



ENGINEERS
AUSTRALIA

14 February 2025

Associate Professor Tim Nelson
Chair
Expert Panel
National Electricity Market wholesale market settings review
NEMreview@dcceew.gov.au

Dear Associate Professor Nelson and Expert Panel Members

Re: National Electricity Market wholesale market settings review

As Australia's national body for engineering, Engineers Australia is the voice and champion of our 130,000-plus members. We provide them with the resources, connections, and growth they need to do ethical, competent and high-value work in our communities. A mission-based, not-for-profit professional association, Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers are essential enablers of the clean energy transition. Their involvement encompasses all aspects of energy policy, governance, management, and compliance, ensuring the efficient, safe and sustainable use of energy resources and optimal management of Australia's energy system.

Engineers Australia supports reviewing the National Electricity Market (NEM) wholesale market settings. Energy is critical to the prosperity and well-being of all Australians. The pace of change to meet decarbonisation goals, price volatility, and changing market concentration are just a few of the central drivers of a review of the NEM wholesale market settings. The NEM is fundamentally changing and requires a new market response. Adding ad hoc services and markets to the already complex system will not adequately support the energy system as we move toward net zero.

Engineers Australia acknowledges the complexity of the energy system and the difficulty of capturing all those issues in a brief submission. We suggest a meeting between the Expert Panel and our expert members.

Key Messages

- A market with high and growing levels of variable renewable energy requires a new cohesive design, not ad hoc or incremental change.
- Market uncertainties slow the transition and place a premium on the cost of equity.
- The current infrastructure discount rate disadvantages long-lived capital assets.
- Embedding carbon and natural capital considerations in project evaluations would more accurately account for clean energy infrastructure's environmental and resilience benefits.
- A holistic and structured risk management approach would help to de-risk investment.
- The complexity of the energy transition requires a coordinated portfolio approach.
- Structural reform needs to ensure consumers are getting the best possible deal.
- While market-based approaches drive efficiency, system-level stability requires government leadership.
- System services must be designed to follow and enable technical requirements.

Engineering House
11 National Circuit, Barton ACT 2600
Phone: +61 2 6270 6555 | Facsimile: +61 2 6273 1488
engineersaustralia.org.au

General comments

The NEM was initially designed to provide investment opportunities in an energy-only market dominated by large fossil fuel generators. The current transformation creates a vastly different system, requiring a different response. The current market is not equipped to incentivise and coordinate the complex system of firmed renewables. Renewable energy investment needs a new cohesive design, not ad hoc changes to the current market.

A market designed to ensure generators can cover their short-run marginal cost (SRMC) may not be suitable for a market with predominantly renewable generators with near zero SRMC. In this situation, spot prices will likely become far more volatile based on the time of day and season, particularly regarding solar output.

The technologies are mainly already available, but the more significant constraint is incentives emanating from market design.

Investment

So far, the energy transition has fallen short of expectations. The build-out of firmed renewables is behind pace¹ and energy prices in the NEM are high and volatile.

Market uncertainty creates a premium on the cost of equity. The Clean Energy Investor Group (CEIG) estimates this will add AUD7 Billion (close to 10 per cent) to the net present value (NPV) of investment needed to achieve the energy transition.²

The current seven per cent discount rate applied in Australian infrastructure evaluations is high compared to international best practices and does not adequately reflect the long-term benefits of firmed renewables, pumped hydro and nuclear power. Higher discount rates disproportionately disadvantage capital-intensive projects that offer sustained carbon reduction and energy security benefits.

To address this, we recommend:

- Reforming the discount rate methodology to establish a dynamic and evidence-based approach that considers long-term societal benefits, rather than a rigid standard rate.
- Periodic updates to discount rate assumptions to ensure they remain appropriate for evolving market conditions and the needs of future generations.
- Mandating sensitivity analysis in investment evaluations to explicitly show the impact of different discount rate scenarios on project viability.
- Aligning discount rate assumptions with international best practices, including the UK (~3 to 4 per cent for nuclear and infrastructure projects), France (which applies lower rates for strategic energy investments), and Canada (which adjusts discount rates based on project lifespans and decarbonisation priorities).
- Embedding carbon and natural capital valuation within infrastructure evaluations to ensure projects are assessed holistically, reflecting their full economic and environmental value.

Implementing these reforms will create more balanced investment decisions that align with Australia's long-term energy transition and sustainability goals.

Establishing natural capital valuation (such as avoided emissions and biodiversity preservation) as a standard consideration in project assessments would align with international frameworks such as the EU Taxonomy for Sustainable Activities.

