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AUSTRALIAN ENERGY REGULATOR

Assessing the performance of the wholesale cost model

Supplementary report for the DMO 8 issues paper

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Contents

1 Executive summary 1

2 Introduction 2

3 Analysis, results and observations 5

3.1 Composition of the hedging strategy 5

3.2 Modelled spot prices and their influence on the WEC 8

3.3 Testing whether the assumed hedging strategies are robust and realistic 19

1 Executive summary

This report reviews the performance of the wholesale cost model (the model), which has been used to determine the wholesale energy cost (WEC) component of the default market offer (DMO) price since DMO 2 (2020–21). This analysis and report have been prepared in response to stakeholder submissions to previous DMO determinations. Some stakeholders have expressed concern regarding the accuracy of the model and percentile estimate adopted from the modelled results. During consultation on DMO 7 some stakeholders requested the AER undertake back-cast analysis of the model's performance in prior determinations, specifically, they requested that forecasts from the model be compared with actual results in the market. This report covers:

- how the model decides the assumed hedging strategy and produces WEC estimates
- a summary of recent feedback from stakeholders on the wholesale modelling
- composition of the modelled hedging strategy
- modelled spot prices and their influence on the WEC
- a back-cast of the DMO 6 assumed hedging strategy against the past 5 years of spot price and load outcomes and analysis of the results
- a back-cast of 2 alternative hedging strategies against the past 5 years of spot price and load outcomes and analysis of the results.

Findings indicate that while the model has tended to underestimate spot prices in recent years, this underestimation is consistent with broader industry forecasts during a period of unprecedented price volatility. Importantly, underestimation of actual spot prices often resulted in overestimation of the WEC due to the risk averse modelled hedging strategy. Actual WECs (those resulting from the back-cast) in most regions fell at or below the modelled 50th percentile of outcomes in most years.

Some stakeholders have expressed concern that the model's assumed hedging strategy would result in excessive exposure to actual spot prices. The back-cast analysis showed that, when applied to actual spot price and load outcomes, the modelled hedging strategy typically resulted in exposure to mid-range spot prices around $50–$150 per megawatt hour (MWh), though not to extreme price spikes, due to strong cap coverage. Replacing caps with more base futures, as suggested by some stakeholders, did not consistently improve WEC outcomes across years. While increased base cover reduced the WEC in high-price years via favourable swap settlements, it raised the WEC in low-price years due to outgoing payments and reduced benefit from low spot prices.

Ultimately, our analysis highlights that the modelled strategy balances risk across a wide range of price scenarios. Its cap-heavy structure limits volatility, and the modelled 75th and 50th percentile WECs have generally provided sufficient cost recovery for retailers. While the model has not always predicted future outcomes, there is no evidence of systemic underestimation or overestimation.

2 Introduction

How the model produces the wholesale energy cost

The model is market based; it forecasts the cost a retailer may incur to purchase electricity by simulating outcomes in the NEM spot market under a variety of conditions. Since DMO 2, ACIL Allen has modelled the WEC on behalf of the AER for inclusion in the overall DMO price. To calculate the WEC for each DMO region, ACIL Allen uses its proprietary software, *PowerMark*, to stochastically simulate the upcoming financial year's hourly spot market prices almost 600 hundred times, drawing on various combinations of weather, baseload availability, renewable generation and demand.[1]

ACIL Allen then tests the settlement of a range of hedging strategies against the array of simulated spot prices and the assumed retailer load profile (chosen by the AER). The modelled retailer is assumed to have paid the trade-weighted average price of ASX base future and cap contracts (as well peak contracts until DMO 5) for each quarter of the upcoming determination year.[2] The sum of contract payments and payouts, along with settlement against the spot market, are divided by the total energy demanded by the modelled retailer to produce a WEC in $/MWh terms for each simulation. ACIL Allen then selects the hedging strategy that produces the lowest variation in WEC results across the simulations.[3]

Once this process is complete, the AER selects one of the nearly 600 WECs produced for inclusion in the DMO price. In early DMO determinations, the AER selected the 95th percentile of estimated WECs; however, since DMO 4 the 75th percentile has been used. The WEC selected makes up the largest portion of the wholesale cost component for each DMO determination.

Stakeholder feedback on the model and impetus for review

Over the last few DMO determinations, several stakeholders have made submissions about the performance of the model. Generally, the submissions have questioned the accuracy of the assumed hedging strategy and the accuracy of the simulated spot prices produced by the model. In response to the DMO 7 draft determination, both Origin Energy and ENGIE requested that the performance of the model be assessed in comparison with actual outcomes observed in the spot market. The concerns and requests of the 2 retailers are distinct but related and summarise most of the feedback we have heard from stakeholders across previous DMO determinations.

ENGIE considers the 95th percentile of WEC outcomes would be more appropriate to include in the DMO price than the 75th percentile. ENGIE disagreed with the AER's position at the time, which was that the 75th percentile 'strikes the right balance between retailers

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1 ACIL Allen, [Report to the Australian Energy Regulator, Default Market Offer 2025−26, Wholesale and environmental costs](), 26 May 2025, pp. 9–24.

2 The trade-weighted average price is calculated at the 'wholesale cut-off date', which is always a few weeks prior to the determination being published.

3 ACIL Allen, [Report to the Australian Energy Regulator, Default Market Offer 2025−26, Wholesale and environmental costs](), 26 May 2025, pp. 9–24.

recovering efficient costs for providing their services and the allocation of risk to consumers'. ENGIE does not believe that the 75th percentile adequately reflects the DMO's policy objective to allow retailers to recover their efficient costs.[4] ENGIE requested that the 75th percentile WEC from prior determinations be compared with actual market outcomes, to determine whether adopting the 75th percentile WEC provides an appropriate estimate of wholesale costs.

Similarly, Origin Energy requested that forecast spot prices from the model be compared with those observed in reality. Origin Energy expressed concern that the simulated hedging strategy assumes an insufficient level of base futures cover in favour of a greater volume of cap contracts. Origin Energy considers the assumed hedging strategy's cap-heavy composition is caused by the 'high level of modelled cap payouts' in the spot price simulations, with the lower volume of base futures resulting in more unhedged exposure to the spot price than a prudent retailer would tolerate.[5]

Essentially, ENGIE is concerned with the percentile selected from the distribution of modelled WECs, while Origin Energy questions the accuracy of the modelled spot prices, suggesting they lead to an unrealistic assumed hedging strategy and inaccurate WEC estimates at all percentiles.

The analysis in this report was undertaken to assess the validity and materiality of these concerns, which align with previous stakeholder feedback received in earlier DMO determinations. Notably, findings are impacted by the relatively short lifespan of the DMO, which was only introduced in 2019, with sophisticated modelling of the WEC only commencing for the 2020–21 determination. The existence of the DMO has mostly coincided with a rising price environment, including the unprecedented cluster of extreme spot prices that saw the spot market suspended for the first time in mid-2022. While the analysis below shows that, in most determination years, the model's spot price forecasts underestimated the spot prices that eventuated in the market, it is important to note that these prices were also underestimated by forward markets and industry participants (Figure 1). Just as the model has underestimated spot prices in rising price years, it has the same propensity to overestimate them in a falling price environment.

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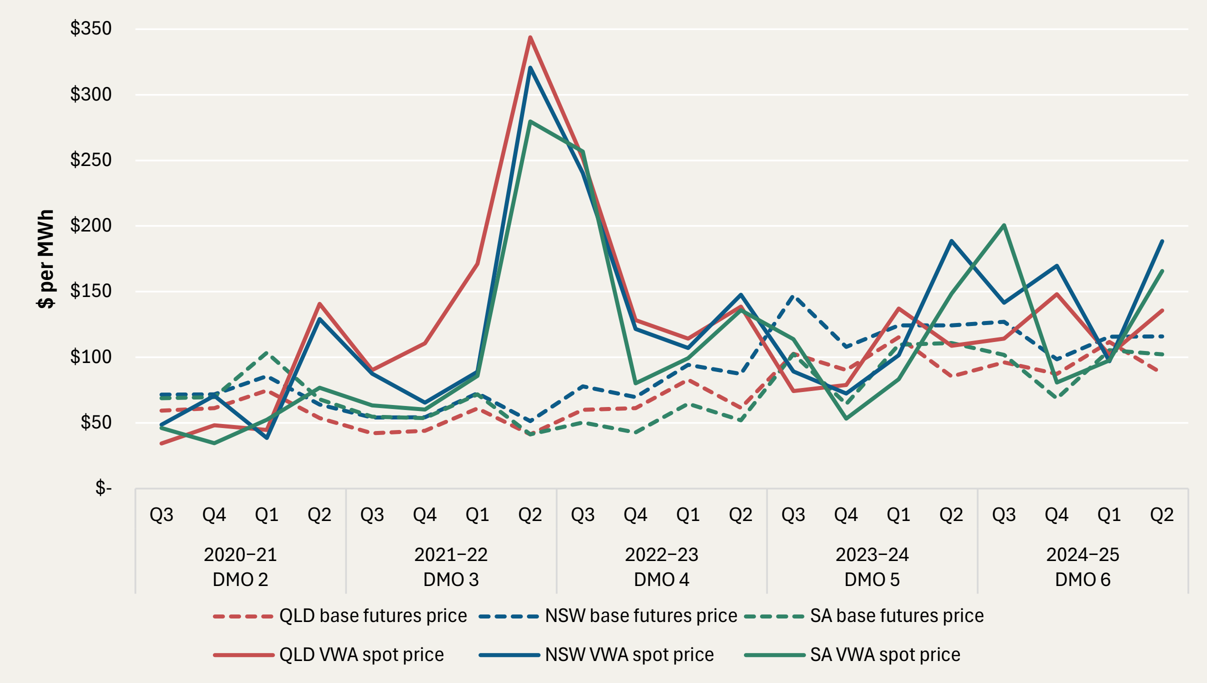
4 ENGIE, Submission to the DMO 7 draft determination, 2025, 3 April 2025, p. 2.

5 Origin Energy, Submission to DMO 7 draft determination, 8 April 2025, p. 4.

Figure 1 Trade-weighted base futures prices from prior determinations and actual load-weighted average prices



Note: The base futures price is the trade-weighted average base futures price assumed in the given DMO determination year (as calculated a few weeks prior to release of the determination). The VWA spot price is the average spot price in each quarter, volume weighted by native demand.

In investigating the concerns of stakeholders, it is also important to note that, given the risk averse nature of the simulated hedging strategy, higher spot prices do not always result in a higher WEC. Often, higher spot prices decrease the actual WEC by triggering payment from the modelled retailer's contract cover. This occurred for most determination years included in our back-cast.

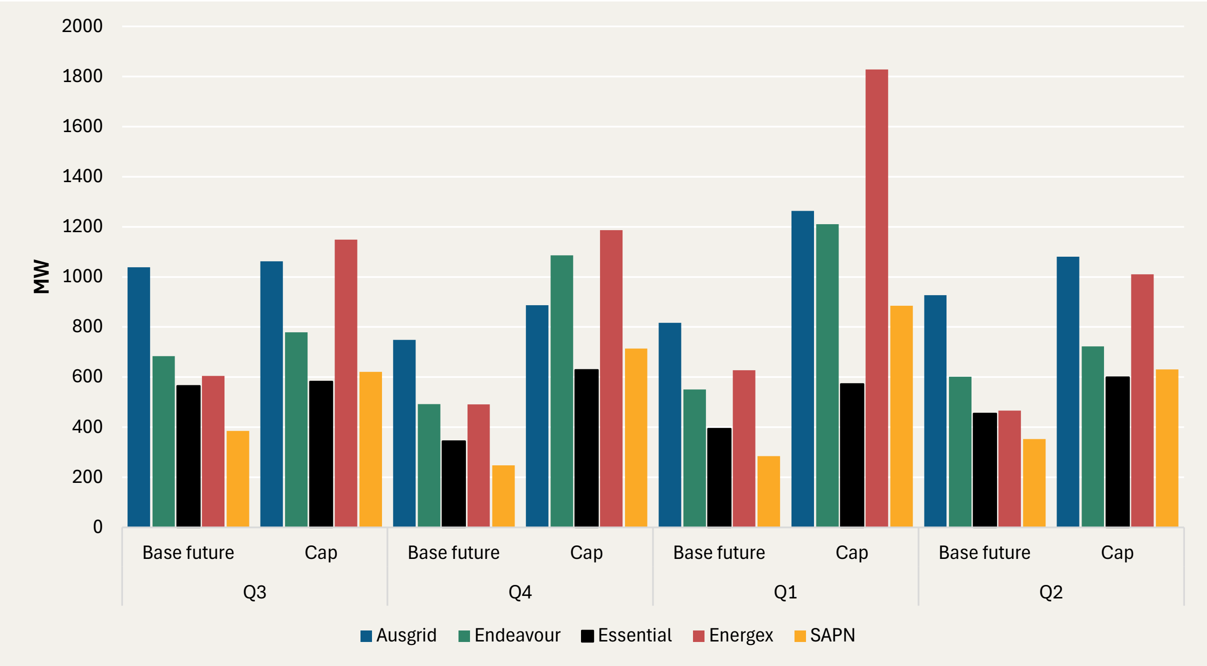
3 Analysis, results and observations

This section presents analysis regarding the performance of the model and the hedging strategies assumed in previous DMO determinations. In instances where trends and findings were uniform across regions, we have included only 1−3 figures as an example to illustrate these findings, rather than including 5 figures for every metric that we analysed. If findings were unique for a particular region, we have ensured that the chart specific to that region has been included.

3.1 Composition of the hedging strategy

As noted by some stakeholders, the modelled hedging strategy contains a higher proportion of caps than base futures. The DMO 6 hedging strategy (Figure 2) utilises a greater volume of caps than base futures for all regions and in all quarters, with the disparity greater in quarters characterised by greater price and load variability.

