Estimation of the regulated profit margin for gas retailers in New South Wales

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1. Introduction

SFG Consulting has been engaged to advise the Independent Pricing and Regulatory Tribunal ("IPART" or "the Tribunal") on the retail margin to be factored into regulated gas tariffs from 1 July 2013 to 30 June 2016. In this report we present the results of this estimation procedure.[1]

Recall that we have three approaches to estimating the retail margin. Under the expected returns approach, we estimate the retail margin which provides compensation for an assumed level of systematic risk. We consider a representative firm of average size to the four standard retailers and jointly estimate the value of this firm and the retail margin. In contrast, under the bottom-up approach, we assume a value for the representative firm, based upon transaction prices over the last 14 years. In this approach we estimate the margin which sets the present value of expected cash flows equal to this assumed value. Our third approach is to estimate the margin earned by listed retailers in industries other than gas.

In the 2010 review the Tribunal ultimately relied upon the results of the expected returns approach and the benchmarking results from listed retailers, rather than the bottom-up results, a position we agreed with. The average estimated EBITDA margin from these two approaches was 7.8%. The reason the bottom-up approach did not form part of the conclusion was because the implied margin per customer and per unit of energy was consistent with past transactions, but the percentage margin was unreasonably high due to the low cost estimates for gas retailers. In the current analysis, we recommend using the margin estimates from the bottom up approach, with the valuation of an energy retailer based upon past transaction multiples per unit of energy.

In Table 1 we present our estimates of the retail margin along with the estimates formed in the past review. The figures are the average values over three forecast years. The average estimated EBITDA margin is 6.6%, which is substantially below the corresponding average of 9.9% from 2010.[2] In terms of dollars per customer or dollars per GJ, the average margins are close to those previously estimated. The reason the percentage margins are lower than previously estimated is because cost estimates are substantially higher.

Our report proceeds as follows. In Section 2 we briefly outline three methods used to estimate the retail margin: the expected returns approach, whereby the retail margin is set such that the distribution of returns in above- and below-average economic conditions is consistent with the estimated cost of capital; a benchmarking analysis to be conducted with reference to listed retail firms; and a bottom-up approach, whereby the retail margin is a function of an estimated asset base, including the retailer's intangible assets, and its estimated cost of capital. Our goal is to use these three different approaches to triangulate around an economically reasonable retail margin. To the extent that the results of the three approaches corroborate one another, decision-makers and industry can have more confidence in the outcomes. In Section 3 we present our results and make concluding comments in Section 4. Our conclusions are reported below and summarised in Table 1. Note that our estimation procedures generate estimates for the EBIT margin (that is, earnings before interest and tax relative to sales), to which estimated depreciation and amortisation charges are added in order to provide the Tribunal with EBITDA margin estimates (earnings before interest, tax, depreciation and amortisation relative to sales).

[1] Note that for the regulation of gas, IPART has agreed to Voluntary Transfer Pricing Arrangements ("VTPAs") with each of the standard retailers. This is a more light-handed approach to regulation than applies to electricity retailers. The form of regulation is not relevant to our analysis because we estimate the profit margin which we would expect to prevail in a competitive market. The mechanism via which IPART attempts to encourage competitive markets in gas and electricity or to achieve any other objective does not influence our margin estimates.

[2] Considering only the average of the results from the expected returns and benchmarking analysis, the current estimates are 4.7% EBIT/Sales and 5.8% EBITDA/Sakes, compared to estimates of 6.2% and 7.8% from 2010.

Table 1. Results summary

	2013		2010	
	EBIT	EBITDA	EBIT	EBITDA
% sales				
Expected returns	4.2	5.3	6.6	8.2
Benchmarking	5.2	6.3	5.8	7.4
Bottom up	7.1	8.2	12.5	13.9
Average	5.5	6.6	8.3	9.9
$/Customer				
Expected returns	44	55	50	62
Benchmarking	56	67	43	55
Bottom up	77	88	100	112
Average	59	70	64	76
$/GJ				
Expected returns	1.33	1.68	1.40	1.73
Benchmarking	1.68	2.03	1.21	1.54
Bottom up	2.33	2.68	2.80	3.13
Average	1.78	2.13	1.80	2.14

With respect to the bottom-up analysis, the estimates are based upon transaction multiples in terms of acquisition price per GJ for both the 2013 and 2010 figures. In 2010 the bottom-up estimates were ultimately not used in arriving at a final margin estimate.

- The expected returns approach implied an EBIT margin of 4.2% and an EBITDA margin of 5.3%. This corresponds to EBIT margins of $44 per customer and $1.33 per GJ, and EBITDA margins of $55 per customer and $1.68 per GJ.[3]

- The benchmarking analysis implied an EBIT margin of 5.2% and an EBITDA margin of 6.3%. This corresponds to EBIT margins of $56 per customer and $1.68 per GJ and EBITDA margins of $67 per customer and $2.03 per GJ.

- The bottom-up analysis implied an EBIT margin of 7.1% and an EBITDA margin of 8.2%. This corresponds to EBIT margins of $77 per customer and $2.33 per GJ, and EBITDA margins of $88 per customer and $2.68 per GJ.

- Applying equal weight to margins estimated from all three approaches, the estimated EBIT margin is 5.5% and the estimated EBITDA margin is 6.6%. This corresponds to EBIT margins of $59 per customer and $1.78 per GJ and EBITDA margins of $70 per customer and $2.13 per GJ.

The three estimation techniques generate different results because they rely upon theoretical and market-based evidence to different degrees. The expected returns approach places high reliance on the economic theory of the Capital Asset Pricing Model ("CAPM") and an estimated relationship between profitability of gas retailers and economic conditions; the benchmarking analysis allows us to perform large-sample analysis and relies entirely on observed profit margins, but is limited by lack of comparability (we can only observe the profit margins for retailers in industries other than energy – energy retailers are almost exclusively vertically integrated); and the bottom-up analysis relies upon market-based evidence to estimate an asset base, and theoretical analysis to estimate an appropriate return on that asset base. By performing analysis using all three techniques our intent is to rely upon both theoretical and market-based evidence to infer margins which are likely to prevail in a competitive market.

As illustrated in Table 1 our margin estimates differ from those in the 2010 review, most notably with respect to the bottom-up analysis. Under the bottom-up approach the estimated EBITDA margin is

[3] Throughout our report all dollar values are expressed in nominal terms. Our margin estimates are compiled for a representative standard retailer expected to sell 7.27 to 7.66 PJ per year over three years to a customer base of 224,000 to 228,000.

8.2%, compared to 13.9% estimated previously. The estimated EBIT margin is 7.1%, compared to 12.5% estimated previously. The primary reason the margin estimate in percentage terms has decreased is because of an increase in cost estimates. The increase in estimated costs per GJ is over 50%. An increase in costs implies that, in percentage terms, the estimated margin will decrease. Also note that, had we based our valuation upon both multiples of customers and energy units, the estimated margins would have been EBIT/Sales of 8.3% and EBITDA/Sales of 9.3%.

With respect to the expected returns analysis, the margins have declined primarily because of an increase in cost estimates and reduction in expenditure on investments and working capital. Had we retained our previous estimates, but our current cost of capital parameters, the estimated margins would have been 6.2% EBIT/Sales and 7.9% EBITDA/Sales. With respect to the benchmarking analysis there is a decline in the margin estimates, due to the availability of data for more firms and an extension of the time period.

The firms used in the benchmarking analysis can be categorised into six sub-industries, whose estimated EBIT margins were: Food retailers and wholesalers 3.4%, Drug retailers 4.8%, Specialty retailers 4.8%, Broadline retailers 5.9%, Apparel retailers 6.7% and Home improvement retailers 7.3%. This means that the 4.2% EBIT margin from the expected returns approach is between the sub-industry margin of 3.4% for Food retailers and wholesalers and the 4.8% margin for Drug Retailers and Specialty retailers. The 7.1% margin from the bottom-up approach is just below the 7.3% margin for Home improvement retailers.

The reason the expected returns analysis generates lower margin estimates than the other approaches is because it relies upon an assumption that 70% of a retailers' costs are related to volume, which in turn implies that the firm faces relatively low risk associated with unexpected changes in volume. A firm with this level of volume risk exposure faces relatively low systematic risk due to volume changes, and in theory would be prepared to sell at a low margin in order to capture market share. This is the same assumption we adopted in the 2010 review and is consistent with cost information submitted by the standard retailers in both the 2010 and 2013 reviews. It may be the case that the true proportion of fixed costs faced by a retailer is higher than this level. A second reason for the relatively lower margins under the expected returns approach is that we hold our cost of capital assumptions constant under varying market conditions. It is likely that during periods of good economic conditions, when volumes increase, there is a reduction in discount rates, and there is a corresponding increase in discount rates during weak economic conditions. This means that the systematic risk exposure associated with volume changes could be understated.

While these are two possible explanations for why the expected returns analysis generates the lowest margins under our three approaches this does not necessarily mean that we should place less weight on this approach. To place less weight on the expected returns approach would necessarily mean placing more weight on the results for retailers in other industries, or placing more weight on estimates derived from just 12 transactions over 14 years. In the case of the last two transactions observed in 2010, the sale of the New South Wales electricity retailers, the prices paid in those transactions would determine the margins subsequently earned on those same investments. In short we continue to place equal weight on the results from three estimation techniques, which results in an estimated EBIT margin of 5.5% and an estimated EBITDA margin of 6.6%.

Our EBITDA margin estimate of 6.6% can be compared to the figure of 6.5% adopted in advice to the Queensland regulator (QCA, 2008) and an equivalent margin of 5.5% adopted by the South Australian regulator (ESCOSA, 2011).[4] It is below the range 7.3% to 8.3% reported in our 2010 review and which

[4] ESCOSA (2011) adopted a margin which was 13% of controllable costs. If controllable costs are 45% of total costs excluding depreciation the equivalent EBITDA margin is 5.5%.

formed the basis for submissions by AGL, Origin, ActewAGL and EnergyAustralia. While the margin estimate is lower in percentage terms the EBITDA margin is around one quarter higher in terms of margin per energy unit or per customer. This underscores the need to consider the percentage margin in light of all available information. Cost estimates are substantially higher than when the margin was previously estimated, the observed average percentage margin for listed retailers has fallen and we have incorporated the bottom-up analysis into our final estimates. In aggregate this has led to lower margins in percentage terms and higher per unit margins.

2. Methodology

The retail margin represents the return that a gas retailer requires in order to attract the capital needed to provide a retailing service. The term margin is used as an estimate of profit divided by sales. In our report we generally refer to the ratio of earnings before interest and tax (EBIT) to sales as the retail margin, but report margins on a number of different bases. Three approaches are used to estimate the retail margin for a gas retailer: the expected returns approach, the benchmarking approach and the bottom-up approach.

