The Allen Consulting Group

Supplementary Report
Energy Wholesale Price Study

22 November 2004

Report to Essential Service Commission of South Australia

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Chapter 1

Executive Summary

The Allen Consulting Group has been asked by the Essential Services Commission of South Australia (the Commission) to provide a detailed assessment of the efficient and prudent wholesale energy cost that should be built into South Australian electricity retail standing contract prices for the forthcoming period.

Our original report *Final Report - Energy Wholesale Price Study* was provided to the Commission on 13 September 2004. The Commission published it with its *Inquiry into Retail Electricity Price Path Discussion Paper* on 14 September 2004.[1] The Commission received a number of submissions on our original report.[2]

Over recent weeks, we have:

- reviewed public and confidential submissions;
- reviewed an auditor's report on AGL's costs and submission;
- discussed with AGL its submission; and
- reviewed additional information provided by AGL.

After these discussions and our review of the submissions, we have concluded that our methodology remains appropriate, but that our analysis should be revised using the new information that has been provided since our original report was published.

Revisions that we have made to our analysis include that we have:

- taken additional measurers to reconcile better load forecasts load forecasts provided by the Electricity Supply Industry Planning Council (ESIPC) and those provided by AGL;
- incorporated into some of our scenarios AGL's forecast pool prices that have been calculated using a market simulation model;
- updated the forward contract prices used in our model with those published in October 2004;
- amended the risk constraints in our model to recognise that significant retailer over-contracting would probably lead to generators modifying their bids in order to achieve lower pool prices; and
- adjusted the probability weightings of the scenarios.

As for our original report, we have analysed three cases of future contract prices to calculate wholesale electricity costs:

A. contracts priced at current forward prices;

B. as in case A plus a premium for uncertainty which is equivalent to buying an option to lock in future contract prices; and

[1] http://www.escosa.sa.gov.au/resources/documents/040913-R-WholesaleEnergyPriceStudy.pdf

[2] see http://www.escosa.sa.gov.au/site/ under 'electricity'

C. as in case A plus a premium rising to new entrant price levels.

Our revised and original wholesale energy prices for these three cases are shown in Table 1.1 and Figure 1.1.

In our previous report, we also provided recommendations for the wholesale energy purchase cost for the period between January and June 2005. However, our estimates for this period suffered from a number of shortcomings, which are discussed further in section 2.7. After discussions with the Commission, we have not provided an independent estimate of the wholesale energy cost for this period.

Table 1.1

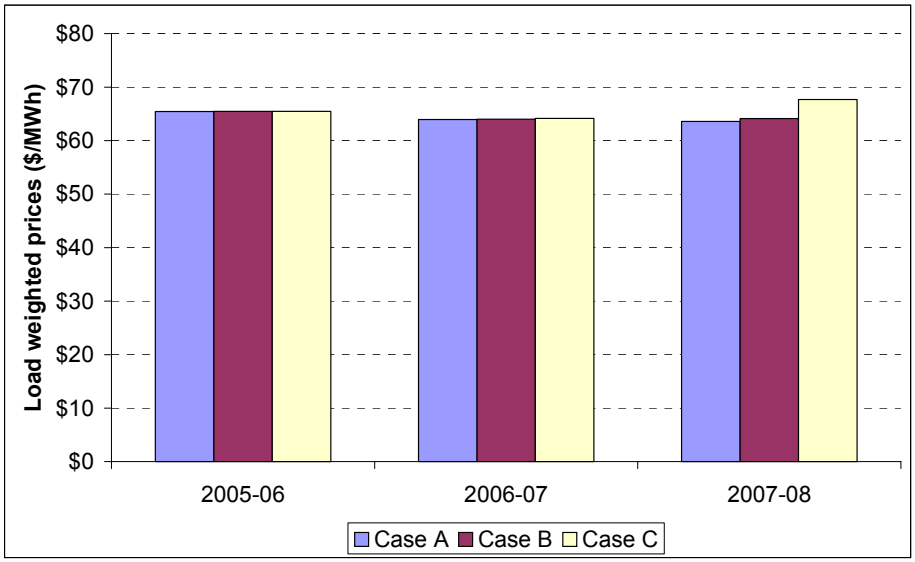
LOAD-WEIGHTED PRICES FOR CONTRACT CASES ($ PER MWH)

	2005-06	2006-07	2007-08
REVISED RESULTS			
Contract Case A	$65.42	$63.94	$63.56
Contract Case B	$65.48	$64.00	$64.15
Contract Case C	$65.48	$64.17	$67.66
ORIGINAL RESULTS			
Contract Case A	$60.02	$58.84	$58.18
Contract Case B	$60.11	$59.04	$59.00
Contract Case C	$60.11	$59.56	$64.17
DIFFERENCE			
Contract Case A	$5.40	$5.10	$5.38
Contract Case B	$5.37	$4.96	$5.15
Contract Case C	$5.37	$4.61	$3.49

Source: ACG modelling of optimal portfolio

Figure 1.1

REVISED LOAD-WEIGHTED PRICES FOR CONTRACT CASES ($ PER MWH)



Source: ACG modelling

The revised prices are higher than those in our original report as a result of changes in inputs, scenarios and weights.

