



National Electricity Market wholesale market settings

Productivity Commission submission

Submission to the *National Electricity Market wholesale market settings review*
– *Initial consultation*

The Productivity Commission acknowledges the Traditional Owners of Country throughout Australia and their continuing connection to land, waters and community. We pay our respects to their Cultures, Country and Elders past and present.

The Productivity Commission

The Productivity Commission (PC) is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The PC's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

For more details, visit the PC's website at www.pc.gov.au.

© Commonwealth of Australia 2025



With the exception of the Commonwealth Coat of Arms and content supplied by third parties, this copyright work is licensed under a Creative Commons Attribution 4.0 International licence. In essence, you are free to copy, communicate and adapt the work, as long as you attribute the work to the PC (but not in any way that suggests the PC endorses you or your use) and abide by the other licence terms. The licence can be viewed at: <https://creativecommons.org/licenses/by/4.0>.

The terms under which the Coat of Arms can be used are detailed at: www.pmc.gov.au/government/commonwealth-coat-arms.

Wherever a third party holds copyright in this material the copyright remains with that party. Their permission may be required to use the material, please contact them directly.

An appropriate reference for this publication is:

Productivity Commission 2025, *National Electricity Market wholesale market settings*, Productivity Commission submission, Canberra.

Publication enquiries:

Phone 03 9653 2244 | email publications@pc.gov.au

The Productivity Commission (PC) welcomes the opportunity to make this submission to the review of the National Electricity Market (NEM). Developing enduring market signals for the energy sector is one of the central productivity challenges facing Australia.

Improving NEM market settings is becoming urgent

Over 85% of Australians use the NEM each day. It powers millions of homes, businesses and public services. But the NEM is facing increasingly urgent challenges as it undergoes a fundamental transformation brought on by ageing thermal generation, rapid technological change and cost reductions in clean energy and storage, together with the need to meet net-zero objectives in line with international commitments.

There are imminent reliability and system security challenges to navigate, as much of the system needs to be replaced and transformed over the next decade. But the transformation is also an opportunity – it will pave the way for the wider electrification of the economy, help minimise harms from climate change and contribute to national productivity growth and competitive advantage. And in all this, it will be critical to achieve these outcomes at least cost to consumers, and to ensure the reliability, security, affordability and sustainability of these essential services.

Governments across the NEM have used a range of policy levers, inside and outside the market, to address urgent issues, and to pursue the goals of reliable, secure, affordable and sustainable power. These measures have been focussed on incentivising the necessary investment in the next several years.

This review has the important task of designing market signals to progress the transformation beyond 2030. Change is needed.

- Many of the policies providing investment signals to generation and storage investments are time limited.
- The range of policies implemented in different jurisdictions has created a somewhat disjointed and overlapping set of signals, and with remaining gaps.
- While understandable in the short to medium term, given the urgency of action, long-term measures relying on budgetary resources to underwrite and incentivise investment are unlikely to be sustainable or provide the enduring and predictable environment conducive to efficient investment.
- There remain questions, to be fully examined by the review, as to whether new market design elements are needed to meet the technological and policy challenges facing the NEM.

Enduring, broad-based market settings are key

A well-functioning wholesale electricity market – one with reliable, affordable and secure supply and low emissions – is most likely to be achieved through enduring, broad-based settings.

Clear and predictable market signals offer the best prospect for calling forth the generation investment needed at lowest cost. Risks and returns can be properly allocated between market participants, maximising overall value and fostering resilience to shocks. Competitive pressures can incentivise innovation and result in least-cost investment in new energy generation. Governments can wind down less efficient measures.

Over-reliance on narrow government interventions, on the other hand, can create uncertainty, deter private investment, prompt inefficient investment choices, and lead to poor outcomes for consumers and taxpayers.

Guiding principles for market design

Markets will provide these benefits if they are built on the following principles.

1. **Clear identification of policy goals.** Identifying policy problems as precisely as possible is crucial to finding and designing the right solutions.
2. **Targeted policy instruments for each policy goal.** Too many instruments per goal can create unnecessary complexity and regulatory burdens. One instrument to achieve multiple goals is also rarely effective, though it is important to ensure the different instruments interact in intended ways.
3. **Technology-neutral policy instruments.** A technology-neutral approach to meeting policy goals can avoid market distortions that increase costs and discourage innovation.
4. **Policy instruments reflect practical market realities.** Early and detailed engagement with market participants will clarify the impact of any policy changes on investment signals and related energy hedge markets and can minimise the risks of unanticipated consequences. Signals affecting retail customers must be designed carefully in line with the capabilities of participants to interact with the market.
5. **Clear and predictable market settings.** Clear governance and timely rule-making around instruments will build certainty and investor confidence. Reforms should be made carefully and incrementally, building on the NEM's strengths, to avoid undermining investor confidence.
6. **Distributional impacts to be addressed separately.** Sequencing NEM reforms and packaging them with other policies to improve electricity and energy efficiency will help reduce costs to consumers. Remaining distributional impacts should be addressed outside the NEM market signals.