- The expected returns approach provides estimates of expected cash flows that a gas retailer will earn, and determines a retail margin that ensures these expected cash flows compensate investors for the systematic risk of those cash flows. Under this approach, the value of the business and the required cash flows are estimated simultaneously in a way that ensures consistency with the estimate of systematic risk.

- A benchmarking analysis is performed with reference to the reported margins of the broader class of listed retailers.

- The bottom-up approach relies upon an assumed investment base and cost estimates, and provides estimates of earnings and revenue which allow the retailer to earn an expected return equal to its estimated cost of capital. This is analogous to the price-setting approach used in the regulation of network businesses, but with an assumption about the value of intangible assets for the retailer.

In theory, these three approaches to estimating the retail margin will generate the same result. The objective is to estimate the profitability, relative to sales, of a gas retailer operating in a competitive environment. Consistent with this objective our detailed modelling relies upon assumptions for the regulated and non-regulated retail segments of the standard retailers, not just the regulated customer segment. This also avoids the arbitrary allocation of costs amongst regulated and contestable customer segments and the circularity problem of customers switching from contestable to regulated tariffs and vice versa in response to the regulated margin. Under the assumptions of the CAPM, and if financial statements perfectly measured the performance of firms each year and the value of the capital base, the margins observed for listed gas retailers would generate a return on assets equal to their cost of capital. However, given that equity returns are explained by variables apart from those in the CAPM, and that accounting information is imperfect, there will be a divergence of estimates from these three approaches. Nevertheless, adopting these three estimation techniques minimises the risk that the estimated margin is inconsistent with observed market pricing. The paper *Methodology for estimating retail electricity margins* provides more detail on these estimation techniques, in particular the expected returns approach.

3. Results

3.1 Overview

In this section we present the results from each of our three estimation techniques. Our computations are performed in order to estimate the EBIT margin as a percentage of sales, which we then convert to an EBITDA margin assuming depreciation estimates derived from projections of the standard retailers. We also report margins relative to GJ of expected volume and customers. Our analysis is based upon a representative standard retailer, which is estimated to sell an annual average of 7.5 PJ of gas to 226,000 customers over the three financial years from 2013/14 – 2015/16. These estimates for volume and customers are average projections provided by the four standard retailers – AGL, ActewAGL, Origin Energy and Country Energy.

The expected returns approach implied an estimated EBIT margin of 4.2% within a reasonable range of 3.6% to 4.9%. This translates to the following average ranges over forecast years one to three: EBITDA margin of 4.7% to 6.0%, EBIT margins of $1.13 to $1.56 per GJ and $37 to $52 per customer, and EBITDA margins of $1.48 to $1.92 per GJ and $49 to $63 per customer. The estimated EBIT margin is that which, if held constant, would generate an expected return to equity holders of 10.84% per year and systematic risk of those returns equivalent to an equity beta of one. The range of 3.6% to 4.9% is the middle third of 81 scenarios derived from low, mid-point and high values for four value drivers: the cost of equity capital (9.73% to 12.25% plus imputation credit value of 0.15 to 0.35)[5], the standard deviation of percentage changes in volume (1.5% to 2.5%), the proportion of fixed costs (25% to 35%) and the volatility of market returns (14% to 24%).

The benchmarking analysis implied an estimated EBIT margin of 5.2% within a reasonable range of 5.1% to 5.4%. This translates to the following average ranges over forecast years one to three: EBITDA margin of 6.2% to 6.4%, EBIT margins of $1.64 to $1.73 per GJ and $54 to $57 per customer, and EBITDA margins of $1.99 to $2.07 per GJ and $66 to $68 per customer. The EBIT margin estimate is the average EBIT margin for a sample of 692 firms and 7,990 annual observations of listed retailers in Australia, the United States, the United Kingdom, Canada and New Zealand over a 33 year period ending in 2012. The range of 5.1% to 5.4% is a 90% confidence interval surrounding the mean estimate.

The bottom-up approach implied an estimated EBIT margin of 7.1% within a reasonable range of 6.8% to 8.3%. This translates to the following average ranges over forecast years one to three: EBITDA margin of 7.9% to 9.4%, EBIT margins of $2.24 to $2.77 per GJ and $74 to $91 per customer, and EBITDA margins of $2.59 to $3.12 per GJ and $85 to $103 per customer. The estimated EBIT margin is that which, if held constant, would generate a value for the representative retailer equivalent to an estimated value derived from historical acquisition prices. In estimating an asset base of $185 million ($24.81 per GJ) we applied a two-thirds weight to valuation multiples derived from seven transactions which occurred during 2006 to 2010 and a one-thirds weight to valuation multiples derived from five transactions which occurred during 1999 to 2002. The 6.8% lower bound of the reasonable range is derived from an assumed asset base of $177 million which is based upon the average transaction multiple of $23.80 per GJ observed for all 12 transactions. The 8.3% upper bound of the reasonable range is derived from an assumed asset base of $223 million, which is based upon the average transaction multiple of $29.88 per GJ observed for the seven most recent transactions.[6]

[5] IPART submitted the base case cost of capital estimates and we assume parameters to determine a range for a number of parameters. The magnitude of these ranges was consistent with ranges reported by IPART in the past.

[6] It is worth re-iterating that in 2010 there was ultimately no weight placed on the bottom-up approach in reaching a final decision on margin. But in 2013 we have placed equal weight on this approach and estimated the value of the business on the basis of past transaction multiples of acquisition price of energy unit. In the analysis for electricity, the asset base was estimated by placing equal weight on multiples of transaction price per customer and transaction price per energy unit.

Applying equal weight to margins estimated from all three approaches, the estimated EBIT margin is 5.5% within a reasonable range of 5.2% to 6.2%. The reasonable range is the average of the three upper and lower bounds from each estimation technique. This translates to the following average ranges over forecast years one to three: EBITDA margin of 6.3% to 7.3%, EBIT margins of $1.67 to $2.02 per GJ and $55 to $67 per customer, and EBITDA margins of $2.02 to $2.37 per GJ and $67 to $78 per customer.

3.2 Comparison to estimates from the 2010 review and other jurisdictions

3.2.1 Comparison overview

In the 2010 review our conclusion was that an appropriate EBIT margin was 6.2% within a reasonable range of 5.7% to 6.7%. This corresponded to an EBITDA margin of 7.8% within a reasonable range of 7.3% to 8.3%. These estimates resulted from an average of the estimates from the expected returns and benchmarking approaches. The bottom-up analysis was not considered because implied EBIT margins were double the average form the other approaches, resulting from low cost estimates and high acquisition prices per energy unit. In the current analysis we have included the margins from the bottom-up approach in reaching a final conclusion, with valuation multiples determined per unit of energy. In the electricity analysis we use transaction multiples per customer and per energy unit, in order to minimise estimation error. But it is less reasonable to think that a gas customer is as valuable as an electricity customer, given that the lower revenue per customer in gas.

This means that, with respect to our final percentage margin estimates, there has been a decrease in our EBIT margin estimate from 6.2% to 5.5%, and a decrease in our EBITDA margin estimate from 7.8% to 6.6%. But the margins per energy unit and per customer have increased. The EBIT margin estimates have increased from $1.30 per GJ to $1.78 per GJ, and from $47 per customer to $59 per customer. The EBITDA margin estimates have increased from $1.64 per GJ to $2.13 per GJ and from $59 per customer to $70 per customer.

The reduction in percentage margin and increase in margin per energy unit and per customer underscores the need to look at margin estimates in conjunction with all available information. At the higher costs incorporated into the current analysis the lower margin estimates are appropriate. In addition, there is no need for the margin estimate to remain static if there is new information which can be used to make a more informed estimate.

With respect to regulatory decisions in other jurisdictions, summarised below, we have EBITDA margin estimates of 6.5% for Queensland and 5.5% in South Australia, so our margin estimates in percentage terms lie above these allowances.

3.2.2 Queensland

With respect to gas, the QCA (2008) performed a review of small customer gas pricing and competition just over four years ago. MMA (2008) provided advice to the QCA based upon an estimated EBITDA margin of 6.5%.

In its most recent electricity draft decision for 2013/14, the QCA (2013) maintained the 5.4% EBITDA margin it adopted in its 2012/13 decision. It also stated that it would reconsider the margin prior to making its final decision, with reference to the analysis conducted by IPART. The QCA benchmarks its estimate of the margin to decisions in other jurisdictions because it considers there to be relatively small incremental gains from conducting its own application of the bottom-up or expected returns approach. It did not accept the arguments from electricity retailers that the margin should be higher in Queensland than New South Wales because Queensland retailers face higher risk. The basis for this

decision was that the retailers could not establish just what the margin should be on the basis of any risk difference.

3.2.3 South Australia

In South Australia, the regulator considers an appropriate margin to be 13% of controllable costs (ESCOSA, 2011). In that decision the implied margin per residential customer was $32.67 and the implied margin per small and medium enterprise was $126.49 per customer. The implied margin per customer from our analysis was $67 per customer. We have not performed a line by line comparison of costs considered to be controllable versus non-controllable but note that the South Australian regulator estimates that about 45% of costs are controllable costs. This implies that the South Australian margin estimate is consistent with an EBITDA margin of 5.5%.[7] Under this assumption our margin estimate is higher than allowed in South Australia.

3.3 Submissions

AGL (2013a) submitted that an appropriate EBITDA margin was within the range of 7.3% to 8.3% which was the range reported by IPART in the last review.[8] The basis for this submission was that churn rates were lowest in the New South Wales gas markets were the lowest of all the electricity and gas markets in the National Energy Market.[9]

ActewAGL (2013a, 2013b) submitted than an appropriate EBIT margin was at least 6.5%, which it noted was consistent with the EBITDA margin range of 7.3% to 8.3% we previously estimated. The reason the figure of 6.5% was put forward as a lower bound was that it considered it faced additional risks associated with wholesale gas costs. EnergyAustralia (2013) submitted that the margin proposals of AGL and ActewAGL appear reasonable.

Origin (2013) also submitted than the previously estimated EBITDA margin range of 7.3% to 8.3% was reasonable. It also supported the concept that the margin should provide compensation for bearing systematic risk on the basis that non-systematic risks are managed through other elements of the framework.

The Energy Supply Association of Australia (2013) submitted that the consequences of setting the retail price too high or too low are asymmetric. It argued that a price set too high will lead to competition, and that increased competition will eventually erode margins to efficient levels. This view was supported by EnergyAustralia (2013).

It was noted in submissions that an EBITDA margin within the range of 7.3% to 8.3% was above the current margin of 5.7% for ActewAGL. The Energy and Water Ombudsman (2013) stated that he would like to see further justification for this proposed increase in margin and the Minister for Resources and Energy (2013) noted that the retail margin should not be excessive and consumer impacts should be considered, in particular the impact of large, sudden price changes.

