Addendum to modelling data

PREPARED FOR ESCOSA

Frontier Economics has undertaken modelling as part of ESCOSA's Draft Determination on retail electricity price in South Australia. Our analysis and advice has been reported in our draft report Wholesale Energy Costs Estimates for 2012-13 to 2013-14. We have also prepared detailed data underlying our analysis in a spreadsheet. This data relates to:

- half hourly load (for small customers) and price forecast for the POE 10/50/90 cases
- optimal contract position

This note provides more detail around the forward contract prices that were used in our analysis. Section 5.2 of our report is reproduced below with additional information such that a subscriber to d-cyphaTrade would be able to recreate the forward prices used in our analysis. We have used three separate forward curves in our analysis:

- marked-to-market
- rolling average
- trade-weighted average

The remainder of this note discusses the specific data used to calculate these three forward curves and then reproduces Section 5.2 of our report.

Specific d-cyphaTrade data used in the analysis

The three forward curves used in our report rest on data for the following South Australian contracts:

- Peak and off-peak swaps by quarter, with peak being defined as 7am to 10pm Monday-Friday, excluding public holidays
- Flat $300 caps by quarter
- Base prices for both swaps and caps have also been used to infer prices in 2013/14 as described below

The specific date ranges for the data used in each approach are as follows:

- **Marked-to-market:** 16 August 2012
- **Rolling average:** 3 years to 2 August 2012 with weights discussed below
- **Trade-weighted average:** from first trade to 2 August 2012 weighted by trade volumes

Section 5.2 of our report is reproduced below.

Marked-to-market approach

The marked-to-market approach sets contract prices according to the most up-to-date contract price information available at the time of the modelling. For the purposes of this review, quarterly peak and off-peak swap prices and flat quarterly $300 cap premiums were accessed on 16 August 2012 from d-cyphaTrade. The contract prices (peak, off-peak and base) and premiums assumed under the marked-to-market approach are outlined in Table 1. Forward prices for contracts become less reliable into the future as traded volumes are much lower. As of 16 August 2012 the d-cyphaTrade peak and off-peak swap prices for 2013/14 were thinly traded. For Q2 peak contracts there was no traded volume and what appears to be a default value for price. This default value implied that the forward curve was inverted. That is, off-peak prices were greater than peak prices. Using an inverted forward curve for 2013/14 would not yield a sensible wholesale energy cost result. To resolve this issue, Frontier has used the price of base swaps in 2013/14 and the relative premium between peak/off-peak and base prices in 2012/13 to infer peak and off-peak prices for 2013/14.

Table 1: Contract prices and premiums – Marked-to-market approach

Financial year (ending 30 June)	Contract quarter	Peak swap price ($/MWh)	Off-peak swap price ($/MWh)	Base swap price ($/MWh)	Flat $300 cap premium ($/MW/hr)
2012/13	Q3	$84.75	$54.75	$68.00	$2.75
	Q4	$67.00	$48.21	$56.25	$6.00
	Q1	$107.60	$41.43	$69.00	$19.75
	Q2	$66.25	$52.06	$58.10	$2.75
2013/14	Q3	$73.10*	$47.22*	$58.65	$3.40
	Q4	$66.34*	$47.74*	$55.70	$8.50
	Q1	$107.60*	$41.43*	$69.00	$24.35
	Q2	$59.58*	$46.82*	$52.25	$2.50

Source: d-cyphaTrade

** Inferred from base swap prices in 2013/14 and the premium between PK/OP and base prices in 2012/13*

Rolling average approach

The rolling average approach gives effect to the approach used by ESCOSA in previous reviews. This approach assumes that retailers accumulate contracts over

a 3-year window in the lead-up to the start of the contract period and that, for the purposes of determining regulated tariffs, the contracts should be priced at the historic contract prices over this period.

Specifically, the rolling average approach assumes that retailers purchase the required volume of contracts in the following proportions during the following periods of time in the lead-up to the start of the contract period:

- 20% is purchased in the 6 months immediately prior to the start of the contract
- 20% is purchased in the period 6-12 months prior to the start of the contract
- 40% is purchased in the period 12-24 months prior to the start of the contract
- 20% is purchased in the period 24-36 months prior to the start of the contract.

