Future Financial Risk Management in the NEM

A report for the ACCC | 16 November 2023

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1.1 Introduction

The Australian Competition and Consumer Commission (ACCC) is continuing its inquiry into the prices, profits and margins for the supply of electricity in the National Electricity Market (NEM). It has used its November reports for this review to focus on retailers' costs to supply electricity to customers.

In its 2022 November report the ACCC gave specific attention to the role and effectiveness of contract markets.[1] The ACCC is again looking into contract markets for its 2023 report and has asked Frontier Economics to consider how the contract market may evolve over the medium to long term. In doing so, it has asked us to take into consideration the changes in the wholesale market, government policy and broader market developments that are focused on substantially increasing the penetration of renewable electricity in the NEM.

The purpose of this report is to set out our views on how the contract market may evolve over the next 10-15 years, with a particular emphasis on how retailers will be able to manage risk. We also provide views on options that could be taken by retailers or governments to address some of the issues we have identified.

1.2 Summary of key findings

Our key findings are as follows:

Electricity risk management and the evolving market landscape

- An efficient hedging market allows market participants to manage risk, reduce costs and lowers barriers to entry. The result of this is a more competitive retail market and ultimately lower prices for consumers.
- Retailers typically employ risk management strategies tailored to their unique business models and risk tolerance. In general, they aim to balance the fixed prices offered to consumers with a volatile wholesale electricity market that updates prices every five minutes. Financial contracts, vertical integration, and/or demand response can be used to mitigate this risk.
- The energy market transition, driven by government policy for a low carbon economy, is affecting electricity prices in complex ways. It is expected to reduce dispatchable capacity, such as thermal generation, which until now has underpinned the bulk of contracts that are traded in the NEM. Conversely, there will be an increase in renewable generation. Output from most renewable generation is dependent on weather conditions and so is unsuited to providing the firm base load swap contracts traditionally sold by baseload coal-fired generators, or the cap contracts that have been sold by gas peaking plants. It may be that the demand for base load swap contracts may decline somewhat, but it is expected that there will still be a demand for this currently dominate form of hedge.

Future challenges to risk management for retailers

We have identified the following potential challenges to risk management for retailers given the circumstances described above:

[1] ACCC, Inquiry into the National Electricity Market – November 2022 Report, p.9.

- The very high penetration of intermittent generation is expected to drive increased spot price volatility and potentially higher peak prices than we see today. This could significantly challenge the ability for independent retailers to manage risk in this environment.
  - Higher and more volatile spot prices would drive higher credit support and margin obligations for retailers. Some retailers may find it extremely difficult to meet these obligations.
- Traditional contracts and futures may not meet the evolving risk profile of retailers. As a result, more bespoke contracting will become increasingly necessary. Trading exchanges, such as the ASX, may be reluctant to trade new innovative hedges, such as a super peak product or inverse solar product, without sufficient evidence of liquidity. Such liquidity is unlikely to emerge, if at all, until baseload generation exits the market. Therefore, retailers are expected to rely heavily on over-the-counter contracts or vertical integration to manage risk.
- The availability of financially firm contracts is expected to reduce. This will make it harder for retailers that rely on contracting to source efficiently priced financially firm contracts. Drivers for the reduced availability of firm contracts include:
  - The retirement of dispatchable generation sources. There is a realistic prospect that every region in the NEM is just one coal-fired generation retirement away from there being a material shortage of firm contracts in the region.
  - Decreasing reliability of remaining baseload generators exposes them to an increased risk of unfunded difference payments if capacity is contracted.
  - Vertically integrated operators may prefer to withhold capacity from contract markets to better manage the uncertain weather driven shape risk associated with their own retail load.
  - Government supported generation investments may have a reduced incentive to make contracts available to the market. A key motivation for a generator to contract is to provide a reasonable assurance of a stable return. If the method of government support provides a reasonable assurance of stable returns, the incentive to contract will be reduced.
- If vertical integration becomes necessary to effectively manage risk in the market this may foreclose on opportunities for smaller new entrant retailers. This is because they are unlikely to possess the investment grade credit rating required to finance large capital assets.
  - This risk may mitigate in the future if smaller retailers are able to source cost-effective bespoke storage solutions that match their load and risk exposure.

Strategies and options to assist future retailer risk management

We have considered the following options that may assist retailers in managing future risks:

- Given governments currently fund the majority of new supply technologies in one form or another, we consider the ACCC and the Government should identify if there are ways that these government funded generation/storage projects could be used to support qualifying small retailers with access to a quantity of hedges.
- The Government may wish to also investigate underwriting new products on futures exchanges. The intent being to support the development and availability of these products until sufficient liquidity emerges.

Importantly, we advocate against market interventions, such as market design changes, to manage risk for retailers. Reducing risk through market mechanisms, such as reducing the market price cap, would likely reduce the incentive for retailers to contract, and in doing so, reduce the incentive for new investment in essential dispatchable capacity.

1.3 Our approach

The aim of the study is to make informed predictions about how the contract market for electricity retailers may evolve over the next 10-15 years. It is important to emphasise up-front that this is not a modelling exercise. Instead, we are leaning on our global energy experience while drawing on industry perspectives gained through an extensive consultation exercise and desktop research to inform our views.

1.3.1 Economics as a foundation

We have adopted an economics framework to guide our understanding of an expected future landscape for the contract market. In this case we want to consider how participants are likely to react to the market circumstances and financial risks they face. Therefore, we have applied game theory concepts – where profit maximising participants seek to adopt the risk management strategy that most likely achieves their objectives while reacting to other participants attempting to achieve their profit maximising objectives. Until recent times, electricity generators (as suppliers of risk management instruments) had a mutual interest in agreeing on hedging contracts with retailers (as a source of demand for risk management instruments) as both parties wanted more price certainty than provided by the relatively volatile spot price. This mutual interest of the two sides of the risk management market meant that participants could set their contract position relatively easily and cheaply. However, with the changes that are going on in the market, where interventions to drive the energy transition are the most important driver of participant risk, it may be less likely and more costly for participants to find a suite of hedging arrangements that allow participants to set a preferred risk management position.

The evolving patterns of risk management choices in response to the normal operation of the NEM and to past interventions (albeit at a different scale and speed to those occurring more recently) can be used to help make predictions about how participants might develop their approaches in the future. Similar lessons can be drawn from comparable experiences in most other wholesale markets operating around the world going through the same changes. We have relied on our experience in these markets to draw comparisons to the expected outcomes in the evolving NEM.

1.3.2 Industry input

To inform our analysis we conducted extensive interviews with key industry stakeholders. The stakeholders comprised:

- market institutions,
- financial sector entities, and
- electricity industry participants.

For the electricity industry participants, we sought views across a range of participants including large gentailers, mid-sized retailers with some vertical integration and smaller independent retailers. These consultations have been informative and important in shaping our views of expected future developments in risk management.

1.3.3 Desktop research

In addition to the consultation exercise, we have undertaken desktop research to supplement our understanding of the potential market issues that might arise from an increased penetration of intermittent generation. This research includes academic literature, policy documents, rule change proposals and other publications that discuss the prospective state of contract markets.

1.4 Structure of this report

The remainder of this report is structured as follows:

- Section 2 provides relevant background information, including how market participants currently manage risk in the NEM and how and why the market landscape is expected to evolve given climate change policies.
- Section 3 describes the challenges we have identified for risk management in the future.
- Section 4 considers some strategies and options to assist retailers to manage risk in the future.

2 Current risk management strategies and the evolving market landscape

2.1 Introduction

In this section we provide background information that informs our discussion of the possible outcomes for risk management that could emerge due to the expected changes in the make-up of the wholesale electricity market in the NEM.

We first consider the role of risk management within the context of the NEM's design. We then consider how this affects the way retailers hedge their risk and how the opportunities for hedging can impact on retail competition. We conclude the chapter by identifying the drivers for the change in the stock of generation in the market.

2.2 Risk management in the NEM

Hedging (in all its general forms – financial and physical) has been a central feature of the NEM. In summary, hedging is critical to the economic efficiency of the NEM in the following ways:

1) Generation - hedging helps manage the revenue risks to generators who would otherwise face a highly volatile revenue stream to cover their largely fixed costs. The greater revenue certainty that hedges provide generators the more likely it is that generators will be able to access lower cost capital, and this lowers the cost of providing wholesale electricity.

2) Retailers – customers generally prefer fixed prices over time. To provide these to customers retailers need a high degree of certainty of their energy purchase costs. Hedging provides retailers with greater energy purchase cost certainty which then allows retailers to more vigorously compete for customers.

3) Price discrimination – until recently, hedging allowed buyers and sellers to agree a price that was different to the single spot price. This allowed welfare maximising price discrimination.

4) Lowering entry and exit barriers – for the reasons identified above, a functional hedging market facilitated the easier entry of generators and retailers (and exit, as a departing business could liquidate its position at the market price without affecting the market price – the definition of liquidity).

Without an efficient hedging market, the NEM will be more risky and costly and the barriers to entry will be higher, resulting in lower competition and higher prices. These concepts are discussed in more detail below.

Hedging is a risk management strategy that is adopted to offset potential future losses that might be incurred. It effectively involves taking an opposite position in relation to the asset or security that is being hedged. While hedging serves to reduce downside risk, it can mean that future gains are also offset. However, this is acceptable where it allows for more predictable outcomes overall. Obviously reducing risk comes at a cost, either through the cost of the hedge itself or the opportunity cost of not fully benefiting from favourable price movements.

Hedging is an important tool for electricity retailers and generators given how the NEM operates. The NEM is a compulsory energy-only market. This means that all energy is traded through a single spot market. Prices in the spot market are set for every 5-minutes of the day with a maximum price cap of $16,600/MWh and a market price floor of -$1000/MWh. Absent some form of hedging arrangement, market participants would be substantially exposed to spot prices.

In a simple scenario where generators and retailers are entirely separate entities, the exposure to spot prices arises because:

- Generators own the generation assets and so are naturally 'long' electricity generation, which means they gain if the spot price rises
- Retailers typically supply electricity to consumers at fixed prices, or at least prices that do not vary according to the spot price, and as such are naturally 'short' electricity which means they gain if the spot price falls.

