AUSTRALIAN ENERGY COUNCIL

NEM Review Secretariat

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Submission to NEM Wholesale Market Settings Review Initial Consultation

The Australian Energy Council welcomes the opportunity to make a submission to the NEM Wholesale Market Settings Review Initial Consultation (Initial Paper).

The Australian Energy Council (AEC) is the peak industry body for electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. AEC members generate and sell energy to over 10 million homes and businesses and are major investors in renewable energy generation. The AEC supports reaching net-zero by 2050 as well as a 55 per cent emissions reduction target by 2035 and is committed to delivering the energy transition for the benefit of consumers.

This submission will address five main areas:

- a list of the key issues the market settings review needs to solve for;
- suggested key principles for the Expert Panel to consider when making its recommendations;
- a high-level assessment of different market design concepts;
- responses to key themes raised by the Expert Panel in its consultation paper; and
- an overview of the NEM from now through to the achievement of the 82% renewable energy target. This has been informed by modelling conducted for the AEC by Endgame Analytics.

Key issues for expert panel to focus on

The AEC has held several member discussions to arrive at what we believe are the key focus areas for the Review Panel. These focus areas are a function of how the market has been performing, and a forward view on the changing energy mix as the energy sector continues to decarbonise.

The AEC considers that the energy only market has historically done a good job at sending market signals in the operational timeframe and continues to perform well in this regard. What has emerged as an issue is its performance in the investment timeframe, noting it is difficult to assess whether that is an energy only market deficiency or a result of the large number of uncoordinated State and Commonwealth policy interventions, which have ultimately impacted on market certainty. Whatever the root cause of the problem, the majority of AEC members believe that the current market settings are not sufficient to drive investment in flexible, dispatchable energy sources.

Issue 1 – Coal exit and investment incentives

The exit of coal generation may result in a shortfall of energy supply during certain periods that cannot be addressed by increasing renewable energy supplies alone, resulting in both short (intra-day) and long duration (multi-day) supply shortages. To avoid the risk of shortfall and to ensure coal generation can exit smoothly, there is a need for a clear and strong ongoing signal to encourage ongoing investment in firm generation.

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Recommendation 1 – The Panel should focus their efforts on mechanisms that provide investment signals for flexible, dispatchable energy sources on both supply and demand sides.

Issue 2 – Contract markets role as variable renewable energy increases

With the exit of coal generation and high volumes of renewables in the system, wholesale markets and prices will be more weather-dependent, increasing price volatility, including notable periods of negative prices. As renewables are unable to offer the same level of firm contracts, standard contracts in secondary markets may become harder to obtain. The role of contract markets and their preferred forms have not yet evolved to balance management of risks with exposing customers to an efficient level of price volatility over time.

Recommendation 2 – The Panel should consider the role of the contracts market in providing the required investment signals for flexible, dispatchable energy sources.

Issue 3 – Essential system security services must be valued

The market is not valuing the full range of system security services needed for a net-zero emissions system. As thermal plant exits, system security needs must be met via non-traditional plant, for which there are no market mechanisms or investment incentives in place.

Recommendation 3 - In its consideration of investment signals for flexible, dispatchable energy sources, the Panel should ensure ESS is valued through the establishment of spot markets such as for the provision of inertia.

Suggested key principles for the Expert Panel to consider

Any future design must support the achievement of the National Electricity Objective (NEO) and support the long-term interests of energy consumers. The AEC has workshopped a series of guiding principles with members that describe what a successful wholesale market reform program would achieve. These principles have received broad support from the AEC membership base and therefore provides a strong foundation from which various reform options can be considered.

Both Governments and consumers are looking for greater certainty in the investment pipeline to ensure there will be sufficient capacity in the system to support both short term and long-term reliability standards. Given this, we have included this requirement in establishing the aforementioned principles and also considered a wider range of design concepts to address this concern. To this end, the AEC suggests the Expert Panel focus on the following principles when considering market design options:

1. Provides appropriate signals for investment in technologies and/or products that provide flexible, dispatchable energy sources from both supply and demand sides, including the participation of consumer energy resources;
2. Facilitates market participation in a liquid secondary market to ensure there are products available to adequately manage generator and retailer price risks;
3. Enables wholesale and retail product offerings that shield customers from increasing price volatility;
4. Allocates market risks efficiently to participants best positioned to manage them;
5. Encourages healthy competition in wholesale and retail markets;
6. Limits regulatory complexity and compliance costs to the greatest extent possible; and

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7. Ensures transparency on investment pipelines to build confidence among government, policymakers, and industry in the security and reliability of the system.

A high-level assessment of different market design concepts

As described in the Initial Paper, the energy only market design (EO) has served the NEM and energy consumers well. In recent years both State and Commonwealth governments have introduced policies designed to incentivise investment in variable renewable energy (VRE). These interventions have fast tracked VRE investment compared to what would have been the case absent Government intervention. This VRE will co-exist with existing thermal plant for a period of time, effectively distorting price signals, and creating revenue adequacy issues. The CIS will also reduce the participation in the contracts market, which could cause liquidity problems unless the CIS is restructured to better support the contracts market.

This has now reached a point where the integrity of the market has been distorted and there are questions as to whether the current market settings are adequate to incentivise investment in new firming generation and ensure that existing thermal plant is able to continue to operate while it is still needed for reliability and essential system services (ESS). A related question is whether the issues the market is facing today can be resolved through a series of temporary measures focused on the transition (with a reversion to energy only market settings once the transition is further progressed) or whether more enduring mechanisms are required.

In summary any new market design must be able to:

- support existing and new non-weather dependent capacity including but not limited to gas-powered generation (GPG), hydro and longer duration storage; and
- ensure existing thermal plant is able to operate until no longer required, noting that asset owners will require sufficient returns to continue to invest in the safety and reliability of assets approaching their end of life.

A price on carbon would have been the most economically efficient way to decarbonise and the AEC has consistently advocated for this as a least cost policy approach to decarbonising the energy system. We understand however, that carbon pricing is outside the terms of reference for the Expert Panel and we accept that alternative approaches must now be considered to address the issues facing the NEM, which includes consideration of a mechanism that prices capacity. In our view the energy only market can still operate in tandem with a capacity mechanism, but the need for increasing the market price cap (MPCs) will be reduced.

There are a range of market design concepts that we have actively discussed with members. While there is consensus regarding the key issues to be addressed and the desired outcomes of a wholesale market reform program, members have a range of views regarding the various design concepts that the Expert Panel should consider. To assist the review panel in considering these design concepts further, the AEC has assessed these concepts against the key principles proposed above. The AEC welcomes the opportunity to work collaboratively with the review panel to further refine and narrow down the options under consideration. To date, the key design concepts we have explored with our members is listed below:[1]

a) **Strategic standing reserve (e.g.RERT).** Payments made to generators (or demand side management participants) to be available only when needed (does not operate in the market unless required).
b) **Direct payments.** To enable thermal generation to operate profitably until it is not required, negotiated arrangements could be undertaken. Ideally, any contract would be made as transparent as possible.