To calculate the contract prices under the rolling average approach, Frontier firstly calculated the average price of peak and off-peak swaps and flat $300 cap premiums over the above time periods. When calculating average contract prices and premiums over these time periods, all prices posted by d-cyphaTrade were utilised, even if an associated trade at that price did not occur. This was done due to the lack of trading liquidity for the majority of these contracts over the period 18-36 months out from the start of the contract.

Once average contract prices and premiums had been calculated for each time period, a weighted-average price was taken based on the assumed proportionate volume of contracts that were purchased in that time period.

The contract prices and premiums assumed under the rolling average approach are outlined in Table 2.

Table 2: Contract prices and premiums – Rolling average approach

Financial year (ending 30 June)	Contract quarter	Peak swap price ($/MWh)	Off-peak swap price ($/MWh)	Base swap price ($/MWh)	Flat $300 cap premium ($/MW/hr)
2012/13	Q3	$48.55	$42.87	$45.38	$3.60
	Q4	$60.44	$44.93	$51.57	$8.66
	Q1	$110.43	$67.28	$85.26	$29.74
	Q2	$42.63	$67.01	$56.63	$3.08
2013/14	Q3	$58.75*	$51.87*	$54.91	$3.80
	Q4	$67.28*	$50.02*	$57.41	$8.93
	Q1	$110.33*	$67.21*	$85.18	$24.15
	Q2	$41.95*	$65.94*	$55.72	$2.48

Source: d-cyphaTrade

** Inferred from base swap prices in 2013/14 and the premium between PK/OP and base prices in 2012/13*

Using this weighting approach leads to an inversion of the peak and off-peak contract prices for Q2 of 2012/13. This anomaly is a function of the relative price of peak and off-peak contracts at different points in time over the past three years and the weightings applied at each of these points in time. Frontier believes that this outcome reduces the veracity of the wholesale energy costs that are calculated using the rolling average approach.

As was the case with the marked to market approach, due to the very low level of traded volumes for 2013/14 Frontier has used the rolling-average price of base swaps in 2013/14 and the relative premium between rolling-average peak/off-peak and rolling-average base prices in 2012/13 to infer rolling-average peak and off-peak prices for 2013/14. In the marked to market approach this ensured that the forward curve was not inverted however that outcome is not achieved for the rolling average case as the peak and off-peak prices are inverted in 2012/13 due to the averaging process.

Trade-weighted average approach

The trade-weighted average approach uses contract prices that are a volume-weighted average, where the volume weighting used is the volume of contracts that actually traded on d-cyphaTrade over the life of the contract. The trade-weighted and rolling average approaches differ in that under the traded-weighted approach, only contract prices that were associated with an actual volume trade are included in the average calculations, where the price that is included is weighted according to the volume of trade that occurred at that price. Due to a

lack of liquidity for the majority of these contracts in the period 18-36 months out from contract start, the trade-weighted average approach focuses on more recent contract prices than does the rolling average approach.

The contract prices and premiums assumed under the trade-weighted approach are outlined in Table 3.

Table 3: Contract prices and premiums – Trade-weighted average approach

Financial year (ending 30 June)	Contract quarter	Peak swap price ($/MWh)	Off-peak swap price ($/MWh)	Base swap price ($/MWh)	Flat $300 cap premium ($/MW/hr)
2012/13	Q3	$53.76	$40.34	$46.26	$3.13
	Q4	$67.22	$39.82	$51.55	$9.14
	Q1	$112.02	$42.52	$71.48	$23.71
	Q2	$56.91	$50.40	$53.17	$2.47
2013/14	Q3	$62.32*	$46.76*	$53.63	$3.50
	Q4	$73.43*	$43.50*	$56.31	$9.00
	Q1	$133.49*	$50.67*	$85.18	$24.15
	Q2	$53.51*	$47.40*	$50.00	$2.48

Source: d-cyphaTrade

** Inferred from base swap trade-weighted prices in 2013/14 and the premium between PK/OP and base trade-weighted prices in 2012/13*

As was the case with the other two approaches, due to the very low level of traded volumes for 2013/14 contracts Frontier has used the trade-weighted price of base swaps in 2013/14 and the relative premium between trade-weighted peak/off-peak and trade-weighted base prices in 2012/13 to infer trade-weighted peak and off-peak prices for 2013/14.