In the present report we have recommended an EBITDA margin of 6.3% to 7.3% and an EBIT margin of 5.2% to 6.2%. In percentage terms this is lower than previously estimated but represents an increase of approximately 36% in terms of dollars per GJ and 25% in terms of dollars per customer.

[7] If controllable cots were $45 out of $100, the margin would be $5.85 computed as 0.13 × $45. Revenue would be $105.85 and the margin would be $5.85 ÷ $105.85 = 5.5%.

[8] In relation to the 2010 review, AGL (2009) submitted that an EBITDA margin within the range of 6.5% to 8.0% was appropriate.

[9] In a subsequent submission AGL (2013b) suggested that the estimate of wholesale energy costs was understated, which would imply that the resulting margin falls below the estimated range of 6.3% to 7.3%. This is a matter for the estimation of energy costs rather than our margin estimates.

This is due to higher cost estimates than assumed in 2010. The AGL proposed margin is 1.0% higher than our margin estimates, but it is important to consider the percentage margins in the context of all the inputs. We have new information regarding costs, transaction values and observed profit margins, and now include the bottom-up analysis in our reasonable range estimate. The aggregate impact of this information led to a reduction in the percentage margin range and an increase in the dollar margins compared to our prior estimates.

3.4 Comparison between electricity and gas results

There are differences between our margin estimates between electricity and gas, which we summarise in Table 2. On a percentage basis the margin estimates are higher for gas, at 6.6% versus 5.7% EBITDA/Sales and 5.5% versus 4.4% EBIT/Sales.

With respect to the expected returns approach, there is a difference of 1.1% in the EBIT margin estimates and 1.0% in the EBITDA margin estimates. This difference is primarily attributed to the proportion of fixed costs in the representative firm's cost structure. For electricity we assumed that 20% of costs were unrelated to volume, compared to 30% for gas. What are capture with this assumption is how much variation in earnings we expect to observe with fluctuations in volume. Gas businesses have fewer economies of scale than electricity businesses, so their fixed costs are spread across fewer units of energy. This means that we would expect gas businesses to have greater percentage variation in earnings for the same percentage variation in volume. If we were to use the same 20% fixed cost assumption for gas, the EBIT margins would be 3.0% of sales, $0.95 per GJ and $31 per customer, and the EBITDA margin estimates would be 4.1% of sales, $1.30 per GJ and $43 per customer.

With respect to the benchmarking analysis, the EBIT margins are identical at 5.2% by assumption. There is a marginal difference in depreciation relative to sales across the two industries leading to EBITDA margins of 6.4% for electricity and 6.3% for gas. The differences in margins per energy unit and margins per customer are due to the different costs in the two industries. For electricity the estimated costs excluding depreciation are, on average over three years in nominal terms, $53.61 per GJ or $2114 per customer. In comparison the estimated costs for gas are $30.50 per GJ or $1007 per customer.

With respect to the bottom-up analysis the difference in margin is due to a combination of the investment base and the costs of the two industries. All else being equal a higher investment base will result in a higher margin. So if there are two business with identical costs and discount rates, the business with the higher value will require a higher margin in order for the present value of expected cash flows to equal the asset base. By the same rationale, all else being equal, higher costs will result in a lower percentage margin. If there were two businesses with the same investment base, but one has lower costs, the expected cash flows as a percentage of revenue will be higher.

We valued the representative electricity business at $676 million, which equates to $27 per GJ. This resulted in an EBIT margin of 4.9% in order for the present value of expected cash flows to equal this investment base. Put another way, this margin allows the equityholders to earn a return of 10.84% from the expected future cash flows. We valued the representative gas business at $185 million, which equates to $25 per GJ. All else being equal the lower investment base would result in a lower margin. To quantify this, had we valued the gas business at $27 per GJ instead of $25 per GJ, consistent with the electricity valuation the estimated EBIT margin for gas would have been 7.% (instead of 7.1%) and the estimated EBITDA margin would have been 8.7% (instead of 8.2%). Furthermore, by the third forecast year the EBIT margin estimate for gas would have been $2.71 per GJ compared to $2.83 for electricity. So if the same valuation per energy unit were applied to gas and electricity the margins per energy unit would be approximately the same from year three onwards.

Table 2. Comparison of margin estimates between electricity and gas

	Electricity				Gas			
	Exp. ret.	Bench.	Bottom-up	Average	Exp. ret.	Bench.	Bottom-up	Average
EBITDA margin								
% sales	4.3	6.4	6.2	5.7	5.3	6.3	8.2	6.6
$/GJ	2.45	3.71	3.53	3.23	1.68	2.03	2.68	2.13
$/Customer	95	144	137	125	55	67	88	70
EBIT margin								
% sales	3.1	5.2	4.9	4.4	4.2	5.2	7.1	5.5
$/GJ	1.75	3.01	2.83	2.53	1.33	1.68	2.33	1.78
$/Customer	68	117	110	98	44	56	77	59

However, all is not equal because of the cost differences between electricity and gas. Per unit of energy, the value of the gas business is estimated to be 9% lower. But the estimated costs of the gas business are only 60% of those of the electricity business. On average over three years, total costs including depreciation for the electricity business are estimated $54.52 per GJ, compared to $30.50 for gas. In the third year the respective costs are $53.71 per GJ and $32.65 per GJ. It is these cost differences which result in the higher margin estimate for gas in percentage terms.

3.5 Expected returns analysis

3.5.1 Rationale

The rationale for the expected returns approach is that it allows us to simultaneously estimate the value of a gas retail business and the margin that is consistent with the risks that underpin this valuation. If we rely exclusively on benchmarking to estimate the margin we necessarily assume away any differences in the margins of retailers in other industries compared to gas retailers. If we rely exclusively on the bottom-up approach we necessarily assume that the prices paid in a small number of past transactions should form the investment base upon which retailers should earn a return.

3.5.2 Assumptions

Outline

In the expected returns approach, the estimated EBIT margin for a gas retailer is a function of the following assumptions:

- cost of capital assumptions – the risk-free rate of interest, debt margin, market risk premium, systematic risk of returns as measured by the equity beta, financial leverage, corporate tax rate, and the value of imputation credits;
- economic assumptions – the standard deviation of percentage change in volume in response to economic conditions and the standard deviation of market returns; and
- operating leverage as measured by the proportion of costs which increase at a constant rate with changes in volume.

Cost of capital

The Tribunal has provided inputs into the weighted average cost of capital for a gas retailer and we have incorporated ranges above and below these point estimates in order to construct a reasonable range under the expected returns approach.[10] Our analysis relies upon the individual parameter inputs into the cost of capital, rather than the overall weighted average cost of capital. These are presented in Table 3.[11]

Our expected returns modelling explicitly models the cash flows available to equity holders, including imputation benefits, over a ten-year forecast horizon followed by a perpetual growth assumption. We measure the distribution of returns to equity holders at the end of the ten-year forecast period and its covariance with market returns over this period, assuming any distributions are reinvested in the businesses (that is, analogous to a dividend reinvestment plan where the shares are repurchased on-market). The objective is that the covariance of equity returns with market returns, scaled by the variance of market returns, should equal one, consistent with the assumed equity beta. Hence, the reasonable range for the total returns to equity holders is 9.73% to 12.05% (which incorporates a range for the equity beta of 0.90 to 1.10), and that the estimated value of imputation credits (that is, γ or gamma) lies within the range of 0.15 to 0.35.

Volatility of market returns

Under the expected returns approach we estimate how cash flows and returns will change in periods of above- and below-normal market conditions. We take a binary approach such that, in any given year, market returns are one standard deviation above or below expected returns of 10.84%. Our estimate for the annual standard deviation of market returns is 19% per year. In the 2010 review we used this estimate of the volatility of market returns, which was an estimate of the standard deviation of annual returns on the Australian share market for 109 years from 1900 to 2008.[12] Incorporating additional returns information over the last four years has not had a material impact on the volatility of historical stock returns estimated over a long time series.

Association between expected volume changes and economic conditions

We also need to make an assumption about the percentage change in volume we would expect to observe in these periods of above and below-normal conditions. We assume that volumes will be 2.0% above or below expectations, contingent upon whether market returns are high or low. This assumption has been a point of contention each time we have performed this analysis, prompted by the basis upon which we arrived at the 2.0% estimate.

[10] The ranges for parameter inputs should not be interpreted as the Tribunal's range estimates, which the Tribunal considers in a broader context. We have simply adopted ranges with a magnitude similar to what the Tribunal has used in the past.

[11] The cost of equity capital is estimated according to the Capital Asset Pricing Model (CAPM) which states that risk premium above a risk-free return required by investors is determined by the systematic risk of the returns, also termed market risk, economic risk or non-diversifiable risk.

[12] For a description of the data used to estimate these historical returns, see Dunn, Francis and Hall (2009), Brailsford, Handley and Maheswaran (2008) and Brailsford, Handley and Maheswaran (2012).

Table 3. Cost of capital assumptions

Parameter	Low	Mid-point	High
Risk-free rate (%)	4.20	4.20	4.20
Market risk premium (%)	6.14	6.64	7.14
Debt margin (%)	1.72	2.22	2.72
Debt funding (%)	25.00	20.00	15.00
Equity beta	0.90	1.00	1.10
After-tax cost of equity = $r_f + \beta \times MRP$ (%)	9.73	10.84	12.05
Cost of debt = r_f + debt margin (%)	5.92	6.42	6.92
Vanilla WACC = $D/V \times r_d + E/V \times r_e$	8.78	9.96	11.28
Value of imputation credits (gamma)	0.35	0.25	0.15
Tax rate (%)	30.00	30.00	30.00
Inflation (%)	2.26	2.76	3.26

What we intend to capture is an estimate of how expected electricity volumes might change under different economic conditions. The way we considered this issue is to consider whether energy consumption was a normal good. Would we expect demand for energy to rise at the same time as demand for other goods and services was rising, and fall when demand for other goods and services was falling? Our default position was that energy consumption would be expected to increase when consumption of other goods and services increased, on the basis that consumers do not seem to be satisfied once their consumption reaches a certain threshold. This is the reason why consumers in wealthy nations, like Australia, are large consumers of energy. They demand more energy to run more devices, control climate in larger homes, and consume more energy for entertainment outside the home.

We then considered whether there was any sufficiently long time series of data which would allow us to (1) test this conjecture that changes in energy consumption was positively correlated with changes in economic conditions; and (2) arrive at an estimate of what percentage changes we would expect in different circumstances. This lead to our 2009 report entitled *The association between changes in electricity demand and GDP growth*. On the basis of that report, which included a literature review and empirical analysis, we concluded that a reasonable assumption was that percentage changes in energy consumption would be expected to exhibit a one-for-one relationship with percentage growth in GDP, and that 2.0% was a reasonable estimate of fluctuations in consumption, given that this is approximately the historical standard deviation of GDP growth.