Figure 2 DMO 6 assumed contract volumes



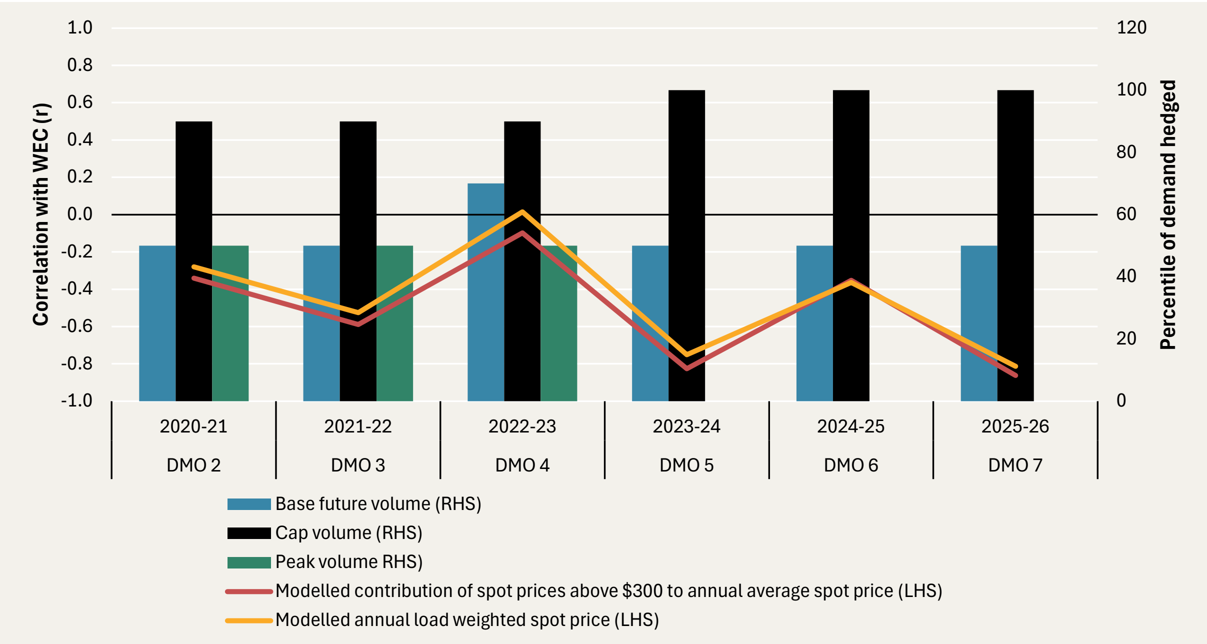
Changes in the hedging strategy year-on-year have usually been immaterial (Figure 3 to Figure 5). However, a notable increase in the assumed proportion of cap contracts did occur from DMO 4 to DMO 5. This was driven by a step change in the frequency and magnitude of actual prices greater than $300 per MWh that occurred during and after the market events of mid-2022, and by changes in the shape of the assumed retailer load profile. DMO 5 also saw removal of peak contracts from the assumed hedging strategy, while the volume of base futures in the hedging strategy fell, driven by the increasingly peaky shape of the assumed load profile in all regions.

Midday demand decline in a retailer's load profile can make base futures a less attractive hedging instrument because it increases the risk of over-hedging.[6] The retailer incurs a swap difference payment whenever the spot price falls below the strike price of their base futures contracts. High futures cover risks the retailer paying significant swap difference costs on each MW of futures cover held, especially during the typically low or negatively priced middle of the day, despite low demand from their customers. In lower priced simulations, these costs will be greater. This is because swap settlement costs are applied across a greater number of MW, but still divided by the same volume of demanded MWh. As the assumed load profile's midday carveout has deepened and the risk of over-hedging has increased, the modelled hedging strategy has adjusted by deprioritising base futures and peaks in favour of stronger cap coverage.

We conducted a coefficient analysis on the model's simulated spot prices to assess correlation between these and the WEC, and test how this relationship may have been influenced by changes in the hedging strategy, like increasing cap coverage. (Figure 3 to Figure 5). This relationship is important for interpreting a comparison of modelled spot prices against actuals, as it helps to establish whether the modelled spot prices are causing overestimation or underestimation of WEC.

The analysis indicated that since 2022, greater reliance on caps has caused the WEC to become inversely correlated with both modelled average spot prices and the modelled incidence/magnitude of price events above $300/MWh (Figure 3 to Figure 5).

Figure 3 Energex hedging strategy composition and impact on spot price relationship with the WEC

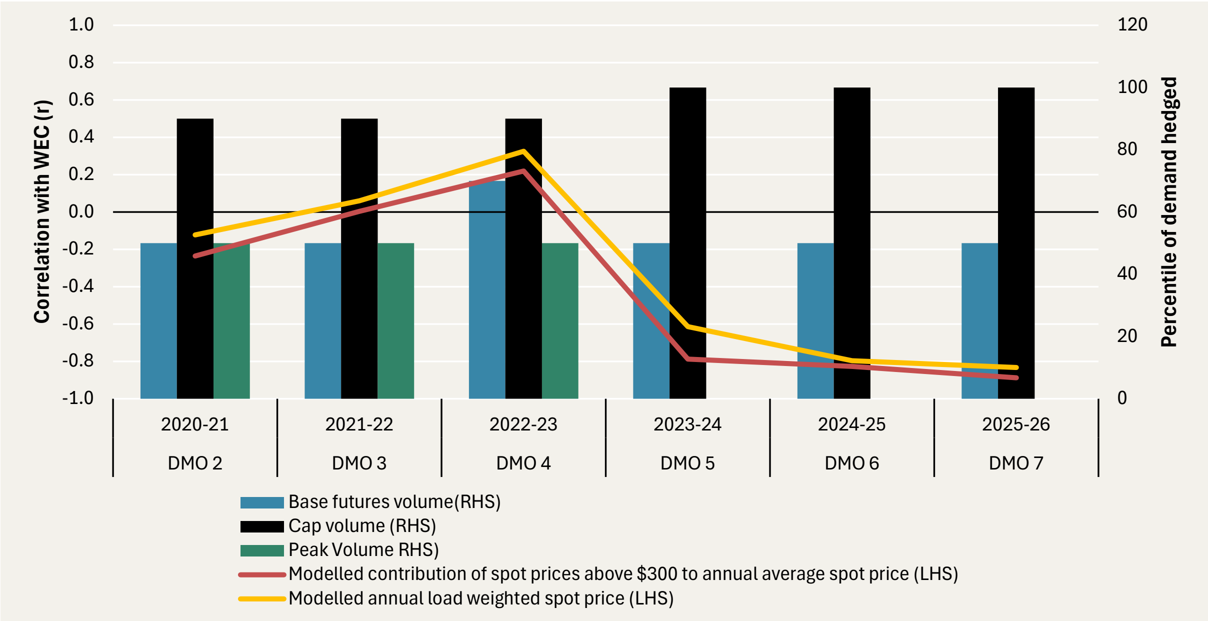


Note: The y-axis (LHS) depicts Pearson's correlation coefficient (r) values. A value of 0 indicates no correlation, +1 indicates perfect positive correlation, and −1 indicates perfect negative correlation. R values below absolute 0.4 indicate weak correlation, while values above absolute 0.6 indicate strong correlation. The y-axis (RHS)

6 AER, Wholesale electricity markets performance report - December 2024, Australian Energy Regulator, 20 December 2024, pp. 116–134.

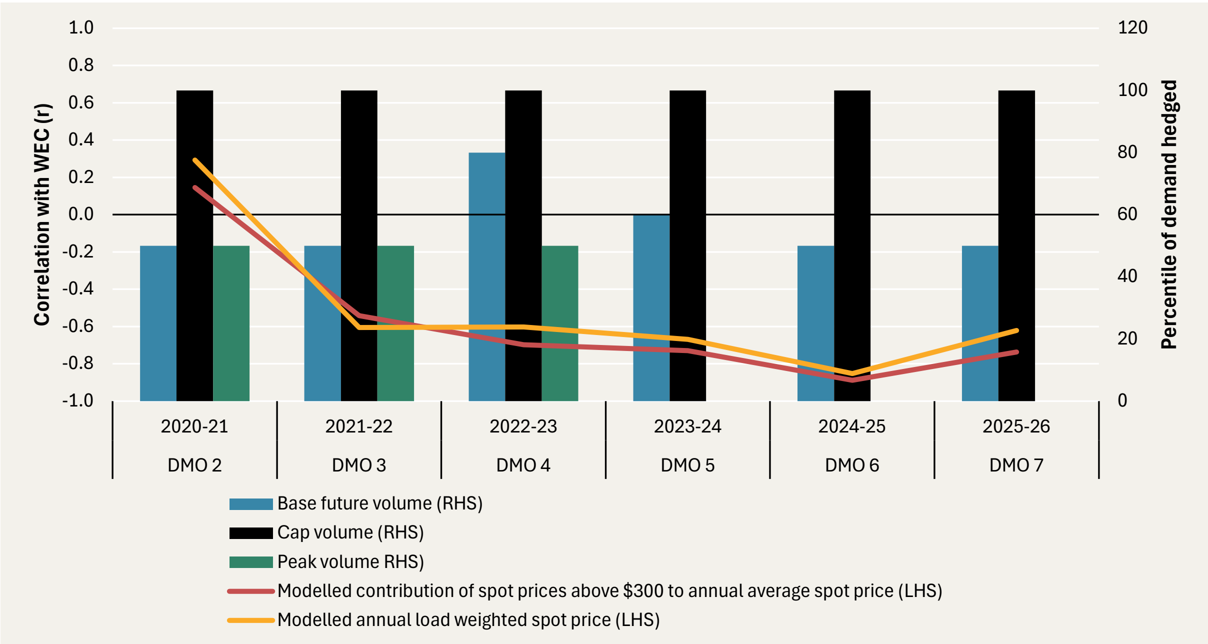
depicts the percentile of demand from the simulations that ACIL Allen used to derive the contract volumes for the hedging strategy. For caps and peaks, this is peak demand; for base futures, this is off-peak demand.

Figure 4 SA Power Networks hedging strategy composition and impact on spot price relationship with the WEC



Note: The y-axis (LHS) depicts Pearson's correlation coefficient (r) values. A value of 0 indicates no correlation, +1 indicates perfect positive correlation, and −1 indicates perfect negative correlation. R values below absolute 0.4 indicate weak correlation, while values above absolute 0.6 indicate strong correlation. The y-axis (RHS) depicts the percentile of demand from the simulations that ACIL Allen used to derive the contract volumes for the hedging strategy. For caps and peaks, this is peak demand; for base futures, this is off-peak demand.

Figure 5 Endeavour Energy hedging strategy composition and impact on spot price relationship with the WEC



Note: The y-axis (LHS) depicts Pearson's correlation coefficient (r) values. A value of 0 indicates no correlation, +1 indicates perfect positive correlation, and −1 indicates perfect negative correlation. R values below absolute 0.4 indicate weak correlation, while values above absolute 0.6 indicate strong correlation. The y-axis (RHS) depicts the percentile of demand from the simulations that ACIL Allen used to derive the contract volumes for the hedging strategy. For caps and peaks, this is peak demand; for base futures, this is off peak demand.

We consider it is logically sound for greater cap coverage to drive an inverse relationship between spot and WEC results. The modelled cap payout increases in line with more volatile spot outcomes, putting downward pressure on the WEC in the higher priced simulations. This is driven by intervals where the modelled retailer's cap coverage is greater than their demand from the spot market, and the spot price is above the cap strike. In these scenarios the retailer receives a cap payout for energy that they did not demand from the spot market and are not settled for by the Australian Energy Market Operator (AEMO). In severe price spikes, the retailer may be paid several thousand dollars for each MW of cap coverage held, and for their surplus cap coverage their only expense is the cap premium. Greater cap coverage makes it more likely that the volume of caps held will exceed the retailer's demand during a high price event. The substantial payout that results in higher priced simulations creates an inverse relationship between spot market outcomes and the WEC.

3.2 Modelled spot prices and their influence on the WEC

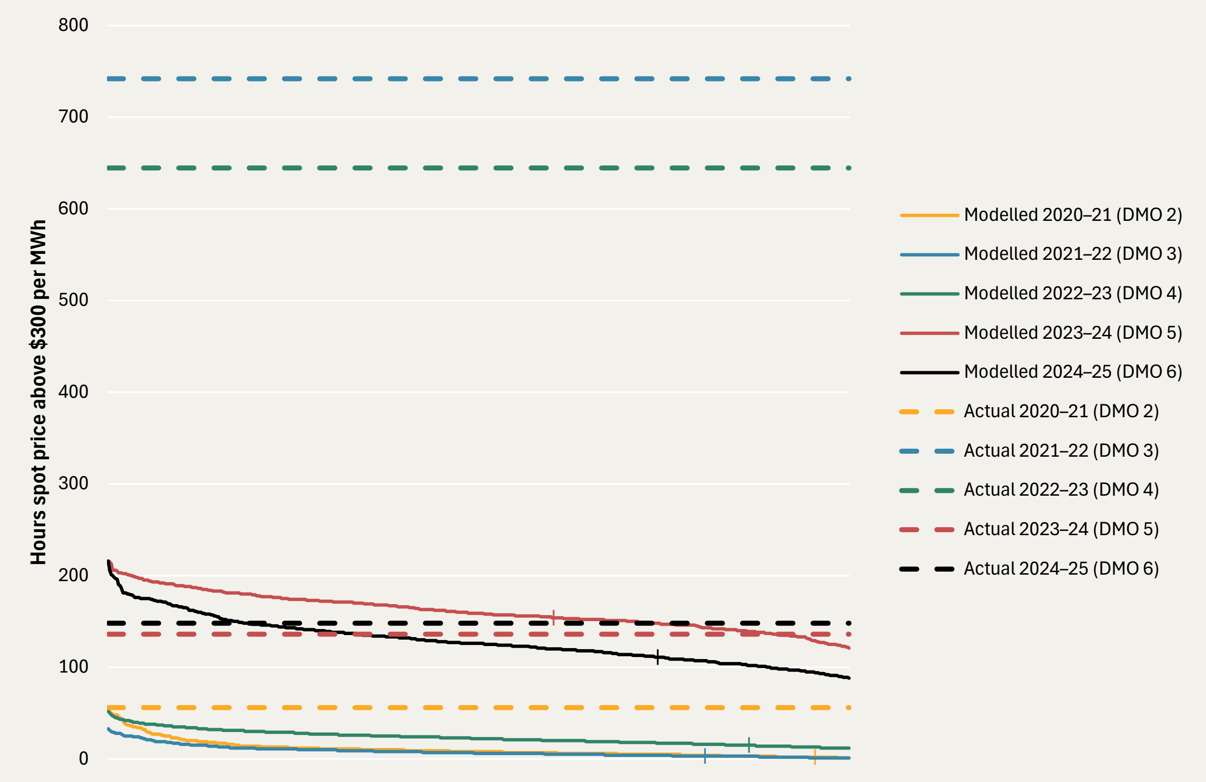
Prices greater than $300/MWh and cap contracts

Stakeholder feedback has often suggested that modelled cap payouts have been greater than what usually occurs in the actual market, and that this puts downward pressure on the WEC and causes adoption of an unrealistic hedging strategy.