The wholesale cost of electrical energy at the customer meter has to include allowance for additional charges and line losses. Our revised calculation of the sum of all the relevant costs and changes that make up the wholesale cost of electrical energy at the meter for standing contract customers is shown in the following table.

Table 1.2

REVISED WHOLESALE COST AT THE CUSTOMER METER — BASED ON CONTRACT CASE B ($ PER MWH)

	FY 2005-06	FY 2006-07	FY 2007-08
Energy hedging cost	$65.48	$64.00	$64.15
Pass through costs			
NEMMCO fees	$0.40	$0.41	$0.42
Ancillary services	$0.60	$0.62	$0.63
Bank guarantee	$0.10	$0.10	$0.10
Embedded generation	$0.51	$0.55	$0.59
MRET	$0.83	$1.10	$1.39
Subtotal pass-through	$2.44	$2.78	$3.13
Total before losses	$67.92	$66.78	$67.28
Line losses	$5.52	$5.42	$5.46
Energy costs at meter	$73.43	$72.21	$72.74
Energy cost at meter (Dec 2004 prices)	$71.64	$68.73	$67.55

Source: ACG modelling, assuming an annual inflation rate of 2.5%.

Further analysis has been provided to the Commission on a confidential basis, so as not to prejudice AGL's commercial negotiations in respect of future contracting.

Chapter 2

Revisions to our inputs and analysis

2.1 Introduction

The Allen Consulting Group has been asked by the Commission to provide a detailed assessment of the efficient and prudent wholesale energy cost that should be built into South Australian electricity retail standing contract prices over the forthcoming period.

Our initial report *Final Report - Energy Wholesale Price Study* was provided to the Commission on 13 September 2004. The Commission published it with its *Inquiry into Retail Electricity Price Path Discussion Paper* on 14 September 2004.[3] The Commission received a number of submissions on our report.[4]

Since that time we have:

- reviewed public and confidential submissions from NRG (15 October 2004), TXU (15 October 2004), Origin Energy (15 October 2004) and AGL (17 October 2004);
- reviewed an auditor's report on AGL's costs and submission;
- discussed with AGL its submission; and
- reviewed additional information provided by AGL.

After these discussions and review of submissions, we have concluded that our methodology remains appropriate, but that analysis should be revised using new information that has been provided since our original report was published.

This chapter explains how we have updated our inputs and scenarios.

2.1 Load forecasts

For our original report, we used load forecasts provided by AGL and by the ESIPC. Submissions supported the use of these load projections.[5]

In our original report, we noted differences between AGL and ESIPC projections and we have had the opportunity to investigate these differences further.

AGL has advised that the ESIPC annual energy projections should be reduced by 125 GWh to account for the fact that the ESIPC forecast projects energy sales to customers whereas the AGL data projects AGL's energy purchases at the node, which do not include embedded generation. Accordingly, we have now removed the value of this generation from the ESIPC load forecast, which improved its consistency with the AGL load forecast.

[3] http://www.escosa.sa.gov.au/resources/documents/040913-R-WholesaleEnergyPriceStudy.pdf

[4] see http://www.escosa.sa.gov.au/site/ under 'electricity'

[5] TXU and AGL submissions.

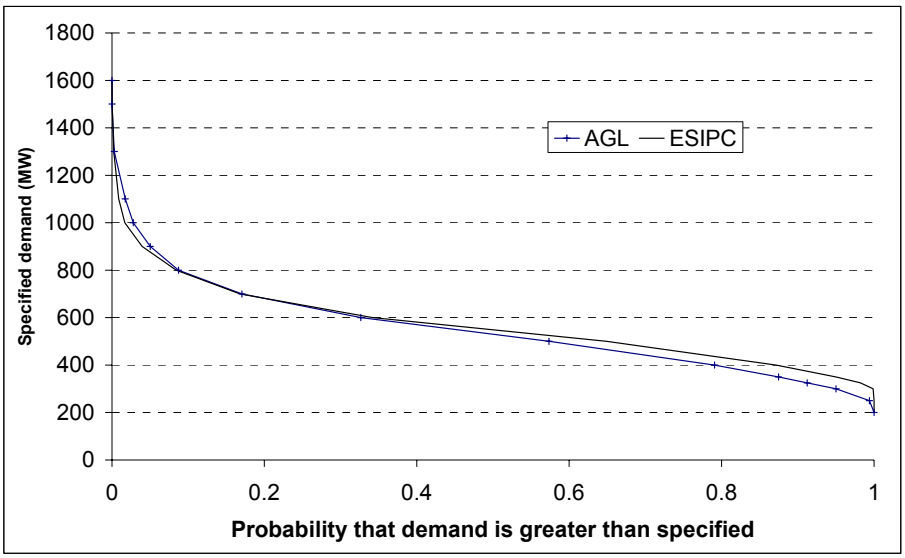
Even after adjusting for the difference in customer bases and the 125 GWh, the AGL and ESIPC forecasts still have different shapes. AGL's load forecasts have more high load peaks and more low load dips compared to the average load than the ESIPC load forecasts, as shown in Figure 2.2.