A market participant that is short electricity – such as a standalone retailer – will typically seek to hedge to reduce their exposure to high spot prices. Conversely, a standalone generator that is long electricity will typically seek to hedge to reduce their exposure to low spot prices.

There are several ways that participants can hedge their exposure to spot prices. The most common are the following:

- Vertical integration through the ownership of an electricity generator. A retailer that owns a generator has what is known as a natural hedge. That is, when the spot price is high, the retailer will have to pay the high spot price for its customer's load but, as the owner of the generator, it will also receive the high spot price for its electricity generation.
- Power purchase agreements (PPA) with a generator. PPAs provide a similar hedging benefit to vertical integration, but they do so through contractual arrangements between a retailer and a generator, rather than through ownership.
- Financial derivatives. There are a range of financial derivatives that are available to retailers (and generators) to hedge their exposure to volatile spot prices. Common contracts include swap contracts (which effectively lock-in a spot price for the counterparties) and cap contracts (which effectively cap the spot price for a retailer). These are traded both on the stock exchange and over-the-counter (OTC) between participants.

As noted above, the NEM wholesale market includes a market price cap. It also has a cumulative price threshold (CPT). Combined, these regulatory mechanisms limit the extent of risk that participants are exposed to. The level of the market price cap represents a trade-off between delivering price signals for new supply-side investment while also recognising that without a price cap the price could rise to extremely high levels that could be unsustainable for exposed retailers or contracted generators that are unable to operate at those times.[2] For similar reasons, the CPT sets a threshold for the cumulative value of transactions over a 7-day rolling period, beyond which the Administered Price Cap applies.

In a well-functioning market, the contracts or hedging market, acts like an informal capacity market. That is, through the revenue certainty it can deliver, hedges can provide the incentive and capacity for participants to invest in supply that is needed to meet the demands of customers. As retailers demand more contracts, or a particular form of contract, this should signal new investment to deliver that protection to retailers. In an efficient market, in combination with the spot market, the hedge market should signal the least cost mix of supply-side capacity and technology to meet the forecast level and pattern of electricity demand.

2 If a generator has a contract to supply electricity at a certain time but is unable to, for instance due to an outage, it would need to source that electricity from the market. Therefore, the costs of sourcing that electricity from the market could be extremely high if the outage coincides with a period of very high prices.

In addition, well-functioning contract markets should facilitate low entry and exit barriers for retailers. That is, participants should be able to easily source contracts that suit their needs and the contracts are efficiently priced. Further, a departing business would be able to liquidate its position at the market price without affecting the market price. When this is the case, it means that the contract market is liquid and participation in the market is less risky.

2.2.1 Hedging is important for welfare maximisation in the NEM

As lesser known role of hedging in the NEM is its role in maximising economic welfare. The NEM spot market produces a single spot price that every electricity producer earns and retailer pays. The resulting equilibrium spot price simultaneously determines the size of the:

- producer surplus - which is the difference between the price that producers have been paid and the price at which they are willing to produce electricity, and
- consumer surplus - which is the difference between the price that consumers have paid and the price at which they are willing to pay for electricity.

The sum of these two surpluses defines the extent of economic welfare from this economic activity.

There are likely to be consumers willing to buy more electricity if the price was lower than the prevailing spot price, and there may be some suppliers who would be willing to offer more production at a price lower than the spot market (because they are inframarginal). If these two parties can come to agreement about the price to be paid and received price outside the operation of the spot market they can both benefit economically. Standard hedges facilitate such an agreement. If parties strike such a deal and this results in greater consumption of electricity (e.g. for manufacturing of a good that is meets consumer demand) and production (that involves employing people directly and indirectly and increases income), then economic welfare is likely to be enhanced.

It follows that if participants do not have the option to engage in this welfare enhancing price discrimination using instruments such as hedging contracts because of the unavailability of these hedges (or because regulation discourages this form of pricing intentionally or unintentionally), then the NEM single spot price will not function as intended as it will not maximise welfare.

2.2.2 Risk management strategies for retailers

The risk management strategies a retailer implements to manage their energy purchases is highly specific to the particular retailer. It turns on its business structure, its financial resources, the expertise of its staff, and how much risk it is willing to be exposed to. Retailers also understand that their trading position can deliver or lose them a competitive advantage in the market, so they are strongly motivated to achieve the best energy trading position they can.

Retailers face a particularly difficult job managing their energy purchase cost risk in the highly volatile NEM. There are some consumers who are enthusiastic about engaging with the energy market, where they agree to variable price contracts and avoiding costs by adjusting when they consume power and installing technology that allows them to either produce their own power or shift their demand automatically to minimise costs. However, experience in electricity markets shows that the vast majority of consumers do not want to engage with the energy market. The majority of consumers would rather a fixed price contract for a reasonable period with the option to switch suppliers at minimal cost if they become unhappy with their retail supplier.

Consumers who don't routinely engage with the market are inherently more risky for a retailer to supply than consumers who pay attention to the price and modify their behaviour to avoid high costs. This is because more casual customers are less likely to modify their consumption in response to prevailing market prices. This means the retailers serving these customers have to more carefully estimate how much electricity these consumers will use at different prices. This allows the retailer to determine how much hedging cover they require at every point in time so the retailer has sufficient certainty of their energy purchase cost. Having sufficient certainty means that they can confidently set a fixed price for the customer that will earn them a margin large enough to justify taking on the risk of bearing the price variability risk on behalf of the customer.

If the retailer serving fixed price customers is under-hedged (i.e. have less MW hedge cover than the MW of their customer demand – quantity risk) at times when the spot price rises above the energy purchase cost embodied in the fixed price contract (price risk), the retailer is exposed to additional energy costs that they won't be able to recover from customers (energy purchase cost risk). These additional costs will have to be met from the retailer's margin.

Unfortunately for retailers, margins are very low and they are unable to bear too many unrecoverable costs before their margins are eclipsed. The retailer could seek to avoid these unhedged energy costs by buying more hedges than they expect they need (i.e. over-hedge). However, retailers must pay a premium for the insurance value provided by the hedge. While the retailer may seek to impose this cost on their customers, the extent to which this is possible is determined by the competitiveness of the market. Competing retailers may have superior risk management capabilities and this could result in lower hedging costs, which would allow them to charge a lower price to customers.

Larger retailers are better able to manage these price and quantity related hedging risks as they have a more diversified load which is inherently less variable. Larger retailers also tend to have the benefit of being more geographically diverse, and this also tends to diversify their energy purchase cost risks as there is variability in prices across the NEM regions.

Vertically integrated retailers (gentailers) are even better placed to manage these energy purchase costs risks as they have the benefit of large and diversified customer bases as well as the benefit of a natural hedge in that they are selling and buying at the same price. The more balanced the gentailer in terms of how much electricity they sell compared to how much electricity they purchase at the same time, the more efficient the natural hedge. While a naturally hedged gentailer can avoid paying contract premiums, they are also losing out on earning contract premiums. The advantage of a balanced natural hedge is the avoided costs of being over or under-hedged. A gentailer also has the advantage of being able to avoid the transaction costs associated with haggling to achieve their preferred contract position. In addition, a gentailer can quickly re-price their internal transfer price to be more market responsive to changes in market conditions. This responsiveness will provide the gentailer with a competitive advantage compared to competitors that have to renegotiate their contracts to respond to changing market conditions.

For the reasons identified above small retailers with a narrow customer base (in terms of type and location) are perhaps the most exposed to electricity purchase cost risk, particularly when they are selling at fixed prices to customers. This class of retailer is therefore more likely to be adversely affected by a deterioration in hedging market conditions than other retailers, especially the gentailers. Small retailers apply significant competitive pressure to the larger retailers as they are highly motivated to identify and win customers being supplied by the larger retailers that are paying excessive margins. The loss of small retailers will adversely affect retail competitiveness. The survival of small retailers is highly dependent on a well-functioning contract market.

2.3 Forces for change in the electricity market

There is a complex relationship between NEM spot prices and contract prices. In general, however, the contract prices reflect the opportunity cost of the spot price that could be earned by a generator and the price paid by a retailer. Many, but not all, factors that affect the spot price are likely to affect contract prices.[3]

The energy market transition is already affecting electricity prices in complex ways. It is likely to affect the supply of contracts and the nature of contracts being offered to the market. This is because the transition will progressively change the operating patterns of generators in ways that are likely to affect the characteristics of risk management instruments available in the market. To understand these likely changes it is important to appreciate the changes to the nature of power generation in the NEM over time.

2.3.1 Government policy to reduce emissions

Australia has committed to reduce its greenhouse gas emissions by 43 per cent below 2005 levels by 2030. The Australian Government's commitment to a 43 per cent reduction in emissions by 2030 brought it into line with emissions targets that had already been set by State Governments. Table 1 below, sets out emission reduction targets for Federal and State Governments.

Table 1: 2030 Emissions targets

Region	% reduction on 2005 emissions by 2030	Notes
Australia	43%	Submitted to United Nations Framework Convention on Climate Change (UNFCCC) June 2022.[4] This is a cumulative target from 2021-2030 and a target for the year 2030.
QLD	30%	Net zero 2050.[5]
NSW	50%	Net zero 2050. Target increased from 35% Sept 2021[6]
VIC	45-50%	Net zero 2050; 45-50% reduction by 2030[7]
WA	n/a	Net zero 2050. No Statewide 2030 target but adopted a target 80% reduction on 2020 Government entity emissions by 2030
SA	50%	Aspirational goal of 50% below 2005 emissions by 2030, net zero 2050[8]

3 Irregular short term price spikes are unlikely to affect contract prices.

4 https://www.dcceew.gov.au/about/news/australia-submits-new-emissions-target-to-unfccc accessed 1 August 2023. DCCEEW 2022, *Australia's emissions projections 2022*, Department of Climate Change, Energy, the Environment and Water, Canberra, December. https://www.dcceew.gov.au/sites/default/files/documents/australias-emissions-projections-2022.pdf

5 https://www.des.qld.gov.au/climateaction

6 https://www.energy.nsw.gov.au/sites/default/files/2022-12/NSW-Net-Zero-Plan-Implementation-Update-2022.pdf; https://www.soe.epa.nsw.gov.au/all-themes/climate-and-air/net-zero-plan-stage-1-2020-2030

7 https://www.climatechange.vic.gov.au/victorian-government-action-on-climate-change

8 https://www.environment.sa.gov.au/topics/climate-change/net-zero-pathway

TAS	100%	Net zero or lower by 2030. Net zero was achieved in 2015, with negative net emissions in 2020.[9]
NT	n/a	No target.
ACT	54%	65-75% reduction on 1990 emissions (equivalent to 54% reduction on 2005 emissions); net zero by 2045[10]

To support these emission reductions targets, Federal and State Governments have also set targets for the amount of generation that is produced by renewable energy. The Australian Government is targeting 82 per cent of electricity generation being produced by renewable generators by 2030. Again, State Governments also have their own targets for renewable energy penetration. These are shown in Table 2 below.