The reason this assumption has been contentious is that the "GDP/electricity volume" relationship has sometimes been considered as a more fundamental relationship rather than merely a proxy for the changes in energy demand we might expect in economic conditions which are above or below average. Historically we have observed periods of high growth and periods of low growth in the economy, and while there might be sectors of the economy with differing exposure to changes in economic conditions, there do not appear to be sectors that are either immune from recessions or which only prosper during good times. The assumption we adopt is merely that, during a period when economic indicators are one standard deviation above average we would expect change in energy consumption of 2% above trend, and during a period when economic indicators are one standard deviation below average we would expect change in energy consumption which is 2% below trend. In estimating a range of results under the expected returns approach we incorporate upper and lower bounds of 1.5% and 2.5%.

This leads to a further question as to whether the same relationship holds for consumption of electricity and consumption of gas. We maintain the same relationship for both energy sources on the basis that it is difficult to quantify whether this relationship is different, and if so, what specific assumption would be appropriate. On the one hand it is arguable that electricity consumption will respond more directly to changes in wealth because households use more appliances, more households

decide to control their climate and they control climate in larger homes. On the other hand the reason we have both energy sources is because they are substitutes (hot water systems, heating and cooking). The installation and usage of appliances using gas instead of electricity will depend upon he relative costs of each energy source, which points to electricity and gas consumption being a normal good. As wealth increases, the consumer has more ability to switch to the more economically efficient energy source at the time, so we would expect to see more substitution. Over the 10 years until 30 June 2011, residential consumption of electricity grew at an annual rate of 2.3%, compared to 2.0% for gas. Over the previous 10 years electricity consumption grew at an annual rate of 2.3%, compared to 3.1% for gas. So over 20 years, we have observed approximately the same overall growth in residential consumption of both fuels, at 2.3% per year for electricity and 2.6% per year for gas. There seems no compelling reason to treat electricity and gas differently in terms of how volumes might fluctuate in states of strong or weak economic conditions.

Operating leverage, operating costs and long-term growth

As the proportion of fixed costs in a retailer's cost structure increases, so does the volatility of its returns. For the purposes of estimating the retail margin we require an estimate of operating leverage, computed as the proportion of expenses which are fixed versus variable. In estimating this operating leverage, we consider how expenses would increase or decrease in response to electricity demand which is above or below expectations. Therefore, we use the term *volume-related costs*.

We incorporate an assumption that volume-related costs comprise 70% of total costs and incorporate a range of 65% to 75% in determining a reasonable range. This estimation is derived from estimates for energy purchase costs, network fees, operating costs and customer acquisition cost – which have been provided by IPART – and depreciation and amortisation estimates provided by the standard retailers. The table below presents the derivation of volume-related costs.

For our representative standard retailer, estimated costs in real 2012/13 terms are $25.75 per GJ in 2013/14, $30.69 per GJ in 2014/15 and $30.09 per GJ in 2015/16 as presented in the upper left hand section of the table. In the middle section of the table we present the estimated total costs in nominal terms for the representative firm, and these range from $192 million in 2013/14 to $250 million in 2014/15. In the lower section of the table we present estimates of the costs which are estimated to be unrelated to volume. In aggregate, the costs unrelated to volume are estimated at around 21% to 22% of total costs, implying the remaining 78% to 79% of costs fluctuate with volume. But for the purpose of estimation we continue to assume that just 70% of costs fluctuate with volume. There are two reasons for this slightly lower assumption. First, it is possible that network charges could be restructured towards fixed charges over the regulatory period. Second, there may be some energy-related hedging costs that, although reported as variable could be fixed.[13]

[13] There is an assumption that energy costs are 17% fixed and 83% volume-related. In a subsequent submission AGL (2013b) commented that this understates the proportion of fixed costs as it does not acknowledge the existence of take-or-pay obligations. AGL did not provide an estimate of the appropriate amount of fixed energy costs. We note that our assumption that costs are 30% fixed exceeds the estimate of 21% to 22% from a straight decomposition of fixed versus variable cost components to take into account the potential for fixed costs to be understated. All else being equal, to reach the figure of 30% that we have assumed for fixed costs, would require energy costs to be 38% fixed and 62% volume-related.

Table 4. Derivation of the proportion of volume-related costs

	$/GJ			$/customer			$m			%		
	2013/14	2014/15	2015/16	2013/14	2014/15	2015/16	2013/14	2014/15	2015/16	2013/14	2014/15	2015/16
Real terms cost allowance												
Operating costs incl. cust. acqu.	3.86	3.85	3.82	125	127	128	28	29	29	15	13	13
Wholesale gas costs	8.05	13.20	12.90	261	435	433	59	98	99	31	43	43
Carbon	1.61	1.65	1.65	52	54	55	12	12	13	6	5	5
Network charges	11.90	11.66	11.40	385	384	383	87	87	87	46	38	38
Depreciation and amortisation	0.34	0.33	0.32	11	11	11	2	2	2	1	1	1
Total costs	25.75	30.69	30.09	834	1011	1009	187	228	231	100	100	100
Nominal terms cost allowance												
Operating costs incl. cust. acqu.	3.97	4.06	4.15	129	134	139	29	30	32	15	13	13
Wholesale gas costs	8.27	13.94	14.00	268	459	470	60	104	107	31	43	43
Carbon	1.65	1.74	1.79	54	57	60	12	13	14	6	5	5
Network charges	12.23	12.31	12.37	396	406	415	89	92	95	46	38	38
Depreciation and amortisation	0.35	0.35	0.35	11	12	12	3	3	3	1	1	1
Total costs	26.46	32.40	32.65	857	1067	1095	192	241	250	100	100	100
Capital expenditure (estimate)	0.41	0.41	0.41	19	19	19						
Capital expenditure (assumption)	0.51	0.50	0.49	16	16	16	4	4	4			
Costs unrelated to volume												
Operating costs incl. cust. acqu.	2.50	2.56	2.61	81	84	88	18	19	20	9	8	8
Wholesale gas costs	1.41	2.37	2.38	46	78	80	10	18	18	5	7	7
Carbon	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0
Network charges	1.65	1.66	1.67	54	55	56	12	12	13	6	5	5
Depreciation and amortisation	0.35	0.35	0.35	11	12	12	3	3	3	1	1	1
Total costs	5.91	6.94	7.01	191	229	235	43	52	54	22	21	21

For example, consider the following scenario with respect to network charges. For the representative firm network charges are estimated at around $12 per GJ[14] of which 81% are considered to be volume-related. Suppose volumes are below expectations in future. As network charges are generally set such that the present value of charges equate to the present value of constructing and maintaining network assets, and this replacement cost estimate will be largely independent of volume, the aggregate network charges over an extended period may well be more akin to fixed costs than assumed in the modelling.

Energy costs are also assumed by be largely variable costs.[15] But part of the risk exposure of energy retailers arises because of an inability to perfectly hedge energy purchase costs. If volumes were perfectly predictable, retailers would have greater ability to hedge their energy purchase costs. Volumes are not perfectly predictable so there is always the chance that the retailer has entered into hedge contracts for more or less volume than is required, leading to volatility in profits. The economic outcome is equivalent, in a conceptual sense, to there being a fixed cost component of energy purchase costs. If part of energy purchase costs were a fixed charge, and there was a constant variable charge per unit of energy, the risk outcome is the same as hedging a particular volume and incurring the risk that volumes are more or less than anticipated.

Subsequent to the costs modelled over the first three years of our analysis, we assume an expected annual long-term growth rate for the representative firm of 2.76%, equal to the assumed inflation rate. In our analysis with respect to the 2010 review we assumed a long-term growth rate of 2.48%, based upon estimates of capital expenditure and depreciations, relative to book value of asserts. In the current review we have less information available to us about capital expenditures so have assumed growth equal to the inflation rate. In any event, the estimated EBIT margin from the expected returns approach is largely insensitive to the long term growth rate assumption.

[14] This is the average nominal network charge for the representative firm over three forecast years. The individual year estimates are $12.22 per GJ in 2013/14, $12.31 in 2014/15 and $12.37 in 2015/16. These estimates are presented in Table 4.

[15] In the table, gas commodity and transmission costs are grouped together. In aggregate these costs are assumed to be 17% fixed and 83% volume-related.

Summary

In sum, we make the following assumptions in our expected returns modelling, where the mid-point of the range listed below forms our base case assumption:

- the required return to equity holders lies within a range of 9.73 to 12.05% (which includes a range for the equity beta of 0.9 to 1.1) and imputation credits have an estimated value of 0.15 to 0.35 as a proportion of company tax paid;
- the standard deviation of market returns lies within a range of 14 to 24% per year;
- the standard deviation of percentage changes in volume in association with market returns being one standard deviation above- or below-expectations is 1.5 to 2.5%; and
- operating costs are estimated at $26.46, $32.40 and $32.65 per GJ over the first three forecast years, the proportion of volume-related costs is estimated at 65 – 75% and the long-term growth rate is 2.76% per year.

3.5.3 Results

A base case estimate for the required margin is computed using the mid-points of the assumptions discussed above. Similarly, a range for the required margin could be estimated with reference to the extreme (maximum and minimum) assumptions. However, this approach would result in a wide and relatively meaningless margin range. That is, the probability that all assumptions are at the extreme end of the reasonable range is small. For this reason, our margin analysis considered 81 potential scenarios. Each assumption outlined at the end of the previous section was assumed to take one of three values: high-point, mid-point and low-point.[16] This resulted in a potential distribution for the required margin that incorporates uncertainty in the key assumptions. Our approach is to assume a reasonable range that incorporates the middle third of the 81 potential outcomes. In other words, the low and high results reported in Table 5 reflect the 33rd and 67th percentiles, of projections for each year. The table also reports a comparison with estimates reported in our 2010 report for which we present average estimates over the three forecast years. We subsequently present a detailed summary of the expected income statement and valuation metrics for the representative firm.

We estimated a reasonable range for the EBIT margin of 3.6% to 4.9%, which translates to EBITDA margin ranges of 4.9% to 6.1%, 4.6% to 5.9% and 4.6% to 5.9% for forecast years one, two and three, respectively. In our work in relation to the 2010 review, using the expected returns approach, we estimated an EBIT margin within the range of 5.9% to 7.5% and an EBITDA margin range of 7.5% to 9.0%. Hence, in percentage terms, our estimated margins from the expected returns approach are around one-third below those estimated three years previously. In terms of margins per dollar of GJ the EBIT margin estimates are around 5% lower than previously estimated and the EBITDA margins are around 3% lower than previously estimated. On average, the EBIT margin range is $1.13 to $1.56 per GJ and $37 to $52 per customer, and the EBITDA margin range is $1.48 to $1.92 per GJ and $49 to $63 per customer.