There is no simple 'markets know best' solution to electricity policy, especially given electricity is an essential service with a key externality from carbon emissions. But a carefully designed market-based approach to the NEM should support productivity growth and cost less than alternatives.

Key challenges

The terms of reference direct the panel to review market settings to promote investment in firmed, renewable generation and storage following the conclusion of Capacity Investment Scheme (CIS) tenders in 2027.

The concept of 'firmed renewables' highlights two separate but interacting objectives.

1. efficiently ensuring a reliable supply of electricity
2. reducing carbon emissions in the electricity sector via the increased adoption of renewable energy.

Consistent with the principles above, the review will need to tease these goals apart and consider market signals to achieve each.

Investment incentives to ensure reliable supply

In an energy-only market like the NEM, scarcity pricing is the primary mechanism for ensuring reliability. Electricity prices rise when demand is high and supply is tight. High prices provide a financial incentive for existing generators to be available. Anticipation of these prices can provide signals for new investment in capacity, and forward contract markets provide hedging products for investors and participants for limited time horizons. NEM market signals are attenuated by price caps, which are ubiquitous in energy markets around the world.

Reliability has been a central part of NEM regulation. The price caps are set by reference to a reliability standard determined within NEM governance arrangements. In addition, generators and retailers have faced

new obligations and the market operator can, in some circumstances, procure emergency reserves and direct participants to maintain reliability. Market bodies also forecast and plan for reliability over multiple time horizons, for example in AEMO's Electricity Statement of Opportunities and Integrated System Plan.

Concerns have emerged over NEM reliability

For much of its history the NEM was largely successful in securing a reliable supply of electricity. However, there are growing concerns about reliability and, in particular, the ability of existing market signals to manage the very significant transformation of the composition of generation infrastructure over the next decade. The number of 'lack of reserve' notices issued by the market operator has increased in most NEM regions since 2017 (Wood et al. 2024, p. 10). NEM governments have sought a higher level of reliability than that built into the NEM arrangements, opening a gap between community expectations over reliability and market price arrangements. Governments have also introduced a range of non-market procurement and direct investment measures to close perceived reliability gaps, further challenging the energy price signal within the NEM.

The review's consultation paper also draws attention to the changing nature of energy spot prices in a high renewable system, and the prospect that this may increase the prices of existing insurance products. The NEM has exchange-traded and over-the-counter contract markets that typically only go out three years, and these developments may further impact this market.

At the same time, many investors appear to be requiring longer contracts to underpin what are often large and up-front expenditures.

The new market signals are likely to have differential impacts on firming investment across different operational timeframes. Many types of firming investment will have strong business cases in such a market, and indeed will benefit from arbitrage opportunities – for example, batteries and some types of shorter-term demand response. The developments outlined above, however, in combination with other market and non-market uncertainties, may particularly reduce the attractiveness of those firming assets with long pay-off periods and highly unpredictable and intermittent utilisation patterns (for example gas peakers). Understanding the reasons for, and likely extent of, these differences will be crucial for targeting any new signals.

A new reliability signal

Effective and targeted signals will be critical in building community, industry and government confidence in transition settings, while ensuring least-cost outcomes for consumers.

Applying the above principles of market design, any new signal should be:

- targeted at types of firming assets where current signals do not provide adequate levels of investment, often known as 'missing money'. Any signals should be targeted to the extent possible at such reliability *gaps*, which are likely to be around the 'deep firming' needed to meet seasonal and time-of-day peak demand as coal assets exit the system. This is akin to buying additional insurance for the system. The amount of insurance needed involves judgement calls, recognising that estimation of any gaps is uncertain and some of the capacity may have been invested in any case. But targeting based on objective rules remains important to reduce risks of over insurance in additional capacity, with consequent costs to consumers
- comprehensive and credible, to facilitate replacement where possible of other government interventions aimed at supporting reliability in these segments, supporting least-cost solutions for consumers
- as broad-based and technology agnostic as possible, so as to ensure the widest possible range of options to achieve the targeted energy services. It should be open to both demand and supply-side response technologies. Given where gaps are most likely in current arrangements, any new signal should be open

to gas peaking investment, noting that decarbonisation objectives can and should be addressed via separate signals (see below)

- carefully designed and tested with market participants, including to ensure any new signal can complement and work in tandem with current energy and contract market price signals to minimise disruption and smooth the transition to maintain investor confidence
- underpinned by sound governance to support investor confidence, with any new signal based on transparent analysis of any targeted market gaps, and with access to any signal based on predictable rules.