Table 2: Renewable targets (including rooftop PV)

Region	2030	Notes
Australia	82%	Large Renewable Energy Target (LRET) of 33TWh annually from 2020-30, which is already met. This is equivalent to approximately 20%. 82% renewable share was the projected level of renewables resulting from that *Powering Australia* policy, which includes $20B in low cost finance for electricity network projects[11]
QLD	50%	70% 2032, 80% 2035[12]. Queensland expects to be at 60% by 2030[13].
NSW	12GW	We estimate this to be equivalent to around 80% of NSW generation, depending on the mix of wind or solar capacity.
VIC	65%	95% 2035[14]
WA	n/a	State owned coal to be retired by 2030[15].
SA	100%[16]	
TAS	150%	200% 2040[17]

9 https://recfit.tas.gov.au/climate/climate_change_action_plan https://www.premier.tas.gov.au/site_resources_2015/additional_releases/tasmanian-greenhouse-gas-emissions-report-2022-released

10 https://www.climatechoices.act.gov.au/policy-programs/act-climate-change-strategy

11 https://www.energy.gov.au/government-priorities/australias-energy-strategies-and-frameworks/powering-australia

12 https://www.des.qld.gov.au/climateaction/sector-action/energy

13 https://www.epw.qld.gov.au/__data/assets/pdf_file/0031/32989/queensland-energy-and-jobs-plan-overview.pdf

14 https://www.energy.vic.gov.au/renewable-energy/victorian-renewable-energy-and-storage-targets

15 https://www.wa.gov.au/government/announcements/state-owned-coal-power-stations-be-retired-2030-move-towards-renewable-energy

16 https://www.energymining.sa.gov.au/industry/modern-energy/leading-the-green-economy

17 https://www.premier.tas.gov.au/site_resources_2015/additional_releases/state-on-track-to-reach-tasmanian-renewable-energy-target

NT	50%[18]	
ACT	100%[19]	Net target based on contracted projects in other regions

2.3.2 Government initiatives to support the transition

To support the policy objectives identified in the previous section, Governments have also implemented policies and incentives to drive investment in renewable generation as well as complementary technologies such as storage and electricity networks. These initiatives use a variety of different mechanisms to drive the required investment, including:

- Public ownership of new generation assets, such as:
  - Victoria's announcement for $1B to deliver 4.5GW of renewable generation capacity [20]
  - The Queensland Government's CleanCo which was established as a government owned portfolio of assets in 2018. CleanCo has direct ownership in firming generation, this initially included ownership of around 1GW of firming generation.[21] In addition, the Queensland Energy and Jobs Plan included several direct investment projects[22]
  - The Commonwealth investment in Snowy 2.0, which is a 2GW pump hydro project in NSW
- Contracts with large renewable projects, such as:
  - The ACT signing contracts for difference (CFDs) with large renewable projects[23]
  - NSW's Electricity Infrastructure Roadmap where, through AEMO Services, it signs long-term contracts called 'Long Term Energy Service Agreements (LTSEAs) with projects to set an effective floor price.
  - Queensland's CleanCo also contracts with renewable energy projects using Power Purchase Agreements (PPAs) and Capacity Purchase Agreements (CPAs) to achieve a target 1.4GW of renewable energy by 2025[24]
- Concessional finance, such as:
  - The Commonwealth's Clean Energy Finance Corporation, which has reported investments of $3B to support 5GW of solar and wind capacity,[25] and $19B to deliver network investment and long duration storage support via the Rewiring the Nation policy[26]
- Grant funding and subsidies, such as:

18 https://territoryrenewableenergy.nt.gov.au/about/our-renewable-energy-target

19 https://www.climatechoices.act.gov.au/energy/what-the-act-government-is-doing

20 https://www.vic.gov.au/state-electricity-commission-victoria

21 https://s3.treasury.qld.gov.au/files/CleanCo-fact-sheet.pdf

22 https://statements.qld.gov.au/statements/97925

23 https://www.environment.act.gov.au/__data/assets/pdf_file/0007/987991/100-Renewal-Energy-Tri-fold-ACCESS.pdf

24 OUR PORTFOLIO - CleanCo Queensland

25 https://www.cefc.com.au/media/media-release/cefc-reaches-5-gw-and-3-billion-clean-energy-milestone-with-walla-walla-solar-farm-commitment/

26 https://www.cefc.com.au/where-we-invest/renewable-energy/energy-grid/

- The Australian Renewable Energy Agency (ARENA) which provides grant funding to support renewables and complementary technologies.[27]

- Incentive schemes, such as:
  - The Commonwealth's Small and Large-Scale Renewable Energy Targets (SRET and LRET). These are certificate schemes that effectively provide a subsidy for small renewable generation with requirements that eligible parties hold certificates (e.g., retailers).

2.3.3 Expected supply-side outcomes

As part of its Integrated System Plan (ISP) function, the Australian Energy Market Operator (AEMO) have developed several scenarios considering how the government policy objectives might play out for the composition of the electricity supply-side. Of the four scenarios it prepared, it considers its 'step change' scenario is most likely. The 'step change' scenario sees a rapid consumer-led transformation of the energy sector and coordinated economy-wide action. AEMO describes the scenario as follows:[28]

> *Step Change moves much faster initially to fulfilling Australia's net zero policy commitments that would further help to limit global temperature rise to below 2°C compared to pre-industrial levels. Rather than building momentum as Progressive Change does, Step Change sees a consistently fast-paced transition from fossil fuel to renewable energy in the NEM. On top of the Progressive Change assumptions, there is also a step change in global policy commitments, supported by rapidly falling costs of energy production, including consumer devices. Increased digitalisation helps both demand management and grid flexibility, and energy efficiency is as important as electrification. By 2050, most consumers rely on electricity for heating and transport, and the global manufacture of internal-combustion vehicles has all but ceased. Some domestic hydrogen production supports the transport sector and as a blended pipeline gas, with some industrial applications after 2040.*

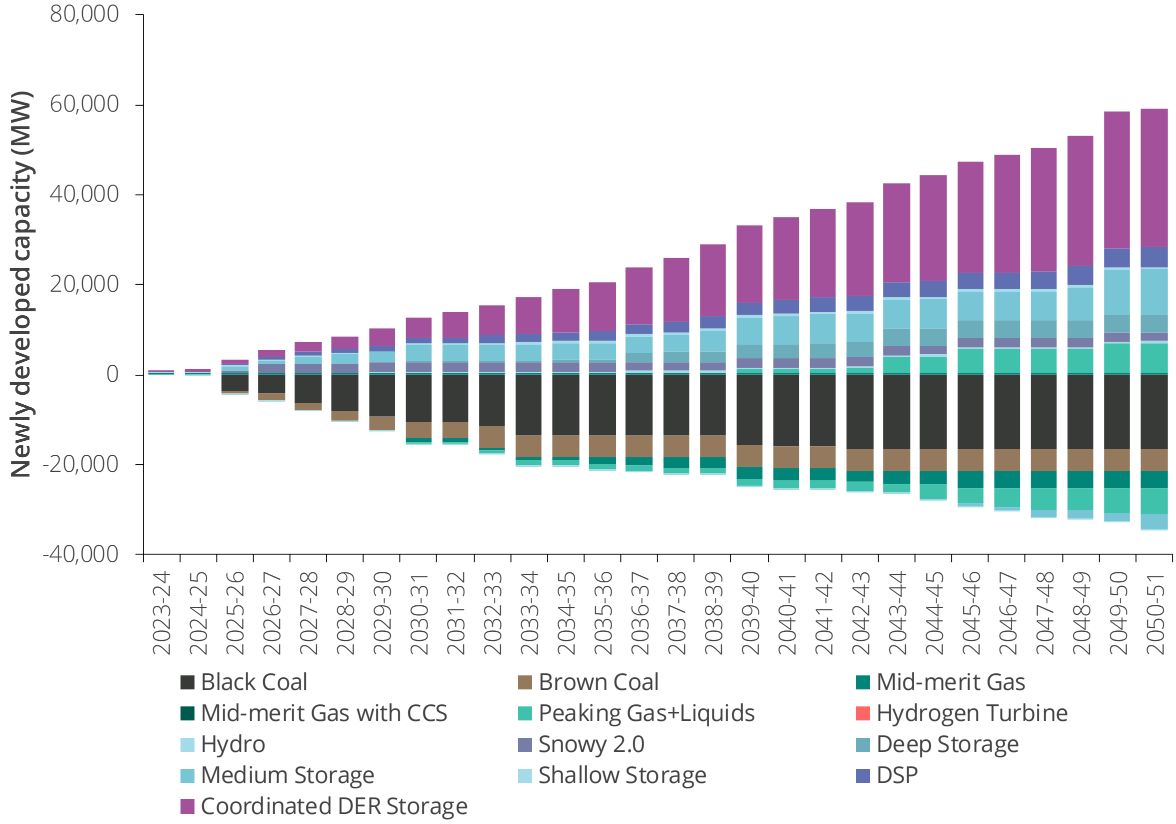
In terms of dispatchable capacity, which is capacity that can be contracted under firm supply agreements, AEMO forecasts that dispatchable capacity built will not exceed dispatchable capacity retired until 2035-36. Importantly, however, the replacement of dispatchable capacity does not deliver a like-for-like replacement. The retired generation is mostly coal-fired generation which is able to run all day as baseload power. The forecast replacement in dispatchable generation is expected to be co-ordinated distributed energy resources (DER) storage, which are behind-the-meter battery installations that are enabled and coordinated via virtual power plant arrangements. This dispatchable capacity will not be able to run all day as is the case for baseload generation and instead is more likely to operate for several hours of a day. The fact that they provide different services is not necessarily an issue so long as the storage capacity is available when it is needed in the market, and for the duration it is needed.