[1] Capacity Definition Sources: *Combining capacity mechanisms and renewable energy support: A review of the international experience* M. Koziova, I.Overland, Renewable and Sustainable Energy Reviews, March 2022

c) **Capacity market (reliability obligations).** A decentralised market where utilities/retailers have an obligation to purchase enough capacity to meet demand plus a contribution to reserves. This would be like the RET, in that a monthly or seasonal target would be established and retailers would have to surrender certificates or pay a penalty. As with large generation certificates (LGCs) a liquid secondary market would evolve. Firm capacity can be provided by any firm technology.

d) **Capacity market (auctions).** A centralised market arrangement whereby required capacity volumes are procured by a coordinating entity.

e) **Capacity market (reliability options).** A decentralised market where a trade in reliability options reflects a call option, usually an option held by the electricity consumer to acquire electricity from the generator at a specified price during a defined period in the future.

f) **Energy only market levers.** Changes to pricing thresholds, for example the market price cap, cumulative price threshold, average price cap, introduce a dual floor price.

g) **Firmed renewables requirement.** All new VRE could be required to be matched with a predetermined percentage of flexible dispatchable capacity.

h) **Operating Reserve Demand Curve (ORDC) / Price adders** – assume incorporated into dispatch. The basic idea underlying this mechanism is that generators that participate in the real-time market get paid not only the real-time spot price, but also an "extra" price – called the ORDC price adder – if total reserves available in the market cross a lower threshold. Therefore, generators get additional revenue, which they can use to invest in additional generation units and, eventually, resource market adequacy is restored.

i) **Payment for availability (possibly Operating Reserves)** – explicitly value capacity reserves through an operating reserve market.

j) **Market making.** To help address declining financial market liquidity for electricity derivatives and enable retailers to hedge their wholesale market risk. Details of an ongoing market making framework should be developed with market participants.

The process of focussing on the key issues to resolve in the market, identifying a set of principles, and then assessing different design concepts against these principles has been a useful exercise. It should be said though, that this assessment of different design concepts is indicative only, and that any future assessment will be very much informed by the detailed design choices the Expert Panel will advise on. We are also conscious that each design concept has pros and cons, and whatever choice the Expert Panel makes will invariably involve complex issues that need to be worked through. With these caveats in mind, the AEC and its members would give additional weight to the following aforementioned principles when further assessing design options:

- Provides appropriate signals for investment in technologies and/or products that provide flexible, dispatchable energy sources from both supply and demand sides, including the participation of consumer energy resources (Principle 1);
- Ensures transparency on investment pipelines to build confidence among government, policymakers, and industry in the security and reliability of the system (Principle 7).
- Allocates market risks efficiently to participants best positioned to manage them (Principle 4);
- Facilitates market participation in a liquid secondary market to ensure there are products available to adequately manage generator and retailer price risks (Principle 2).

If the design concept implemented supported these four principles, we think it would also deliver on the remaining principles. On that basis, we believe the Expert Panel should further explore mechanisms focussed on incentivising the required level of capacity.

Independent of which design concepts the Expert Panel focusses on developing further, we look forward to working collaboratively with the Expert Panel as it enters the next phase of its consultation. AEC members are open to exploring a range of design concepts and would be willing to support a number of options that policy makers are confident of being able to implement in a coordinated fashion.

Table 1 on the following page provides an assessment against the principles of the various design concepts considered in our member consultation.

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Table 1: Design Concept Assessment Template

High, **moderate** and **low** rankings to rate the extent to which each concept aligns with the proposed principles. Note, where a principle involves minimising complexity, a high score means a design concept is low in complexity. Principles in bold higher weighting than other is assessment.

Design Concept	**Alignment with Guiding Principles**							
	Principle 1 – investment signals	***Principle 2 – liquid secondary market to manage risk***	*Principle 3 – wholesale and retail offerings to shield consumers from price volatility*	***Principle 4 – risk allocated to those best able to manage them***	*Principle 5a – wholesale competition promoted*	*Principle 5b- retail competition promoted*	*Principle 6 – limit complexity and compliance costs*	***Principle 7 – transparent investment pipeline***
Strategic reserve	Medium	Low	Low (No greater than status quo if new resources held outside of the market)	Medium (Depending on design parameters to limit over-procurement)	Low	Low	Medium Complexity could be low.	Medium (Depends on design – could target new firming resources, timing of entry uncertain).
Direct payments	High If payments are transparent.	Low Annual payment shouldn't affect current liquidity.	Low	Medium Participants only manage their own financial risks.	Medium Potential new entrants to contract with.	Low	Med/High No compliance costs, but payments need transparency.	High (Potentially)
Capacity market (reliability obligations) *(Would need to include all assets)*	Low - Medium Indirect incentive to invest, reliant on participants forward contracting. Rating will be influenced by penalty in detailed design.	Medium Participants mange 'obligations' over time.	Low - Medium Capacity is separate to derivatives that inform substantial price. Success dependent on the ability to deliver new capacity.	Medium Participants purchase capacity based on their own future expectations.	Med/High	Medium Large participants remain best placed to contract capacity therefore market concentration is maintained.	Low Compliance remains complex (somewhat similar to current RRO).	Low Not clear any better than current (in participants' hands).
Capacity market (auctions) *(Centralised, will need to include all assets)*	High Clear investment pipeline and revenue support.	Low - Medium With a central buyer, not clear that capacity gets traded. Could improve if mechanism drives investment in dispatchable plant.	High Derivatives markets unchanged. More confidence in reliability may mean lower premiums.	Medium As a whole market reliability has higher confidence. Market participants can still choose between develop or purchase capacity.	Medium	Medium Central capacity buyer means participant size is less of a factor in forward capacity procurement.	High One central buyer with transparent forward procurement means low complexity.	High

Design Concept	Alignment with Guiding Principles							
	Principle 1 – investment signals	***Principle 2 – liquid secondary market to manage risk***	*Principle 3 – wholesale and retail offerings to shield consumers from price volatility*	***Principle 4 – risk allocated to those best able to manage them***	*Principle 5a – wholesale competition promoted*	*Principle 5b- retail competition promoted*	*Principle 6 – limit complexity and compliance costs*	***Principle 7 – transparent investment pipeline***
Capacity market (reliability options)	Medium	Medium (May promote options trading).	High	Medium Does a central buyer on-sell the options or is it decentralised procurement?	Med/High	Low Depends on procurement model.	Medium Relatively complex for compliance and potential market flow-on.	High
Energy only market levers	Med/Low Needs confidence change is enduring.	High	Low/Med Consumers benefit if participants increase product offerings including innovation.	Medium (Noting current problem that demand only contracts short and new projects need longer).	High	Medium	High	Low/Med Improvement relies on new behaviours.
Firmed renewables requirement	Medium	Low	Low	Low (Either VRE firms itself or relies on availability of products?)	Medium	Low	Low Appears complex (without more design detail).	Medium
Operating Reserve Demand Curve (ORDC) / Price adders– assume incorporated into dispatch	Medium	Medium	Low	High (If investment is forthcoming).	High	Medium	High (Not compliance, just adding to NEM).	Low (Drive for investment but not transparent pipeline).
Payment for availability (possibly Operating Reserves) – assume incorporated into dispatch	Medium	Medium	Low	Medium (Would be High but customers are paying for energy that is never generated – they can't control this).	High (Encourages availability and bidding).	Medium	High (Not compliance, just adding to NEM).	Low (Drive for investment but not transparent pipeline).
Market making framework	Low	Medium (Supports greater market liquidity).	Medium (Supports greater market liquidity).	Medium	Medium	Medium	High	Low

The following section of the AEC submission focusses on the Expert Panel's questions outlined in its Initial Consultation Paper.

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Yours sincerely,

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Attachment 1: AEC responses to Initial Paper questions

1. Investment Signals

How might the NEM wholesale market and derivative markets most efficiently evolve to provide signals for investment in firmed, renewable generation and storage capacity?

Liquid derivatives markets provide clear price signals for the value of electricity in the future. Sold futures positions on the ASX do not require physical backing. All they require is margin depending on whether they are in or out of the money. Margining became an extremely important issue during the 2022 energy crisis where Macquarie Bank stepped in to provide finance. Nevertheless, most sold positions are generators hedging their output price risk.