This can be explained to some extent by the fact that AGL's load profile is based on 2001 calendar year, with some correction for weather as 2001 may have more extreme events than usual. AGL has not provided detail on this correction. ESIPC's load forecast is based on load profile during the financial year 2002-03.

There are no grounds for preferring either the AGL or ESIPC forecasts, so we have continued to use both load profiles in our analysis, in different scenarios.

Figure 2.2

COMPARISON OF AGL AND ESIPC LOAD PROFILES FOR 2005-06 TAKING ACCOUNT OF CUSTOMER LOSSES AND EMBEDDED GENERATION



Source: AGL base case. ESIPC medium and 50% probability of exceedance, less AGL profile of customer churn and embedded generation

2.2 Changes to pool prices

For our original report, we used historical pool prices for South Australia for the years 2001-02 to 2003-04, inclusive, with adjustments to produce some scenarios with higher average pool prices. The historical pool prices were used to develop a composite pool price dataset, separated into peak and off-peak by month.

Some submissions questioned our use of historical pool prices, saying that they were too low and not a good predictor of future prices.[6]

[6] TXU, NRG and AGL submissions.

It should be noted that, in our model, contracting strategy is not dictated by future pool prices but is constructed according to the strategy that would be adopted by a prudent retailer. The average level of pool prices used in the scenarios have minimal impact on the composition of the contract portfolio, because pool prices are primarily used to calculate the cost of being over- and under- contracted in each half hour.

AGL's submission correctly understood that the key issue with pool price scenarios is not the level of average price, but inter-relationships between contract position, load and pool price. This issue was recognised in our initial report, in that scenarios had pool price and load synchronised in specified months. However, we did not have sufficient information to model the full complexity of relationships between contract position, load and pool price.

AGL has subsequently provided four time series of forecast half-hourly pool prices from its simulations of the NEM using the simulation model, PROPHET.[7] The AGL modeling and resultant forecasts were based on assumptions from NEMMCO's Statement of Opportunities and four sets of load forecasts for small customers in South Australia:

- AGL's 'Base Case' load forecasts;
- ESIPC's load forecasts based on medium economic growth and 50 per cent probability of exceedance (POE);
- ESIPC's load forecasts based on low economic growth and 90 per cent POE; and
- ESIPC's load forecasts based on high economic growth and 10 per cent POE.

We reviewed AGL's modelling assumptions and the resulting pool price projections. Our conclusions are that AGL's assumptions are plausible, and that its pool price projections are reasonable.

2.3 Changes to forward contract prices

For our original analysis, we used forward contract prices obtained in August 2004 from a number of sources including Next Generation Energy Solutions (NGeS)[8], Tradition Financial Services (TFS)[9], and closing electricity futures contracts prices from the Sydney Futures Exchange.

Some of the submissions argued that the forward contract prices that we used were low, and that the forward contract market has since risen.[10]

AGL provided more recent contract prices in its presentation to the Commission on 20 October 2004. We agree that forward prices have risen, and have updated our forward prices in October 2004, as shown in Table 2.3.