[16] With three difference states and four variables, the number of scenarios is $3^4 = 81$.

Table 5. Margin summary and valuation metrics according to the expected returns analysis

	Year 1 ranges			Year 2 ranges			Year 3 ranges			2010 report (avg)		
	Low	Base	High	Low	Base	High	Low	Base	High	Low	Base	High
EBITDA margin												
% sales	4.9	5.4	6.1	4.6	5.2	5.9	4.6	5.2	5.9	7.5	8.2	9.0
$/GJ	1.33	1.50	1.70	1.55	1.77	2.01	1.56	1.78	2.03	1.56	1.73	1.92
$/Customer	43	49	55	51	58	66	52	60	68	56	62	69
EBIT margin												
% sales	3.6	4.2	4.9	3.6	4.2	4.9	3.6	4.2	4.9	5.9	6.6	7.5
$GJ	0.99	1.16	1.35	1.20	1.42	1.66	1.21	1.43	1.68	1.23	1.40	1.59
$/Customer	32	37	44	40	47	55	41	48	56	44	50	57
Value ($m)	82	100	123	85	104	128	88	107	132	62	75	89
Book-to-mkt assets	0.86	1.06	1.29	0.92	1.03	0.92	0.92	1.01	0.92	1.34	1.60	1.94
Value multiples:												
$/GJ	11	14	17	11	13	17	11	13	16	8	10	12
$/Customer	363	443	548	361	441	544	357	436	539	286	350	418
$/Revenue	0.27	0.50	0.27	0.27	0.40	0.27	0.27	0.38	0.27	0.38	0.46	0.55
$/EBITDA	8.2	9.1	9.8	6.8	7.6	8.1	6.5	7.3	7.9	5.1	5.6	6.2
$/EBIT	10.7	11.8	12.6	8.5	9.4	10.1	8.2	9.1	9.7	6.5	7.0	7.4
Equity multiple:												
$/NPAT	11.5	16.0	11.5	11.0	12.4	11.0	11.4	11.9	11.4	7.8	8.5	9.3

We also observe implied valuation multiples of $11 to $16 per GJ. In Section 3.7 we present our bottom-up analysis which relies upon observed transaction multiples for Australian electricity and gas retailers. The average inflation-adjusted volume multiple is $25 per GJ. Hence, the valuation multiples implied by the expected returns analysis are below the average multiples observed in acquisitions. The difference between valuation multiples and margins implied by the expected returns approach and the bottom-up analysis could occur for a number of reasons. For example the difference could occur because:

- the volatility of market returns is lower than we have assumed (that is, we under-estimate the required margin and therefore understate value because market risks are overstated) – all else being equal a 5% change in the volatility assumption changes the estimated margin by approximately 1.4% in the opposite direction;[17]

- the standard deviation of changes in expected volume in association with market movements is greater than we have assumed (that is, we under-estimate the required margin and therefore understate value because the systematic risk of volume changes is understated) – all else being equal a 0.5% change in the standard deviation of percentage volume fluctuations changes the estimated margin by 1.1% in the same direction; and

- the proportion of fixed costs in a retailers' cost structure is more than we assumed (that is, we under-estimate the required margin and therefore understate value because operating risks are understated) – all else being equal a 5% change in the proportion of fixed costs changes the estimated margin by 0.6% in the same direction.

[17] The sensitivity analysis presented in this section is derived by computing the average EBIT margin resulting from 27 scenarios associated with the high, mid-point and low values of the particular variable of interest. We then take an average of the difference between the average EBIT margin associated with the high input versus the base case, and the difference between the average EBIT margins associated with the low input versus the base case. For example, the average estimated EBIT margin associated with the 19% mid-point volatility of market returns assumption is 4.25% (the averaging across 27 scenarios is the reason for the difference between this figure and 4.19% in the base case). Under the lower volatility assumption of 14% the average estimated EBIT margin is 6.07% and under the higher market volatility assumption of 24% the average estimated EBIT margin is 3.20%. The difference between these estimates and the average under the mid-point volatility assumptions are 1.82% and 1.04%, respectively, which implies an average sensitivity of 1.43%.

These three assumptions have a greater impact on the estimated margin than the cost of capital estimates. Recall that under the expected returns approach we solve for the margin which sets the systematic risk of the returns to equity holders equal to the estimated equity beta. This means that an increase in the cost of capital does not necessarily lead to an increase in the margin. The margin is estimated such that the systematic risk of returns to equity holders is at the estimated level, which can entail an increase or decrease in the margin. Holding all else equal, changes an individual cost of capital parameter input from Table 3 from the mid-point to either the high or low parameter estimate impacts the margin by 0.3% in the opposite direction. This is in contrast to the bottom-up approach whereby there is a direct relationship between the estimated cost of capital and the margin. This is because, in the bottom-up approach the value of the business is imposed on the analysis, rather than being estimated jointly with the margin.

The table below illustrates the expected income statement and valuation metrics over a ten-year forecast horizon incorporating a constant expected EBIT margin of 4.2%. Over the first three years this table can be directly compared with data presented in corresponding tables which underpin the bottom-up analysis of Section 3.7.

To illustrate the relationship between the estimated margin and systematic risk, we present Table 7 which shows the distribution of returns to equity holders and the market given 11 potential market outcomes at the end of the ten-year forecast horizon. The shaded section highlights the most likely outcomes, which have a cumulative probability of occurrence of 89%, in which equity holders would expect to earn total returns of –4% to 17% per year, and the market is expected to earn total returns of 2 to 17% per year.

Table 6. Expected financial statement items derived from the expected returns analysis

Year	0	1	2	3	4	5	6	7	8	9	10
PJ	7.137	7.271	7.440	7.661	7.661	7.661	7.661	7.661	7.661	7.661	7.661
Customers (million)	0.224	0.224	0.226	0.228	0.228	0.228	0.228	0.228	0.228	0.228	0.228
Income statement, cash flows and valuation											
Revenue		200.8	251.6	261.0	268.2	275.6	283.2	291.0	299.0	307.3	315.7
Operating costs		189.9	238.5	247.4	254.2	261.2	268.4	275.8	283.4	291.2	299.3
EBITDA		10.9	13.1	13.6	14.0	14.4	14.8	15.2	15.6	16.0	16.5
Depreciation		2.5	2.6	2.7	2.7	2.8	2.9	3.0	3.1	3.1	3.2
EBIT		8.4	10.5	10.9	11.2	11.5	11.9	12.2	12.5	12.9	13.2
Interest		1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.6	1.6	1.7
Pre-tax profit		7.1	9.2	9.6	9.8	10.1	10.4	10.7	10.9	11.2	11.6
Income tax expense		2.1	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.4	3.5
Net profit after tax		5.0	6.4	6.7	6.9	7.1	7.3	7.5	7.7	7.9	8.1
Capital expenditure		3.7	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.6
Borrowings/repayments to debtholders		0.9	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
Net cash flows to equityholders including imputation benefit		5.2	6.6	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.4
Net cash flows to debtholders		0.4	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9
NPV of cash flows to equityholders (end)	80	83	85	88	90	93	95	98	101	103	106
NPV of cash flows to debtholders (end)	20	21	21	22	23	23	24	24	25	26	27
Firm value	100	104	107	110	113	116	119	122	126	129	133
Leverage	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Growth in debt over time		4.29%	2.88%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%	2.76%
Exp capex from debt		0.9	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
Equity reinvestment	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
Value decomposition											
Debt	19.9	20.8	21.4	21.9	22.5	23.2	23.8	24.5	25.1	25.8	26.5
Equity	79.6	83.0	85.4	87.8	90.2	92.7	95.2	97.9	100.6	103.3	106.2
Firm	99.5	103.8	106.8	109.7	112.7	115.9	119.0	122.3	125.7	129.2	132.7
Book value of assets	105.3	106.5	107.6	108.7	109.8	111.0	112.1	113.4	114.6	115.9	117.2
Book-to-market assets	1.06	1.03	1.01	0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.88
Book-to-market equity	1.07	1.03	1.01	0.99	0.97	0.95	0.93	0.91	0.89	0.87	0.85
Value0/Revenue		0.50	0.40	0.38	0.37	0.36	0.35	0.34	0.33	0.32	0.32
Value0/EBITDA		9.1	7.6	7.3	7.1	6.9	6.7	6.6	6.4	6.2	6.0
Value0/EBIT		11.8	9.4	9.1	8.9	8.6	8.4	8.2	8.0	7.7	7.5
Price0/Earnings		16.0	12.4	11.9	11.6	11.3	11.0	10.7	10.4	10.1	9.8
Value0/GJ		13.7	13.4	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Value0/Customer		443	441	436	436	436	436	436	436	436	436

Table 6. Expected financial statement items derived from the expected returns analysis (continued)

Year	0	1	2	3	4	5	6	7	8	9	10
Income statement (%)											
Revenue		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Operating costs excluding D&A		94.6	94.8	94.8	94.8	94.8	94.8	94.8	94.8	94.8	94.8
EBITDA		5.4	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
D&A		1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
EBIT		4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Interest expense		0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Pre-tax profit		3.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Income tax expense		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Net profit after tax		2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Income statement ($ per GJ)											
Revenue		27.62	33.82	34.07	35.01	35.98	36.97	37.98	39.03	40.11	41.21
Operating costs excluding D&A		26.12	32.06	32.30	33.19	34.10	35.04	36.01	37.00	38.02	39.06
EBITDA		1.50	1.77	1.78	1.82	1.87	1.93	1.98	2.03	2.09	2.15
D&A		0.35	0.35	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42
EBIT		1.16	1.42	1.43	1.47	1.51	1.55	1.59	1.63	1.68	1.73
Interest expense		0.18	0.18	0.18	0.18	0.19	0.19	0.20	0.21	0.21	0.22
Pre-tax profit		0.98	1.24	1.25	1.28	1.32	1.35	1.39	1.43	1.47	1.51
Income tax expense		0.29	0.37	0.37	0.38	0.40	0.41	0.42	0.43	0.44	0.45
Net profit after tax		0.69	0.87	0.87	0.90	0.92	0.95	0.97	1.00	1.03	1.06
Income statement ($ per customer)											
Revenue		894.72	1113.96	1143.12	1174.62	1206.98	1240.24	1274.41	1309.52	1345.61	1382.68
Operating costs excluding D&A		845.98	1055.80	1083.55	1113.41	1144.09	1175.61	1208.00	1241.29	1275.49	1310.63
EBITDA		48.74	58.15	59.56	61.21	62.89	64.62	66.41	68.24	70.12	72.05
D&A		11.28	11.52	11.71	12.03	12.36	12.70	13.05	13.41	13.78	14.16
EBIT		37.46	46.63	47.86	49.17	50.53	51.92	53.35	54.82	56.33	57.88
Interest expense		5.70	5.90	6.01	6.17	6.34	6.52	6.70	6.88	7.07	7.27
Pre-tax profit		31.76	40.73	41.85	43.00	44.18	45.40	46.65	47.94	49.26	50.62
Income tax expense		9.53	12.22	12.55	12.90	13.26	13.62	14.00	14.38	14.78	15.19
Net profit after tax		22.23	28.51	29.29	30.10	30.93	31.78	32.66	33.56	34.48	35.43
Expected cash flows as a probability-weighted average											
Revenue		200.8	251.6	261.0	268.2	275.6	283.2	291.0	299.0	307.3	315.7
EBIT		8.4	10.5	10.9	11.2	11.5	11.9	12.2	12.5	12.9	13.2
Pre-tax profit		7.1	9.2	9.6	9.8	10.1	10.4	10.7	10.9	11.2	11.6
Income tax expense		2.1	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.4	3.5
Net profit after tax		5.0	6.4	6.7	6.9	7.1	7.3	7.5	7.7	7.9	8.1
Cash flows to debt and equity holders including imputation b		5.6	7.3	7.7	7.9	8.1	8.3	8.6	8.8	9.1	9.3
Disaggregation of returns to providers of capital											
Expected cash flows to equity ($m)		5.2	6.6	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.4
Capital gains ($m)		3.4	2.4	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.8
Total return ($m)		8.6	9.0	9.3	9.5	9.8	10.0	10.3	10.6	10.9	11.2
Total return (%)		10.84%	10.84%	10.84%	10.84%	10.84%	10.84%	10.84%	10.84%	10.84%	10.84%
Expected cash flows to debtholders ($m)		0.4	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9
Capital gains ($m)		0.9	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
Total return ($m)		1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.6	1.6	1.7
Total return (%)		6.42%	6.42%	6.42%	6.42%	6.42%	6.42%	6.42%	6.42%	6.42%	6.42%