Figure 1 below provides AEMO's projections for the dispatchable capacity that will be retired and built in the NEM by year.

27 https://arena.gov.au/news/arenas-perfect-score-large-scale-solar-12-12/

28 AEMO, 2022 Integrated System Plan, p.31.

Figure 1: NEM dispatchable capacity addition versus retired by year

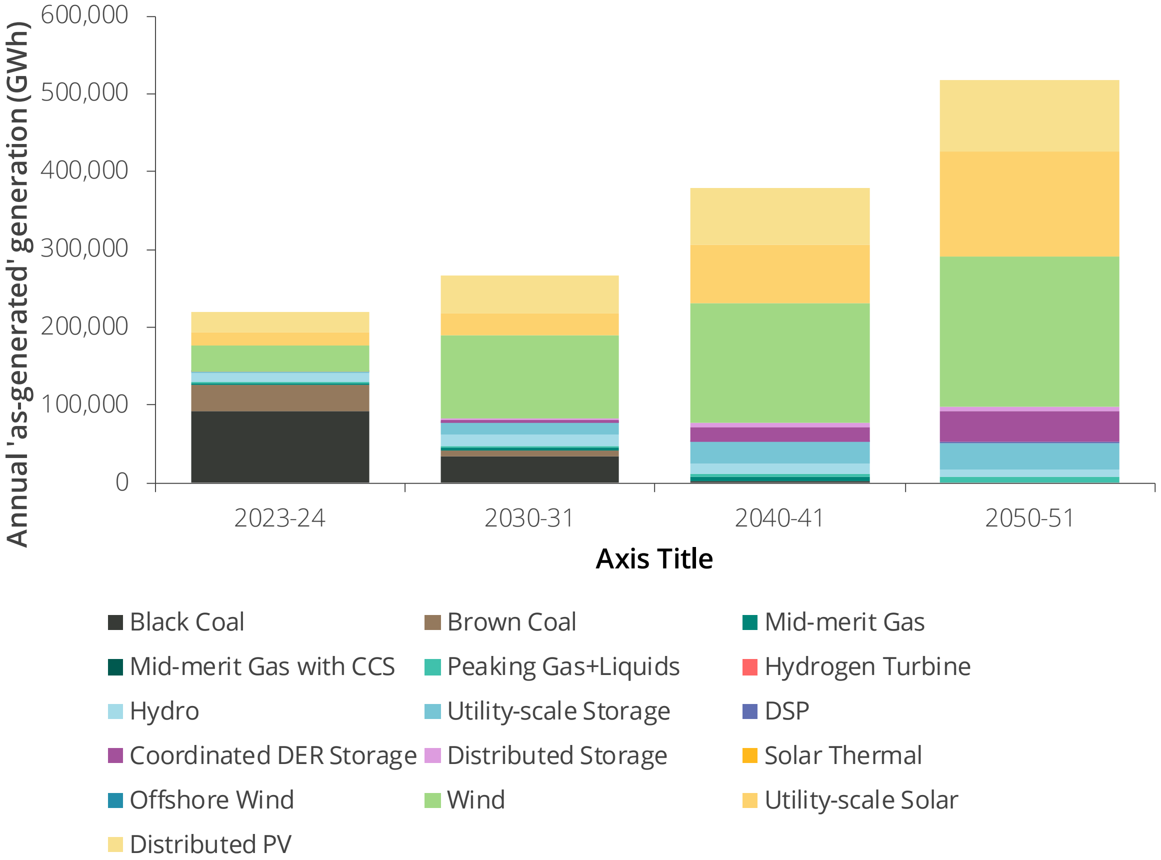


Source: AEMO, 2022 Integrated System Plan, Step change scenario

As shown in Figure 2 below, AEMO forecasts under its 'step change' scenario that by 2030-31 the contribution from wind generation will increase substantially while the contribution from black and brown coal will decrease substantially. By 2040-41, AEMO forecasts that only 2.502 GWh of output will be generated by black coal and zero from brown coal. Conversely, it forecasts 153,925 GWh will be generated via wind and 147,916 GWh from either utility scale solar or distributed PV.[29]

[29] AEMO, 2022 Final ISP results workbook - step change – Updated Inputs, Summary Sheet.

Figure 2: NEM generation by technology type



Source: AEMO, 2022 Integrated System Plan, Step change scenario

Recently, there has been some uncertainty as to whether Australia will achieve its renewable energy targets. This is largely driven by the ability to deliver the transmission network capacity to the source of renewable generation.[30] However, even if 82 per cent of renewables is not achieved by 2030, the expectation remains that a substantial proportion of electricity will be supplied by renewable generation.

For instance, the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) publish annual emissions projections of Australia's future greenhouse gas emissions. In the most recent projection, published in December 2022, the baseline scenario adopted does not assume that the Australian Government's renewable energy target is met. It forecasts that by 2030 renewable generation will still comprise a substantial 76 per cent of the NEM, with an 82 per cent share 5 years later.[31]

2.4 Some implications of these policies for hedging

These government programs to develop large quantities of intermittent renewables will have the effect of driving out existing thermal plant – plant that is often referred to as dispatchable plant, plant that can operate on command. Currently, dispatchable generators underpin the bulk of contracts that are traded in the NEM – financially firm base load swaps (or more commonly referred to in markets as two-way contracts-for-differences). These swaps have been the mainstay of contract trading in the NEM since its commencement in 1998. Base load coal fired

30 See: https://www.afr.com/companies/energy/long-haul-ahead-to-right-off-track-energy-transition-20231011-p5ebix

31 DCCEEW, Australia's emission projections 2022, December 2022, p.26.

generators have traditionally been the main supplier of these contracts as their financial characteristics suit the operational characteristics of these generators – retailers want contract cover for their base load (load that exists most of the day for most days) and generators want price stability to cover their mostly fixed costs. That is, the mutual need by retailers and generators for constant contract cover for a (large) proportion of demand and supply has been fulfilled by a very basic contract – a swap.

The second main form of contracts traded in the NEM have been cap contracts (one way contracts-for-differences). These contracts tend to have a strike price of $300/MWh above which is generally considered to be the lower end of peak pricing in the NEM. Traditionally, gas turbines and hydro electric generators have been used to underpin these contracts, again because the operational characteristics of these types of generators, where they are highly responsive and have high operating costs, suit the requirements of the retailers who require protection against price spikes that can occur unexpectedly and tend not to last long. Increasingly, batteries are being used to meet peak demand, although their power reserves are usually quickly depleted. As more batteries are connected to the grid and as Snowy 2.0 eventually becomes operational, these will increasingly assume the role of supplying peak demand.

To the extent that retailers still want access to swap contracts into the future to provide a hedge against higher prices for base load demand, this may prove increasingly challenging as the transition progresses. This is because the share of generation that can support these contracts at a reasonable risk will progressively decline as the base load thermal generators are decommissioned. Any generators that cannot "run behind their contract" (which means to produce electricity at the same time the spot price exceeds the contract strike price for the amount of electricity that has been contracted) the supplier faces the risk of unfunded difference payments. An unfunded difference payment is a difference payment that a contract seller (usually a generator) has to pay that does not have offsetting spot revenue available to fund the difference payment (because the generator did not dispatch as much electricity as they had contracts). Unfunded difference payments can present a serious risk to a contract seller. Traditionally, to manage this contract trading risk, base load generators would limit the contracts they sold to their total capacity less their single largest generating unit (this is known as a N-1 rule).[32] This spare unit could be used to operate in place of a failed or unavailable unit to ensure exposure to unfunded difference payments is managed.

For a range of reasons, it is expected that base load generators will become less reliable as they reach the end of their economic life. As these base load generators become less reliable it is likely that the generators will manage their unfunded difference payment risk by selling fewer base load contracts. It is expected that, initially, generators will move from a N-1 to a N-2 rule.[33] Unless another supplier replaces these base load swaps, the supply of these contracts will progressively decline as more renewables are commissioned.

It is doubtful that intermittent renewables will replace the supply of base load swaps dispatchable generators currently supply to the market due to the difficulty of managing the unfunded difference payment risk. It is thought by some that a portfolio of renewables scattered across the NEM will provide sufficient production diversity that the unfunded difference payment risks could be managed from selling base load swaps. It is certainly true that, at times, there could be enough geographic diversity of production that difference payments could always be covered across the interconnected system. However, analysis has shown that there is a high

32 Generators use very sophisticated methods for determining the optimal quantity of contracts but in our experience, generator behaviour tends approximate this N-1 rule.

33 It is expected that if base load generators become so unreliable that an owner must adopt a N-3 rule to manage contacting risk, it is likely that generating units will be decommissioned and these will be unavailable to be contracted.

correlation of when intermittent generators are generating and are not generating and that renewables are unlikely to offer sufficient supply diversity to ensure reliable supply.[34] This raises some serious questions about the likelihood that there will continue to be a supply of base load swaps into the future. Of course, it is possible that participants could address this problem by developing alternative hedging products, but to-date, there seems to be little recognition of this looming problem let alone a solution.

[34] Frontier Economics (2020), "Sunny with a chance of wind", March, Website: https://www.frontier-economics.com.au/publications/sunny-with-chance-of-wind, and https://www.energycouncil.com.au/analysis/integrating-renewables-an-assessment-of-generation-correlation/.

3 Future challenges to risk management for retailers

3.1 Introduction

In the preceding section we established that significant transformations are anticipated with respect to the supply of energy in the NEM. In this section we focus on the expected consequences of those changes, specifically addressing the implications for how participants can effectively manage market risk.

A fundamental assumption for our analysis is that the supply-side changes, driven by government policies, have already occurred and will continue to occur at a greater scale and speed. As such, the analysis is focused on the adaptive strategies that participants may employ in this evolving context. Relevant to how the hedging market will respond will be what actions governments take in light of the expected market dynamics and their consequent effects on risks and market prices. We discuss this matter more in section 4 below.

