

Wholesale Electricity Cost Modelling

Update of residential electricity price
trends modelling for the Australian
Energy Regulator

1 May 2019

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1. Update of wholesale cost modelling

This report presents a minor update to the modelling and calculations that EY prepared for the AEMC informing the AEMC 2018 Residential Electricity Price Trends report (the “AEMC Report”)¹. The AER instructed us to:

- Apply the identical methodology and modelling assumptions applied in the AEMC Report
- But update the projected wholesale electricity cost component for representative residential customer demand profiles (Net System Load Profile) across various jurisdictional areas (QLD, NSW and SA) in the NEM by applying the newly available daily prices of the ASX energy futures since the work concluded for the AEMC Report.

Only the electricity component of the wholesale electricity cost has been reviewed for this report. The analysis presented in this report essentially provides an update to section 5.3 of the AEMC Report only. No further work or updates have been assessed relating to other components of wholesale cost such as renewable policy costs, ancillary services costs, market fees, etc. No other changes to the wholesale electricity market modelling or calculations were made to consider other possible or actual market developments other than the ASX energy futures data set.

This report should be read in conjunction with our report to the AEMC¹, which is publicly available, as this report does not present the detailed methodology and modelling assumptions applied in the AEMC Report.

1.1 Methodology

A gradient descent method was used to optimise the retail hedge portfolio that is constructed with standard contract types including base swap, peak swap and \$300/MWh cap contracts. The optimisation is based on inputs of the forecast demand, the calculated strike prices and the simulated wholesale spot market prices. The outcome of the gradient descent optimisation provides a relative level of hedging to target a consistent weekly electricity cost for each representative customer load jurisdiction. A detailed description of the methodology and the background materials can be found in the AEMC Report.

1.2 Contract strike price

The prices of the ASX energy futures for the base swap, peak swap and cap contracts in three regions (QLD, NSW and SA) were updated to 31 March 2019², incorporating the latest prices in the last six months. Note that the strike prices in the AEMC Report were estimated based on ASX energy futures data up to 15 October 2018. The contract strike prices were then calculated by weighting the average monthly ASX energy futures settlement prices based on an exponential hedging procurement strategy with a 24 or 12 month procured period.

The updated strike prices for the 24-month hedge book build approach are shown in Figure 1³. Compared with the AEMC Report data set, in financial year 2018-19 the strike prices are not affected as the assumed procurement strategy is based on a book build up to 2 months prior to the delivery period. In some quarters of the financial year 2019-20 the base and peak strike prices have become considerably higher, more than \$20/MWh higher in some cases. The cap strike prices

¹ EY - 2018 Residential Electricity Price Trends - Wholesale Market Costs Modelling. Available <https://www.aemc.gov.au/market-reviews-advice/residential-electricity-price-trends-2018> as at 24 April 2019.

² <https://www.asxenergy.com.au/>

³ EY produced chart based on analysis of ASX energy futures daily closing price data

have also generally increased for the third quarter (summer). The higher strike prices are due to the continued increase of the ASX energy futures prices over the last six months.

Strike prices from the 12 month hedge book build approach are shown in Figure 2³. Generally, the trends of the change in the base, peak and cap strike prices are similar to those in the 24 month hedging. However, there is a larger increase in the prices in some quarters. As explained previously, there is an increasing trend in the contract prices in the last half year. The 12 month hedging strategy applies a higher weighting to more recent ASX prices and thus, compared with the results in the 24 month hedging, has a stronger increase in the strike prices compared to the AEMC Report.