Table 7. Disaggregation of returns at the end of ten years

Economic state	Probability (%)	Cumulative return (%)		Annualised return (%)	
		Equity holders	Market	Equity holders	Market
1	0.1	771	1262	24	30
2	1.0	642	863	22	25
3	4.4	518	581	20	21
4	11.7	399	382	17	17
5	20.5	284	241	14	13
6	24.6	174	141	11	9
7	20.5	69	71	5	5
8	11.7	-33	21	-4	2
9	4.4	-130	-15	na	-2
10	1.0	-224	-40	na	-5
11	0.1	-312	-57	na	-8
Expectation		180	180		
Variance		292	263		
Covariance			263		
Beta			1.00		

Referring to the cumulative returns over ten years we have the following computation which is consistent with an equity beta of one.

$$\beta = \frac{COV(r_m, r_e)}{\sigma_m^2}$$

$$= \frac{\sum_{i=1}^{11} p_i \times [r_{e,i} - E(r_e)] \times [r_{m,i} - E(r_m)]}{\sum_{i=1}^{11} p_i \times [r_{m,i} - E(r_m)]^2}$$

$$= \frac{0.001 \times \times [7.71 - 1.80] \times [12.62 - 1.80] + \ldots + 0.246 \times [1.74 - 1.80] \times [1.41 - 1.80] + \ldots + 0.001 \times [-3.12 - 1.80] \times [-0.57 - 1.80]}{0.001 \times [12.62 - 1.80]^2 + \ldots + 0.246 \times [1.41 - 1.80]^2 + \ldots + 0.001 \times [-0.54 - 1.80]^2}$$

$$= \frac{2.63}{2.63}$$

$$= 1.00$$

where:

$COV(r_e, r_m)$ is the covariance of equity and market returns;
σ_m^2 is the variance of market returns;
p_i is the probability of economic state i from 1 to 11;
$r_{e,i}$ and $r_{m,i}$ are the expected returns to equity holders and the market in economic state i; and
$E(r_e)$ and $E(r_m)$ are the aggregate expected returns to equity holders and the market.

3.6 Benchmarking

3.6.1 Rationale

The rationale for conducting a benchmarking exercise is to estimate the profit margin that we actually observe in competitive markets, despite not being able to observe margins for electricity retailers. The assumption is that retailers in other industries are exposed to the same consumers and face a number of the same competitive pressures.

Our method for this analysis is to compile a set of "comparable" listed firms, whose margins are readily observable because of stock exchange disclosure requirements. The term "comparable" can take on an expansive or constrained definition, where the set chosen involves a trade-off between (a) obtaining a sufficiently large sample size to ensure the statistical reliability of estimates, and (b) ensuring that the set of firms face substantially the same risk and growth prospects as a New South Wales electricity retailer.

The benchmarking analysis is intended to overcome a limitation of the expected returns approach. Its limitation is that, like any analysis based on an economic model, the reality of markets may violate the model's underlying assumptions, resulting in observed margins which differ from the predictions of the model. This is why the benchmarking analysis is important, to ensure that margins generated by the expected returns approach approximate those observed for comparable listed firms, and that there are robust explanations for any differences. It should also be the case that margins derived from the expected returns approach approximate those derived from the bottom-up approach, if the assumed asset base approximates market value.

3.6.2 Analysis of listed retailers

We analysed a sample of 692 listed retailers from 1980 to 2012, which comprises 7,990 annual observations. This is all firms listed in the United States, United Kingdom, Australia, Canada and New Zealand classified by FTSE as "Retail" and for which data was available, but excluding the sector Specialised Consumer Services. We excluded observations in which ratios were above the 99th percentile or below the 1st percentile, as we did in 2010. This is to ensure that our conclusions are not based upon extreme outcomes which are likely to be due to asset writedowns.

The reason we look at the broader class of retailers, rather than listed energy retailers or the segment information of listed retailers, is that this more comparable dataset does not exist in any substantial size in order to make meaningful conclusion. Energy retailers are almost exclusively vertically integrated. In our previous analysis we analysed the segment data for 84 listed energy utilities, and were able to analyse just five firms with available data over the three year period from 2006 to 2008.

The problem with small samples is that it is unclear just what interpretation should be placed on the information. In analysing a large sample we make the assumption that random differences in profitability and accounting choices will offset each other and we draw conclusions about the average firm. But in small samples this assumption no longer holds and the results could be used in support of or to reject a particular conclusion.

For example, Origin reports segment information for Energy Markets, which includes natural gas, electricity, non-commodity and LPG segments. Over the last two years it reported EBITDA/Sales in this segment of 15% and 14%, respectively. Australian Power and Gas Company Limited is an electricity retailer with market capitalisation of $79 million. In the last 10 years it has never earned a positive net profit after tax.

Suppose that we observe the results for Origin, do we say that it has a higher EBITDA margin than our estimates and then shift the margin estimates to something above 6% because they clearly are below what we observe in the marketplace? Or do we say that Origin is clearly accounting for corporate costs differently, so its margin is overstated compared to what we have estimated?

With respect to the Australian Power and Gas results, do we say that it has a lower EBITDA margin than our estimates and then shift the margin estimates to something below 5% because they clearly are above what we observe in the marketplace? Or do we say that the company is at a different stage of development and so does not represent an example of a sustainable profit margin?

We also note that in our review of the recent electricity decisions in Queensland, South Australia, the ACT and Tasmania the regulator did not draw conclusions from the observed margins of listed energy retailers. In short, we can draw conclusions about average margins for large samples of retailers in other industries. While these firms are not as comparable to electricity retailers as we would prefer we can at least interpret the average margin estimates.

The appropriate profit margin for comparison with gas retailers is the EBIT margin of listed retailers, rather than the EBITDA margin. Listed retailers are more capital-intensive than gas retailers, incurring depreciation charges which, on average, are 2.3% of sales. However, for completeness, we report descriptive statistics on both EBITDA and EBIT margins, along with leverage [Debt/(Debt + Market capitalisation)], Book-to-market assets ratio [(Book value of equity + Debt)/(Market value of equity + Debt)] and Value/EBIT [(Market value of equity + Debt)/EBIT]. The table presents mean and median figures, along with lower and upper bounds from a 90% confidence interval around the mean estimate.

The mean EBITDA margin is 7.5%, the median is 7.0% and the 90% confidence interval is 7.4% to 7.7%. The corresponding figures reported in our 2010 report were a mean of 8.1%, a median of 7.9% and a 90% confidence interval of 7.9 to 9.3%. Descriptive statistics are presented in Table 8.

The mean EBIT margin is 5.2%, the median is 4.9% and the 90% confidence interval is 5.1 to 5.4%. The corresponding figures reported in our 2010 report were a mean of 5.8%, a median of 5.7% and a 90% confidence interval of 5.6% to 6.0%.

In using the benchmarking analysis to arrive at an EBITDA margin for a gas retailer, we use the EBIT margin for listed retailers and add back in estimate of depreciation and amortisation for the electricity retailer. Retailers in other industries incur higher depreciation charges relative to sales because the value of their business is comprised of a higher proportion of fixed assets. This means that the implied EBITDA margin for our representative gas retailer is 6.3%. This is 1.1% lower than the estimate of 7.4% reached in 2010, with half of this reduction due to lower depreciation charges as a percentage of costs.

The main reason for the reduction in the estimated margin is an increase in number of firms and the years available for analysis in the historical data. The change in sample composition lowered the margin estimates by around 0.5% but the extension of the time period lowered margin estimates by around 0.1%. Margins during 2009 to 2012 did fall substantially, but this is a reasonably small proportion of the overall sample.

Across different types of retail businesses we observe the same relative ranking of EBITDA and EBIT margins as observed previously. Food retailers & wholesalers and Drug retailers have low margins, and Apparel and Home Improvement Retailers have high margins.