If the hedging market does not function to support generation entry by securing revenues for a period to improve financeability of new generating plants, or provide adequate protection of retailer margins, this will adversely affect market competitiveness. A poorly functioning hedge market will result in the exit of financially vulnerable businesses – mostly small retailers and fledgeling entrants into the generation sector. The same negative forces will deter new entrant retailers and generators. Under these conditions the larger retailers and the gentailers will become increasingly dominant and this will come at the expense of competition and, ultimately, the economic well-being of customers.

In this section of the report, we address the following specific challenges:

- Managing price volatility
- Innovation in contract products
- Supply of financially firm contracts
- Competing with large gentailers.

3.2 Managing price volatility

3.2.1 Spot price outcomes will be driven more by weather than peak demand

Currently, spot price outcomes are reasonably predictable for market participants. When baseload thermal generation is in the market, the generating capacity available is relatively predictable throughout the day such that it is peak demand that is a primary driver of peak prices. A key theme across the stakeholder interviews we conducted was that should the expected very high penetration of intermittent generation in the market be realised, this would drive increased risk through spot price volatility and potentially also higher peak prices than we see today. Several stakeholders expressed concern for the ability for independent retailers to manage financial risk in this environment.

The current drivers of the peak prices will be much less relevant in the future. Instead, the profile of output from rooftop solar, as well as wind output, will be the primary drivers of peak prices.

That is, peak prices will more frequently be driven by the *output of generation* rather than the *occurrence of peak demand* periods. A consequence of this will be that the pattern of spot prices, (i.e., shape) will become much more dynamic. This is expected to drive more segmentation of contracting periods through the day rather than the current binary 'off-peak' and 'peak' categories. As a result, weather driven output and the 'duck curve' created by residential solar is likely to make it far more difficult to hedge than in the past.

Importantly, retailers will not be able to rely on a portfolio of contracts with renewable energy producers to mitigate risk. A common assumption is that the shape risk imposed by intermittent generation can be mitigated through supply in different parts of the NEM. That is, even though output may be low in one area, for instance due to low winds, this can be made up for from generators located elsewhere. However, the evidence suggests a positive correlation in wind and solar generation across the NEM. The correlation is very strong for solar across all regions of the NEM and there is a reasonably high correlation for wind, particularly in South Australia, Victoria and New South Wales. This means that solar and wind in different states do not tend to diversify the contribution of renewables in the NEM sufficiently to deliver reliable electricity supply.[35] The inability for retailers to be able to rely on renewable generation alone is further emphasised given the evidence that low wind conditions are coincident with high demand periods, implying wind generation output will be low when spot prices are expected to be high.[36]

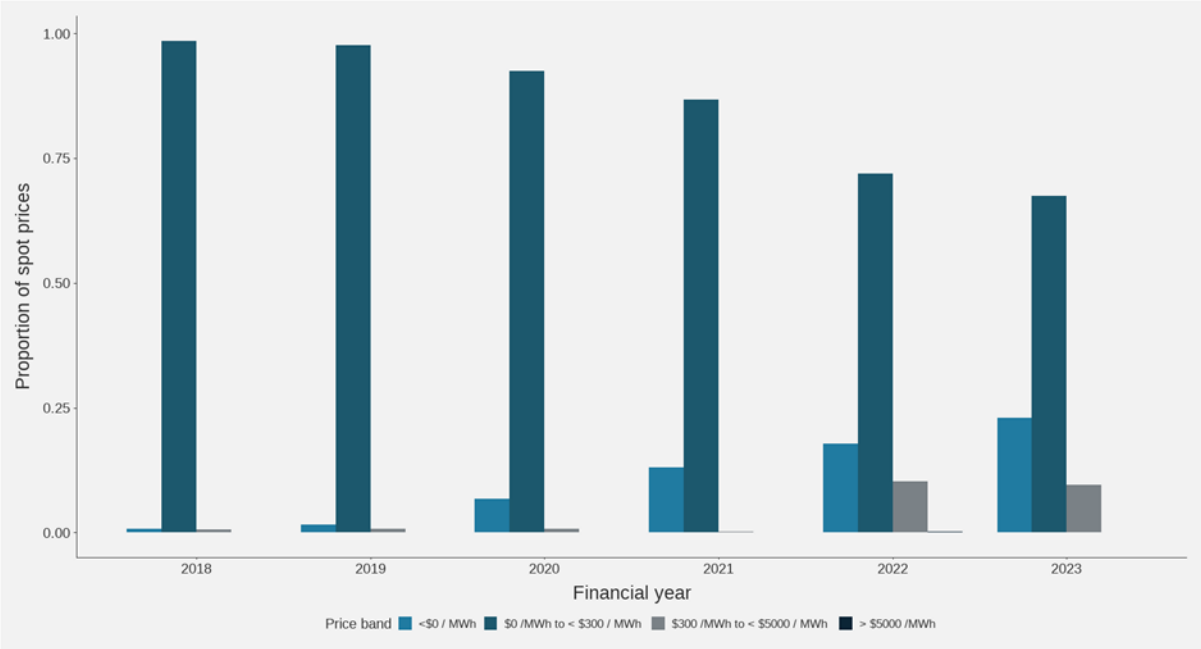
Peak prices are expected to consistently rise to higher levels than they do today, while off-peak prices will be lower. The current market is already witnessing low off-peak prices from the penetration of renewable generation, particularly due to rooftop solar reducing demand for supply off the system. Peak prices, however, are expected to be driven by high-cost peaking plants in the absence of baseload generators. This is at least until battery technology can produce sufficient output to cover peak periods over multiple days in a row.

The increasing prevalence of higher peak prices and lower off-peak prices is evident in South Australia, which has a very high penetration of renewable energy. Figure 3 shows the proportion of South Australian spot prices in certain price bands between FY2018 and FY2023. It shows that the proportion of negative prices has been increasing since FY2018, while the proportion of prices in the $300/MWh to $5000/MWh range has significantly increased over the past two financial years.

[35] Frontier Economics (2018), "Sunny with a chance of wind", Weblink: https://www.frontier-economics.com.au/documents/2020/03/sunny-with-a-chance-of-wind-bulletin.pdf, and https://www.energycouncil.com.au/analysis/integrating-renewables-an-assessment-of-generation-correlation/ .

[36] AEMO, 2023 Electricity Statement of Opportunities, August 2023, p.9

Figure 3: South Australian spot prices by financial year, 2018-23



Source: Frontier Economics

Recognising that spot price outcomes are expected to become more volatile and less predictable, there was a general consensus from the stakeholders we met with that vertical integration would be the best strategy to manage this future environment. In the absence of vertical integration, the view was that highly sophisticated hedging skills would be needed to manage financial risk. Some stakeholders believed the level of sophistication needed was likely to be beyond that available to small and new entrant retailers.

3.2.2 Higher and more volatile prices will drive higher margin and credit support obligations

Compounding the challenges retailers will face, if peak spot price outcomes are expected to be more volatile and result in higher peak prices, the credit support and margin obligations imposed on retailers are likely to rise also.

High spot prices, and in turn high contract prices, mean that the credit support and margin obligations that must be provided by retailers to participate in the spot market, and to contract with counterparties either through an exchange or OTC, has to increase to cover the increased price. For example, the ASX requires an initial margin from counterparties that covers 99.7 per cent of expected daily price movements for a given futures or options contract.[37] It is conceivable that the credit support obligations imposed on retailers make it extremely difficult for some retailers to participate in the contract or futures market, particularly where financial intermediaries, clearing participants and brokers feel overly exposed to market risk and so become unwilling to trade with smaller retailers.

The link between higher spot prices and difficulties for retailers was something that the ACCC has previously highlighted, stating:[38]

[37] ACCC, Inquiry into the National Electricity Market November 2022 Report, 23 November 2022, p.34.

[38] ACCC, Inquiry into the National Electricity Market November 2022 Report, 23 November 2022,p.78.

Our analysis reveals increased hedging contract prices (Section 3.2.1), associated increases in Australian Energy Market Operator (AEMO) prudential and Australian Securities Exchange (ASX) margin requirements for some retailers (sections 3.2.8, 3.2.6 and 3.2.5) and declining hedging contract liquidity (Section 3.2.2) in 2022. These pressures are impacting retailers' ability to manage their risks and driving broader shifts in hedging behaviour (sections 3.2.5 to 3.2.7).

3.3 Innovation in contract products

The current contract market does not provide the types of products that retailers will require in the future to manage risk. This is understandable, the market for such products would only be expected to fully emerge once baseload generation exits the market and spot price outcomes are dominated by the output from intermittent generators. However, if the exit of baseload generation is required before suitable products can develop, it may create a situation where retailers exit or seek alternative sub-optimal solutions before such products are able to develop. This would reduce the overall efficiency of the market.

Traditionally, the dominant products purchased by retailers have been base swaps based on either an 'off-peak' or 'peak' period and caps. Further, contracts with either coal or gas fired generators have been used to manage quantity risk. Stakeholders told us that these traditional contracts are not well suited to the expected future risk profile retailers will encounter and more bespoke contracting arrangements will be required.

- For 'off-peak' products, the issue is that spot prices are expected to be very low during these times such that contracting may be of limited value for retailers outside of whatever PPA arrangements that they might be able to arrange.
- For 'peak' products, the issue is that the current peak products, such as those sold by the ASX, are for a duration that will be too long given the expectation of a shorter peak period. Further, cap contracts are unlikely to be priced high enough for future requirements.

In their place, retailers are expected to prefer a peak product that operates for a shorter period of time, for instance, at the time that solar output decreases and demand increases in the early evening. This is sometimes referred to as a 'super peak' product. Stakeholders also told us that products based on solar shape would be beneficial. This is a product that protects market participants against the risk of fluctuations in solar energy production. Two products that have been developed in this context are a solar shape swap, which provides a firm shape and fixed price against the solar profile, and the inverse solar shape, which is a sculpted swap contract representing the energy required to firm the solar shape contract to a flat swap.[39] In the future retailers may also prefer to rely more on 'insurance' type products, such as weather derivatives. However, these are currently not well traded in Australia and will likely require a sophisticated trading team to arrange.[40]

Stakeholders we met with also had the view that product innovation from the ASX is slow and so cannot be relied upon as a source of hedging in the future. In this case, there appears to be a 'chicken and egg' problem, whereby the ASX requires demand for a product before it will list it, but without a well-defined product it is not possible to create demand. We were told that retailers are likely to want more bespoke contracts that more closely reflect the shape risk that

[39] See: Australian Renewable Energy Agency, Knowledge Sharing Report 1 Contract Performance Report Renewable Energy Hub, November 2020.