¹ The Climate Change Authority (CCA), 2024 Annual Progress Report, <https://www.climatechangeauthority.gov.au/2024-annual-progress-report>

² Unlocking low-cost capital for clean energy investment, Clean Energy Investor Group (CEIG) 2021, https://ceig.org.au/wp-content/uploads/2021/08/CEIG_Clean-Energy-Investor-Principles.pdf

Investment evaluations should internalise carbon benefits to create stronger long-term price signals for low-emission firmed power generation.

New transmission deployment is slow, with lengthy assessment processes and social license concerns. This, combined with the open access regime, increases investment risk and reduces the number of projects that reach financial investment decisions (FID). Establishing a strategic asset management framework for energy infrastructure aligned with ISO 55000 would improve infrastructure planning across transmission, generation, and storage. This would ensure investment decisions are holistic, lifecycle-driven, and integrated across energy, transport, and communications infrastructure.

A structured risk management approach (aligned with ISO 31000) would de-risk investment and enhance long-term grid resilience.

Consumer interaction with the wholesale market

The complexity of Australia's energy transition requires a coordinated, portfolio-based approach across sectors rather than isolated project-based planning.

A portfolio management framework (aligned with the ISO21500 series) would:

- prioritise investments that enhance grid stability and decarbonisation
- improve resource allocation to avoid bottlenecks in workforce and supply chains
- align public and private investment in a sequenced manner, reducing costs and duplication.

Portfolio-based planning ensures that demand response programs, distributed energy resources (DER), and flexibility services are integrated effectively.

A broad range of consumers, from consumer groups to large energy users, should be engaged in developing the market to ensure decisions reflect flexible and relevant services located in the right places. Considering the information and resource asymmetries, funding the engagement of a broad range of consumers would increase understanding of the challenges and boost awareness and trust in the energy transition.

Changing nature of spot prices

The market rules in Australia give participants a great deal of freedom in their bidding behaviour. Structural reform needs to ensure consumers get the best possible deal.

While market-based approaches drive efficiency, system-level stability requires government leadership to coordinate strategic grid investments, firming capacity, and energy security. Governments in the UK, France, and Canada have taken a long-term approach to energy transition planning, ensuring national priorities are met through a mix of public and private investment. Like other critical infrastructure sectors (defence, transport, and water management), the energy sector would benefit from a more structured government-led planning approach to complement market mechanisms.

The 'least cost' restriction may be unnecessary. Everyone wants affordable energy, but consumers should have the right to make choices that provide superior services and/or are aligned with their values.

Essential system services

Services must be designed to follow and enable technical requirements. Services must match customer needs and system resilience to prepare for emerging designs.³ Investment will not occur at pace without this clarity.

Markets are being overlaid on a complex, non-linear system, deteriorating the system. For example:

³ GPST Topic 6 on Services, CSIRO and RMIT. <https://www.csiro.au/en/research/technology-space/energy/g-pst-research-roadmap>

- Generators are being exempted from mandatory droop control so they can participate in the FCAS market.
- Frequency is spending less time at 50Hz and skewing to the boundaries of the rules-based deadband frequencies, which could lead to resonant conditions and equipment wearing out more quickly.
- Inertia is now a system service rather than a physical property that must be controlled in a well-managed system.
- The market should be encouraging all existing renewable energy projects to add a battery behind their connection point to store and provide electricity when needed, instead of the current process that is so onerous that some give up.

The system is best serviced when all generators act to control frequency and voltage (active power and reactive power). The creation of the market dispatch injects the forecast error into the system, and market services have been added to correct that error, which adds unnecessary cost to the system when the error could be removed with appropriate controls.

The government should invest in purpose-driven practical research that will contribute to relevant technology that enables reliable control and supply of electricity while minimising the need for costly additional system services.


Closing remarks

Despite some excellent initiatives, the NEM has not yet created a marketplace designed to embrace firmed renewables. The government has a critical role in creating temporary incentives to establish the market and bridging the gap between the end of the Capacity Investment Scheme in 2027 and the achievement of net zero.

It is critical that engineering and engineers have a prominent voice in the governance of the energy system.

We would welcome the opportunity to discuss any aspect of this submission further. Please contact us at policy@engineersaustralia.org.au.

Yours sincerely

A handwritten signature in black ink, appearing to be 'D. Ogden', followed by a horizontal line and a period.

Damian Ogden CompIEAust
Group Executive
Policy and Public Affairs