Introducing a new market signal brings with it some risks of disruption and additional costs. However, if carefully designed and accompanied by removal where possible of other potentially redundant measures, and transitioned into this new NEM wide approach, this will support the provision of affordable and reliable power.

Renewable energy incentives

Commitments to net zero

All Australian, state and territory governments aim to reach net zero by 2050. Significantly reducing emissions from electricity production will be vital to success and all jurisdictions have committed to renewable energy targets as central ways to contribute to these goals.

Several policies seek to help meet these goals. For example, the Australian Government's Renewable Energy Target helped boost investment, leading to a 'renewable investment supercycle' (Simshauser and Gilmore 2022, p. 9). And in recent years, multiple NEM governments have implemented underwriting schemes to help drive private investment in renewable energy and storage projects. Most notably, the Australian Government's CIS aims to encourage the development of 23GW of renewable capacity and 9GW of clean dispatchable capacity by 2030.

By incorporating emissions targets in the National Electricity Objective, governments have also given investors and others a strong signal about the long-term direction of the market. The new obligation for market bodies to consider emissions targets in their work also creates opportunities for new approaches, including in the making of rules within the NEM that support achievement of net zero targets and renewable energy adoption. This also presents an opportunity for the review.

A new signal for renewable energy

As the review's terms of reference make clear, the review will need to consider how NEM market settings can support Australia's transition to a high penetration renewable energy system post the CIS and the RET. As indicated above, a separate renewable energy signal is likely required in the market as part of efforts to drive investment in 'firmed renewables'. Indeed, a new, technology-agnostic signal to underpin reliability will increase the need for other signals to ensure ongoing progress to decarbonise the electricity sector.

There are several policy instruments available to drive the take up of renewable energy and reduce emissions. Reflecting the principles outlined above, that instrument should be:

- targeted precisely and specifically at increasing renewable energy, leaving other signals to maintain reliability or meet other policy objectives
- technology-neutral, where possible. Ideally this means not preferencing one form of clean renewable energy over another.

Like the reliability signal discussed above, a clean energy signal should be carefully designed to interact with other market signals, including by giving credible signals to encourage the co-optimisation of firming and

renewable investments. It would ideally be governed by predictable rule-making processes and arms-length and transparent market access to any signal.

Several types of policy signal might meet these objectives. For example, renewable certificate programs have been successful in Australia and overseas, and the new Guarantee of Origin arrangements could provide ongoing infrastructure. Some market-based contracts-for-difference programs might also meet these objectives. The amended National Electricity Objective may allow for clean energy signals to be built into the NEM mechanisms more directly.

Applying sound market design principles to any new signal could build investor confidence and help smooth the transition by contributing to the vision of incentivising investment in firmed renewables.

Reflections on other aspects of the review

Consumer interaction with the wholesale market

The review's initial consultation paper indicates that it will consider interactions between consumer energy resources, and the demand-side more generally, with the wholesale market.

Many of the principles of market design set out above would be relevant to this exercise. Application of technology-neutral market settings, for example, would lead to settings in the CER market that are broadly agnostic between rooftop and utility-scale solar (taking account of network costs in delivering energy). Similarly, any enhanced signals for household contributions to system reliability should be neutral between supply and demand response solutions. Market features would need to account for the capacity of owners of CER and all consumers to participate in the market.

The work of the review will complement the Australian Government's Consumer Energy Roadmap, which features a large number of initiatives designed to make efficient use of rooftop solar, home batteries and other consumer energy resources to 'smooth the transition, reward participation and lower emissions'.

Essential system services

The review's initial consultation paper notes that many of the essential system services (ESS) provided by large thermal generators may not be provided in the future without new markets and pricing signals.

The current approach of managing system strength through market operator directed asset configurations may not be feasible in the long term as large generators retire (Australian Energy Regulator 2024, p. 26). And markets for some system services might become less competitive if they come to be dominated by a small number of synchronous generators.