[7] http://www.iesys.com.au/ies/IES.asp?page=Products/Prophet/Prophet.html

[8] <http://www.nges.com.au/>

[9] < http://www.tfsbrokers.com>

[10] TXU, NRG and AGL submissions

Table 2.3

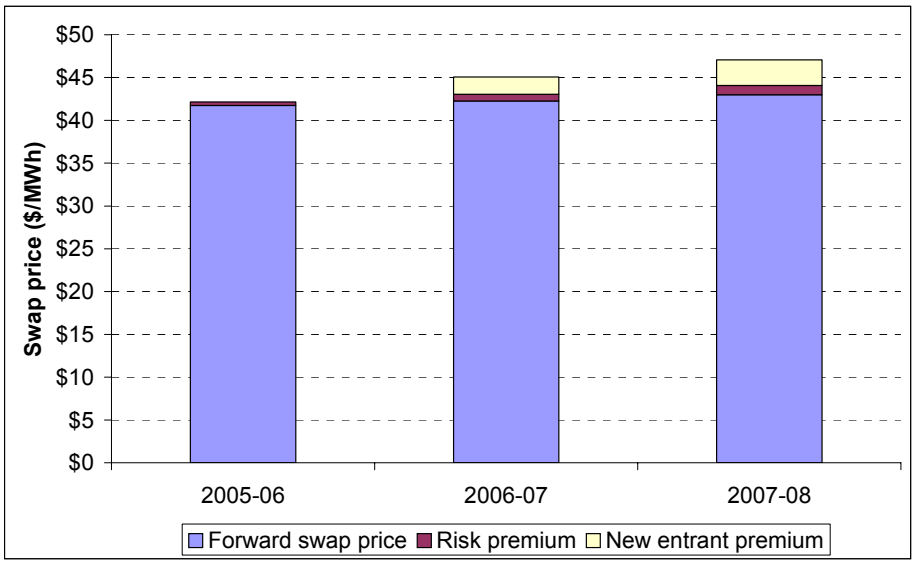
FORWARD CONTRACT PRICES

Year	Forward swap price ($/MWh) at August 2004	Forward swap price ($/MWh) at October 2004	Forward cap price ($/MWh)
2005	$39.50	$41.00	$9.50
2006	$40.50	$41.75	$9.50
2007	$41.20	$42.25	$9.50
2008	$41.66	$43.00	$9.50

Source: NGeS, AFMA

Figure 2.3

FORWARD CONTRACT PRICES ($/MWH)



Source: Table, ACG analysis

2.4 Long run marginal cost of generation

To assist with our original analysis, the ESIPC provided the Commission with a report on new entrant price for a mix of base load and peaking generation to meet the mix of small customer load. We used these prices as an input to pool price scenarios that average new entrant levels, and in calculating new entrant price premiums for contracts.

Some submissions have argued that the ESIPC base case for long run marginal cost (LRMC) of generation was derived using a cost of capital and an interest rate that were both too low.[11] Some also argued that the cost of gas was too low, especially in calculating the cost of peaking generation which needs a supply of gas readily available for the few times it has to run, but uses none on a regular basis. We were not asked to investigate the veracity of ESIPC assumptions and have therefore continued to use the ESIPC base case LRMC figures in our calculation of new entrant level contract prices.

2.5 Implications of over-contracting

Our original report identified that a prudent retailer would:

- consider a range of plausible scenarios when assessing risk;
- balance the dual objectives of minimising cost and minimising risk;
- have a clear contracting strategy for minimising risk; and
- take into account prices paid for portfolio of contracts.

We developed an extensive spreadsheet based model of the above factors that:

- incorporated five scenarios for customer load and pool prices, with associated weights;
- calculated risk as the load weighted variance due to under- or over-hedging for the range of scenarios;
  - all calculations done on a half-hourly basis;
- used a hedging strategy of finding a portfolio of contracts that minimised risk, with specified limits on contract quantities; and
- hence calculated the peak and off-peak wholesale energy cost for each quarter.

AGL had advised that its risk management policy requires a high level of hedge cover, although it did not provide any written policies. AGL initially advised that a prudent retailer would seek to contract swaps to cover average demand, and swaps plus caps to cover at least expected peak demand under assumptions of medium growth and 50% probability of exceedance. So our initial report modelled a prudent retailer as:

- minimising risk;
- contracting to cover at least average demand with swaps in each quarter; and
- contracting with swaps and caps to cover peak load, under assumptions of medium economic growth and 50% probability of exceedance.

[11] NRG and AGL submissions.

After publication of our original report, AGL submitted that our modelling resulted in over-contracting in some scenarios. AGL submitted that over-contracting would be likely to affect pool price outcomes, because generators would not want pool prices above contracted prices when AGL was over-contracted and generators would modify their bids to achieve lower pool prices. AGL presented arguments in support of this point – a summary is in AGL's public submission[12] with supporting information in the confidential submission. AGL submitted that modelling should have swaps to cover minimum demand (rather than average), and swaps plus caps to cover exactly (rather than at least) expected peak demand.

We acknowledge that significant over-contracting would probably lead to generators modifying their bids in order to achieve lower pool prices. We have therefore modified our modelling to:

- limit the purchase of additional contracts so that swaps to cover minimum demand (rather than average), and swaps plus caps to cover exactly (rather than at least) expected peak demand; and
- exclude any net revenue earned when AGL is over-contracted.

This has increased the cost of wholesale electricity purchases in some of the scenarios.

2.6 Definition of scenarios

Our modelling methodology uses five scenarios for load and pool prices on a half-hourly basis, for each of the years:

- July 2005 to June 2006;
- July 2006 to June 2007; and
- July 2007 to June 2008.

Our original report contained five scenarios that had been agreed with the Commission and discussed with AGL, with associated weightings for the scenarios to use in assessing risk. AGL subsequently submitted that the scenarios were not realistic. For the reasons discussed in 2.1 and 2.2, we have changed load projections and pool prices in the scenarios.