Over the Counter (OTC) contracts allow for much more flexibility and can be structured to meet the requirements of a participant and are more responsive to changes in market conditions. When a particular OTC contract starts becoming common and relatively standardised, it provides a signal to the ASX that there may be adequate demand/supply (ie, liquidity) to justify it creating a similar product.

As the MW available from thermal generators decreases there is a question as to where the sellers of firm volume contracts will come from. Both hydro and gas generation naturally incline towards caps or super peak OTC contracts and stand-alone VRE is unable to offer firm swaps. Therefore, what is required is a natural sell side participant that 'wants' to sell firm swaps. What needs to be established is a firm product market that will incentivise investors to construct the assets that are necessary to create a firm product.

It is possible to structure a financial product using physical VRE, storage, dispatchable generation and possibly weather derivatives and while this may protect the cash flows of both parties, it does not deliver enough physical dispatchable capacity to satisfy governments and consumers. Our understanding is that the ASX cannot set contract conditions based on physical delivery capacity, however a government mandated product may provide an index that products could trade around. Furthermore, OTC contracts can be written to require physical delivery. In addition bilateral contracts with generators achieve this too.

The Endgame Analytics analysis (included in more detail at Attachment 2) modelled the amount of VRE capacity that would need to be installed to support a 10MW flat swap, which ranged from 70-170 MW. Under this analysis, only VRE, battery storage and 1 percent of imported energy were assumed. Hence, other generation types will be required in practice such as pumped hydro, gas powered generation, and demand response.

Under a capacity market reliability obligation (physical RRO) option, it is envisioned that 'firm' certificates would trade in secondary markets as LGCs do. This would enable participants to trade in this market to manage risk associated with the certificate requirements. The AEC believes that the RRO in its current form adds no value and should be repealed and that the market liquidity obligation (MLO) could be replaced by an ongoing market making framework to promote liquidity. Market participants have gained experience of both acting as a market maker in the NEM and the benefits of market making. It is generally accepted that the MLO has boosted liquidity and been a positive for the NEM, with parties who have been obliged to act as market makers confident that they can manage the risks of being a market maker.

Is there a role for certificate schemes to promote investment in firmed, renewable generation and storage and what might these look like?

Retailers could be required to 'prove' they have adequate firm capacity to supply their customers within a certain probability level. For vertically integrated (VI) retailers this should be relatively straight forward for

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a portion of their load. Non-VI retailers will require a market in firmed products and this market needs to be readily accessible and liquid.

One way to achieve this may involve a physical RRO, where retailers must have adequate firm coverage as opposed to purely financial products. A physical RRO requirement for retailers would be likely to incentivise new firming capacity. For example, a retailer would be required to acquire certificates that require them to be firm capacity backing that unit (MWh). Compliance with the requirements of a certificate could be assured by the AER.

Suppliers of a certificate would need to demonstrate the reasonable capability to provide the physical capacity at all times. The AER in this case would have a role in developing a guideline which specifies how a certificate seller can determine its physical capability to supply as well as compliance with this guideline.

A key issue with this approach is the duration of the certificates. New investment generally requires long term contract (PPAs, which are an OTC contract) to provide stable cash flows that can cover the plant's capital and operational costs. A retailer, particularly a small one, is unlikely to want or be able to enter into a long duration PPA of 10 years or more.

Could the Retailer Reliability Obligation (RRO) play a role to incentivise new investment if it was expanded in the future?

One of the options in this paper is replacing the RRO with a physical RRO. The AEC has consistently argued for the repeal of the RRO in its current form, on the basis that the RRO does not contribute to achieving the desired reliability outcomes. We believe this review is an opportunity to consider repeal of the current RRO design and replace it with design concepts that better meet the aforementioned principles.

Could other capacity mechanisms efficiently attract investment in firmed, renewable generation and storage capacity?

The AEC has identified a number of different design concepts which could potentially support the market (refer to Table 1 above).

How can markets ensure we have sufficient capacity in place when and where we need it before existing resources retire? How do the market settings preferred by stakeholders provide sufficient confidence to consumers and governments that capacity will be delivered?

Ideally, we require arrangements that create an environment where new investment and retirements occur seamlessly – the goal being an orderly transition at least cost to consumers. In our view there are two limbs to this question:

1. new investment in capacity; and
2. ensuring existing capacity remains until no longer required or the asset owner can recover their initial investment.

While we recognise these two are separate problems that need to be addressed, at this nascent stage of the project we believe the Expert Panel should still consider a technology neutral approach and how it satisfies the NEO and the internal balance of this between reliability, cost and emissions reductions.

<u>**New Investment**</u>

Investment in relatively small assets (ie, VRE, batteries, gas) is best determined by industry on commercial terms and subject to competitive pressure. With investment comes risk and this should reside with the private sector. At the simplest level an investment decision is based on the investor having what it considers to be adequate certainty that it will make a return commensurate with the risk over the life of the asset. As the NEM evolves:

- the ability to forecast revenue is likely to be more challenging;
- the potential for oversupply of VRE capacity is high; and
- regulatory risk has become extreme as demonstrated by the array of recent government policies and schemes including LTESAs, the CIS and the $12/GJ gas price cap.

Placing a value on capacity will send a signal to participants. Mechanisms that value capacity generally create a requirement for a given level of capacity albeit through different arrangements. The Renewable Energy Target (RET) and Queensland Gas Energy Certificate (GEC) scheme both achieved the targeted levels of investment in renewables and gas generation respectively. This should reassure governments that capacity will be delivered when required.

However, in the case of the RET, projects required long term power purchase agreements (PPAs) to underwrite their financing. Hence, to obtain finance, investors will generally require a certain level of stable cash flows, particularly debt holders. At this stage of the review, we are not exactly sure as to how this can be achieved in practice and look forward to engaging with the Panel on a solution that does not negatively impact wholesale or retail competition or place unnecessary barriers to entry.

The other factor to consider is regulatory risk. This is limiting investment and has been observed in the past. For example, the Abbott government's RET review led to a VRE investment drought. The focus now is more on how to firm up a high penetration renewables energy system where revenue in an energy only market is uncertain. Nevertheless, where possible we hope the Panel seeks to reduce this risk where possible.

Existing capacity and thermal plant retirements

It is expected that some thermal plant will need to remain operating even if it is at the end of its economic life. Alternatively, there may be other drivers for thermal plant to remain operating. The AEC considers that there will need to be separate but coordinated arrangements to support new plant entry alongside the retention of thermal plant while it is needed for reliability and security of supply. This allows for newly introduced design concepts to focus on future capacity investment, rather than also having to cover legacy thermal plant. The AEC does not support the unlevel playing fields that have arisen through confidential bilateral deals with select plants. This is not efficient, nor transparent and creates uncertainty for existing and future investments. Thermal plant should compete based on their merits, with competitive pressure among the remaining facilities ensuring that the least economic and least reliable exit first and the most, last. In addition, whether assets are privately or government owned should not be a determinant for participation in energy market incentives.

How can the NEM wholesale market and any other markets work in tandem to ensure we have appropriate signals for the right type of resources in place when and where we need it?

To the extent ancillary markets are recommended by the Expert Panel, the way they interact with the wholesale physical and financial markets is an important consideration. Past interventions such as the Capacity Investment Scheme, while bringing forward renewable investment, run the risk that the efficient operation of the contract market is diminished, as market participants who are receiving CIS underwriting have lower incentives to contract than they would otherwise due to their revenues being underwritten.