A comparison of modelled spot prices and actual spot market outcomes contradicts the assertion that a 'high' modelled cap payout is causing the modelled retailer to adopt an unrealistic volume of cap contracts. In reality, both the number of actual spot prices above $300/MWh and their contribution to average annual spot prices were usually at the upper bound of modelled estimates or exceeded them entirely (Figure 6 to Figure 8), with the exception of 2023−24. Since the model assumes fewer and less severe exceedances of the cap strike price than have occurred in the spot market in recent years, modelled cap payouts have been lower than they would have been under actual market conditions. Given these findings, we do not consider any reduction of the volume of caps in the assumed hedging strategy is necessary.

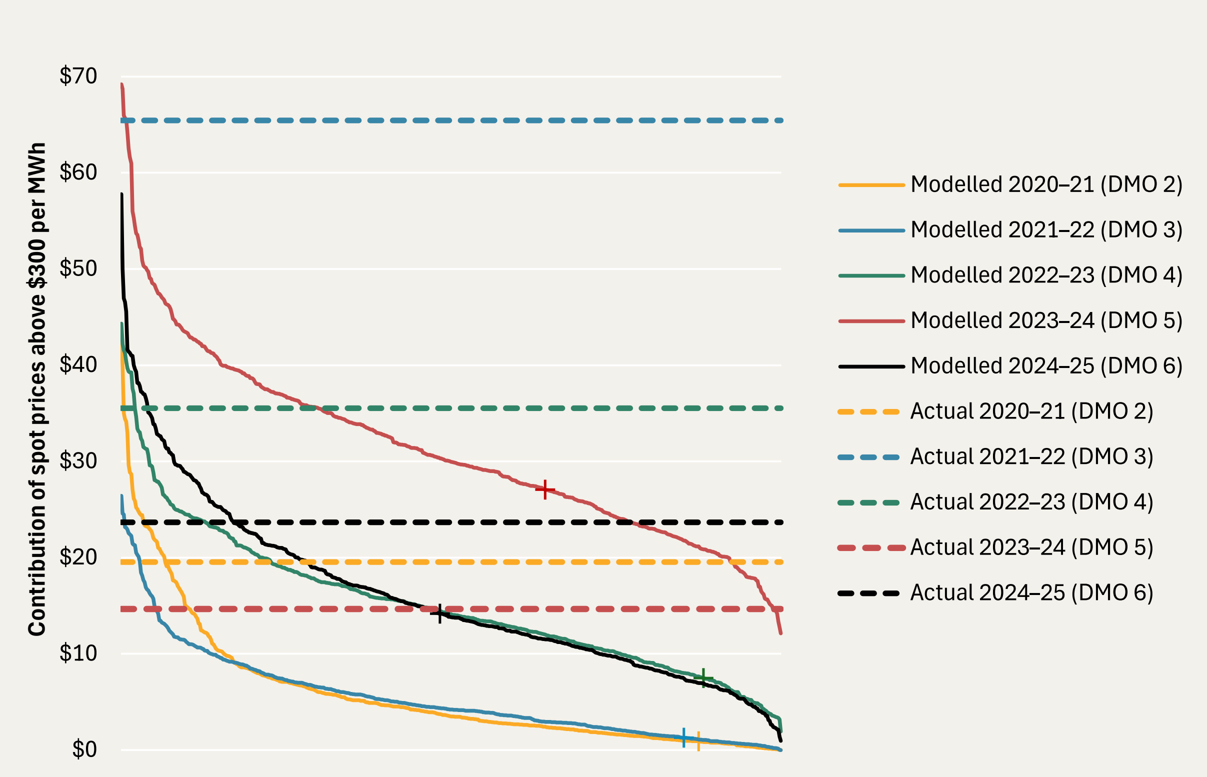
Rather than being driven by a 'high cap payout', as suggested by some stakeholders, the selected modelled hedging strategy reflects the combination of products that produces the lowest variance in WEC outcomes across all simulations. This prioritises risk mitigation and protection against extreme volatility, rather than targeting the lowest average cost across the simulations. We consider that minimising exposure to extreme costs rather than targeting lower costs aligns more closely with the behaviour of a 'prudent' retailer.

Figure 6 Hours of spot prices above \$300/MWh, simulated results vs actual outcomes, Ausgrid



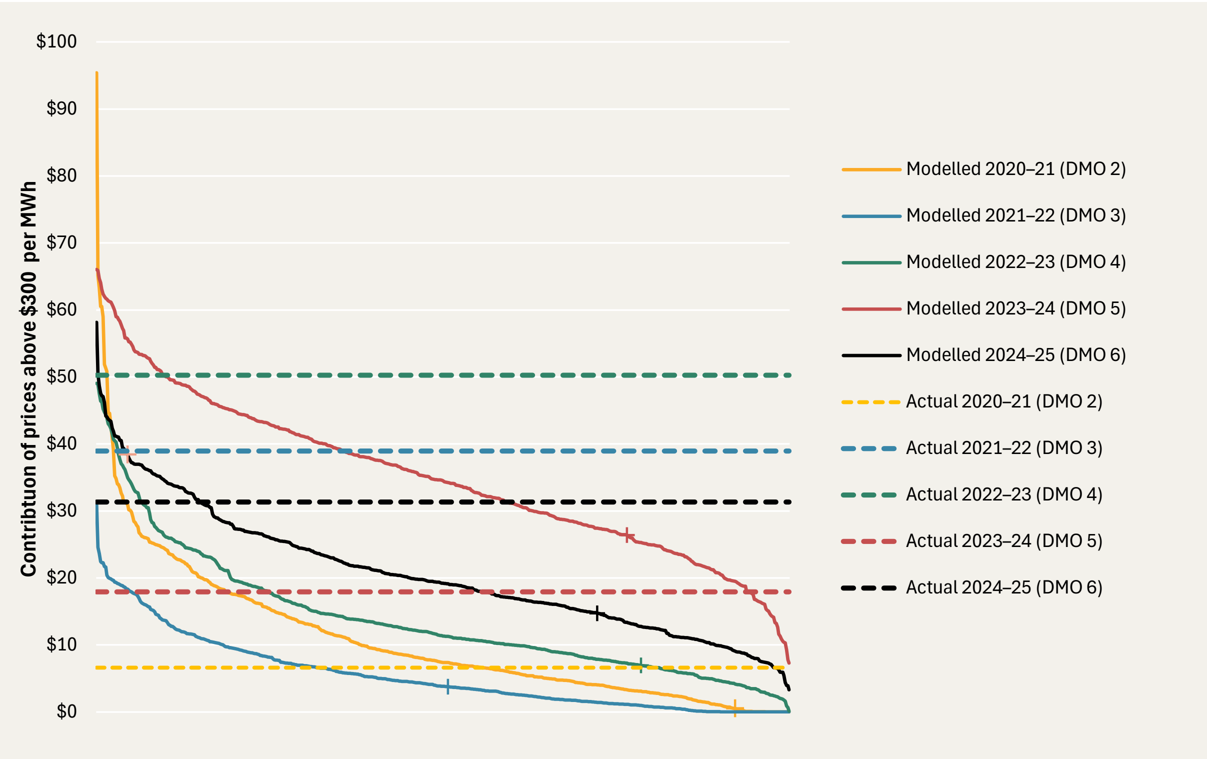
Note: Solid lines depict the distribution of outputs from the model. These are ordered from highest to lowest, rather than organised by the WEC percentile from which the output originated. The output belonging to the 75th percentile WEC simulation has been marked with a '+' for each determination year.

Figure 7 Contribution of spot prices above $300/MWh to average spot prices, simulated results vs actual outcomes, Energex



Note: Solid lines depict the distribution of outputs from the model. These are ordered from highest to lowest, rather than organised by the WEC percentile from which the output originated. The output belonging to the 75th percentile WEC simulation has been marked with a '+' for each determination year.

Figure 8 Contribution of prices above $300/MWh to average spot price, simulated results vs actual outcomes, SA Power Networks



Note: Solid lines depict the distribution of outputs from the model. These are ordered from highest to lowest, rather than organised by the WEC percentile from which the output originated. The output belonging to the 75th percentile WEC simulation has been marked with a '+' for each determination year.

The current hedging strategy's cap contract volumes are set at 100% of median annual peak demand, less the volume already covered by base futures. This emphasises protection against extreme price spikes during high-demand periods, where the greatest financial risks typically occur. In targeting the lowest spread of WEC outcomes, the strategy selected is likely to favour the product that best neutralises exposure to extreme spot prices in higher priced simulations, without significantly increasing the cost of swap settlements in lower priced simulations. For the purpose of minimising overall volatility in the WEC distribution, caps are better suited than base futures, given their fixed premium (and, therefore, fixed cost).

Average spot prices and base futures contracts

Actual average spot prices consistently matched the higher bound of modelled estimates or exceeded them altogether (Figure 9 to Figure 11). This occurred in the context of the rising price environment depicted in Figure 1. The only exception was in 2023−24 (DMO 5), when modelled estimates rose to account for the extreme volatility of the prior 2 years, only for actual spot prices to fall significantly.

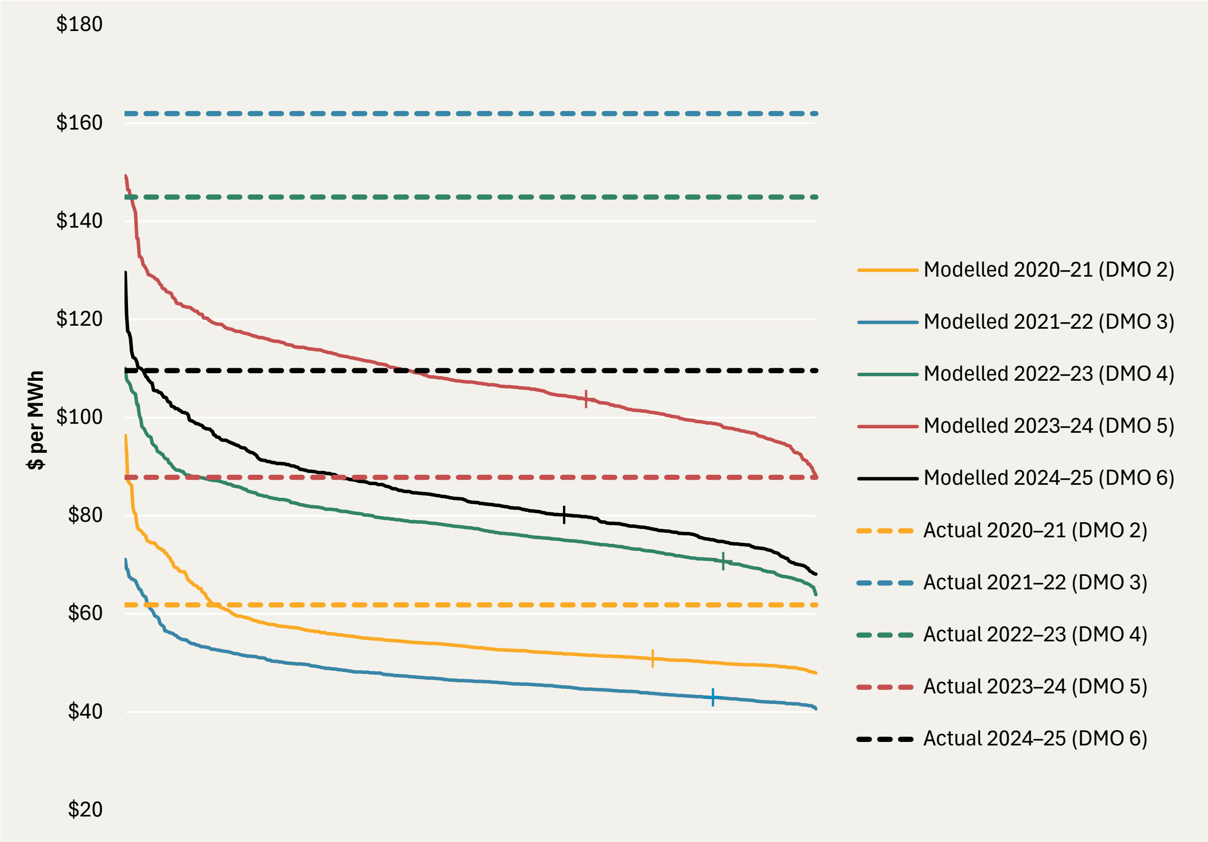
Average spot prices primarily impact the WEC through 2 mechanisms:

- unhedged exposure to spot prices – where a retailer's demand exceeds their contract cover
- swap difference payments – resulting in either payments received (if spot prices exceed the purchased base future's strike price) or payments made (if spot prices are below the purchased base future's strike price).