Scenario 1 - Base case

AGL has argued in its submission that its base case load and pool price projections from its market simulation modelling using PROPHET[13] is the most appropriate for the Commission to use, because it takes into account the level of contracting that generators have established. AGL argues price can actually be high in a period of relatively low load, if that load is still higher than the contracted position of generators. Conversely, it is unlikely that price will be high, despite a very large load, if generators have contracted to an even higher level. Therefore an examination of future pool price scenarios must take into account three variables – system load, generator hedge levels and thus pool price.

[12] AGL response to Retail price inquiry, http://www.escosa.sa.gov.au/resources/documents/AGL_RetailPricePathInq_DP.pdf

[13] http://www.iesys.com.au/ies/IES.asp?page=Products/Prophet/Prophet.html

We agree that the AGL base case is a good scenario to include in our modeling. It differs from scenario 1 used in our original analysis only to the extent that we use AGL's forecast pool prices instead of historical prices.

Scenario 2 – Historical prices

This scenario involves the use of AGL's base case load projections and historical pool prices. Load and pool prices have been sorted on a quarterly peak and off-peak basis, so that highest prices occur at times of highest load and lowest prices occur at times of lowest load. In our original report, this was described as perfectly synchronised load and pool price.

No information has come to light that indicates we should alter this scenario. In fact, AGL has agreed that scenario 2 should remain unchanged.

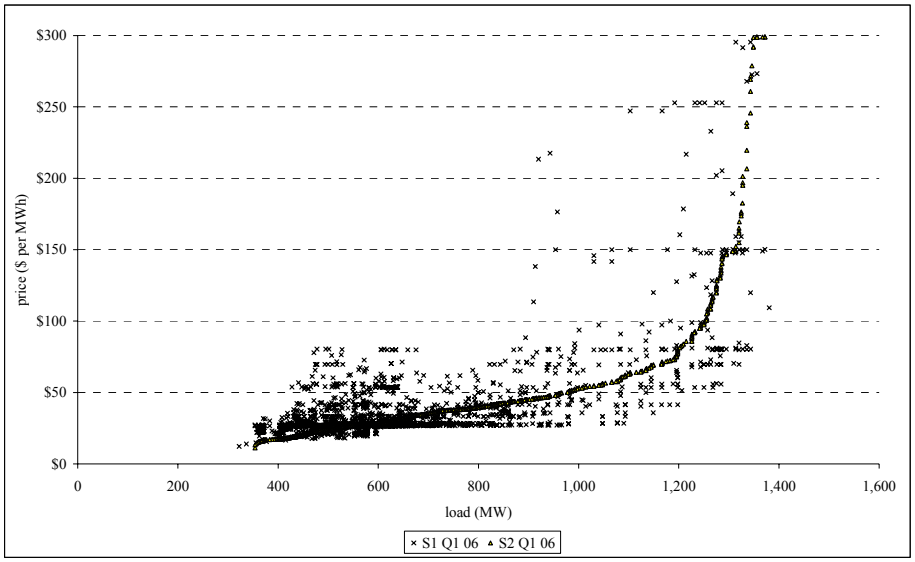
Perfect synchronisation of load and price represents the greatest hedging risk to a retailer, because prices are highest when the load is highest and the retailer is most likely to be under-contracted, and conversely prices are lowest when the load is lowest and the retailer is most likely to be over-contracted.

Figure 2.4 illustrates the assumption of perfect synchronisation, by contrasting the load and price points from AGL's base case (marked as crosses) and the perfectly synchronised load and price points from scenario 2 (marked as triangles). Perfectly synchronised load and price as in scenario 2 appears to be a 'supply curve' with price increasing as load increases. However, the situation in the NEM is much more complicated, as price is definitely not a single valued consequence of load. Figure 2.4 shows that there can be many prices corresponding to a specified load, and sometimes prices remain constant as load increases.

Hence perfect synchronisation is far from realistic. However, it still has validity as a scenario because it represents the greatest risk, and in fact has the highest cost even though the pool prices (taken from the previous three years) are the lowest of all scenarios.

Figure 2.4

COMPARISON OF LOAD AND PRICE POINTS FOR SCENARIOS 1 (BASE CASE) AND SCENARIO 2 (PERFECT SYCHRONISATION)



