10 February 2021

Sebastian Henry
Director
Australian Energy Market Commission

Sent electronically

public interest
ADVOCACY CENTRE

Dear Mr Henry,

Submission to Frequency control rule change directions paper

The Public Interest Advocacy Centre (PIAC) is an independent, non-profit legal centre based in New South Wales. Established in 1982, PIAC tackles systemic issues that have a significant impact upon people who are marginalised and facing disadvantage. We ensure basic rights are enjoyed across the community through litigation, public policy development, communication and training. The Energy + Water Consumers' Advocacy Program represents the interests of low-income and other residential consumers, developing policy and advocating in energy and water markets.

PIAC welcomes the opportunity to respond to the Australian Energy Market Commission's (AEMC) directions paper.

The NEM is currently transitioning from a predominantly mechanical to predominantly electronic electricity system.

Under the old 'mechanical' system, electrical energy is provided by centralised clusters of large generation plant, and consumed mostly instantaneously. The generators are 'direct connected' AC machines that have to be electrically synchronised and hence both provide, and are dependent on, the collective inertia of the system.

The emerging 'electronic' system involves energy being generated from multiple, often dispersed and smaller sources, with some consumed instantaneously and the remainder stored for later consumption. These generators, batteries and power electronics themselves neither provide, nor depend on, material amounts of 'traditional' inertia in the system. They can, however, provide 'synthetic' or artificial inertia, which has substantively different attributes – some advantageous and some disadvantageous - to traditional inertia.

Managing system strength and stability in an all-mechanical or all-electronic system is relatively straight forward, but the transition from the former to the latter presents many challenges. In a system with a changing mix of mechanical and electronic generation, there is a challenge in identifying the most appropriate ways to value and incentivise the services that efficiently maintain reliability and security, along with who should pay for which services and how trade-offs can be managed.

PIAC considers that risk should be borne by those best placed to manage it. Distinct from the allocation of risks, is the recovery of costs – noting that while costs and risks are generally related, they are not necessarily the same. PIAC supports a 'beneficiary-pays' approach to cost allocation meaning costs should be recovered based on the nature of the benefits and to whom they accrue – noting that the quantum and distribution of benefits may substantially change over time (see Attachment).

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This must be reflected in the AEMC's decisions regarding frequency control. Any market or regulatory obligation, including the mechanisms to recover their costs, must be designed to help accelerate the transition to zero emissions. And it must not impose unfair obligations on new entrants to provide services that only benefit a reducing number of direct connected AC machines.

Continued engagement

PIAC would welcome the opportunity to meet with the AEMC and other stakeholders to discuss these issues in more depth.

Yours sincerely,

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Attachment: Example of changing beneficiaries for services

The example below is taken from PIAC's submission to the ESB's post 2025 Market Design consultation.[1]

It demonstrates how adaptable settings could be put into practice for inertia services as the beneficiaries of inertia are likely to change over time. Prices for services must be able to respond to these changes by shifting both upwards and downwards in response to the changing need as opposed to constantly ratcheting upwards. Who these prices are recovered from must also be able to change to reflect who the primary beneficiaries are.

The beneficiaries of inertia services in 2030 may include:

- Groups of asynchronous generators such as wind turbines (particularly older model wind turbines).
- 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).
- 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.

Under this scenario, costs could be recovered most effectively via energy market pool fees levied on all market participants.

A plausible later scenario is that in 2040, the grid will be characterised by smarter electronics on both the supply and mass-market demand side, including a high level of DER, and two or three remaining large thermal generators.

Under this later scenario, the main beneficiaries of inertia services – as in, those whose presence imposes a need for inertia to be provided in the market – may be:

- The remaining synchronous thermal generators that are of sufficient size to impact system frequency when they cut out unexpectedly. These may also be providing inertia under normal operating conditions.
- Individual large energy users that have:
    - Loads, particularly motors, of sufficient size to effect 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.

Under this 2040 scenario, recovering costs from benefitting generators and large users with 'causer-pays' payments would be more efficient and fairer than socialising the cost of an inertia market across all consumers.

1 PIAC, *Submission to Post 2025 Market Design*, October 2019.