[40] See; AEMC, Market making arrangements in the NEM, Rule determination, 19 September 2019, p.v.

they are exposed to as a retailer. The implication of this is as more bespoke contracts are demanded it reduces the ability to create products with high liquidity that are suitable for exchange trading.

A 2023 study from Griffith University that surveyed 21 market participants in the NEM identified that the dominant perspective of market participants surveyed was that product innovation was required. Specifically, the study noted:[41]

> *Of the market participants surveyed, 95% confirmed that innovation in the contract products offered to participants is required. If the NEM is to have an active derivative contracting market into the future it will require some form of product innovation or overhaul of the market traded. Without any form of innovation or overhaul it is likely to become increasingly difficult for retailers to hedge their market positions in an efficient or economical way.*

In the absence of suitable hedging tools being available on exchanges, our expectation is that retailers will either rely heavily on OTC contracts or seek to vertically integrate to manage risk.

An alternative option to contracting or vertical integration would be for retailers to pass the risk onto consumers. This might be through pool price pass through or by controlling the load for some of their customers. While this could be a successful strategy for some retailers, the number of customers that would be willing to bear pool price exposure is likely to be small, such that it is unlikely to be a mass-market offering. In addition, there is the prospect that while retail offers that include pool price pass-through appear attractive up-front, once an extended high price period occurs customers may choose to move to more a more stable arrangement.

3.4 Supply of financially firm contracts

There is a reasonable prospect that retailers find it materially harder to source efficiently priced financially firm contracts in the future. Importantly, PPAs with intermittent generators are not financially firm because the generator cannot commit to producing output at particular times.[42] The financially firm contracts that retailers will need, but may have difficulty sourcing, are the ones that provide financial protection at those times intermittent generators are not supplying electricity and prices are high. Currently these products are provided by baseload coal-fired generators or gas-fired peaking generators.

If retailers that are not vertically integrated are unable to easily source efficiently priced financially firm contracts, they will be exposed to material financial risk. If a retailer is unhedged during periods of high prices, they will either need to source the electricity through the spot market, which could be prohibitively expensive, or require their customers to reduce or avoid consumption. The first solution would likely force the business out of the market, the second is likely to be unattractive to customers over the long term, or if it occurs frequently.

In the remainder of this section we discuss some of the reasons why the supply of financially firm contracts may reduce in the future when baseload generation retires.

[41] Flottmann, J., Wild, W., & Todorova, N., Derivatives and Hedging Practices in the Australian National Electricity Market, July 2023, p.23

[42] Batstone, S., MDAG – Price Discovery with a 100% Renewables Wholesale Market Wholesale risk management practice trends in the NZ electricity market, and prospects for a high-renewables future, October 2021, p.21.

3.4.1 Less firm capacity will exist in the NEM

As coal-fired generators retire and are replaced by intermittent generators there will be fewer sources of financially firm contracts available for retailers. Indeed, it is feasible that every region in the NEM is just one coal-fired generation retirement away from there being a material shortage of firm contracts for that region.

Currently the alternative technologies that could provide firm contracts are either insufficient to compensate for the loss of coal-fired generation or are incapable of matching the service that has been provided by thermal generators. For instance, pumped hydro and batteries are unlikely to be suitable to support reliable supply where there are periods of extended droughts in the availability of wind or solar. Batteries, for instance, tend to be capable of supply for a period of hours, while pumped hydro can be capable of supply for a period of days. Whereas, a solar or wind drought could persist over a week even into several weeks.

The consequence of the high penetration of intermittent generation is that retailers will have fewer options available to them for firm contracts. During the transition phase where traditional thermal plant is closing and only limited dispatchable capacity remains, the remaining dispatchable plant would be able to charge a high premium for firm financial contracts due to a lack of supply competition. In addition, we note that the dominant source of firm capacity is likely to be gas-fired generation, which is expensive to run. As such, reliance on these sources for firm contracts with high premiums attached to them will be an expensive option for independent retailers who cannot draw on their own firming assets. This may threaten the ability for independent retailers to remain cost competitive.

The Griffith University study identified that market participants are concerned about dispatchable plant exiting the market and the impact this would have on risk management. The study revealed that market participants were particularly concerned about their hedging position once dispatchable coal plant exits, in particular, because a shortage of supply will likely drive a large premium for contracts with firm dispatchable supply.[43]

> *The results of the survey indicate that hedging is a growing concern for market participants. 16 of 21 respondents communicated that this is an increasing issue to their portfolios. Concern for hedging positions comes as dispatchable coal plant (historically a dominant provider / supplier of hedge contracts) exits the market, taking their derivative contracts, which are used primarily as a hedging tool, with them. When most or all dispatchable plant has exited an electricity market it can be difficult to purchase derivative contracts OTC or through an exchange (Simshauser, 2019b). This is because if participants were able to purchase those contracts the buyer of the contract might pay a large premium as there are limited sellers. If a participant cannot get access to derivative contracts for hedging, they can become exposed to highly volatile spot prices.*

3.4.2 Remaining baseload generators may need to reduce contract levels

The aging infrastructure of many power generation units, which have historically provided baseload energy, is nearing the end of its operational lifespan. For those generating assets that remain in the market, this leads to escalating unreliability, leading to an increase in both planned and unplanned outages.

[43] Flottmann, J., Wild, W., & Todorova, N., Derivatives and Hedging Practices in the Australian National Electricity Market, July 2023, p.16.

As the frequency of outages from aging thermal generators increases, so does the risk associated with contracting these generators. Specifically, if a generator is contracted for a certain capacity and experiences an outage, it will be obligated to fulfil the contact via spot market purchases. If the spot market prices happen to be high at the time of the outage, the financial consequences for the generator could be substantial.

The response from aging generators to outage risk is likely to be to reduce the amount of capacity that they are willing to offer under contract. This is because it reduces their exposure to unfunded difference payments. One stakeholder told us that while baseload used to sell contracts based on an N-1 risk profile, they could be moving to an N-2 risk profile now.[44]

3.4.3 Incentives for vertically integrated generators to offer contracts

As identified above, in a market with a high penetration of intermittent generation, shape risk driven by weather fluctuations becomes a significant factor for risk management. The timing and size of this exposure will be difficult to predict. This uncertainty about the generation profile may encourage a generator to rely more on its own generation as a hedge against this risk rather than making it available to the market. By keeping their generation in-house, retailers may consider they are able to offer more competitive and stable prices to their customers. Furthermore, these retailers may consider there is value in being able to access the high spot prices at times when renewable generators are not producing.

3.4.4 Incentives for government underwritten generation

One concern that was raised several times through our consultation with stakeholders was that in some circumstances where generator investments have been underwritten by governments, particularly through contracts for supply with government or arrangements that limit downside risks, there would be a reduced incentive for those generators to offer contracts to the market.

As indicated previously, a key motivation for a generator to contract is to provide a reasonable assurance that it can finance the investment. If a contractual agreement with the government provides a reasonable assurance of stable returns for the generator, it has limited incentive to offer contracts to retailers. Indeed, this arrangement is likely to attract investors that prefer to avoid sophisticated trading arrangements in favour of a stable return that looks more like a regulated asset.

A particular concern that was identified was the circumstance where governments invest in generation and also own an interest in retailers in the region. In this case the view was that it will become very difficult to find efficiently priced contacts in the region given the expectation that the government owned generators contract with the government owned retailers. Even where this is not the intention of governments, the expectation that this outcome could emerge is likely to deter participation in the market.

[44] An N-1 risk profile means that the generator is able to withstand the loss of a single unit or component. Similarly, an N-2 standard means the generator is able meet its obligations while withstanding the simultaneous failure of two units or components.

3.5 Competing with large gentailers

The ACCC has previously shown that the retail market has become more concentrated over time.[45] In the Commission's 2018 reviews they identified three tiers of retailers:[46]

- Tier 1 (AGL, EnergyAustralia and Origin) — extensively vertically integrated and have strong balance sheets and substantial customer bases through which they can achieve economies of scale.
- Tier 2 (for example, the Snowy Hydro retail brands, Red Energy and Lumo Energy, and a handful of other medium sized retailers)—typically are partially vertically integrated and have reasonably strong balance sheets, and sufficient customer numbers to achieve moderate economies of scale.
- Tier 3 (the rest of the market)—have little or no generation assets, constrained balance sheets, and small or very small customer numbers.

As indicated above, vertical integration can allow an entity to efficiently manage its exposure to price volatility because it provides a natural hedge. This is an option that may not be available to small retailers. There is the prospect that in the future retailers that are not vertically integrated are not able to effectively compete in the market.

Vertical integration has always been an attractive business model in liberalised electricity markets. In addition to providing a natural hedge, vertical integration can also reduce the transaction costs that would otherwise be required to procure energy from other sources. Increased market volatility and difficulty in hedging that volatility would serve only to increase the perceived benefits of vertical integration for retailers.

The capital requirements for electricity generation are substantial and, to-date, these have required investors in large scale new generation to have an investment grade credit rating. Small retailers do not have the financial resources of larger retailers and so tend not to possess the investment grade credit rating required to finance large capital assets, this is evident in the reported difficulties they have had meeting clearing participant requirements and the prudential requirements to participate in exchange trading.[47]

Whether these capital barriers to vertical integration for smaller retailers persist in the future is less certain. This is because technological changes in renewable electricity generation and

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45 ACCC (2018), Restoring electricity affordability and Australia's competitive advantage, Retail Electricity Pricing Inquiry – Final Report, June, Website: https://www.accc.gov.au/system/files/Retail%20Electricity%20Pricing%20Inquiry%E2%80%94Final%20Report%20June%202018_0.pdf

The AEMC concluded in their 2020 review of retail market competition, using 2019 data, that market concentration had, more recently, improved. However, since this review a number of small retailers have exited the market and it is likely that the AEMC's conclusions may no longer be valid.

