20 August 2020

Sebastian Henry
Director
Australian Energy Market Commission

Lodged electronically

Dear Mr Henry,

Submission to System services rule changes consultation 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 AEMC's consultation paper.

General principles for the provision of system services

The current energy-only market arrangements for the National Electricity Market (NEM) were effective when available technology and economies of scale meant the most cost-effective investments in generation were large, centralised generators with individual units in the 100s of MW that provided a range of system services as a by-product.

In the coming decade, there will be more variable generation and high price events will be harder to predict on the basis of high demand and low generation alone as diurnal and seasonal factors influence the state of charge of energy storage systems. With this uncertainty, the type of peaking plant required to meet very occasional peaks is an increasingly risky investment in an energy-only market. Signalling an energy-only price to a market where variable sources have no marginal cost, and dispatchability is in short supply, is inefficient.

Price signals, such as through a market or financial incentives, are preferable to ensure the optimal mix of flexible generation, storage and demand side resources and should be pursued where net benefits justify their introduction. The framework for providing system services should also err on the side of creating a price signal to provide a service rather than setting a mandatory requirement as well-functioning markets are typically better able to adapt and reflect changes in value of a service. Adaptable prices are important for promoting the long-term interest of consumers.

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.

Risk allocation and cost recovery in a market for system services would therefore need to reflect:

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- The need for system services may not increase indefinitely and could conceivably be low again. Therefore market or price settings must be able to move upwards and downwards in response.
- The quantum and distribution of benefits of system services may substantially change over time (see Attachment).

Responses to the AEMC's approach

PIAC supports the AEMC's '4P's' service design framework for considering how to plan, procure, price and pay for system services. As described above, it is essential that service design frameworks are able to reflect how the need for particular services and who will benefit from their provision are likely to change over time.

PIAC also supports the AEMC integrating adaptability into the frameworks for system services such as where

> … frameworks could be designed to procure the same service covering more than one time frame, for different reasons. For example, one framework might provide a signal or payment for minimum, essential levels of a service many years in advance to make sure the service is provided (or there is time to make alternate arrangements if it is not) - and that participants are confident in this service being provided. A separate framework might be developed to signal and pay for additional amounts of the very same service closer to real time, in order to "fine tune" and take into account the dynamic nature of the electricity system and so conditions at that point in time.[1]

Such frameworks would allow the quantity of services procured to be more adaptable to changing circumstances. In doing so, the question of how much of any particular service to procure in advance and how much to leave to procure closer to real time is an important one to determine and we would welcome exploring this aspect further.

PIAC also supports the AEMC's principles for assessment, in particular for risk allocation:

> The allocation of risks and the accountability for investment and operational decisions should rest with those parties best placed to manage them… Where practical, operational and investment risks should be borne by market participants, such as businesses, who are better able to manage them.[2]

Allocating risks to those best able to manage them (as opposed to those best able to bear them) is a fairer principle, and can deliver ultimately more efficient outcomes as it allows participants to 'opt in' to carry risks via market-based incentives, which supports the most cost effective or efficient outcome.

Timing of rule change progress

Many of the rule change proposals seek to create or substantially amend existing markets to provide system services. PIAC considers that, unless trivial, adaptable or urgently required for system security, these should not progress in advance of more strategic and comprehensive market design processes such as the ESB's post-2025 market design.

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1 AEMC, *System services rule change consultation paper*, July 2020, 17.

2 Ibid, 26

The NEM is currently transitioning from a predominantly mechanical electricity system to a predominantly electronic one. This requires re-examining the most appropriate ways to value and incentivise the services to maintain reliability and security, who should pay for them and how trade-offs can be managed.

The 'mechanical' system we are moving from is one where electrical energy is provided by centralised clusters of large generation plant, and consumed instantaneously (some pumped hydro and hot water storage notwithstanding). 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 'electronic' system we are moving to 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.

Locking in specific arrangements for system services now may compromise the effectiveness of more efficient, holistic frameworks for the NEM later and may need to be substantively revised or removed in the near to medium term. Either outcome may add otherwise avoidable costs and risks for consumers or investors (or both). It may also complicate the ability of the system to manage increasing numbers of electronic rather than mechanical equipment. Ultimately, this would delay the transition to a low cost and low emissions NEM.

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.[3]

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.

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