Table 8. Summary statistics for 692 Australian, US and UK listed retailers from 1980 to 2012

	N	EBITDA/Sales (%)				EBIT/Sales (%)				Leverage (%)				Book-to-market assets (%)				Value/EBIT			
		Mn	Md	Lo	Hi	Mn	Md	Lo	Hi	Mn	Md	Lo	Hi	Mn	Md	Lo	Hi	Mn	Md	Lo	Hi
All firms	**7990**	**7.5**	**7.0**	**7.4**	**7.7**	**5.2**	**4.9**	**5.1**	**5.4**	**23**	**17**	**23**	**23**	**78**	**77**	**77**	**78**	**9.3**	**9.0**	**9.1**	**9.6**
Country																					
Australia	498	7.5	6.3	6.9	8.2	5.1	4.4	4.4	5.7	22	16	20	23	75	72	73	77	8.5	9.3	7.6	9.5
Canada	669	7.0	6.6	6.7	7.3	4.9	4.6	4.6	5.1	29	28	28	31	90	90	88	92	7.5	7.8	6.7	8.3
New Zealand	139	9.2	10.1	8.6	9.9	7.0	7.5	6.4	7.6	19	16	16	22	70	68	66	75	10.7	9.7	9.4	12.0
UK	2256	7.9	7.3	7.6	8.1	5.5	5.1	5.3	5.8	19	14	19	20	77	74	76	78	8.8	8.7	8.4	9.3
USA	4428	7.4	7.0	7.3	7.6	5.1	4.8	4.9	5.2	24	17	24	25	77	76	76	78	9.9	9.3	9.5	10.3
Sub-industry																					
Drug retailers	352	6.2	6.3	5.8	6.7	4.8	5.0	4.4	5.3	16	12	15	17	70	67	68	72	10.6	10.4	9.4	11.8
Food ret & w'sale	1507	5.2	4.8	5.0	5.4	3.4	3.3	3.2	3.6	31	27	30	32	80	80	79	81	9.5	9.2	9.0	10.1
Apparel retailers	1718	9.6	9.7	9.3	9.8	6.7	7.1	6.4	7.0	15	8	15	16	73	69	71	74	8.6	8.4	8.1	9.1
Broadline retailers	1034	8.2	7.9	7.8	8.6	5.9	5.8	5.5	6.3	22	17	21	23	78	77	77	80	9.6	9.6	8.9	10.3
Home improve.	504	9.8	9.8	9.2	10.3	7.3	7.5	6.8	7.8	20	13	19	22	71	70	69	74	10.0	9.6	8.9	11.1
Specialty retailers	2875	7.1	6.4	6.8	7.3	4.8	4.3	4.5	5.0	25	20	24	26	82	83	81	83	9.3	8.8	8.8	9.8
Year																					
1980	81	7.5	6.8	6.4	8.6	6.0	5.2	5.0	7.0	35	33	31	39	1.04	1.06	1.00	1.09	3.9	4.6	2.4	5.3
1981	115	7.9	6.6	7.1	8.7	6.4	5.4	5.7	7.1	35	35	31	39	1.02	1.06	98	1.06	5.6	4.9	5.0	6.1
1982	121	7.5	6.2	6.7	8.3	6.0	4.8	5.2	6.7	34	34	30	38	99	1.05	95	1.03	3.9	5.0	2.1	5.8
1983	129	7.4	6.7	6.5	8.4	5.9	5.1	5.0	6.8	30	29	26	33	90	93	86	94	5.5	5.8	4.4	6.7
1984	152	8.0	6.4	7.2	8.9	6.6	5.1	5.7	7.4	23	20	21	26	83	86	80	87	6.4	6.5	5.1	7.7
1985	161	7.5	6.0	6.7	8.3	5.8	4.5	5.1	6.6	26	21	24	29	84	85	81	87	6.0	6.4	5.1	7.0
1986	162	8.3	6.7	7.5	9.1	6.5	4.8	5.8	7.2	23	18	20	25	74	76	71	78	10.0	8.4	8.5	11.5
1987	181	8.3	7.1	7.5	9.1	6.5	5.2	5.8	7.3	23	19	20	25	72	73	69	75	10.0	8.5	8.6	11.4
1988	201	8.4	7.6	7.6	9.2	6.5	5.7	5.7	7.3	24	17	21	26	78	78	75	81	8.3	7.8	6.6	9.9
1989	213	8.8	7.9	8.1	9.6	6.9	6.1	6.2	7.7	25	19	22	27	78	76	75	81	8.8	7.9	7.7	10.0
1990	210	8.6	7.7	7.9	9.3	6.5	5.7	5.8	7.2	26	22	23	28	78	75	75	81	8.7	8.3	7.3	10.2
1991	212	8.0	7.2	7.3	8.7	5.8	5.2	5.1	6.5	30	26	27	33	89	89	86	92	8.7	7.8	7.4	10.0
1992	233	7.3	6.5	6.6	8.0	4.9	4.6	4.2	5.6	23	18	21	25	78	77	75	81	9.8	9.9	8.4	11.1
1993	244	7.3	7.0	6.7	7.9	5.0	4.7	4.4	5.6	22	15	20	25	77	76	74	80	10.4	9.9	8.8	12.1
1994	282	7.5	6.8	6.9	8.1	5.3	4.7	4.7	5.9	22	17	20	24	73	70	70	75	12.2	10.5	10.7	13.7
1995	300	7.1	6.5	6.4	7.7	4.9	4.3	4.3	5.5	24	20	22	25	79	80	76	81	10.1	9.4	8.4	11.8
1996	298	7.3	7.0	6.6	7.9	4.9	4.9	4.2	5.5	24	20	22	26	79	80	76	82	9.3	9.6	8.0	10.7
1997	324	8.0	7.3	7.4	8.6	5.6	5.1	5.0	6.1	22	17	20	24	75	74	72	77	11.7	9.7	10.2	13.2
1998	325	8.0	7.7	7.4	8.6	5.6	5.3	5.1	6.2	21	14	19	22	71	68	68	74	10.7	10.3	9.6	11.8
1999	313	7.7	7.5	7.1	8.3	5.4	5.0	4.9	6.0	23	18	21	25	76	73	73	79	10.8	9.3	9.5	12.1
2000	316	7.5	7.2	6.7	8.2	4.7	4.7	3.9	5.4	25	19	23	27	78	78	75	81	8.4	8.6	6.8	10.0
2001	312	6.4	6.7	5.7	7.2	3.7	4.1	2.9	4.5	26	20	24	29	86	88	83	90	9.5	8.8	8.1	10.9
2002	327	7.3	7.2	6.7	8.0	4.5	4.7	3.8	5.2	23	17	21	25	78	79	75	81	8.6	9.9	7.4	9.7
2003	327	7.6	7.0	7.0	8.2	4.9	4.9	4.3	5.5	24	17	22	27	83	82	80	86	9.3	9.2	8.0	10.6
2004	318	7.8	7.5	7.1	8.4	5.2	4.8	4.6	5.8	19	13	18	21	72	68	69	74	11.4	10.4	10.0	12.8
2005	312	8.3	7.5	7.7	8.8	5.9	5.1	5.3	6.4	17	11	16	19	67	63	65	70	11.8	10.5	10.1	13.4
2006	305	7.5	7.3	6.8	8.3	5.2	4.8	4.5	5.9	18	12	16	20	67	64	65	70	10.9	10.4	9.3	12.5
2007	294	7.5	7.1	6.8	8.2	5.0	4.7	4.3	5.7	17	11	15	19	64	62	61	66	12.8	11.8	11.5	14.1
2008	285	5.6	6.2	4.7	6.5	3.0	4.0	2.2	3.9	19	14	17	20	72	69	69	74	7.0	9.0	5.2	8.9
2009	261	6.4	6.4	5.6	7.2	3.6	3.8	2.9	4.4	26	20	24	29	94	93	91	97	6.7	7.6	5.2	8.2
2010	288	7.4	7.2	6.7	8.1	4.8	4.7	4.1	5.5	20	12	18	23	78	75	76	81	7.2	9.1	5.8	8.6
2011	272	7.3	6.7	6.6	8.0	4.7	4.5	4.0	5.4	19	12	17	22	73	70	70	75	9.6	10.0	7.8	11.3

Observations in which the EBITDA margin, EBIT margin, Book-to-market equity ratio, book-to-market assets ratio and Value/EBIT ratio are below the 1st percentile or above the 99th percentile are excluded.

In Table 9 we report the margin estimates on various bases for the representative firm if we incorporated the EBIT margin estimates from listed retailers. On average across the three forecast years the EBITDA margin is within the range of 6.2% to 6.4%. The estimated EBIT margin corresponds to a range of $1.64 to $1.73 per GJ and $54 to $57 per customer, and the estimated EBITDA margin corresponds to $1.99 to $2.07 per GJ and $66 to $68 per customer.

Table 9. Margin summary and valuation metrics according to the benchmarking analysis

	Year 1 ranges			Year 2 ranges			Year 3 ranges			2010 report (avg)		
	Low	Base	High	Low	Base	High	Low	Base	High	Low	Base	High
EBITDA margin												
% sales	6.4	6.5	6.6	6.1	6.3	6.4	6.1	6.2	6.4	7.2	7.4	7.6
$/GJ	1.77	1.81	1.84	2.09	2.14	2.18	2.10	2.15	2.20	1.50	1.54	1.59
$/Customer	57	59	60	69	70	72	71	72	74	54	55	57
EBIT margin												
% sales	5.1	5.2	5.4	5.1	5.2	5.4	5.1	5.2	5.4	5.6	5.8	6.0
$/GJ	1.42	1.46	1.50	1.74	1.79	1.83	1.76	1.80	1.85	1.17	1.21	1.25
$/Customer	46	47	48	57	59	60	59	60	62	42	43	45
Value ($m)	126	130	133	131	135	139	135	139	143	56	59	63
Book-to-mkt assets	0.84	0.81	0.79	0.81	0.79	0.77	0.80	0.77	0.75	2.14	2.01	1.90
Value multiples:												
$/GJ	17	18	18	17	17	18	16	17	17	7	8	8
$/Customer	561	577	594	558	574	590	552	568	584	261	278	295
$/Revenue	0.62	0.64	0.66	0.50	0.51	0.52	0.48	0.49	0.50	0.35	0.37	0.39
$/EBITDA	9.8	9.9	9.9	8.1	8.2	8.2	7.8	7.9	7.9	4.9	5.0	5.2
$/EBIT	12.2	12.2	12.2	9.7	9.7	9.8	9.4	9.4	9.4	6.3	6.4	6.6
Equity multiple:												
$/NPAT	16.5	16.6	16.6	12.8	12.8	12.9	12.3	12.3	12.4	7.5	7.7	7.9

3.7 Bottom-up analysis

3.7.1 Rationale

The rationale for conducting a bottom-up analysis is that transaction prices provide an indication of the market value of an energy retailer and, on average, we would expect the profit margin of an energy retailer to provide an appropriate return on investment. This approach is also consistent with the approach to the regulation of network assets, albeit with an asset base estimated with reference to transaction prices rather than construction costs. It overcomes a limitation of the benchmarking analysis, that we can't observe energy retail profit margins directly.

3.7.2 Estimating the asset base

We estimated the asset base of a representative retailer with reference to 12 transactions of Australian electricity and gas retailers over the 12 year period from 1999 to 2010, as summarised in the table below. We estimated the consideration paid for the proportionate interest acquired, which we then converted to an implied value for a 100% interest. We then computed an inflation-adjusted value as at 30 June 2013 using percentage changes in the consumer price index since the acquisition, and assumed inflation of 2.7% per annum for the two quarters of 2013. This allowed us to estimate inflation-adjusted multiples of value per customer and value per GJ of equivalent energy. In estimating the asset base for gas retailers, however, we only rely upon the multiples per energy unit. Using multiples per customer for electricity allowed us to mitigate estimation error, but this basis for gas is likely to overstate the value of a gas retailer, for which the revenue per customer will be considerably lower.