46 Op cit ACCC (2018), p137

47 ACCC, Inquiry into the National Electricity Market – November 2022 Report, 23 November 2022, pp.47-48. See also: Simshauser, P., Tian, Y., Whish-Wilson., Vertical integration in energy-only electricity markets, Economic Analysis and Policy, Vol. 48, December 2015, pp35-56, which stated: *The energy industry is among the most capital-intensive industries in the world and understanding the capital flows is vital. Why is the presence of investment-grade credit important in the NEM? The credit metrics applied to project financings, historically the dominant source of capital for new generating equipment, were tightened dramatically by project banks from ca.2004 in direct response to episodes of 'the missing money' in various energy-only markets around the world.6 As a result, in energy-only markets like the NEM, new plant now requires the involvement of an investment-grade credit-rated entity either as principal investor or underwriter of long-dated Power Purchase Agreements (PPAs)—an entry barrier not envisaged by policymakers during the market design phase. The change in credit parameters, applied by risk-averse project banks, is not unique to Australia—it is a characteristic of energy-only markets around the world.7 The presence of investment-grade credit amongst (some) merchant firms allows the broader market to execute efficient ex ante investment propositions because credit-rated firms have the capacity to raise debt and equity capital in an efficient and timely manner.*

battery storage has reduced the scale at which the unit cost of production is minimised. [48] Over time it is expected that plant economies of scale will fall further and this will open the hedging possibilities for small retailers. However, it may take some time before these become realistic opportunities for small retailers and they may succumb to the rigors of the NEM before then.

Many retailers are dependent on the (generation long) gentailers selling contracts off the back of their surplus generation, which is often base load coal generators. It is expected that as large base load coal generators are closed, the gentailers will replace this capacity with renewable generators and storages they own and operate. In order to minimise their costs and equity exposure to generation assets, the gentailers will likely build enough renewable generation and storages for themselves and no more. This means that gentailers will increasingly not supply contracts to the market as base load generators are closed and retailers with no generation capacity will find it increasingly difficult to find hedging products to manage their energy purchase cost risk. This will pose a serious obstacle to the continued operation of small retailers and present a formidable barrier to entry of new retailers.

Increasingly, gentailers will be able to take advantage of their customer base in ways that small retailers will find very hard to compete with. For example, electricity customers are progressively installing solar panels, on-site batteries and buying EVs. Retailers can take advantage of these technologies owned by their customers to help manage the retailer's energy purchase cost risk.

For example, a large retailer that has customers spread across the NEM is more likely to have, on average, more uniform generation from customer PV systems as compared to a small retailer with customers located in a smaller number of areas. The large retailer that has this diverse customer base with diverse PV electricity production can more accurately predict customer-based electricity generation and therefore predict the required top-up generation required to meet their customer electricity needs. A large-scale retailer with a more predictable customer generation profile could develop a product where all customers in their portfolio share in the cost savings that arise from the portfolio. Of course, this large retailer could also use the diversity of its customers use of its batteries and EVs to extend this cost advantage. The larger and more diverse the customer base, the greater the cost advantage to the retailer. These large retailers can then meet their top-up generation requirements with their own renewable generation and energy storages, leaving these highly integrated gentailers operating, more or less, independent of the rest of the market. This model represents an extension of the concept of conventional vertical integration to incorporate customers into the production process. Information technology such as artificial intelligence will facilitate this integration of millions of elements across a highly integrated business. This will transform the way that energy retailing is undertaken.

Unfortunately, it is difficult to see how small retailers will be able to compete with this highly integrated model on a cost basis unless they are provided access to a large customer base and technologies that are required to be successful. Indeed, the cost advantages of this highly integrated model is likely to result in large retailers increasing their dominance in the NEM as every customer they add to their portfolio further lowers their costs, albeit at a diminishing rate.

3.6 Are small retailers worth protecting?

Consumers benefit from the operation of a vibrantly competitive market where suppliers cannot sustainably price above efficient costs (including a normal return), lest a competitor undercuts them and wins their customers.

[48] See for example Frontier Economics (2018), NEM Structure in light of technology and policy changes, 13 December, Weblink: https://www.energycouncil.com.au/media/14945/20181213-final-report-advice-on-nem-structure-in-light-of-technology-change-stc.pdf

A competitive market can only operate if there is sufficient rivalry between existing suppliers such that no supplier can sustainably charge prices higher than efficient costs and/or offer substandard service. Even if there is not sufficient rivalry between existing suppliers, if there are low barriers to a new supplier wanting to enter a market so they can undercut the existing suppliers and/or provide better services to customers, the market will also be competitive. The opposite is true if there are obstacles to entering a market. Barriers will deter or slow market entry and allow incumbents to charge more than is efficient for longer.

The survival or demise of small retailers in the NEM is an indicator to potential new entrants of the barriers to entry. Successful small retailers are therefore harbingers for other potential new entrants.

If potential new entrants observe that small retailers are exiting while other larger retailers and gentailers survive under the same market conditions, this would tend to indicate to potential entrants that there are some serious barriers to their survival if they entered. In this regard the ACCC noted in their November 2022 report that: [49]

> *Since May 2022, 6 retailers have exited the market through the retailer of last resort scheme, while other retailers have actively encouraged their customers to switch to another retailer. Additionally, several retailers are no longer seeking new market offer customers.*
>
> *The result is consumers moving from small and very small retailers towards retailers with larger market share, increasing market concentration.*

This recent loss of small retailers and retailers abandoning their customers suggest that there are some serious challenges facing small retailers in the NEM.

Aside from presenting a threat to incumbents who charge excessive prices and provide poor service, small retailers can lead the way on better, low-cost services for consumers. This is perhaps out of necessity as they will only likely to be successful as a new entrant if they offer sufficient advantage to customers to overcome the costs of switching away from an incumbent. The ACCC has found in the past that while, on average, small retailers have a higher cost-to-serve their customers, they found that: [50]

> *There is significant variation within the costs of the big three and within the 'Other retailers' category. Some results are surprising. For example, some small retailers have much lower CTS per customer than some of their much larger competitors (including some of the big three).*

Customers can also be attracted to small retailers because of their innovation in customer service. For example, a 2022 study by Choice found that smaller retailers generally performed better in customer service than the larger retailers (see Figure 4).[51]

[49] Op cit ACCC (2022), p77

[50] Op cit ACCC (2018), p224

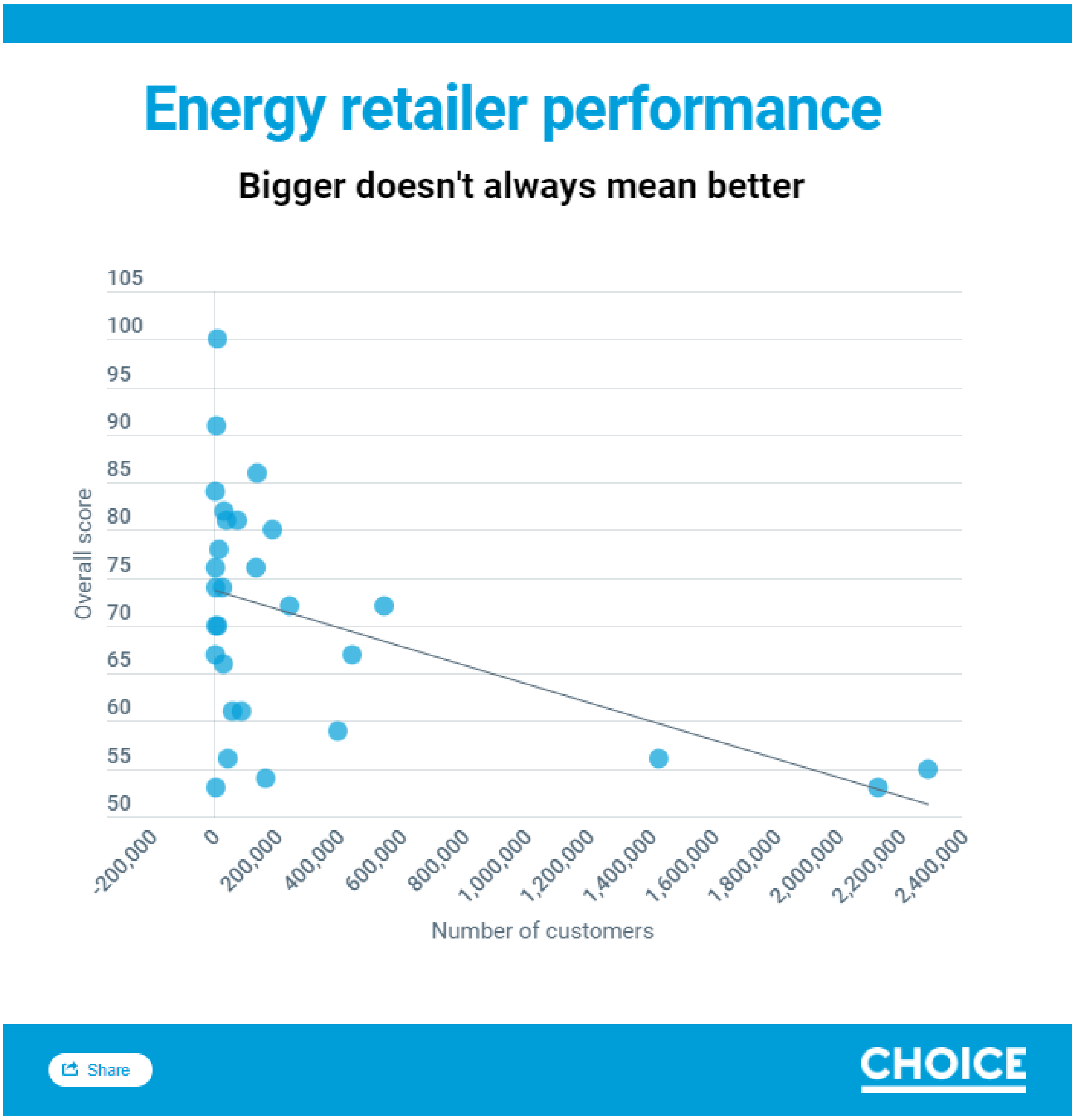
[51] Choice (2022), "Why it's worth considering a smaller energy retailer", Weblink: https://www.choice.com.au/shopping/shopping-for-services/utilities/articles/why-its-worth-consider-a-smaller-energy-retailer

Aside from the barriers to entry, small retailers face an uphill battle to expand once they have entered. Most small retailers remain small in the NEM. However, the technological changes occurring in the electricity sector potentially changes the opportunities for small retailers to grow. Small retailers have always operated at a cost disadvantage to vertically integrated retailers as they have not been able to access the same range of hedging options. For example, gentailers with their own generation facilities avoid the costs, inefficiencies, rigidities and hold out costs and risks of relying totally on the financial contracts to manage their energy sales and purchase cost risks. Technological change in renewables and battery storages have reduced the size at which plants are scale efficient and potentially offer small retailers an opportunity to develop a small scale vertically integrated position that is cost competitive with the larger gentailers.[52] Small retailers could develop innovative ways of overcoming any remaining diseconomies so they can compete with the larger retailers. For example, small retailers could form technology buying clubs to further reduce the unit costs of their energy purchase costs and to spread the equity risk of committing to using renewable generation and electricity storages as part of their suite of risk management instruments.

