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Leveraging lessons for electricity market design

Response to the Energy Security Board, Post 2025
market design issues paper

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LEVERAGING LESSONS FOR ELECTRICITY MARKET DESIGN

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1. Introduction

Engineers Australia welcomes the opportunity to provide input to the [Energy Security Board \(ESB\) Post 2025 Market Design, Issues Paper](#) (September 2019).¹

Engineers Australia is the peak body of the engineering profession. We are a professional association with about 100,000 individual members. Established in 1919, Engineers Australia is a not-for-profit organisation, constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers Australia supports the COAG Energy Council aim of developing a long-term, fit-for-purpose market framework for the National Electricity Market (NEM). The original NEM design created a fundamental shift in the philosophy, operation and governance of the power sector. Twenty years on, a fundamental rethink is needed to deal with the accelerating pace of technology change and to make sense of the organic shifts in market structure (such as market consolidation and vertical integration).

2. Core services review

Engineers Australia supports the principle-based approach to reviewing the NEM design suggested by the ESB. We also note the analytic approach adopted by the ESB is appropriate. However, Engineers Australia also observes that this 'first principles' approach does not explicitly catalogue or build on lessons learned from the operation of the current market arrangements. The current market design is mature and includes many features that support and enable productive outcomes.

Engineers Australia considers an appreciation of the core services provided by the existing NEM infrastructure (systems and institutions) would help centre the debate about future market design. We recommend such a stocktake be incorporated into the ESB methodology. It would complement the proposed approach to modelling and comparing different market designs, including by making obvious how and what existing capabilities need to be maintained, developed or leveraged.

For example, the issues paper identifies the interaction with the financial market as in-scope. This 'secondary market' is a core mechanism for commercial risk management of price volatility. It therefore indirectly features as a key component of the supply market. It enables price volatility to act as a viable signal for new investment. Cataloguing this and related capabilities will enable a better assessment of the challenges and/or opportunities associated with moving from the current energy only, gross pool market design.

At the other end of the spectrum is the underpinning physical power system. The NEM is driven by price-based dispatch over an electrical system that is a large and complex physical machine. The capabilities required to deliver essential security services and effective power network planning are readily catalogued (if not always prioritised in practice) and are a critical component of a capability stocktake.

¹ http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/EC - Post 2025 Market Design Issues Paper - 20190902_0.pdf

3. Emergent capability challenges

Engineers Australia also notes that contemporary experience in the operation of the NEM provides a good indication of key emergent characteristics and requirements for any future market design.

3.1 Integration and innovation

We need to be able to assess and adapt to new opportunities flexibly and efficiently, as a business as usual capability.

Australia's ability to benefit from technology and business model innovation hinges on our capacity to proactively manage their integration into the electricity market and the underpinning power system. Engineers Australia notes that in the case of renewables this process has largely been reactive. The connection challenges faced by large scale solar farms over the last couple of years provides a useful example. The often-significant delays were caused by a sudden surge in demand for (connection) services that were not well understood by the main parties.

The 'learning on the job' that followed is an inevitable and normal part of this process. The lesson to be learnt is about designing out the deadweight costs that come with responding to innovation and integration challenges. A more structured process for engaging with new technologies is required to minimise the cost of integration. This is one that actively seeks out and engages with emerging opportunities through 'sandboxing' and early collaboration in both the economic and engineering domains.

In the absence of a reinvigorated Australian Renewable Energy Agency, alternative provisions will be required to enable funding, management and learning from first-of-a-kind technology deployments both before and as they become active constituents of the power system. This includes providing funding to pilot projects but equally importantly, resourcing the market institutions to understand and work through the technical and regulatory challenges to effective integration.

3.2 Power system capability

We need coordinated market signals that support engineering realities.

Efficient market operation relies on the large-scale coordination of engineering and economic functions. The current market design largely seeks to integrate these through a common market mechanism. This creates an inherent risk that the market dispatch will systematically undermine the power system control philosophy unless it is guided by clear reference to engineering realities. Our view is that the current regulatory regime does not effectively deliver this outcome: it prioritises commercially oriented rule making over high quality power system design and management of power dynamics.

High quality independent engineering advice embedded in the market institutions is a core capability that needs to be actively built. This capability is required in market operation roles, but also in rule setting and policy development: decision making frameworks need to support effective engineering outcomes. The shift in transmission planning philosophy away from incremental and 'on demand' decision making is one area where whole of system thinking is being built. Engineers Australia welcomes the development of the Integrated System Plan because it provides a coherent platform for assessing and responding to long term power system needs.

In this context, Engineers Australia notes that the current market design is based on a basic assumption that an integrated market can optimally address cost and security together. We encourage the ESB to test this assumption, including by assessing whether separate arrangements for the power system and market dispatch would deliver higher quality outcomes.

3.3 Cultural maturity

We need confident and coordinated decision making to manage uncertainty.

Engineers Australia considers that the ESB has filled a key gap in the governance of the NEM. The three market institutions each have separate and defined functional roles. This model ensures and delineates the core responsibilities for each. It is not designed to provide a mechanism for building common direction or coordinated leadership. Ministerial oversight fills this gap at a high level. However, ministers are busy and have the pressure of managing the delivery of electricity as an ‘essential service’.

In this context, the ESB provides a key executive leadership function that is otherwise missing. It provides a forum for addressing systemic challenges and dealing with practical implementation matters. This is of course the rationale for the original creation of the ESB. Engineers Australia, however, recommends that this function be made a permanent feature of NEM governance arrangements (subject to refinement of governance and resourcing arrangements).

3.4 Information and education

We need more accessible debates that reflect the growing diversity of NEM stakeholders and beneficiaries.

Energy markets continue to be topical issue for market participants and the general public alike. The NEM has a celebrity status – because of its complexity, but also the fractured debates about the current transition, this creates continuing and very public controversy. This is not a strong basis for an orderly debate, especially when planning for a future that is likely to involve more customer participation and two-way energy flows.

At a practical level, the ESB has a role to play in shaping this debate and encouraging participation by a broad cross section of stakeholders. Framing the core design questions without reference to economic formalism and rationalising the possible evaluation principles, may make the policy process more accessible.

More fundamentally, Engineers Australia notes that the current National Electricity Objective (NEO) pivots around the concept of the ‘consumer’. This notion seems (at least partially) anachronistic given: the trend towards a more diversified market place in which the line between producers and consumers is blurred; and, the persistent understanding that energy is an ‘essential service’, i.e. a basic right of ‘citizens’ rather than consumers.

Engineers Australia does not make a recommendation for alternatives. Instead we recommend that the ESB reflect on whether the NEO, as currently formulated, mirrors contemporary values and subsequently whether it is the right reference point for assessing market design options.

3.5 Policy integration

We need a market design that supports and enables broader policy objectives.

There are clear linkages between electricity market design and broader energy policy challenges. Critically, Australia has a significant exposure to liquid fuels sourced largely from international sources. An obvious method for enhancing energy security and resilience is to substitute liquid fuels for energy sourced from the domestic electricity system. This includes via the electrification of the manufacturing, transport (e.g. electric vehicles) and the mining sectors etc. along with enhanced demand side participation in the NEM.

This linkage is also relevant to measures designed to increase energy efficiency and energy productivity. A well-insulated home may for example, function as a local storage device by time-shifting heating or cooling loads during the day.

Engineers Australia notes that energy security and energy efficiency measures are likely to strengthen the NEM. Ensuring that market design remains fit for purpose requires a coherent and coordinated approach to policy making across domains. Engineers Australia therefore recommends that the ESB consider the ability of proposed market design to enhance and support Australia’s energy security and resilience.