Since actual spot prices have typically been higher than predicted, the model has generally underestimated the swap difference payment a retailer with a similar hedging strategy would have received, by a significant margin in some years. This would contribute to overestimation of the WEC. Conversely, 2023−24 prices were lower than expected, indicating retailers mostly paid – rather than received – swap difference payments during DMO 5. This would contribute to underestimation of the WEC in that year. Overall, the model likely underestimated swap difference payments in most years, potentially contributing to an overestimation of the WEC for retailers whose load was mostly hedged with base futures.

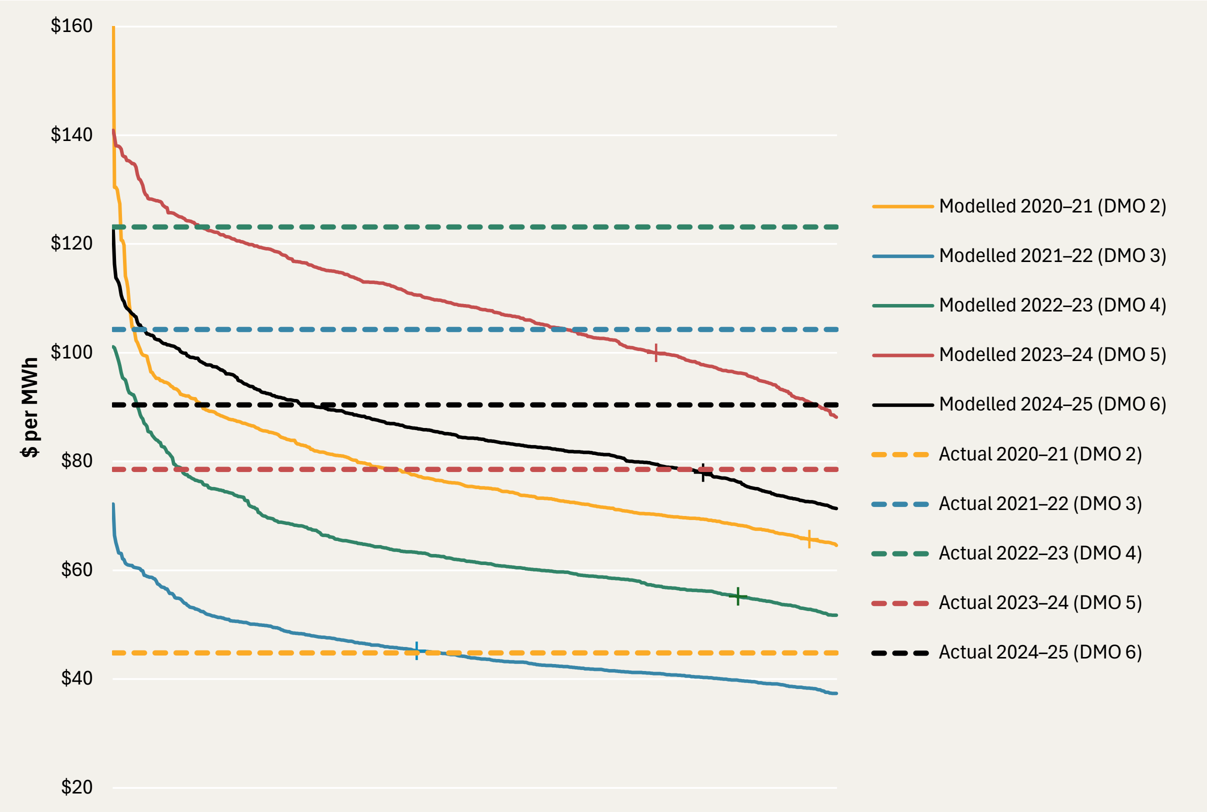
Conversely, retailers that were underhedged likely incurred much higher settlement costs than the model estimated in most years, without receiving swap difference payments to offset these costs. However, in lower priced 2023–24 an underhedged retailer would have benefited from lower-than-expected spot prices while avoiding outgoing swap difference payments.

Figure 9 Distribution of modelled average prices vs actuals, Energex



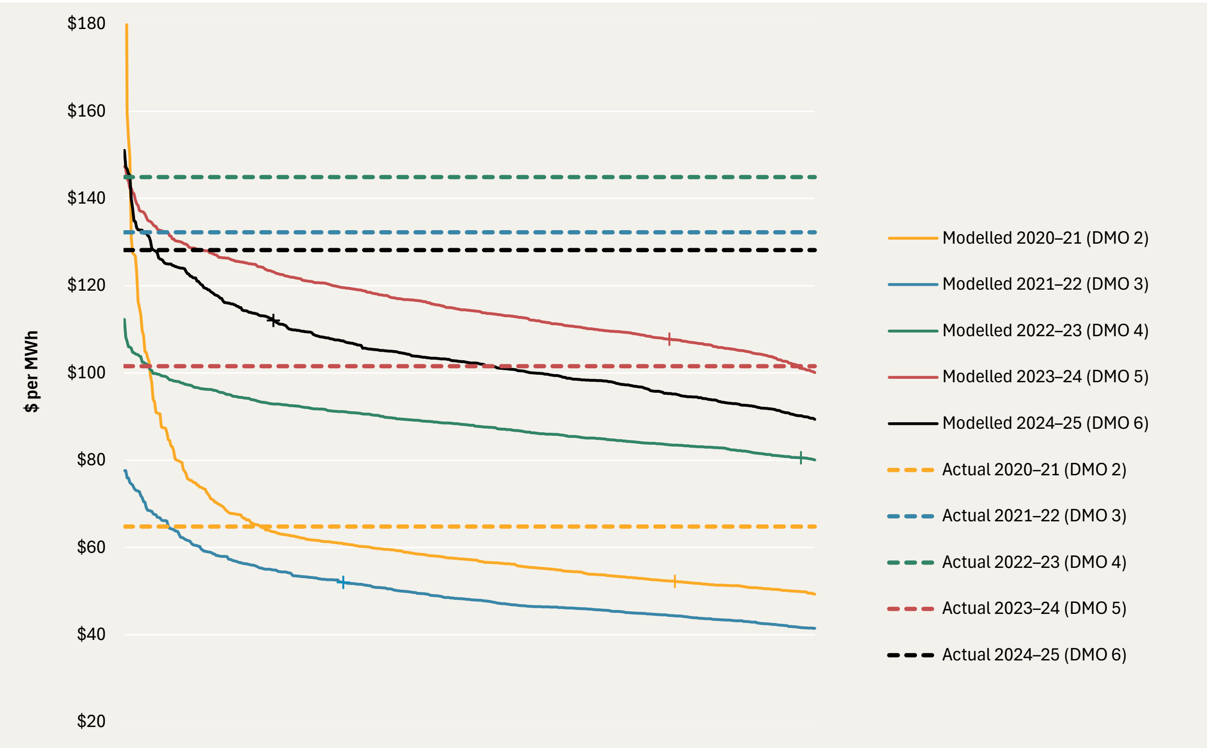
Note: Solid lines depict the distribution of outputs from the model. These are ordered from highest to lowest, rather than organised by the WEC percentile from which the output originated. The output belonging to the 75th percentile WEC simulation has been marked with a '+' for each determination year.

Figure 10 Distribution of modelled average prices vs actuals, SA Power Networks



Note: Solid lines depict the distribution of outputs from the model. These are ordered from highest to lowest, rather than organised by the WEC percentile from which the output originated. The output belonging to the 75th percentile WEC simulation has been marked with a straight '+' for each determination year.

Figure 11 Distribution of modelled average prices vs actuals, Ausgrid



Note: Solid lines depict the distribution of outputs from the model. These are ordered from highest to lowest, rather than organised by the WEC percentile from which the output originated. The output belonging to the 75th percentile WEC simulation has been marked with a straight '+' for each determination year.

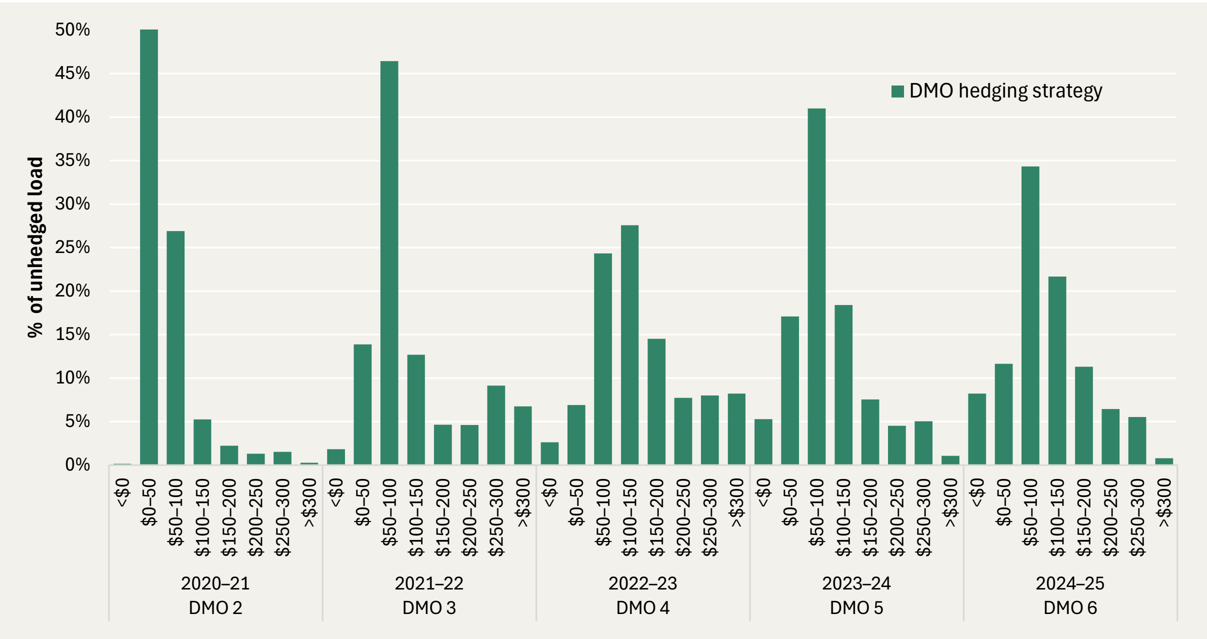
Demand and unhedged exposure to the spot market

The interplay between intra-day demand volatility, the spot price and the hedging strategy is consequential for the WEC. To test how the assumed strategy may fair in the actual spot market, we undertook a back-cast using the DMO hedging strategy for each determination and calculated how it would have interacted with actual spot market outcomes and the mass market load profile (Net System Load Profile [NSLP] and interval meter data) from the same year, to identify instances of spot exposure.

The back-cast analysis indicated that the DMO hedging strategies would have resulted in considerable spot price exposure over the past 5 years, partly validating concerns about insufficient base futures cover. However, most of this exposure was to mid-range spot prices between $50/MWh and $150/MWh, rather than extreme prices (Figure 12).

Almost all unhedged exposure to the spot price occurred when the modelled retailer's demand exceeded their base futures cover, but the spot price remained below $300/MWh and did not trigger a cap payout. Modelled demand very rarely exceeded the assumed hedging strategy's much greater volume of cap contracts, as such exposure to prices above $300/MWh was minimal (Figure 12). While stakeholders are correct to point out that the modelled strategy's lower base future's coverage would result in frequent spot price exposure, the strategy's cap coverage being set at 100% of peak demand[7] ensures a ceiling of $300/MWh for almost all this exposure.

Figure 12 Distribution of unhedged load by spot price, Endeavour Energy



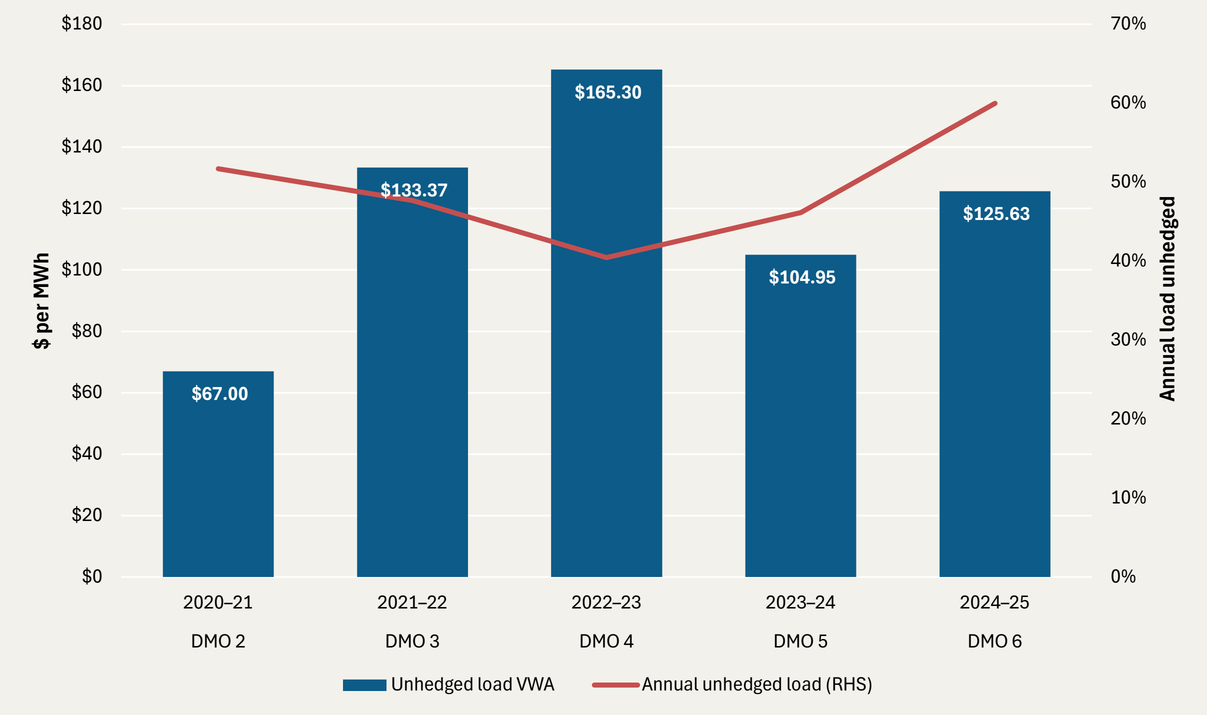
Note: Chart shows the percentage of unhedged load exposed to each price band in each financial year. Load covered by base futures, a triggered cap payout, or peak contracts was excluded from the calculations. Analysis

[7] The median of peak demand across all simulations.

was undertaken using actual spot market and load outcomes, using the DMO hedging strategy to determine where exposure occurred.