Source: AGL base case, and the ACG scenario 2. Quarter 1, 2006

Scenario 3 – Medium case

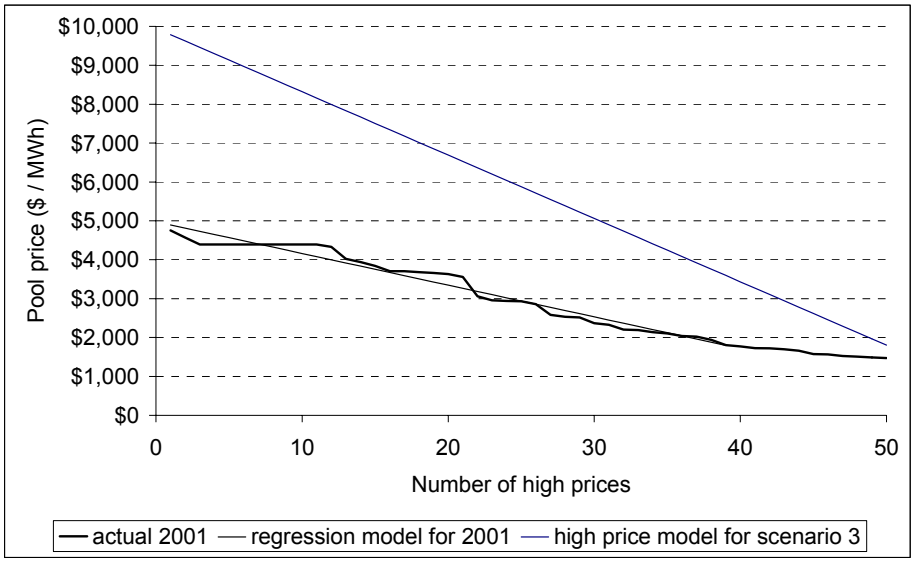
Scenario 3 in our original report involved the use of AGL's base case load forecasts, a set of pool prices based on historical prices, and a number of high price events to cause the average annual price to be equal to the long run marginal cost.

High price events were based on the pattern of events in summer 2001. We analysed high prices in January and February 2001, which was a high priced season, and found that the 50 highest prices could be described well by a straight line as shown in Figure 2.5. We used the same distribution to add a number of high prices, but doubled the prices to take account of the change in Value of Lost Load (VOLL) — the wholesale price cap applied by NEMMCO — from $5,000 per MWh in 2001 to $10,000 per MWh in the study period. [14]

[14] despite one submission claiming that prices needed to be adjusted for the change in VOLL

Figure 2.5

DISTRIBUTION OF HIGH PRICES IN 2001



Source: historical pool prices, ACG analysis

One submission argued that prices may go above LRMC for some years, and so at least one scenario should be above LRMC.[15] However, AGL argued that in view of its contract position, pool prices in the South Australian market would be highly unlikely to rise even to LRMC, because generators would modify their bids to prevent this in order to avoid paying out on AGL's contracts.

We are inclined to accept AGL's argument that prices in South Australia are unlikely to average LRMC annually during the next three years, and have substituted an alternative scenario. Scenario 3 now uses load projections provided by the ESIPC assuming medium economic growth and 50 per cent POE, and adjusted for expected customer switching away from AGL and other factors discussed in 2.1.

The complex inter-relationships between contract position, load and pool price mean that it is highly desirable to undertake pool price simulations to get pool prices consistent with AGL's contracts and the ESIPC load projections. AGL undertook these projections, at our request. However, AGL advised that, because their modelling covered the entire NEM and not just South Australia, in the study timeframe it could not produce load projections for the entire NEM that were consistent with the ESIPC projections for South Australia.[16]

AGL had concerns about the synchronisation between load and price in its pool price simulation using the ESIPC load projections, and recommended that we should use perfect synchronisation. We do not support this recommendation, for the reasons shown in Figure 2.4.

[15] NRG submission.

[16] Phone call from AGL on 14 Oct 2004

For the purposes of our revised analysis, we have taken the pool price series from AGL's pool price forecasts based on the ESIPC load projections, and applied the same synchronisation between load and pool price that occurred in AGL's base case. In other words, the comparison between load and price for scenario 3 will have a similar pattern to scenario 1, rather than AGL's recommendation of having the pattern for scenario 2.

AGL did not provide any pool price forecasts for January to June 2005, so it has not been possible to use scenario 3 to estimate wholesale costs for January to June 2005.

Scenario 4 – Low case

Scenario 4 in our original report involved the use of ESIPC's load based on low economic growth and 90 per cent POE. It also used historical pool prices, synchronised in January and February.

For the reasons discussed under scenario 3, for the purposes of our revised analysis, we have replaced the historical pool prices with AGL's pool price forecast based on the ESIPC load forecast for low economic growth and 90 per cent POE. We have also applied the same synchronisation between load and pool price that occurred in AGL's base case.

AGL did not provide any pool price forecasts for January to June 2005, and so it has not been possible to use scenario 4 to estimate wholesale cost for January to June 2005.

Scenario 5 – High case

Scenario 5 is very similar to scenario 4 except that for scenario 5 we use load and pool price forecasts based on high economic growth and 10 per cent POE.

Scenario 5 in our original report involved the use of ESIPC's load forecasts based on high economic growth and 10 per cent POE. It also used historical pool prices, synchronised in January and February, with fewer high price events as described in scenario 3 in order to have prices averaging at half way between historical levels and LRMC.

For the reasons discussed under scenario 3, for the purposes of our revised analysis, we have replaced the historical pool prices with the prices modelled by AGL using the ESIPC projections assuming high economic growth and 10 per cent POE. We have also applied the same synchronisation between load and pool price that occurred in AGL's base case.