In the absence of small retailers in the NEM, given there are only a small number of large gentailers, it is very likely that the market will quickly descend into oligopolistic pricing and poor service. Policy efforts should therefore be directed to supporting small retailers as they are likely to deliver benefits that are disproportionate to their size.

52 Op cit. Frontier Economics (2018), NEM Structure in light of technology and policy changes

Figure 4: Choice analysis of customer performance of retailers by size



4 Strategies and options to assist future retailer risk management

4.1 Introduction

Consumers are better off with a well-functioning electricity market with effective competitive rivalry between many players. The challenges we identified to risk management in the previous section threaten the ability for smaller retailers to enter and compete effectively. Therefore, it is necessary to consider what options are available to assist retailers with their risk management so that they can remain active participants in the market. This section sets out some findings to assist with the development of recommendations to improve the expected outcomes for retailers in the future.

When considering options to assist retailers we consider it is necessary to seek to preserve market signals to the extent it is feasible. This is to ensure that market participants are able to make efficient commercial decisions that are in the long-term interests of consumers. Solutions that distort or dilute those market signals increase the risk of leading to unintended and worse outcomes.

4.2 Improving the availability of products to support small retailers

In the ACCC's 2018 review of retail competition, the Commission concluded that it was becoming increasingly difficult for small retailers to compete.[53] The Commission considered proposals from some stakeholders that small retailers be given access to "low cost" electricity supplied by government owned generators to ensure their survival. The Commission concluded that a better solution was to ensure the market performed better and warned that further interventions could create their own market distortions.

Theoretically, the Commission's 2018 view is correct. However, practically, five years following the Commission's 2018 retail competition review, it would be difficult to conclude that the market is performing better than in 2018 or that they are fewer distortionary interventions adversely affecting the market. The consultations we have had during this project has confirmed that small retailers are facing a very difficult future.

In our view it is time that the ACCC and the Government consider again the question of whether more active support ought to be provided to small retailers.

In this report, we have explained that small retailers are critical for the operation of a competitive market and that they are facing significant risks in their attempts to remain cost competitive with the larger retailers and gentailers. Small retailers face cost disadvantages because they have fewer economic choices for hedging their risk compared to large competitors and this gap is set to widen as the retail market develops to integrate customer load and supply technology into the retailer production process.

For small retailers to survive, they will need to have access to economic sources of risk management and opportunities to develop their business in the ways open to the large retailers and gentailers. The Government can potentially play a role in this regard, for the benefit of stimulating more retail competition, leading to lower prices for customers. For example, one of

53 ACCC (2018), Op cit, p150

the main barriers facing the future success of small retailers is access to hedging, renewable energy and storage technology.

Given governments currently fund the majority of new supply technologies in one form or another, we consider the ACCC and the Government should identify if there are ways that these government funded generation/storage projects could be used to support qualifying small retailers with access to a quantity of hedges. The aim would be for the Government to maximise the value of their investment by promoting more competition in retail markets.

A common perspective among the stakeholders we consulted is that government intervention is essential for the timely transformation of the electricity sector. However, as noted in the section 3 above, there is a concern that current approaches to government support could inadvertently drive market failure by diminishing the incentive for generators to offer contracts to the open market.

Importantly, we consider a pathway that relied on government funded capacity has the potential to deliver significantly larger benefits than previously proposed market-making requirements or the existing Market Liquidity Obligation arrangements under the Retailer Reliability Obligation (RRO). While market-making requirements compel major market players to offer some supply for contracting, this can interfere with their commercial strategies, which were designed to give them a competitive advantage. In any case, the ephemeral nature of this obligation does not support investment in new capacity. Worse, the RRO interferes with normal contracting as it holds a potential hedging obligation over the heads of the industry (see Section 4.4.1 below).

4.3 Drive ASX innovation

We identified in section 3 that the development of new products on exchanges suffer from a 'chicken and egg' issue. That is, liquidity in a specific product is required before it will be listed on an exchange, but liquidity may not develop until a product is listed on an exchange. Therefore, our findings suggest that the ACCC and the Government should investigate if there are ways to support new products being listed on the exchange in a more timely manner. The intent being to support the development and availability of these products until sufficient liquidity emerges.

4.4 Within market interventions

In evaluating potential regulatory changes aimed at risk management within the energy market, certain proposals, such as reducing the market price cap and the cumulative price threshold may be seen as attractive to policy makers.[54] This is because they would be viewed as reducing the risk that retailers and customers are exposed to.

However, we would advise against the ACCC and governments considering changes to the market rules to reduce retailer price risk for several reasons. Primarily, implementing regulatory changes of this form would substantially reduce the incentive for retailers to contract and for investment in essential dispatchable capacity. This could further weaken the linkage between hedging and investment in supply options. With the NEM being an energy-only market, generators rely on periods of price volatility and price spikes to recover their fixed costs. By capping prices, essential economic signals are removed, and retailers will be less inclined to contract with generators to manage risk. These outcomes make it less attractive for generators to invest in the market. The absence of these price signals would therefore likely result in underinvestment. This resulting underinvestment would result in unreliability, and this will likely

[54] These are just two examples, there are many additional policy interventions that could be taken within the market and the market rules to reduce risk.

result in even more market intervention. Our finding on this matter is consistent with views across the stakeholders we met with.

It is important to be aware also that regulatory uncertainty itself poses a substantial risk to market outcomes. For instance, market participants are less likely to offer long-term contracts when there is a possibility of regulatory changes that could see that position become 'out of the money'. This situation contributes to market inefficiencies and can lead to higher costs as market participants rely on sub-optimal solutions to avoid the long-term risk. Uncertainty in regulation can also deter new entrants from entering the market in the first place where they are concerned that the regulatory stroke of the pen could fundamentally destroy their business model.

The feedback we received, therefore, was that while the intent behind regulatory changes may be to support risk management for small retailers, and ultimately to protect customers, it is more likely to lead to outcomes that have the opposite effect and discourage new investment and competitive entry.

4.4.1 RRO makes it harder for small retailers

In the context of regulatory intervention, we consider it is relevant to highlight stakeholder views on the RRO. Every stakeholder we met with that commented on this mechanism told us that it did not work as intended and makes things harder for small retailers.

The RRO was designed to motivate new investment in firm supply side capacity by requiring that retailers be obliged to form contracts for supply in certain conditions. Those conditions are determined by AEMO, or in South Australia by the relevant Minister. However, the concern is that the RRO does not actually drive new investment given it is only applied in limited circumstances, and when those circumstances might arise are uncertain. As a result, it is our view that it is unlikely that investors would make a decision to invest substantial amounts of capital for new capacity on the basis of an uncertain and time limited contract.

Indeed, stakeholders told the AEMC in its current review of the RRO that it is not driving additional reliability in the market but instead created a regulatory burden for retailers. Specifically, the AEMC identified the South Australian T-1 Reliability Instrument, which has been the only time the RRO has been triggered, revealed several concerns from stakeholders:[55]

> *Submissions to the review raised concerns that the operation of the RRO through the National Electricity Law (NEL), National Electricity Rules (NER) and RRO guidelines – in respect to the SA T-1 Reliability Instrument – had resulted in regulatory burden and additional costs which will be borne by consumers, while not delivering additional reliability to meet the interim reliability measure (IRM).*

In addition, we are aware that in consultations the ACCC has conducted as part of its Inquiry into the NEM, concerns have been raised that the RRO makes it harder for small retailers without vertical integration to operate. This is because if there is a lack of contracts available, as we predict will occur unless changes are made, it is harder for retailers to meet their RRO obligations. Furthermore, we are also aware of concerns that the RRO obligation drives up the price of contracts that are available given suppliers know that retailers are forced to hedge. In principle this ought to drive investment. However, as mentioned, the RRO obligation may be temporary. The ephemeral nature of the RRO will not encourage the development of new plant

55 AEMC, Draft Report, Review of the RRO, 28 September 2023, p.i.

and therefore it is ineffective as an intervention. Worse, it is likely to drive up prices for customers for no gain.

It is our view that the RRO can be easily improved to support access to hedges for small retailers. For example, the RRO could be modified so that the government holds a competition for the supply of new government backed RRO plants where participation is confined to small retailers and/or new entrant generators. The competition can be configured so that the winning bidder is the one who requires the least financial support from the government – a market for subsidies. The addition of supply to the market will of course have positive competitive spill over effects for all market participants and customers as it will add much needed competition for reliability generation. This change will also remove the adverse effects the RRO is having on retailers, especially small retailers. To the extent such a scheme preserves small retailers in the market, customers will, more broadly, be better off, whether or not they are supplied by a small retailer.

Frontier Economics

Brisbane | Melbourne | Singapore | Sydney

Frontier Economics Pty Ltd
395 Collins Street Melbourne Victoria 3000

Tel: +61 3 9620 4488
www.frontier-economics.com.au

ACN: 087 553 124 ABN: 13 087 553 124