We consider that the level of spot exposure observed is considerable, however, the mid-range nature of the prices incurred by unhedged load likely result in lower costs and less volatility than if the midday demand carveout was over-hedged.

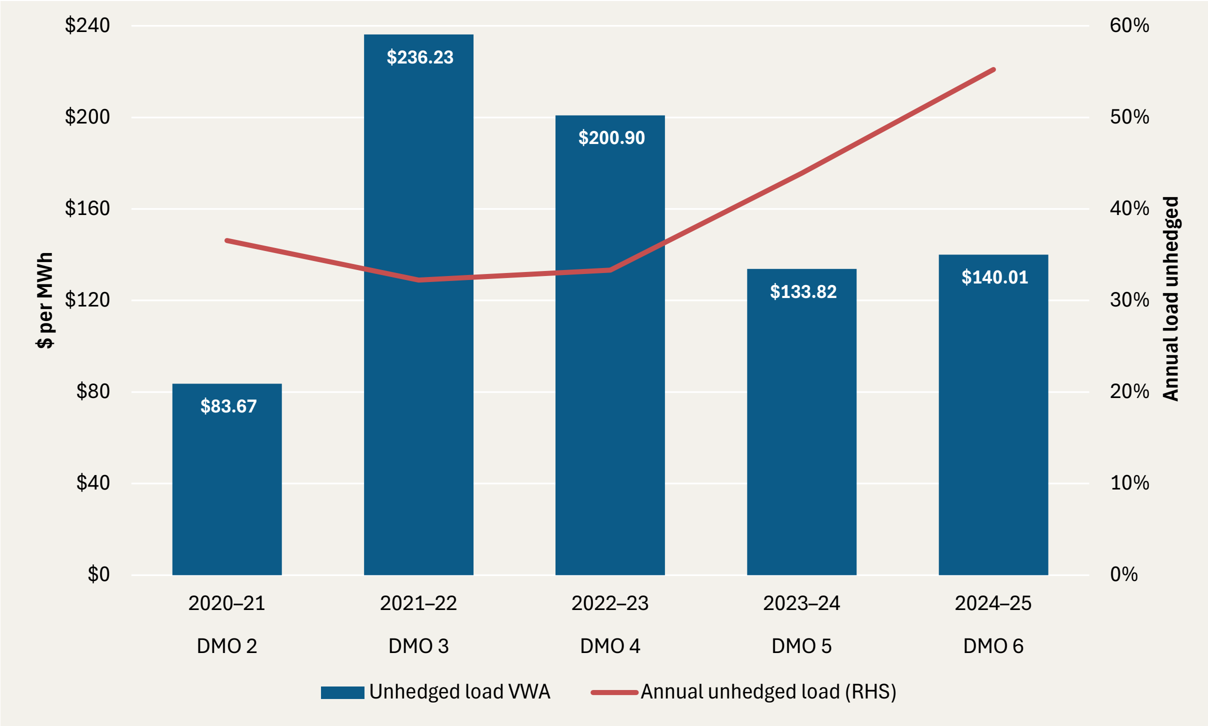
Figure 13 Volume and price of unhedged load, Endeavour Energy



Note: Unhedged load volume-weighted average (VWA) refers only to load not covered by any derivative contract. Load covered by base futures, a triggered cap payout or peak contracts was excluded from the calculations. Annual unhedged load is the percentage of total load for the given financial year that was not covered by any of the financial contracts. Analysis was undertaken using actual spot market and load outcomes, using the DMO hedging strategy for the given determination year hedging to determine where exposure occurred.

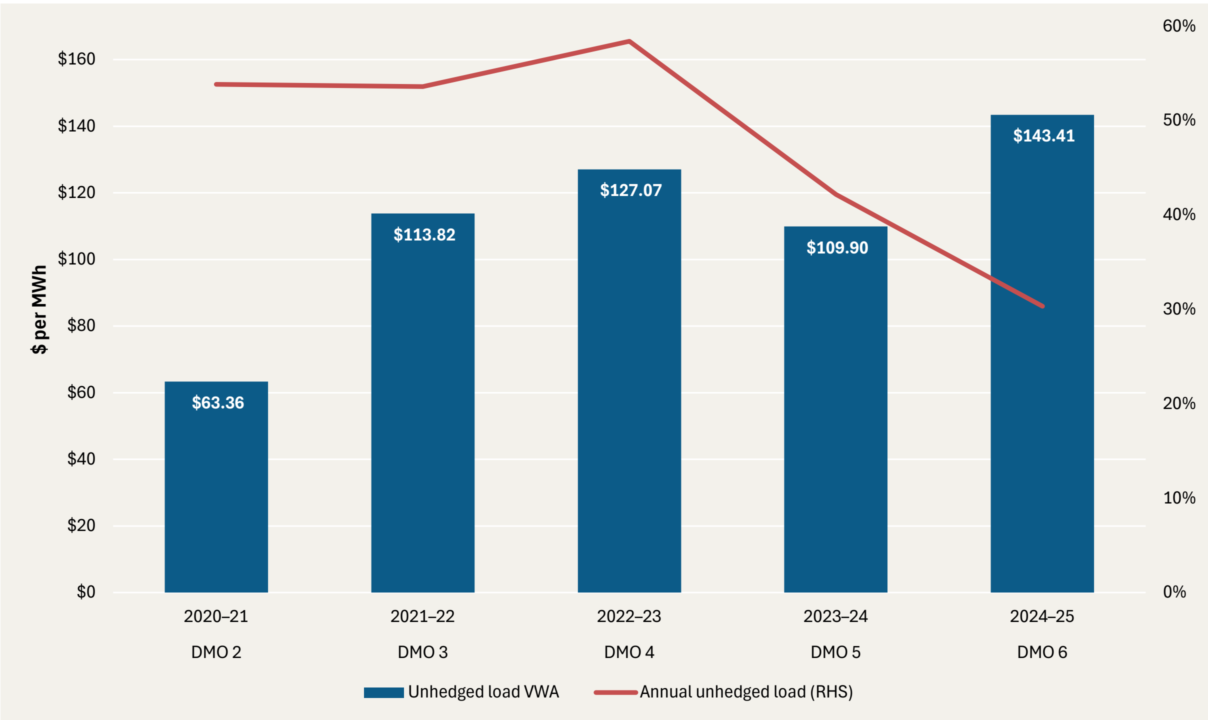
The amount of spot exposure was greater in Energex and SA Power Networks (Figure 14 and Figure 15), where the strategy holds lower proportions of base futures, due to the risk of over-hedging the deeper midday demand carveout.

Figure 14 Volume and price of unhedged load, Energex



Note: Unhedged load volume-weighted average (VWA) refers only to load not covered by any derivative contract. Load covered by base futures, a triggered cap payout or peak contracts was excluded from the calculations. Annual unhedged load is the percentage of total load for the given financial year that was not covered by any of the financial contracts. Analysis was undertaken using actual spot market and load outcomes, using the DMO hedging strategy for the given determination year hedging to determine where exposure occurred.

Figure 15 Volume and price of unhedged load, SA Power Networks

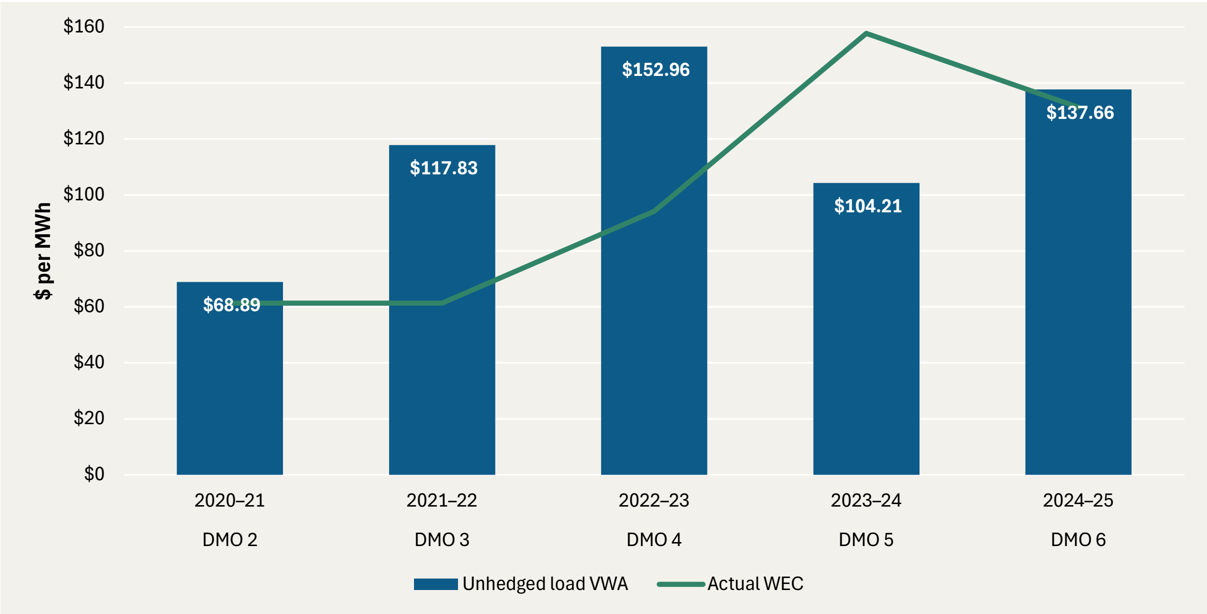


Note: Unhedged load volume-weighted average (VWA) refers only to load not covered by any derivative contract. Load covered by base futures, a triggered cap payout or peak contracts was excluded from the calculations. Annual unhedged load is the percentage of total load for the given financial year that was not covered by any of the financial contracts. Analysis was undertaken using actual spot market and load outcomes, using the DMO hedging strategy for the given determination year hedging to determine where exposure occurred.

The volume-weighted average price of unhedged load was typically higher than the actual WEC in years with high spot prices, and lower in years with low spot prices. This suggests that any direct impact of spot exposure on the WEC is more than offset by the modelled retailer's contract cover.

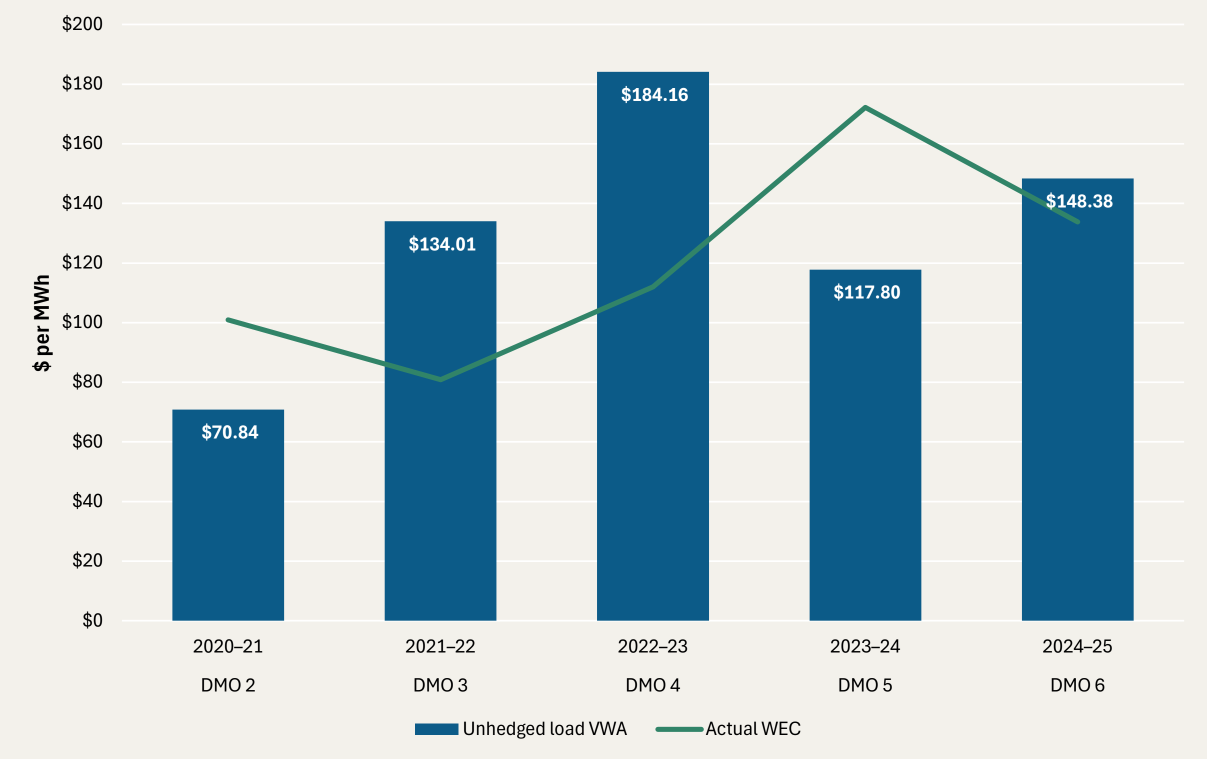
In high spot priced 2021–22 and 2022–23 the actual WEC fell well below the price of unhedged load in all regions. This indicates that incoming swap difference payments and cap payouts more than offset exposure to higher prices. Conversely, in low-priced 2023–24 the actual WEC rose well above the unhedged load price, driven by outgoing swap payments and cap premiums that more than offset exposure to lower prices. By moving in opposing directions, contract payouts and unhedged exposure to mid-range spot prices limit the impact of year on year spot price volatility on the WEC.