As for scenarios 3 and 4, AGL did not provide any pool price forecasts for January to June 2005, and so it has not been possible to use scenario 5 to estimate wholesale prices for January to June 2005.

Summary

In summary, for our revised analysis, we have made the following changes to the scenarios used for our original analysis. We have:

- kept scenario 2 the same;
- modified scenarios 1, 4 and 5 to use AGL's forecast pool prices from simulation modelling rather than historical prices (albeit modified in some cases to average higher levels); and
- replaced scenario 3 with one using ESIPC's load forecasts based on medium economic growth and AGL's forecast pool price from simulation modelling.

The basis of the 5 revised scenarios are summarised below:

Scenario 1 AGL base case load forecast and AGL forecast pool prices.

Scenario 2 AGL load forecast with historical pool prices, perfectly synchronised with customer load, so pool prices are highest when load is highest, and lowest when load is lowest.

Scenario 3 ESIPC load forecast for medium economic growth and 50 per cent POE, and adjusted for customer switching and other factors. AGL forecast pool prices adjusted to have the same synchronisation as for scenario 1.

Scenario 4 ESIPC load forecast for low economic growth and 90 per cent POE, and adjusted for customer switching and other factors. AGL forecast pool prices adjusted to have the same synchronisation as for scenario 1.

Scenario 5 ESIPC load forecast for high economic growth and 10 per cent POE, and adjusted for customer switching and other factors. AGL forecast pool prices adjusted to have the same synchronisation as for scenario 1.

Scenario 2 accounts for the risks arising from AGL facing high pool prices when under-hedged and low prices when over-hedged, so represents the maximum contract risk.

Scenarios 4 and 5 take into account the possibility that actual load will differ from AGL's forecast load due to weather factors economic factors, so can model weather and churn risk by using weights higher than would apply for just weather risk.

2.7 Scenario weightings

The scenarios described above represent a plausible range of future conditions, and are used to analyse risk by assigning weights to the scenarios based on the probability of each scenario coming to pass. For our original analysis, we used weights proposed by AGL.

However, AGL's subsequent submission, and others, disagreed with these weights.

AGL has proposed an alternative set of weights for the revised scenarios. AGL's current proposal places greatest weight on the highest cost but least likely scenario, namely scenario 2. This contradicts its submission that the base case (scenario 1) is the most appropriate basis for determining costs. Hence we do not agree with AGL's proposal.

We hold the following views.

- Scenario 1 is the most likely, given that it is AGL's base case.
- Scenario 3 is next most likely, given that it uses the ESIPC's medium load projections.
- Scenario 4 comprises low economic growth (less than 20 per cent) and 90 per cent probability of exceedance due to weather. Assuming these factors are independent, the probabilities multiply, so that scenario 4 would be less than 2 per cent likely. However, we propose adding 8 per cent to account for the risk of churn being higher than expected, resulting in load being lower than expected.
- Scenario 5 has the same probability as scenario 4.
- Scenario 2 is the least likely, as illustrated by the less than perfect synchronisation between load and price as shown in Figure 2.4.

Table 2.4

WEIGHTS FOR SCENARIOS: JULY 2005 TO JUNE 2008

	For our original analysis	For our revised analysis
Scenario 1	10%	50%
Scenario 2	20%	5%
Scenario 3	25%	25%
Scenario 4	20%	10%
Scenario 5	25%	10%

Source: ACG analysis

We have continued to calculate the risk as the probability weighted sum of variances between the cost of purchasing at the single best expected price and the different cost of purchasing under different scenarios. This is the same approach taken in financial portfolio theory. We have continued to calculate the expected cost of hedging the forecast load as ratio of probability weighted sum of costs to the probability weighted sum of load.

2.8 Estimates for January to June 2005

As indicated above, we have been unable to use scenarios 3, 4 or 5 to estimate the wholesale electricity cost for January to June 2005. The reduction in the information available necessarily implies that the precision of our estimates for this period is lessened. Moreover, there is no straightforward response to the lack of information. While an obvious response would be to raise the weighting that is applied to the remaining scenarios (namely, scenario 1), a key requirement for our approach is that the scenarios modelled capture a substantial degree of the diversity in future demand and price outcomes. Moreover, raising the weighting of scenario 1 would have implied that our estimates would not have provided any information independent of, and additional to, that already provided by AGL. Accordingly, after discussions with the Commission, we have not provided an independent recommendation for the wholesale energy purchase cost for the January to June 2005 period.[17]

[17] While the Commission determined the weighted average wholesale energy purchase cost for the January to June 2005 period, we advised the Commission on how to disaggregate the average cost into quarterly peak and offpeak prices for this period.

Chapter 3

Revised results

This chapter describes our revised results and the changes from our initial results.