A good starting point is determining the mix of generation by their characteristics and what they provide to the market (ie, technology neutral) required to facilitate the transition, and ensuring that the investment incentives are appropriate to encourage the generation mix provides what the market requires.

How can these market settings facilitate emissions reduction in line with the National Electricity Objective and Australia's international commitments?

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Noting the scope of the Terms of Reference, there are still opportunities for the Panel to consider a market design or mechanism that incentivises emissions reductions. The challenge with designing such a mechanism now is the uncertainty regarding what the energy market will look like in 2030, which influences the urgency and cost-efficiency of emissions reductions in the electricity sector post-2030 relative to other sectors. This is obviously further influenced by Australia's 2035 target and the technological ability of other sectors to decarbonise.

If, for example, the electricity grid is 82 per cent renewables by 2030 as per the Federal Government's target, then the relative cost-efficiency of further abatement compared to other sectors is probably less than if the electricity sector is 60 or 70 per cent renewables. Furthermore, as the penetration of variable renewable generation increases, it will increase the (already existing) need for the provision of essential services and firming generation such as batteries and gas, which may not necessarily have an easy to calculate emissions reduction value.

One option the Expert Panel could consider is implementing some type of carbon displacement value to incentivise cleaner fuels to be built at times that displaces fossil-fuel generation. It could do this through an emissions intensity stamp through the Renewable Energy Guarantee of Origin scheme that provides a financial signal for cleaner generation at times of the day when fossil fuel output is high. This would require careful design to ensure fuel constrained assets (namely hydro generation and batteries) are not disadvantaged.

Alternatively, the value could be tied to the design of a capacity mechanism. For example, if auctions were utilised for a capacity mechanism, the emissions intensity of competing bids, calculated based on nameplate capacity, could be assessed along with their relative cost. Nameplate capacity is preferred over a volume limit to recognise the availability of total capacity and avoid distorting the offers generators place in the market.

2. Consumer interaction with wholesale market

What can be done to facilitate better interaction between the demand-side, the spot market, and any existing or future financial markets?

There are already three Demand Response markets in Australia. These being the Wholesale Demand Response Mechanism (WDRM), the Reliability and Emergency Reserve Trader (RERT) and the Frequency Control Ancillary Services (FCAS). [2]

Given the governance of each of the WDRM, RERT and FCAS integrates them into the national market, providing opportunities to respond to price signals from the wholesale energy market (WDRM), to contract with AEMO to participate in the RERT mechanism, and to participate in frequency control for financial reward, the AEC considers that there is no shortage of markets or potential opportunity in the current governance structures. Any future design should ensure that existing schemes are consolidated and that both supply and demand side resources can participate and market operation standards are supported.

How might the NEM wholesale market best allow for customers to engage in the market to benefit from their investment in CER, while allowing for different consumers to choose how they engage and continuing to recognize electricity is an essential service with associated accessibility issues for many consumers?

The 'low hanging fruit' in any demand side response has always been considered as industrial type loads, and nascent markets for these are well underway between businesses and their suppliers. For example,

[2] While there are three specific markets, there are also a significant number of contracted demand response opportunities that could be leveraged.

AGL's Commercial and Industrial Demand Response product provides a range options for businesses with at least 250 kW of curtailable load and/or 250 kW of back up generation.[3] EnergyAustralia's ResponsePro[4] enables its customers to derive a revenue stream from actions such as operational curtailment, switching on the customers own generation assets or simply behavioural change. Other more recent entrants such as Flow Power are actively pursuing customers and participating in the South Australian Government's Demand Management Trials Program[5]. In each of these examples, and there are many more such as the Origin Spike program for small customers, the interface between the consumer and the energy market is via their retailer or other providers.

The question as to how NEM wholesale market might best allow for customers to engage in the market to benefit from their investment in CER appears to persist in spite of the above because of an apparent desire to unbundle demand response from the retail function[6]. This is possible now, as through the Wholesale Demand Response Mechanism (WDRM) businesses can directly participate in energy markets by responding to signals from wholesale energy market. But in practice this appears a less preferred approach for Commercial and Industrial customers potentially due to the requirement to transparently demonstrate provision of the demand response service to achieve payment.

It is important that now that the foundations are there, that regulators allow existing structures to work for industrial and commercial consumers. Whilst there are shortcomings, existing mechanisms and governance responsibilities should be built upon, and no new or modified coordination mechanisms or institutional responsibilities are at present required.

At a domestic (residential and small business) energy level, the question of coordination mechanisms and institutional responsibilities is alive and important work is currently underway. To ensure that policy responses are evidence based. Examples include the AEMO/Mondo/Ausnet Project EDGE, Western Power's Project Symphony, Evoenergy's Project Converge and Ausgrid's Project Edith. The AEC has been on the Demonstration Insights Forum of Project EDGE[7], and when assessing future DER/CER integration and its implications for WDRM, RERT or FCAS participation, the most recently released EDGE paper[8] does provide some useful insights and grapples with some important questions. Perhaps the most important of these is the pathway towards either a centralised hub for data exchange and the ownership, governance and cost recovery that will facilitate efficient and scalable data exchange between industry actors. This now the subject of the CER Data Exchange Project.

The primary use cases being tested in Project EDGE are the exchange of Dynamic Operating Envelopes (DOEs), and trade of local network support services between DNSPs and consumer agents/aggregators. However, use cases could expand as retailers seek to communicate with consumer agents/aggregators. The future functions of all use cases that are actually required are still potentially a long way off in terms of functional specifications, but the work is underway already in the AEMC led multi stakeholder DSO working groups.

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[3] AGL Commercial and Industrial Demand Response https://www.agl.com.au/business/solar-and-energyefficiency/commercial-demand-response?zcf97o=vlx3ap

[4] Energy Australia Industrial and Commercial Demand Response https://www.energyaustralia.com.au/industrial-andcommercial/energy-management/demand-response/energyaustralia-responsepro

[5] FlowPower https://flowpower.com.au/south-australia-demand-response-trial/

[6] AEMC Demand Response Mechanism and Ancillary Services Unbundling: Final Determination. November 2016

[7] Energy Demand and Generation Exchange (EDGE), ARENA funded AEMO project for the development of a major Victorian Distributed Energy Resources (DER) marketplace. https://arena.gov.au/projects/project-edge-energydemand-and-generation-exchange/

[8] Project Edge https://aemo.com.au/-/media/files/initiatives/der/2022/project-edge-lessons-learnt-2-- final.pdf

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Whilst the AEC supports generally strengthening the role of demand-side considerations in energy system planning there is no need for further specific action on institutional responsibility or market mechanisms right now. Having dealt with examples such as the WDRM there is a strong "build it and they will come vibe", but prudent assessment before committing to step change will more likely be in the long-term interests of consumers. While at present we still have a small number of individual users at small scale, we should let things evolve further within the existing framework whilst the CER and DSO mechanisms are specified. The first priority for change should therefore be to let the market evolve within its existing mechanisms.

3. Changing nature of spot electricity prices

How will prices at different times of the day and year change and evolve with the move towards firmed, renewable energy generation and storage?

Previously price volatility was driven by factors influencing intertemporal supply and demand including:

- Interconnector or other transmission line failures
- Major thermal plant outages with unforced outages following an engineering-based probability distribution
- Low hydro water levels
- Abrupt major plant closures ie, Hazelwood
- Gas constraints
- Heat and cold

The future NEM will have weather (particularly wind) as a primary driver of supply side availability. The probability distribution for weather outcomes is extremely complex and is not tractable with respect to accurate forecasting other than in the very short time period. In addition to this a high VRE supply side requires overbuilding capacity because of its intermittency. Hence, when the wind is blowing there is likely to be excess output leading to extended periods of negative prices.