Figure 16 Unhedged load volume weighted average price and WEC, Ausgrid



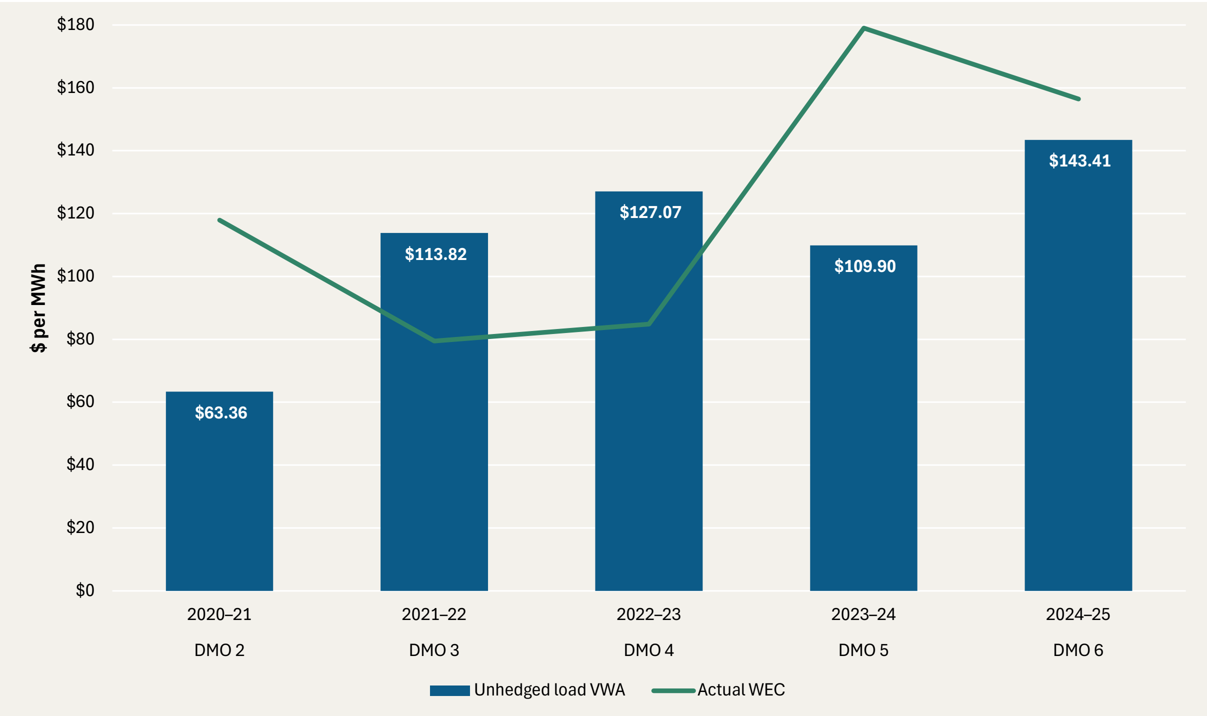
Note: Unhedged load volume-weighted average (VWA) refers only to unhedged load. Load covered by base futures, caps or peak contracts was excluded from the calculations. The actual WEC is the result of settling the assumed hedging strategy against actual spot market and mass market load outcomes from the given determination year. Individual retailer hedging strategies and load profiles are likely to vary.

Figure 17 Unhedged load volume weighted average price and WEC, Essential Energy



Note: Unhedged load volume-weighted average (VWA) refers only to unhedged load. Load covered by base futures, caps or peak contracts was excluded from the calculations. The actual WEC is the result of settling the assumed hedging strategy against actual spot market and mass market load outcomes from the given determination year. Individual retailer hedging strategies and load profiles are likely to vary.

Figure 18 Unhedged load volume weighted average price and WEC, SA Power Networks



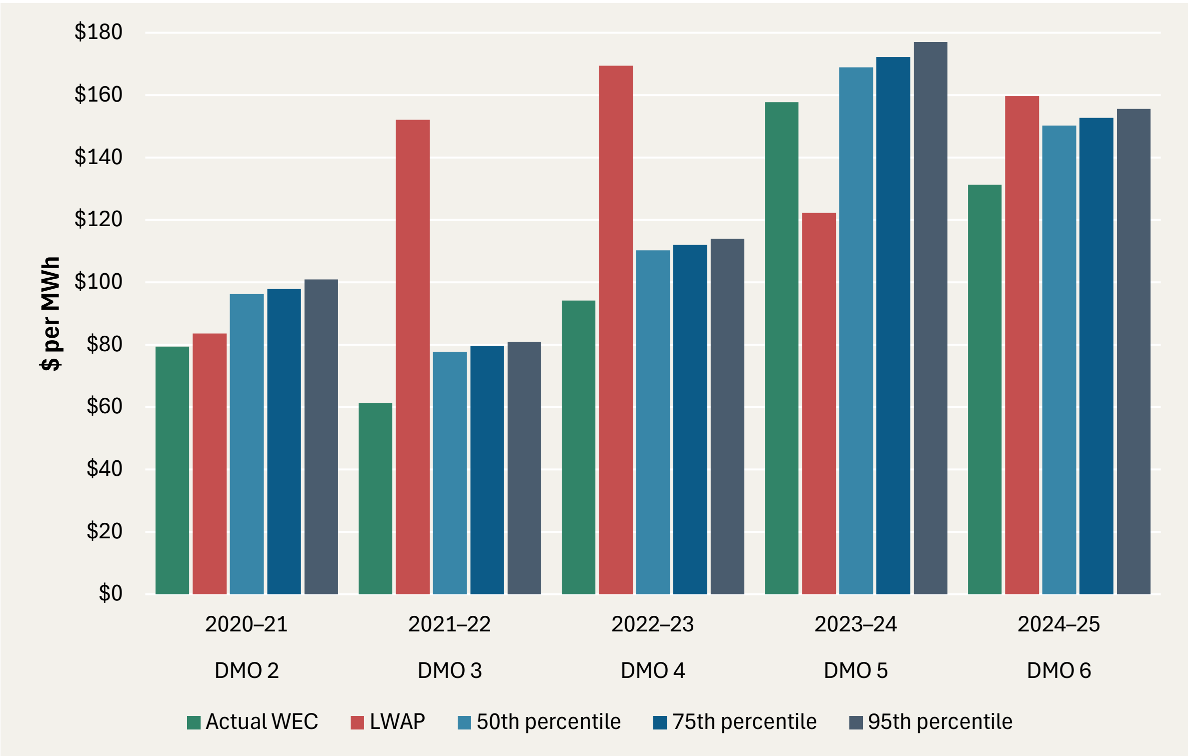
Note: Unhedged load volume-weighted average (VWA) refers only to unhedged load. Load covered by base futures, caps or peak contracts was excluded from the calculations. The actual WEC is the result of settling the assumed hedging strategy against actual spot market and mass market load outcomes from the given determination year. Actual retailer hedging strategies and load profiles are likely to vary.

3.3 Testing whether the assumed hedging strategies are robust and realistic

While the analysis has shown that a 'high' cap payout is not driving the assumed strategy's composition, as suggested by some stakeholders, the hedging strategy does leave a considerable portion of the modelled retailer's load exposed to the spot market. To test the applicability of the hedging strategy to the real spot market, ACIL Allen calculated actual WEC outcomes by settling past DMO hedging strategies against the past 5 years of actual spot market and load outcomes (see actual WEC in Figure 19 to Figure 23). We have also included the 50th, 75th and 95th percentile WEC estimates forecast at the time of each determination, along with a load weighted average price, for comparison. We consider this analysis also fulfils ENGIE's request for back-cast analysis to test the suitability of the 75th percentile WEC estimate.

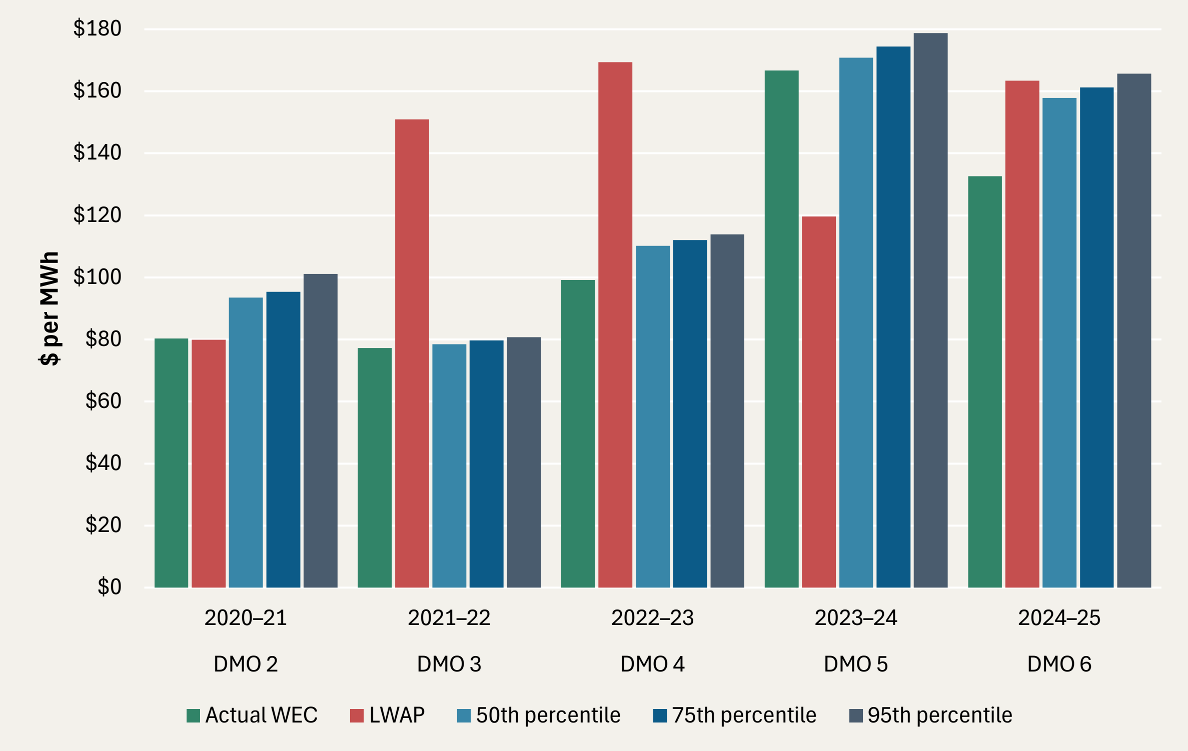
In NSW regions, the back-cast actual WEC was lower than the modelled 50th percentile WEC estimate in almost all instances (Figure 19 to Figure 21).

Figure 19 DMO 6 hedging strategy back-cast against actual spot and load outcomes, Ausgrid



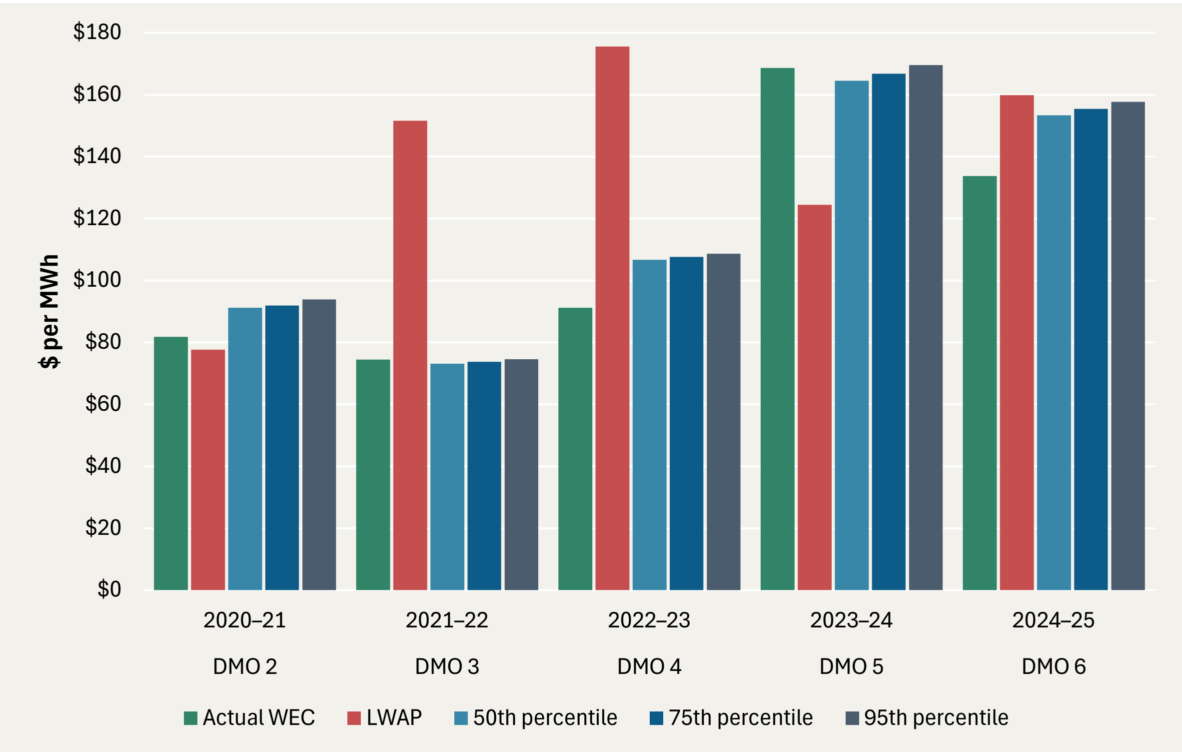
Note: The actual WEC is the result of settling the DMO hedging strategy against actual spot market and mass market load outcomes from the given determination year. Individual retailer hedging strategies and load profiles are likely to vary. The load-weighted average price (LWAP) is the WEC that the modelled retailer would incur without any hedging.