Ensuring system security will require identifying the specific system services needed to maintain grid security and then determining how those services can be provided at least cost. Consistent with the market design principles discussed above, system security signals should be precisely targeted and separate from signals for reliability and emissions reduction. The Energy Security Board previously noted that market signals will not be appropriate for all ESS and procurement options may need to be explored (ESB 2021, p. 28).

Enhancing competition

The review's initial consultation paper asks how the larger number of small participants and growing participation in the NEM can be harnessed to ensure all markets are increasingly competitive.

Enabling competition can put downwards pressure on prices and spur innovation in the wholesale market. This can occur by ensuring broadly neutral signals between different types of generation as outlined above. In addition, well designed new market signals can maximise competition for the provision of reliability services in the wholesale and ESS markets. Over time, economic regulation will need to remain alert to changes in competitive dynamics in segments of these markets, for example a small number of assets providing deep firming or essential services to a market.

Beyond the wholesale market it will be important to maximise competitive pressures in other aspects of the electricity system. For example, household and community batteries and other distributed energy resources could increase competition for the provision of some distribution network services.

Sound economic regulation of monopoly assets will be essential to underpin effective competition. Broader market settings will need to be closely examined, either in this review or elsewhere, to increase utilisation of networks and ensure incentives are in place to optimise investment in network services, for example the right mix of poles and wires, charging points and distributed storage. The efficient economic regulation of networks will only become more important as the grid electrifies and further opportunities emerge to integrate electric vehicles and other distributed resources through virtual power plants. Crucially this will assist in minimising delivered energy costs to consumers, in addition to an efficient set of wholesale market signals.

Some additional points

Locational signals

The discussion above outlined the need to put in place soundly based market signals to encourage reliability and continued take up of clean energy following the cessation of existing measures such as the CIS. Enduring and market-based locational signals are also becoming increasingly important.

The coming decades will require investment in new capacity throughout the NEM and it is crucial that those investments are made in the most sensible locations, taking into account transmission losses and congestion, to minimise the cost of delivered energy to consumers. Indeed, increasing the efficiency of the transmission (and distribution) networks will be a critical contributor to securing affordable energy.

The location of new capacity is currently considered through the CIS and other programs. A new approach will be needed when those programs expire. This may not be critical to resolve as part of this review, but consideration should be given to complementary reforms in the near future, to allow for the right incentives for new generation investment decisions to co-optimize reliability, clean energy and location.

Planning and approvals

Well-based market arrangements will be critical to minimising the cost of energy to consumers of supplying new energy. However, the outcomes of these market arrangements for consumers will depend crucially on the cost of building and maintaining energy infrastructure, such as transmission lines and new renewable, firming generation and storage. It is important and necessary for the planning and approvals processes for these projects to be efficient, while also maintaining trust and building support in affected communities.

Affordability and distributional issues

Any new market settings need to be designed to minimise costs for consumers. Nevertheless, there is potential for new energy market arrangements to have transitional costs. This highlights the importance of the sequencing of market reforms to ensure a smooth transition to new arrangements.

It also emphasises the need for governments to consider the outcomes of this review in concert with broader efforts to improve the efficiency of other aspects of electricity and energy systems to minimise the delivered costs to consumers – for example the issues around improving network efficiency raised above, and the efficiency of energy use.

Remaining equity and distributional issues should be addressed directly where possible, rather than through muting market settings – for example through targeted tax and transfer programs to ensure vulnerable consumer groups are protected.

Conclusion

The review's task of designing a wholesale electricity market for the future is a core part of the broader goal of ensuring Australia has a clean, reliable and affordable supply of energy, and meets legislated goals to achieve net zero emissions. Enduring, broad-based market settings based on sound principles of market design can provide a least-cost pathway for the energy transition.

References

Australian Energy Regulator 2024, *The Efficient Management of System Strength Framework – AER Draft Guidance*, October

ESB (Energy Security Board) 2021, *Post-2025 Market Design Final advice to Energy Ministers Part A*, 27 July.

PC (Productivity Commission) 2023, *5-year Productivity Inquiry: Managing the climate transition*, Inquiry Report no. 100, Vol. 6, Canberra.

Simshauser, P and Gilmore, J 2022, 'Climate change policy discontinuity & Australia's 2016-2021 renewable investment supercycle', *Energy Policy*, vol. 160.

Wood, T, Reeve, A and Yan, R 2024, *Keeping the Lights On - How Australia should navigate the era of coal closures and prepare for what comes next*, Grattan Institute.