3.1 Wholesale electricity prices (excluding additional changes and line losses)

Table 3.5 and Figure 3.6 show the expected load weighted wholesale electricity prices (excluding additional changes and line losses) calculated from our revised modelling of optimal portfolios, for each of the contract cases and for each of the years.

Table 3.5

LOAD-WEIGHTED PRICES (EXCLUDING ADDITIONAL CHANGES) FOR CONTRACT CASES ($ PER MWH)

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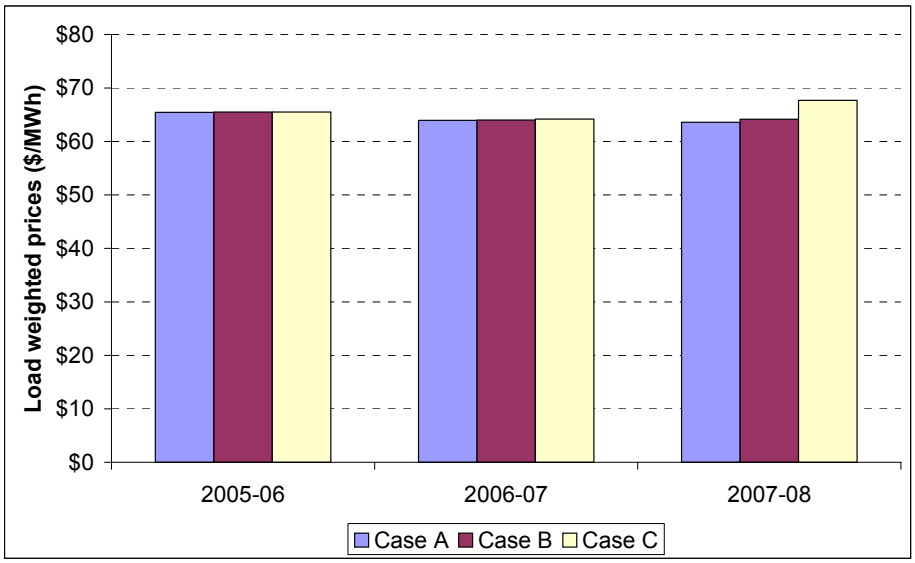
Contract Case A	$5.40	$5.10	$5.38
Contract Case B	$5.37	$4.96	$5.15
Contract Case C	$5.37	$4.61	$3.49

Source: ACG modelling of optimal portfolio

Figure 3.6

LOAD-WEIGHTED PRICES (EXCLUDING ADDITIONAL CHANGES) FOR CONTRACT CASES ($ PER MWH)



Source: ACG modelling

The load-weighted price falls over time as current higher priced swap contracts could be replaced with lower priced contracts. Case B is more expensive by approximately the amount of risk premium assumed to be added to forward prices. However differences are small in 2005-06 and 2006-07 as AGL does not need to purchase much additional contract cover. Contract Case C has contract premiums rising to new entrant level in 2007-08, and the total costs rise accordingly.

The revised prices are higher than those in our original report as a result of changes in inputs, scenarios and weights.

3.2 Total wholesale cost of electricity at the customer meter

In order to arrive at a total cost of energy at the meter it is necessary to add on pass through additional charges to the wholesale energy price forecast by our contract model. These additional charges comprise the following:

- NEMMCO fees and charges, ancillary services, bank guarantee fees and the premium attributable to the use of embedded generation;
- MRET compliance; and
- line losses.

Because our model has already calculated the costs associated with being over- or under-hedged and the costs associated with the potential for increases and decreases in the number of AGL's small customers, this list of additional charges is sufficiently extensive.

The sum of all the relevant costs and changes that make up the total wholesale cost of electrical energy at the meter for standing contract customers is shown in Table 3.6. The final row of Table 3.6 shows prices in real (December 2004) terms, assuming a forecast inflation rate of 2.5%.

Table 3.6

TOTAL WHOLESALE COST OF ELECTRICITY AT THE CUSTOMER METER — FOR CONTRACT CASE B ($ PER MWH)

	FY 2005-06	FY 2006-07	FY 2007-08
Energy hedging cost	$65.48	$64.00	$64.15
Pass through costs			
NEMMCO fees	$0.40	$0.41	$0.42
Ancillary services	$0.60	$0.62	$0.63
Bank guarantee	$0.10	$0.10	$0.10
Embedded generation	$0.51	$0.55	$0.59
MRET	$0.83	$1.10	$1.39
Subtotal pass-through	$2.44	$2.78	$3.13
Total before losses	$67.92	$66.78	$67.28
Line losses	$5.52	$5.42	$5.46
Energy costs at meter	$73.43	$72.21	$72.74
Energy cost at meter (Dec 2004 prices)	$71.64	$68.73	$67.55

Source: The Allen Consulting Group

Further analysis has been provided to the Commission on a confidential basis, so as not to prejudice AGL's commercial negotiations in respect of future contracting.