Figure 20 DMO 6 hedging strategy back-cast against actual spot and load outcomes, Endeavour Energy



Note: The actual WEC is the result of settling the DMO assumed hedging strategy against actual spot market and mass market load outcomes from the given determination year. Individual retailer hedging strategies and load profiles are likely to vary. The load-weighted average price (LWAP) is the WEC that the modelled retailer would incur without any hedging.

Figure 21 DMO 6 hedging strategy back-cast against actual spot and load outcomes, Essential Energy



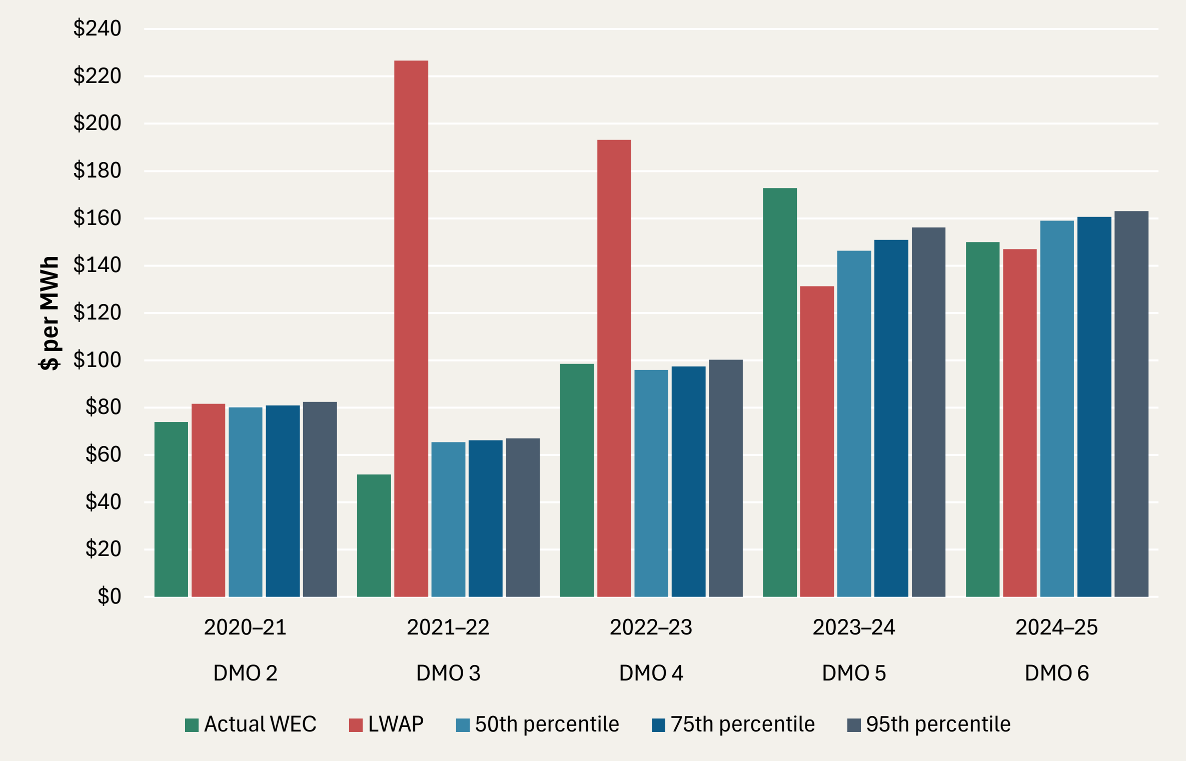
Note: The actual WEC is the result of settling the DMO assumed hedging strategy against actual spot market and mass market load outcomes from the given determination year. Individual retailer hedging strategies and load profiles are likely to vary. The load-weighted average price (LWAP) is the WEC that the modelled retailer would incur without any hedging.

For Essential Energy, the actual WEC estimate marginally exceeded the 75th percentile estimate in 2021–22 and 2023−24, but fell comfortably below the 50th percentile in all other determination years (Figure 21). In 2021–22 NSW and Queensland regions experienced unprecedented spot price volatility that ultimately resulted in the suspension of the NEM for the first time in its history. In all NSW regions, this resulted in substantial swap difference payments and cap payouts received by the modelled retailer, demonstrating the hedging strategy's resilience even in extreme circumstances that were not predicted by the model. A large contract payout is evident in the much lower actual WEC compared to the load weighted average price (Figure 19 to Figure 21). Unlike in Ausgrid and Endeavour Energy, this substantial payout was not sufficient to drive the actual WEC below the modelled 75th percentile estimate for the modelled retailer in Essential Energy.

In lower spot priced 2023−24, actual WECs were higher than the load-weighted average price in all regions, indicating that the modelled retailer incurred swap settlement losses. The modelled retailer purchased contracts at prices that were inflated by the market shock of mid-2022, only for spot prices to fall steeply. Retailers with similar load profiles and contract cover to the modelled retailer benefited from some exposure to lower spot prices, but the cap premium was not fully offset by cap payouts and swap difference payments were mostly outgoing, putting upward pressure on the back-cast actual WEC. In Essential Energy, the sum of outgoing swap difference payments and cap premiums was great enough to push the back-cast actual WEC above the modelled 75th percentile.

Similar results were observed in Energex, where the back-cast actual WEC was lower than the 50th percentile in most years, but exceeded the 75th percentile in 2022–23 and all modelled estimates in and 2023–24. In both instances, the drivers of the back-cast actual WEC exceeding estimates were similar to Essential Energy. In 2022–23 incoming swap settlements and cap payouts were substantial, but not sufficient to offset unprecedented spot prices and drive the actual WEC below modelled estimates. When prices fell sharply in 2023–24 the retailer incurred losses on contracts that had priced in the extreme volatility of the previous financial year, causing the back-cast actual WEC to rise above modelled estimates.

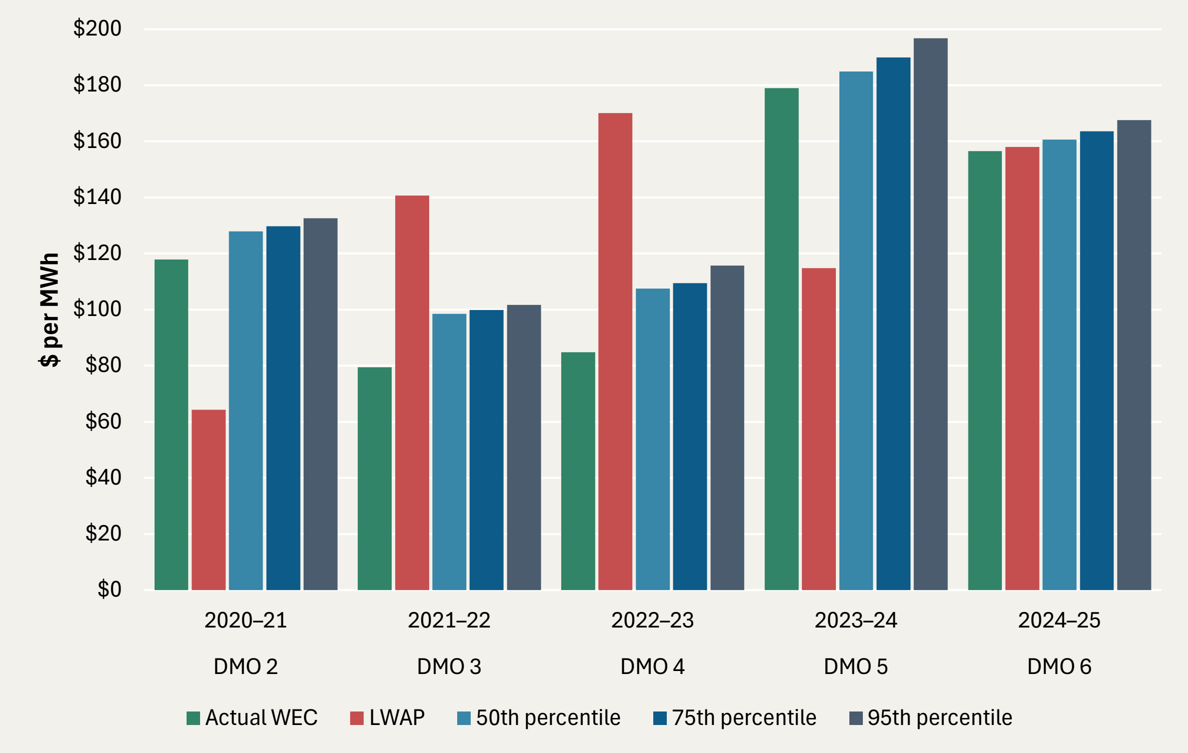
Figure 22 DMO 6 hedging strategy back-cast against actual spot and load outcomes, Energex



Note: The WEC actual is the result of settling the DMO assumed hedging strategy against actual spot market and mass market load outcomes from the given determination year. Individual retailer hedging strategies and load profiles are likely to vary. The load-weighted average price (LWAP) is the WEC that the modelled retailer would incur without any hedging.

In SA Power Networks, the actual WEC fell below the 50th percentile in all determination years (Figure 23). SA Power Networks has the lowest modelled base futures cover of any region because its load profile has the deepest midday carveout and, therefore, the greatest risk of over-hedging. Spot prices in South Australia did not rise as significantly as in NSW and Queensland throughout 2022, so the impact of back-cast spot exposure in 2021–22 and 2022–23 was less severe than in Energex. Conversely, lower assumed volume of base futures and greater spot exposure allowed the modelled retailer in SA Power Networks to benefit more from low actual spot prices in 2023–24 than in any other region, while also avoiding outgoing swap difference payments.

Figure 23 DMO 6 hedging strategy back-cast against actual spot and load outcomes, SA Power Networks



Note: The WEC actual is the result of settling the DMO assumed hedging strategy against actual spot market and mass market load outcomes from the given determination year. Individual retailer hedging strategies and load profiles are likely to vary. The load-weighted average price (LWAP) is the WEC that the modelled retailer would incur without any hedging.

On balance, we consider that the hedging strategy and modelled estimates appropriately balance upside and downside risk. Despite the rising price environment that has prevailed over the past 5 years, the WEC has been overestimated more often than it has been underestimated, and by a more significant margin. In most cases, the 75th percentile has allocated retailers a generous risk buffer. The 50th percentile has also typically overestimated the actual WEC, but by less than the 75th percentile.

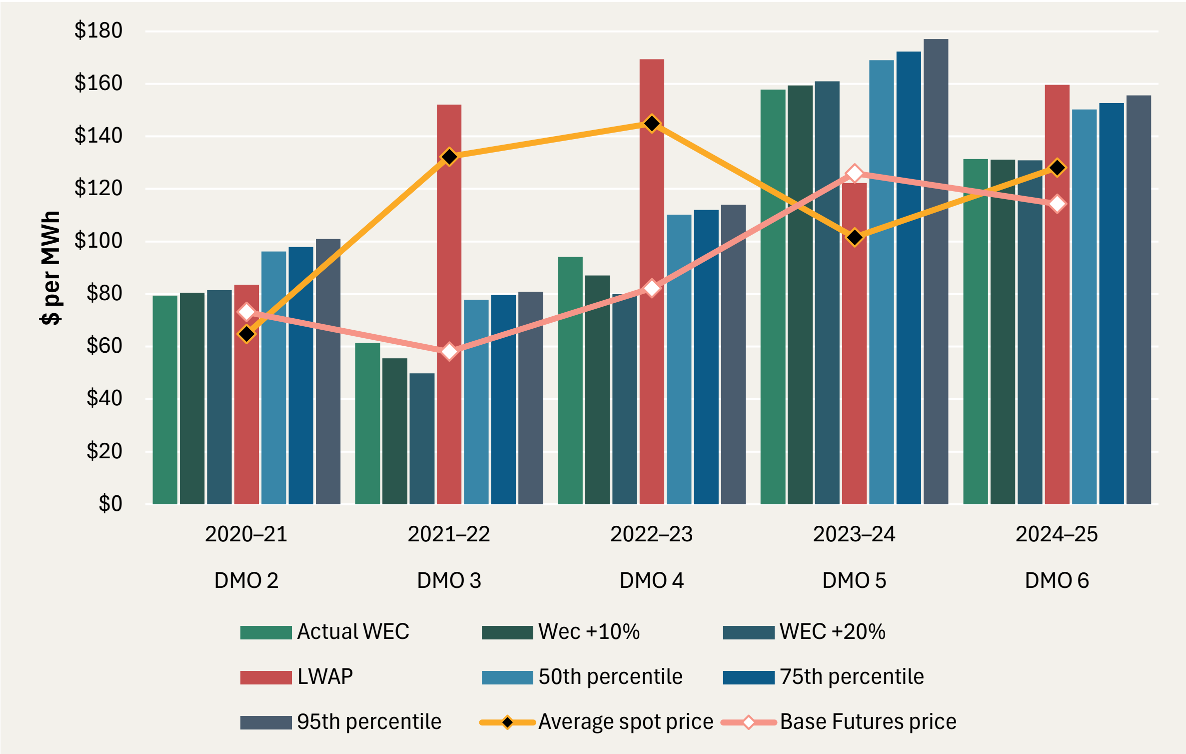
Replacing caps with futures did not consistently improve outcomes

Concerns about a high-level spot price exposure are somewhat supported by the analysis, with the impact on the WEC made more pronounced by the rising price environment that has prevailed over the past 5 years. Given that stakeholders have suggested that the assumed volume of caps should be reduced in favour of modelling greater base futures coverage, the hedging strategy was altered accordingly and 2 more back-casts against the past 5 years of actual spot price and load outcomes were completed. Two alternative hedging strategies were tested. The first strategy increased assumed base futures coverage by 10% and decreased cap coverage by the same amount. The second strategy increased assumed base futures coverage by 20%, decreasing cap coverage by the same amount.

