We understand AEMO is currently working to determine the technical quality of inertia sources and the substitutability of rotational inertia as part of its Engineering Framework project. Research into the provision of synthetic inertia should include consideration of grid-forming batteries and demand response mechanisms. We look forward to seeing the results of this work and encourage the AEMC to draw on these learnings to inform this rule change process.

We share the AEC's view around the need to value inertia as an unbundled service but consider a RoCoF control service likely to be better suited to addressing the problems identified in the current framework than an inertia spot market. While low levels of system

¹ See [PIAC submission to AEMO-AEMC Efficient provision of inertia joint paper](#).

inertia result in faster frequency changes, we consider a focus on RoCoF, as a measure or proxy of inertia, preferable given negative system outcomes are more directly linked to the former than the latter. Put differently, a system can operate within a stable frequency while experiencing low inertia. As a measure of the outcome of inertia, RoCoF provides a better indication of disturbances and acts as a de facto early warning system.

Unlike a RoCoF control service, an inertia spot market may introduce risk by eliciting frequency changes when the system is operating stably (i.e. with a low RoCoF) at the thresholds of its normal frequency band. Further, a RoCoF control service may be easier to implement as determining maximum RoCoF limits involves fewer technical inputs than dynamically calculating inertia through discretionary and non-discretionary demand curves.

A causer pays approach for procuring RoCoF control services should recover costs not only from 'facilities with a RoCoF ride-through capability lower than a benchmark set by AEMO' but those that contribute to the need for the service. At present the beneficiaries of inertia services include:

- Individual synchronous thermal generators with units of sufficient size to impact system frequency when they cut out unexpectedly (these are also the generators that have traditionally provided inertia under normal operating conditions)
- Groups of asynchronous generators such as wind turbines (particularly older model wind turbines)
- Some electronic generators that are particularly sensitive to the rate or magnitude of changes in frequency (these generators may also provide limited inertia or artificial inertia)
- Individual large energy users that have:
 - Loads, particularly motors of sufficient size to affect system frequency when they are turned on, turned off, or cut out
 - Equipment that is particularly sensitive to the rate or magnitude of changes in frequency
- Mass-market energy users

Cost recovery mechanisms should reflect that the primary beneficiaries of inertia services are the participants whose presence imposes a need for inertia to be provided. For example, when a large thermal generator such as a coal-fired power station trips, the beneficiary of inertia services is the power station, not consumers.

We strongly advise against maintaining the current framework in any form. This includes both the proposal to adjust TNSP procurement and to delay reforms until further technical work is completed.

We consider it inefficient, uncompetitive, and not in the interest of consumers to maintain any inertia procurement with TNSPs. The incentive for TNSPs to grow their regulated asset base (RAB) gives them little reason to procure inertia through more efficient non-network solutions. This is evident in Transgrid's current RIT-T process, which flags the need for more than 30

synchronous condensers for NSW alone, without apparent regard for more cost-effective options where parties other than consumers carry some of the risk.

While there should be no TNSP role in maintaining inertia, TNSPs, in their ring-fenced capacity, should be able to compete to provide inertia services as they may be the most efficient provider in some cases.

The AEMC should seek to accelerate the implementation of new arrangements to minimise consumers carrying avoidable costs under the existing framework. We also recommend accelerating implementation to the greatest extent practicable to ensure a smooth transition while the cost of inertia services is relatively low.

We consider the proposed assessment framework broadly appropriate, apart from the need for a stronger focus on the principle of risk-sharing. That is, the AEMC should assess the rule change request with regard to how and to which parties risk is assigned. More pointedly, we seek to ensure that consumers are only asked to bear cost risk for network solutions, not market solutions. This consideration could be included as part of the focus area on 'costs and complexity' or 'timing and uncertainty'.

PIAC welcomes the opportunity to discuss these matters further with the Commission and other stakeholders.

Yours sincerely

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