Figure 1: Strike prices of the base swap, peak swap and cap contracts in QLD, NSW and SA before and after the update (24 month exponential hedging strategy)

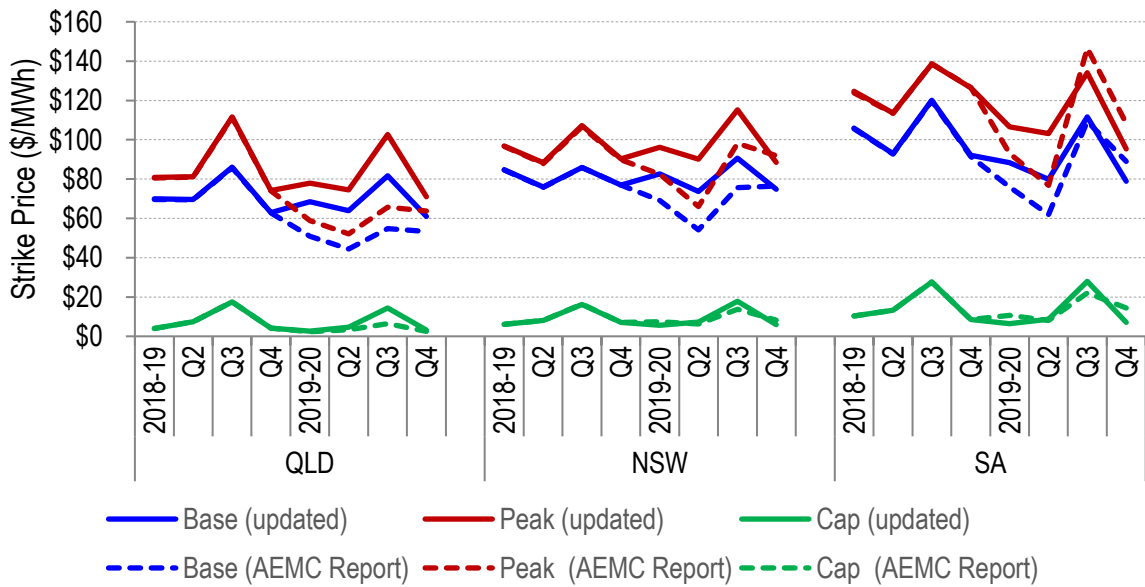
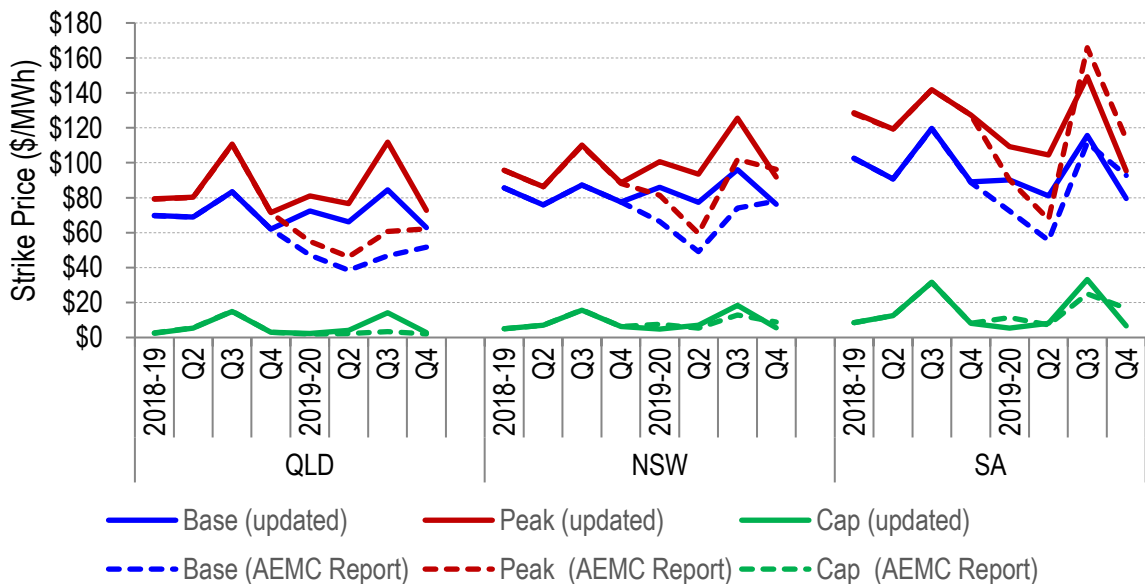


Figure 2: Strike prices of the base swap, peak swap and cap contracts in QLD, NSW and SA before and after the update (12 month exponential hedging strategy)



1.3 Wholesale electricity cost

Wholesale electricity costs for financial years 2018-19 and 2019-20 in three regions, QLD, NSW and SA, have been calculated based on updated strike prices (as outlined in the previous section) applied with the forecast demand and wholesale market spot prices from the AEMC Report work. Costs from two exponential hedging strategies with a procurement period of 24 and 12 months, respectively, are compared with the corresponding results in the AEMC Report.