Pricing in the NEM now generally exhibits a small morning peak, low or negative average prices during the daily solar profile followed by a sharp peak as solar output decreases and consumer load increases and then post 23:00 overnight prices are relatively low due to thermal plant operating at or close to minimum generation levels. We have not quantified this, but it is expected that storage will reverse the current pricing impact of the duck curve to some extent. Large users may also seek to use more energy during these periods and as more distribution level batteries and EVs are also likely to reverse the 'duck curve' to some extent. All of this may increase prices during the solar profile periods.

How might the NEM wholesale market and derivative markets allow market participants to most effectively respond to fluctuating prices and manage price risk?

OTC derivative markets generally respond to changes in market price patterns relatively quickly. ASX products do not adjust as rapidly but the ASX is currently in the process of releasing an evening and morning peak product as follows:

- an evening peak futures contract covering the hours between 4:00pm – 9:00pm; and
- a separate morning peak futures contract across all regions and quarters covering the hours between 6:00am – 9:00am.

Clearly, as an exchange the ASX is not able respond to market demands as fast as the OTC market. Nevertheless, the ASX remains enthusiastic for new products when the demand and supply are able to support a new exchange trade derivative.

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The development of exchange traded products is particularly important for small retailers because they can access these more readily than OTC products or dealing directly with generators. For the latter two approaches, small retailers are at a disadvantage because of their weak negotiating position and lack of collateral. Therefore, it is important to ascertain whether the development of exchange traded products could be accelerated.

As stated earlier, we are supportive of retaining the observed liquidity benefits of the MLO. Hence, it should be replaced with some form of ongoing market making framework with participants involved in the design process.

4. Essential System Services

The AEC agrees with the Expert Panel's observation that many of the essential system security services provided by large thermal generators as a by-product of their generation will not necessarily be provided in the future without new markets and pricing signals.

The AEC has long advocated for ESS to be unbundled from generation and markets established to value ESS and ensure there are the correct incentives for new technologies to enter to offer ESS ahead of the retirement of large thermal units.[9]

The AEC lodged a rule change request for the creation of real time efficient provision of inertia in December 2021 and we supported our request with analysis conducted by MarketWise Consulting.[10] It is now 2025 and we have recently submitted to the AEMC's Directions paper and it has scheduled a draft determination to be published on 27 July 2025.[11] This is three and a half years since the request was lodged and the AEMC is still yet to decide on the introduction of a real time inertia market.

To summarise, if these markets are not identified and created, these services will have to be procured by a central authority, with the risk of over procurement or delay. This runs the risk higher costs for electricity consumers.

It is critical that ESS markets are unbundled to ensure that investment signals in the services required are transparent which then allows investment decisions to be made to supply these services. Capital investment has long lead times, and the sooner investors receive adequate signals that an ESS market is to be unbundled, the more efficient will be their capital allocation decisions.

The AEC believes there needs to be a clearly described and prescriptive transition pathway to unbundling ESS and creating markets. The timeline for this needs to be established in the rules, which would place enforceable obligations on both AEMO and the AEMC to achieve unbundling and markets. Based on our experience with our inertia rule change we recommend that unbundling ESS and creating markets must be driven by the ECMC to ensure it is done in a timely manner and the AEMC and AEMO allocate the necessary resources to achieve this. The Expert Panel could also examine whether an increased role for the Reliability Panel could be warranted to ensure ESS are identified and progress made well ahead of scheduled coal closure.

[9] https://www.energycouncil.com.au/media/jqudwimn/20230928-aec-sub-ess-frameworks-final.pdf
[10] https://www.aemc.gov.au/sites/default/files/2021-12/ERC0339%20Rule%20change%20request%20pending.pdf
[11] https://www.aemc.gov.au/rule-changes/efficient-provision-inertia

5. Enhancing competition

How might we harness the larger number of smaller resources and growing participation to ensure all markets (ie. Spot, forward, retail etc) are increasingly competitive?

Financial markets are complex and require market makers, clearers etc. Nevertheless, one can speculate that as technology evolves it may create scope for smaller players. Although in saying this most people are not 'prosumers' and just want a fixed and stable price for electricity.

There is no doubt that the number of CER resources is growing. Economic theory suggests that these resources would be price responsive, but to date such resources are not visibly integrated into the wholesale electricity market. Therefore, their impact has not been directly considered when determining the level of wholesale demand, how best to meet this demand, or in setting the spot price.

Dispatch mode has been designed with household-based virtual power plants in mind but will also facilitate a wide variety of aggregated small and medium size price-responsive resources participating in the spot market, allowing them to bid into the spot market, set prices, receive dispatch instructions and earn revenue in scheduled markets.

Initiatives are already underway to at least coordinate the increasing number and magnitude of these unscheduled resources. The most important (and designed specifically to address this very question) being the AEMC Final Determination on Integrating Price Responsive Resources into the NEM via a 'dispatch mode' facility, allowing currently unscheduled price-responsive resources to be scheduled and dispatched.

Dispatch mode proposes to leverage existing rules and processes, along with a curious time-limited incentive mechanism to drive participation in dispatch mode in its early years. This curious mechanism is in recognition that market-based incentives may be insufficient in the short term to attract participation but is also a test of their (CER) competitiveness. In the current period, all effort should be made to enable this determination for a market mechanism, to stay focused on delivery and performance, and efficient market outcomes whatever they may be. We urge the review to recommend that we stay the course in this regard, and do not add additional expense and complication to avoid damaging market development and efficiency.

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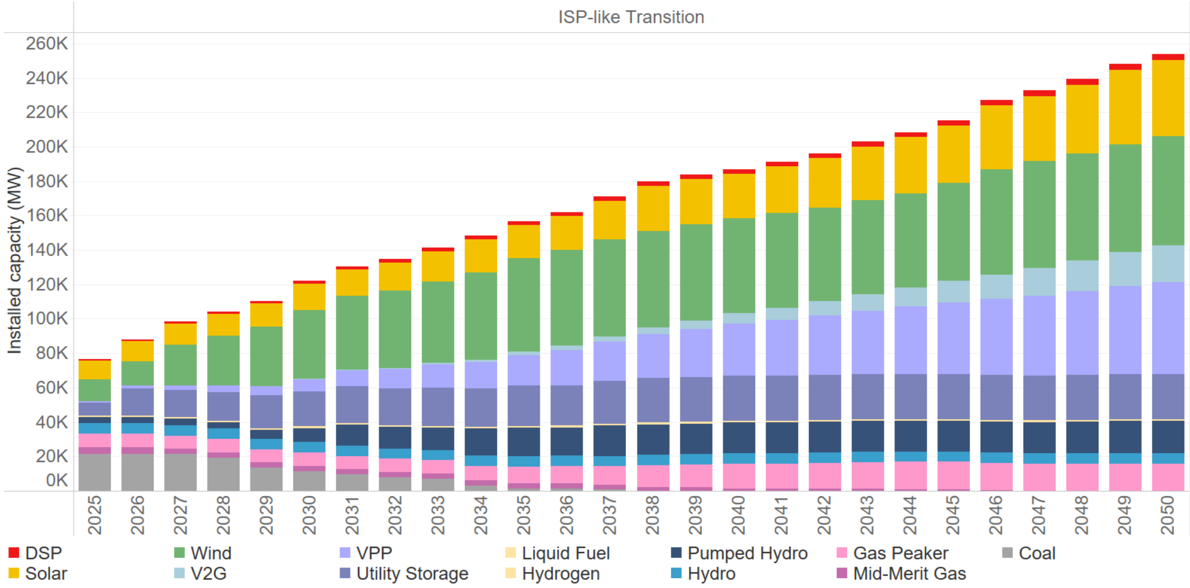
Attachment 2: Future market insights from Endgame Analytics modelling

Endgame Analytics delivered a report to the AEC in late 2024. The report was originally commissioned to consider the impacts of the Capacity Investment Scheme on the wholesale market, but has insights we think may be of use for the Expert Panel. This Attachment summarises some of those insights.