The results indicated that greater base futures cover generally decreases the back-cast actual WEC in years where actual spot prices are higher than the trade-weighted average price of base futures used in the given DMO determination. Conversely, greater modelled base futures coverage increased the back-cast actual WEC in years where actual spot prices were lower than the trade-weighted base futures prices used in the given DMO determination.

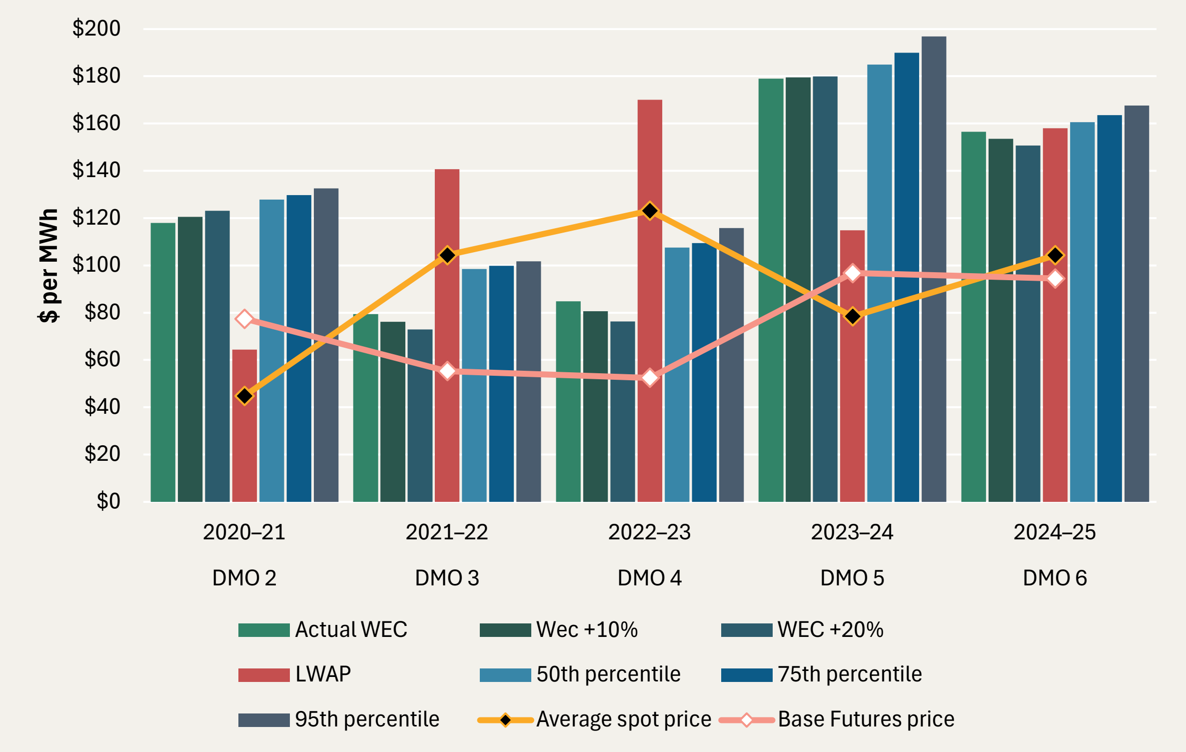
In extreme price years 2021−22 and 2022−23, increasing modelled base futures coverage significantly decreased the back-cast actual WEC, driven by the considerable incoming swap difference payments that resulted from actual spot prices well above the assumed base futures price. The opposite was true in years when actual average spot prices fell below the assumed base futures price – the WEC increased due to outgoing swap difference payments and less exposure to the lower spot price. In years when average spot prices were closer to the base futures price, the WEC was largely unimpacted. All regions followed this pattern closely (Figure 24 and Figure 25).

Figure 24 Ausgrid WEC results, including alternative hedging strategies



Note: Actual WEC refers to the back-cast WEC derived from settling an unaltered DMO hedging strategy against actual spot price and load outcomes from the given year. WEC +10% refers to the same back-cast, with the volume of base futures increased by 10% and the volume of caps decreased by the same amount. WEC +20% refers to the same back-cast, with the volume of base futures increased by 20% and caps decreased by the same amount. The 50th, 75th and 95th percentile WECs refer to the percentile of WEC from the modelled outcomes in each determination year. Average spot price refers to the time-weighted average price in that financial year. Base future price refers to the trade-weighted average price of base futures for the given region at the DMO wholesale cost cut-off date in that year (usually in May).

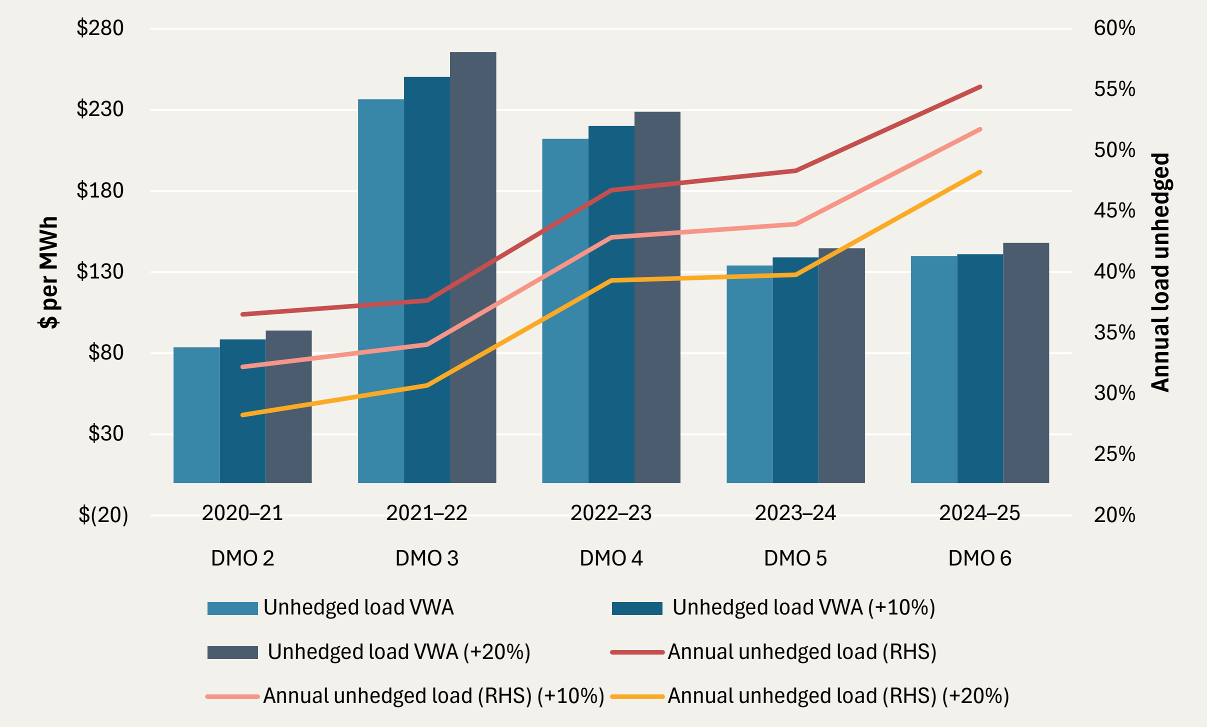
Figure 25 SAPN WEC results, including alternative hedging strategies



Note: Actual WEC refers to the back-cast WEC derived from settling an unaltered DMO hedging strategy against actual spot price and load outcomes from the given year. WEC +10% refers to the same back-cast, with the volume of base futures increased by 10% and the volume of caps decreased by the same amount. WEC +20% refers to the same back-cast, with the volume of base futures increased by 20% and caps decreased by the same amount. The 50th, 75th and 95th percentile WECs refer to the percentile of WEC from the modelled outcomes in each determination year. Average spot price refers to the time-weighted average price in that financial year. Base future price refers to the trade-weighted average price of base futures for the given region at the DMO wholesale cost cut-off date in that year (usually in May).

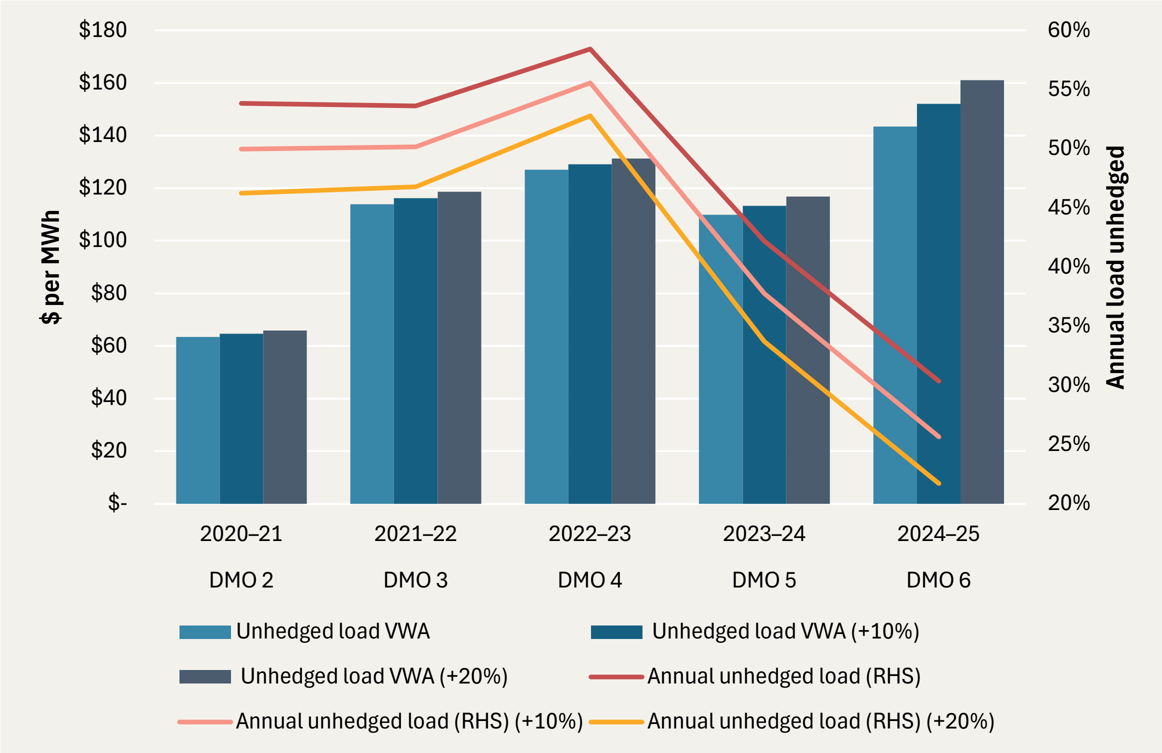
Across all determination years, increasing base futures cover disproportionately reduced back-cast exposure to lower actual spot prices rather than higher ones, due to the correlation between demand and the spot price. Since lower priced periods often coincide with lower demand, these are more likely to be the first instances of exposure displaced by additional base cover. Although increasing base cover exposes less load to the spot market, the volume-weighted average price of that exposure actually increases (Figure 26 and Figure 27).

Figure 26 Volume-weighted average price of unhedged load at differing levels of base futures cover, Energex



Note: Unhedged load volume-weighted average (VWA) refers only to load not hedged under the assumed DMO hedging strategy. Load covered by base futures, a triggered cap payout or peak contracts was excluded from the calculations. Annual unhedged load is the percentage of total load for the given financial year that was not covered by any of the financial contracts. +10% and +20% refer to the alternative hedging strategies where proportion of base cover in DMO hedging strategy was increased by 10% or 20%, respectively (and the proportion of caps decreased by the same amount). Analysis was undertaken using actual spot market and load outcomes, using the DMO hedging strategy to determine where exposure occurred.

Figure 27 Volume-weighted average price of unhedged load at differing levels of base futures cover, SA Power Networks



Note: Unhedged load volume-weighted average (VWA) refers only to load not hedged under the assumed DMO hedging strategy. Load covered by base futures, a triggered cap payout or peak contracts was excluded from the calculations. Annual unhedged load is the percentage of total load for the given financial year that was not covered by any of the financial contracts. +10% and +20% refer to the alternative hedging strategies where proportion of base cover in DMO hedging strategy was increased by 10% or 20%, respectively (and the proportion of caps decreased by the same amount). Analysis was undertaken using actual spot market and load outcomes, using the DMO hedging strategy to determine where exposure occurred.

This suggests that in high-priced years, any reduction in the back-cast actual WEC from increasing base futures coverage is driven by favourable swap difference payments, rather than by reduced spot exposure.

It is not evident from the analysis that greater base futures volume inherently results in a more prudent hedging strategy. The alternative hedging strategies decreased the back-cast WEC in some years but increased it in others. This alternating pattern reflects the fundamental mechanics of base futures contracts – when spot market prices exceed the base future price, retailers with futures cover benefit from the favourable swap settlements, lowering the WEC. Conversely, when spot prices fall below the base futures price, retailers with greater futures cover incur losses on their swaps, driving the WEC higher. Furthermore, increasing base futures cover has been shown to primarily mitigate exposure to lower prices, increasing the average cost of unhedged load. While there have been few instances of net swap losses in the past 5 years of consistently rising prices, a falling price environment would expose retailers with higher futures cover to greater swap losses, increasing the WEC despite greater base coverage and lower prices.

Since additional base futures can increase or decrease the WEC depending on spot price outcomes, any additional modelled base cover would likely increase volatility in the modelled WEC distribution across the range of modelled spot price outcomes. Since the model simulates both extremely low and extremely high spot prices, any additional cover is likely to exacerbate differences in the WECs resulting from these simulations. Conversely, spot exposure where base futures cover is exceeded without triggering a cap payout has been shown to primarily cluster around $50/MWh to $150/MWh, introducing less volatility to the WEC distribution than additional base futures cover. Since the assumed hedging strategy seeks to minimise volatility in the WEC distribution, it favours some exposure to primarily mid-ranged spot prices over the volatility introduced by greater base futures cover, while mitigating almost all exposure above $300/MWh with strong cap coverage.