Figures 3 and 4 show the wholesale electricity costs from different scenarios calculated with the 24 and 12 month exponential hedging strategies, respectively. Results from the two hedge strategies are quite similar as the strike prices are very close to each other in both strategies. The price variations between different scenarios are generally small, less than \$10/MWh, since in this case the wholesale market spot prices are not sensitive to the demand and fuel changes. Results from the base scenario before the update are also included for comparison. In financial year 2018-19, the costs are not changed. In financial year 2019-20, there is an increase in the costs between \$10/MWh and \$20/MWh in all jurisdictional areas. This is because in this financial year the updated strike prices are higher and the cost changes are reflective of the strike price changes.

The wholesale electricity costs shown in Figures 3 and 4 from the base scenario in financial years 2018-19 and 2019-20 are listed in Table 1. The update does not affect the wholesale electricity costs in financial year 2018-19 so the wholesale electricity costs in financial year 2018-19 before and after the update are only presented in one column.

Figure 3: Wholesale electricity costs for QLD, NSW and SA from the 24 month exponential hedging strategy

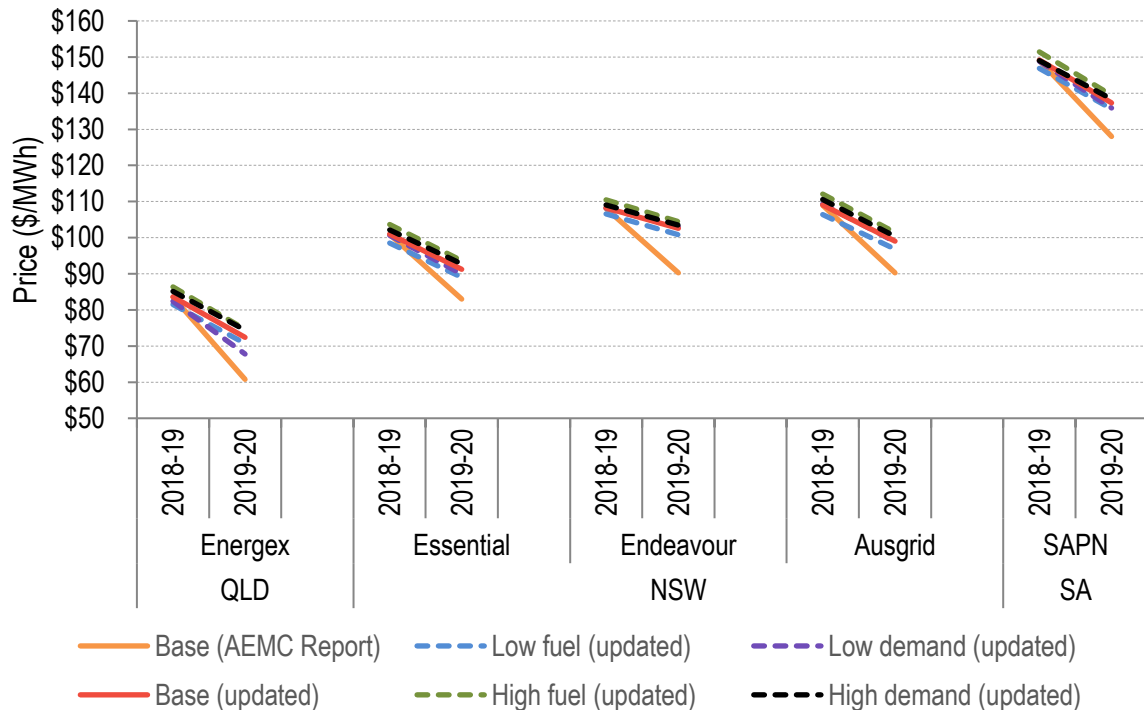


Figure 4: Wholesale electricity costs for QLD, NSW and SA from the 12 month exponential hedging strategy