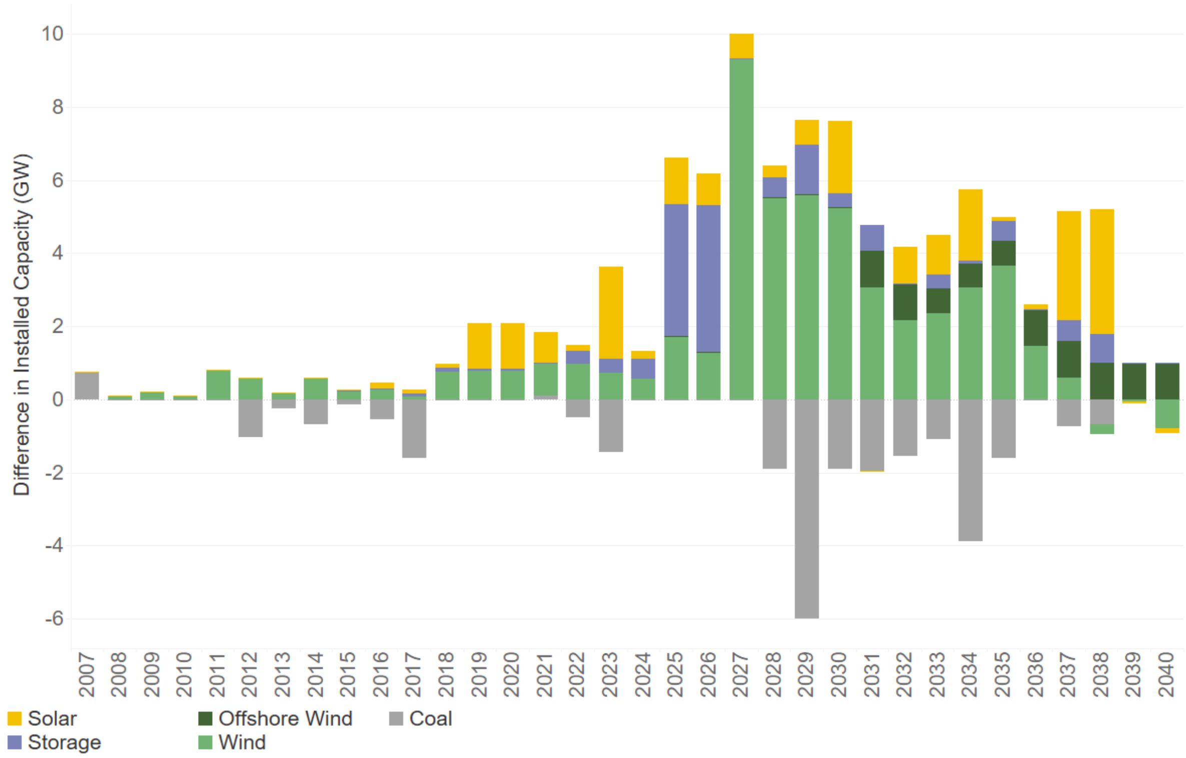
The Government's 82% renewables by 2030 target requires a 40GW build out of wind, solar and BESS at grid scale. Figure 1 shows the scale of the build out based on AEMO's ISP.

Figure 1: ISP transition build out required



The scale of the required build out is far greater than has happened when compared with historical build rates. Figure 2 shows that storage is likely to be met through committed and anticipated projects, with wind the key build challenge.

Figure 2: Modelled year on year new capacity for the NEM (GW)



The Capacity Investment Scheme seeks to bring forward this renewable investment, but does not address supply side issues like delayed transmission build. Whether 82% is reached in 2030 or 2035, similar market design issues will need to be addressed.

The increased supply of renewables co-exists with existing generation for a period of time, creating over supply in the NEM. Prices fall during this period of over supply before increasing once thermal plant exits the market. This is shown in Figure 3.

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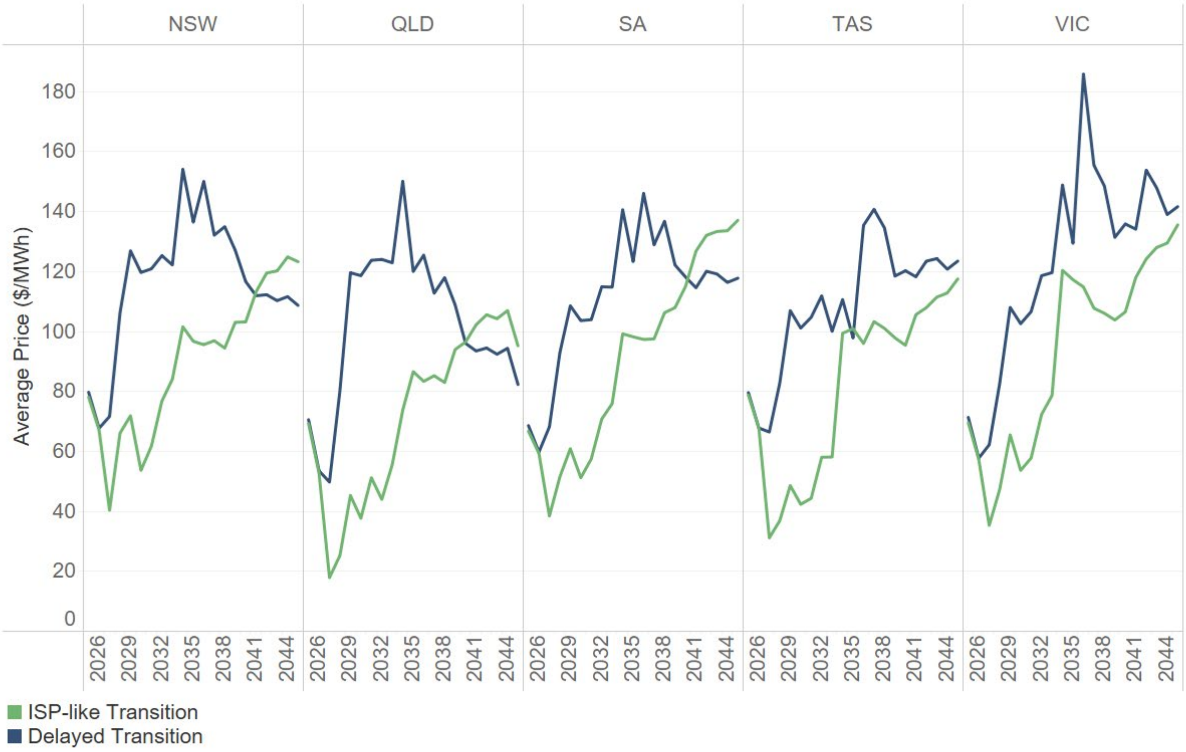
Figure 3: Average FY price ($/MWh), ISP like and delayed transitions



Prices will also vary hugely based on weather, which will make contracting more difficult. Figure 4 shows price estimates using different weather reference years. Figure 4 shows the range of price outcomes for the ISP-like Transition across a high, median, and low weather reference year (ie. high has a high renewable output, driving lower prices). While prices are suppressed in the front-end in all reference years, weather becomes a major determinant of prices in future years. This will make contracting (and valuing CISAs) significantly more challenging as there is fundamentally less certainty on future prices and exposure across swaps and caps.