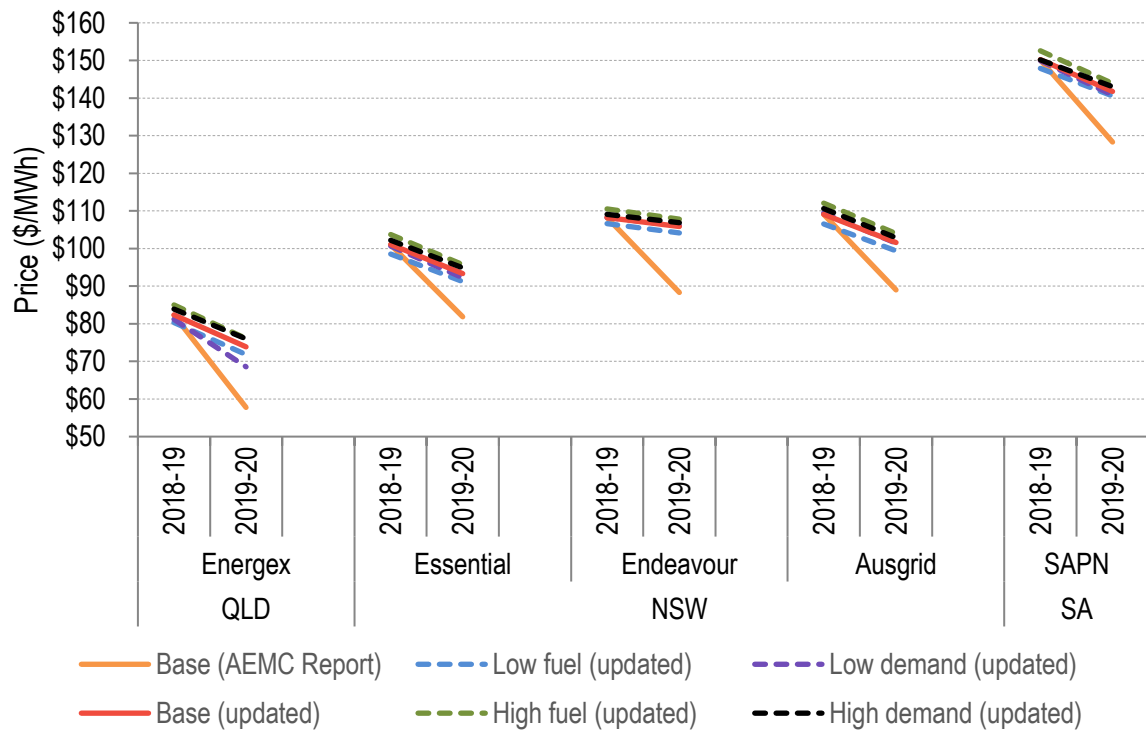


Table 1: Wholesale electricity costs (base scenario) for jurisdictional areas in QLD, NSW and SA from the 24 and 12 month exponential hedging strategies

Jurisdictional area	24 month			12 month		
	2018-19 (AEMC Report)	2019-20 (AEMC Report)	2019-20 (Base updated)	2018-19 (AEMC Report)	2019-20 (AEMC Report)	2019-20 (Base updated)
Energen	\$83.55	\$60.78	\$72.40	\$82.29	\$57.76	\$73.86
Essential	\$100.89	\$83.02	\$91.22	\$101.01	\$81.82	\$93.33
Endeavour	\$108.12	\$90.31	\$102.57	\$108.21	\$88.28	\$105.88
Ausgrid	\$108.98	\$90.28	\$99.04	\$109.07	\$88.98	\$101.57
SAPN	\$149.00	\$128.04	\$137.30	\$150.12	\$128.34	\$141.80

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