This will create revenue adequacy issues for both new entrant renewables and existing generation.

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Figure 4: Average FY price ($/MWh) for an ISP-like transition (median, low, high weather reference year)

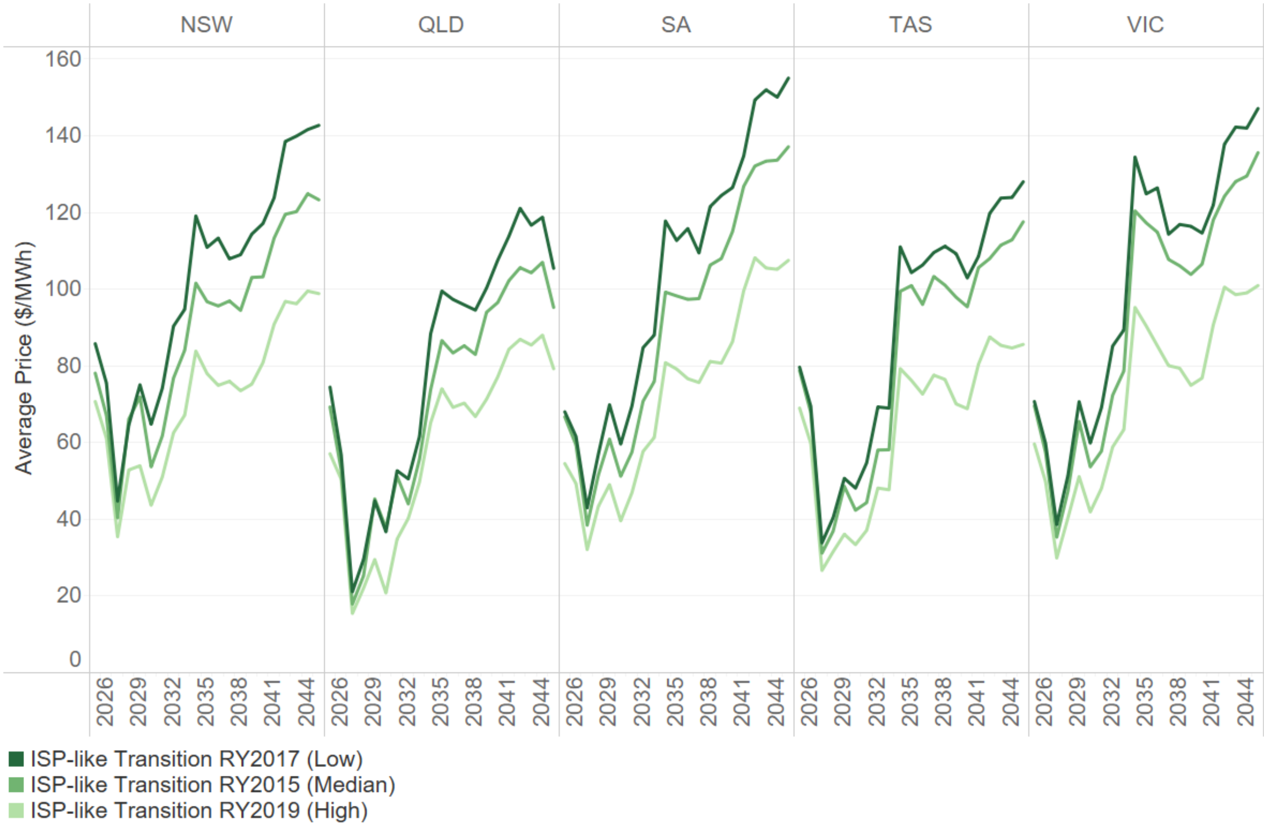

Figure 5 shows $/kW total cost vs $/kW net revenue (ie. for gas peaker and storage pool revenue - fuel costs or costs to charge) for new entrant plant. Total cost represents amortized CAPEX + FOM. The area under the graph for each new entrant generator (ie, the difference between revenue and total cost) is a proxy for the total revenue under-recovery that will need to be covered by the CIS or other sources for revenue.

Without Government support, investors in new entrant capacity will struggle to recover costs and will require significant top ups from Government. The make whole payment varies widely based on the weather reference year modelled.

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Figure 5: Average amortised cost ($/kW) and net revenue ($/kW) of new entrant renewable

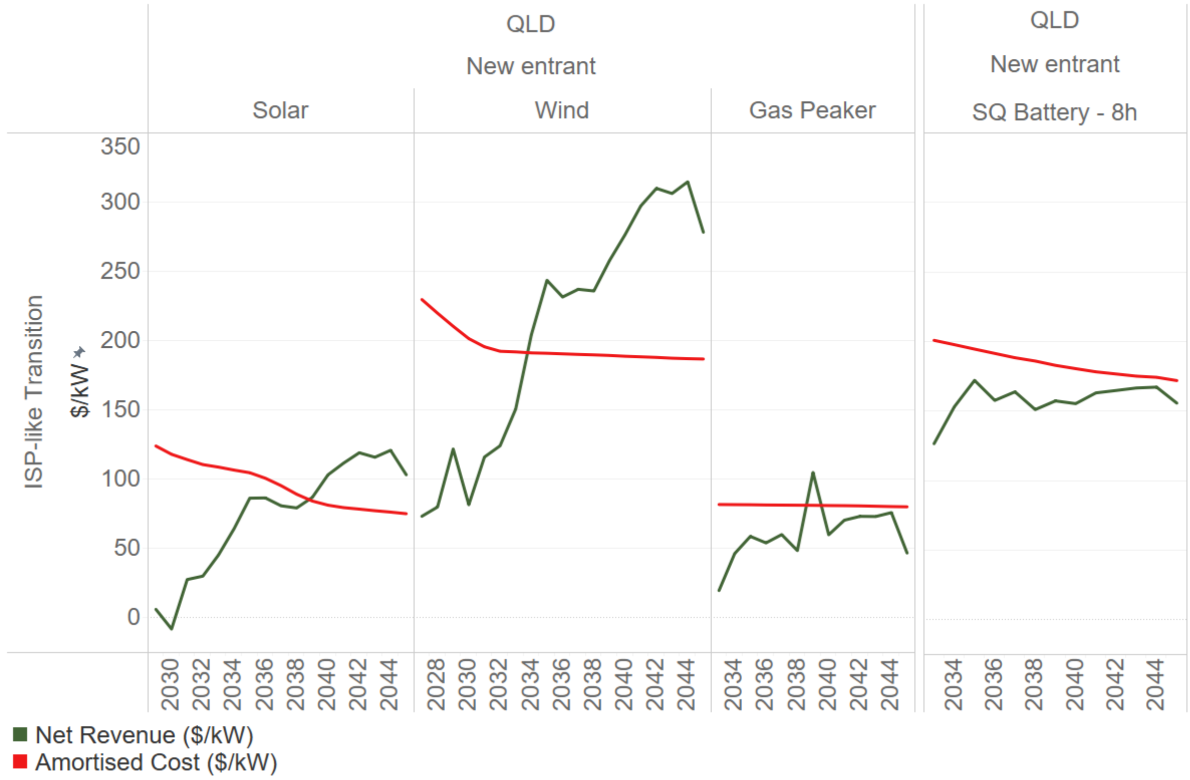

Figure 6 shows annual net revenue for thermal peaking capacity versus fixed operations and maintenance cost. Oversupply into the market and price suppression means limited dispatch of thermal plant. Existing thermal plants will not recover costs in most years out to 2030 in all states. Where the revenue line drops below cost, the plant will be at risk of exiting. However, there is a clear insurance value of maintaining the plant for reliability purposes. In this world, thermal plants may need to be made whole or risk disorderly exit.

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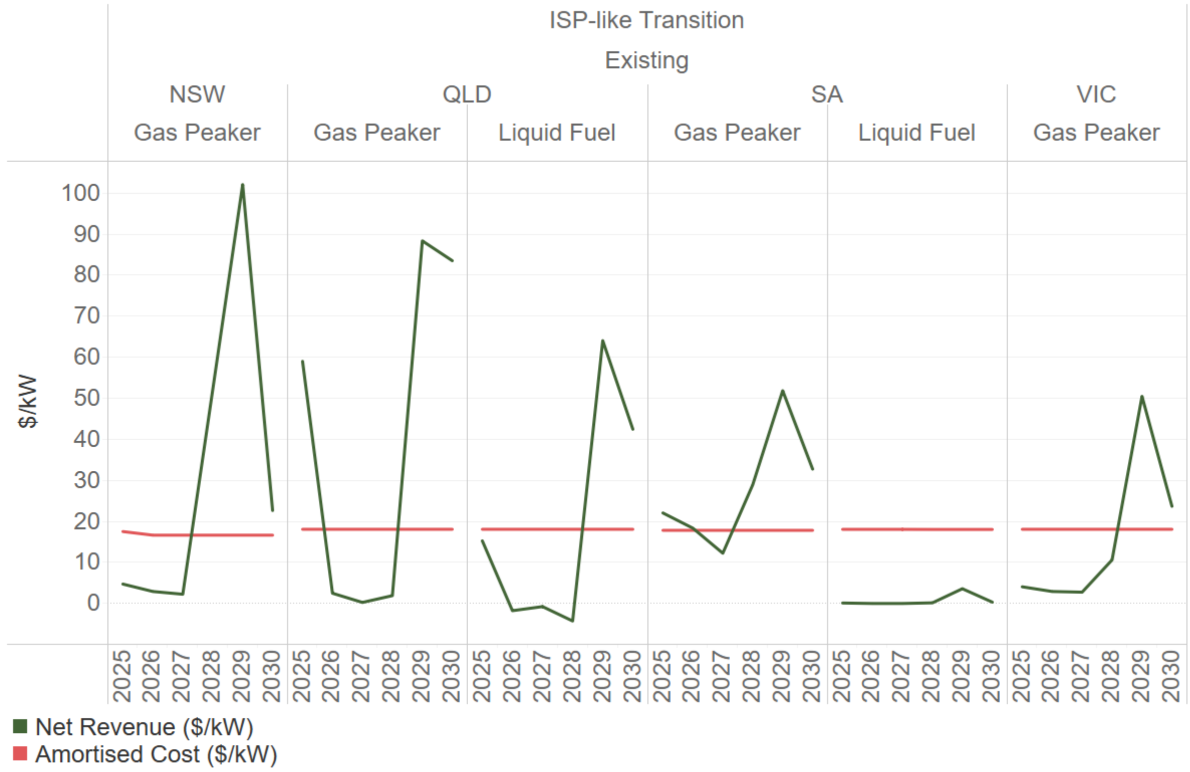
Figure 6: Average amortised cost ($/kW) and net revenue ($/kW) of existing thermal fleet (excluding coal)



The coal fleet will be able to recover its FOM and SRMC, but will likely not be able to refurbish. The coal fleet recovers most of its costs throughout the horizon in NSW and Victoria, although they struggle in Queensland. Note that coal costs are based on ISP step change assumptions. Profitability takes a sharp decline in early years as new VRE enters, although this is offset to some degree by new entrant BESS supporting the coal fleet. Increased maintenance costs and the need for refurbishment provides the largest threats to ongoing viability. Figure 7 shows amortised cost and net revenues.

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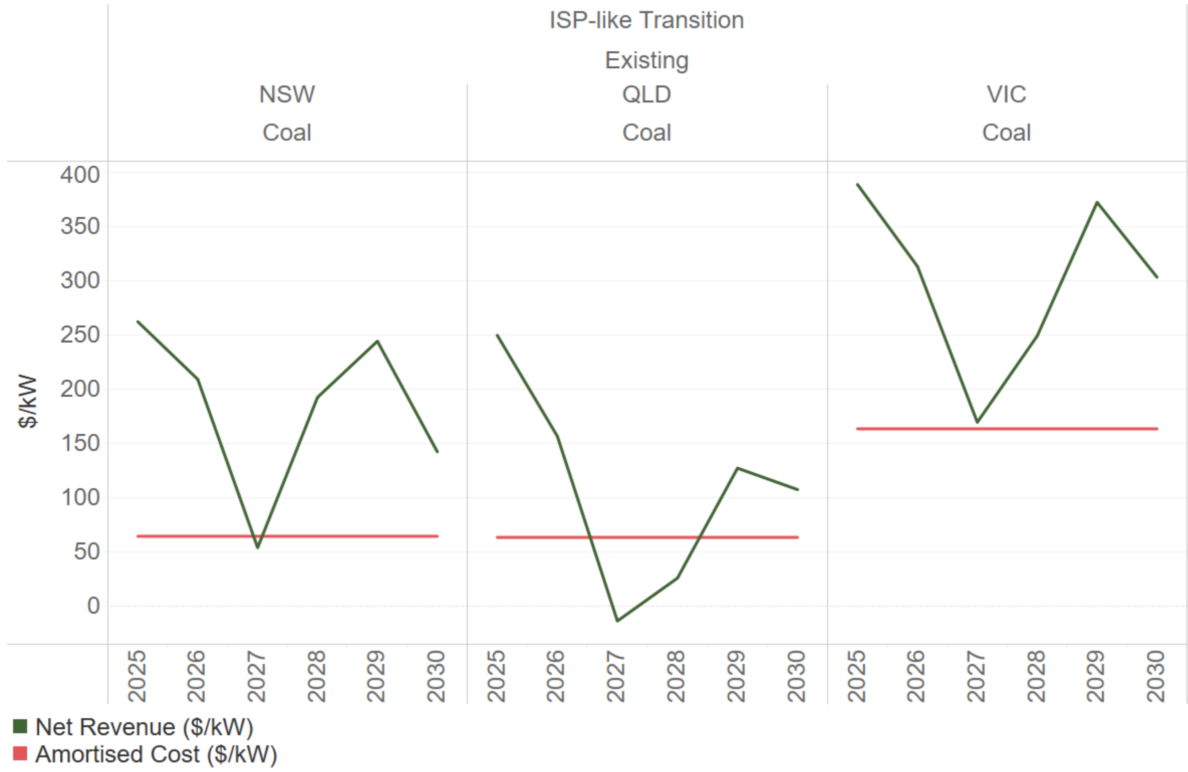
Figure 7: Average cost ($/kW) and net revenue ($/kW) of existing coal fleet



The AEC expects that increased volatility will make traditional contracts more expensive while contracts become scarcer.

In particular, we see that "Base" price (ie the TWAP component < $300) is significantly more variable across weather reference years while volatility in the cap component of prices is extreme.

This will make hedging much more challenging for participants in the market – especially for firming contracts where the proportion of firm capacity over long durations will be much lower than historically.

In Queensland for example, the fair value of a Cap through the 2030s implies anywhere between $0 and $60 – however Endgame Analytics modelling only captures weather volatility and not other sources such as transmission outages. We expect further premiums on cap fair values relative to what Endgame has modelled. The volatility is shown in Figure 8.

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Figure 8: Base and volatility components of TWAP in Hopeful Transition across weather reference years