The average inflation adjusted multiples are $1113 per customer and $24 per GJ. There is considerable dispersion in the multiples across the 12 transaction which likely reflects variations in expected profitability and growth. For the seven transactions which occurred from 2006 to 2010 the average inflation-adjusted multiples are $1,254 per customer and $30 per GJ. In contrast, for the five transactions which occurred from 1999 to 2002 the average inflation-adjusted multiples are $914 per customer and $15 per GJ equivalent.

Table 10. Acquisitions of Australian retail electricity and gas businesses

Acquirer	Target	Sector	Date	Interest (%)	Consideration ($m)	Implied value ($m)	Inflation-adjusted value ($m)	Customers ('000)	Volume (PJ)	Valuation multiples		Inflation-adjusted multiples	
										Customer	GJ	Customer	GJ
AGL Energy[1]	Powerdirect Australia	Electricity	19 Feb 2007	100	570	570	680	432	16.9	1,320	34	1,575	40
Alinta/BBP[2]	AGL Energy	Gas	2 Nov 2007	33	220	667	778	556	13.0	1,200	51	1,399	60
Origin[11]	Country & Integral	Electricity	15 Dec 2010	100	2,300	2,300	2,454	1,642	101.7	1,282	23	1,368	24
Boral Energy[5]	Energy21	Gas	13 Mar 1999	100	474	474	722	540	61.9	878	8	1,338	12
Origin[3]	Sun Retail	Electricity	27 Nov 2006	100	916	916	1092	833	32.4	1,100	28	1,311	34
AGL Energy[4]	Sun Gas Retail	Gas	27 Nov 2006	100	75	75	89	71	33.8	1,059	2	1,263	3
Origin[6]	Powercor Retail	Electricity	17 Apr 2001	100	470	470	656	737	29.5	808	16	1,127	22
AGL[7]	Pulse Energy	Electricity	2 Jul 2002	100	842	842	1,136	1,079	13.0	781	12	1,053	16
TRUEnergy[12]	Energy Australia	Electricity	15 Dec 2010	100	1,488	1,488	1,587	1,540	84.6	966	18	1,031	19
International Power[8]	Energy Australia	Dual fuel	2 Nov 2007	50	142	284	333	400	na	710	na	833	na
Origin[9]	CitiPower Retail	Electricity	19 Jul 2002	100	137	137	185	264	21.6	519	6	699	9
AGL Energy[10]	ETSA Power	Electricity	14 Jan 2000	100	175	175	261	737	na	237	na	355	na
Average			28 Apr 2005	90	651	700	831	723	46.5	905	20	1113	24
Median			27 Nov 2006	100	472	522	701	569	33.1	922	17	1195	20
Average from 2006 to 2010 transactions			30 Apr 2008	83	816	900	1002	782	47.1	1091	26	1254	30
Average from 1999 to 2002 transactions			10 Feb 2001	100	420	420	592	640	45.7	644	10	914	15
Weighted average (2/3 on 06-10, 1/3 on 99-02)			3 Dec 2005	89	684	740	865	735	46.6	942	21	1141	25

[1] On 19 February 2007 AGL Energy announced the acquisition of Powerdirect Australia from the Queensland Government for $1,200 million, stating that the acquisition delivers an additional 473,000 customer accounts and an additional load of 19.1TWh. It states that it valued the retail business of 431,800 customers at $1,300 per customer. Per slide 9/54 of AGL Powerdirect and financial results presentation, AGL stated that the proportion of the total consideration that was attributable to the retail electricity segment was A$570m. It also states that the industrial/commercial business accounts for approximately 14.4TWh per annum, which leaves 4.7 TWh per annum as the estimated load for the retail business. On 1 March 2007 AGL Energy announced it had completed the acquisition.

[2] In November 2007, after the Babcock & Brown consortium successfully bought Alinta, Alinta agreed to buy out AGL's 33% interest in AlintaAGL's business for A$522m (see AGL to record pre-tax profit of A$125m from sale on interest in AlintaAGL article). The implied valuation of the gas mass market segment of the business is calculated as A$1,200 per gas customer × number of mass market gas customers. By way of background to the transaction, in October 2006 Alinta (67%) and AGL (33%) formed AlintaAGL to hold Alinta's former WA retail business (predominantly gas customers) and cogeneration interests. In May 2007, when the Macquarie and Babcock & Brown consortium were bidding for Alinta, AGL Energy agreed to purchase the remaining 67% of the AlintaAGL retail business from Macquarie for a net consideration of A$345m in the event that Macquarie was the successful bidder (see AGL reaches agreement to buy AlintaAGL retail business article).

[3] On 27 November 2006 Origin Energy announced the acquisition of Sun Retail for $1,202 million. It provided a valuation breakdown which included $916 million for the Mass Market Retail business of 833,000 customers. It announced the completion of the acquisition on 1 February 2007. (Per page 1/4 of Origin Energy acquires Sun Retail press release, the valuation placed on the electricity retail mass market business was A$916m).

[4] In 2006, AGL agreed to purchase Sun Gas Retail from Energex for approximately A$75m. This price was in relation to the entire business which services residential, industrial and commercial customers in Queensland, Northern NSW and Victoria (see AGL acquires Sun Gas Retail business article).

[5] In March 1999, Envestra and Boral jointly bid for Stratus Networks and Energy21, Victorian gas distribution and gas retail companies respectively. It was agreed that Envestra would pay A$1.196bn for Stratus Networks and that Boral would pay A$474m for Energy21 (see slide 3/3 Origin Energy acquisition of Energy21 (Background)).

[6] In April 2001, Origin Energy agreed to acquire Powercor's electricity retail business for a total of A$315m cash (A$235m for the retail business and A$80m for access to benefits from the wholesale portion of the business). The parties also entered into a revenue sharing arrangement whereby Origin would make an extra payment to Powercor in 12 months' time if certain performance benchmarks

were met. Subsequent searches of annual reports and ASX announcements did not disclose any further payment being made. Furthermore, Origin assumed A$315m of Powercor's debt as part of the transaction (based on a percentage split of the purchase price between retail and wholesale, A$235m of debt attributed to retail unit).

[7] On 2 July 2002 AGL announced the acquisition of Pulse Energy, EdgeCap and UltiMode for $880 million including $79 million of working capital. The announcement stated that Pulse Energy had 560,000 electricity customers and 520,000 gas customers. UltiMode is a customer services business of United Energy, one of the shareholders of Pulse Energy. Pulse Energy was owned by United Energy (25%), Energy Partnership (25%), Shell Australia (40%) and Woodside Energy (10%) and EdgeCap was owned by United Energy (50), Shell Australia (40%) and Woodside Energy (10%). Woodside stated that the sale price for Pulse Energy and EdgeCap was $842.4 million and the price for UltiMode was $37.6 million. The annual report for AGL in the year to June 2003 states that Pulse Energy contributed 49.1 PJ of natural gas (equivalent to 13,600 GWh) and 4,146 GWh of electricity, which is equivalent to total volume of 17,800 GWh. This contribution was for approximately 11 months so full year volume is approximately 19TWh.

[8] In July 2005, International Power Pty Ltd (subsidiary of International Power plc) and Energy Australia Pty Ltd (subsidiary of Energy Australia) entered into a partnership to target residential, commercial and industrial customers in Victoria under the Energy Australia brand. IPower was required to pay A$60m for its initial 50% stake in the venture. In August 2007, IPower bought out Energy Australia's remaining 50% for A$142m and eventually formed the wholly-owned subsidiary Simply Energy to continue to sell electricity and gas to retail customers in Victoria and South Australia.

[9] In July 2006, Cheung Electric agreed to purchase the entire CitiPower business (comprising electricity distribution and electricity retail) from American Electric Power for a total consideration of A$1.555bn. Cheung Electric made a further agreement with Origin that Origin would purchase only the electricity retail business for A$137m (both residential and industrial/commercial customers). There was no indication as to whether Origin assumed any of CitiPower's previous debt. For further details, see slide 3/10 of Origin Briefing - Acquisition of CitiPower Retail (22 Jul 2002).

[10] In December 1999, Cheung Kong Infrastructure Holdings (CKI) and Hong Kong Electric International Limited (HEI) purchased ETSA Utilities (including ETSA Power which held the electricity retail assets) from the South Australian government for a total consideration of A$3.25 billion. CKI and HEI subsequently on-sold the electricity retail portion of the business (ETSA Power) to AGL for A$175m (see page 1/9 of AGL comment on 2000 results including ETSA Power acquisition, 24 Aug 2000).

[11] On 15 December 2010, Origin announced the acquisition of the retail businesses of Integral Energy and Country Energy and that it had entered into a GenTrader contract with Eraring Energy. Origin stated that the combined mass market retail business was valued at $1,282 per customer and the wholesale business was valued at $0.35 per MWh.

[12] On 15 December 2010, CLP Holdings Limited announced that TRUenergy had acquired the retail business of EnergyAustralia and entered into a GenTrader contract for the Delta Western GenTrader bundle. The CLP annual report disclosed customer numbers of 1.54 million. TRUenergy announced a total acquisition price of $2,035 million and the Auditor-General of NSW reported that proceeds from the generation component were $548 million, which leaves a retail acquisition price of $1,488 million.

In the analysis which follows we estimate the asset base for our representative retailer by applying a two-thirds weight to the average multiples from the seven 2006 to 2010 transactions and a one-thirds weight to the average multiples from the five 1999 to 2002 transactions. We are cautious against placing undue weight on a small number of observations, so are reluctant to ignore almost half of the limited number of observations. In addition, the exclusive use of higher multiples from the more recent transactions reinforces the circularity involved in the bottom-up estimate. If the prices paid in these acquisitions were "too high" in the sense they were made with optimistic expectations of future margins (something which we cannot directly observe), to set a regulated margin on the basis of those prices would imply that retail businesses should be acquired at any cost. Nevertheless, it is relatively more likely that the recent transaction prices provide a more reliable indicator of appropriate asset values, which is the basis for our weighting scheme. We also report results under alternative valuation multiples.

This results in an estimate multiple of $24.81 per GJ and an implied asset value of $185 million for our representative business. This valuation of $185 million forms the basis for our base case margin estimate using the bottom-up approach. This valuation is consistent with a multiple of $818 per customer. Given this asset base, we then estimate the EBIT margin which sets the present value of expected cash flows equal to that asset base. Given that we have cost estimates over a three year period ending 30 June 2013 we model a three year explicit forecast period and then assume that the business grows at a constant rate into perpetuity. The long-term growth rate is estimated at 2.70%, equal to expected inflation.[18] Consistent with the cost of capital assumptions, the business is assumed to be financed with 20% debt and 80% equity, implying a debt value of $37 million and equity value of $148 million.

In estimating the margin we model the entire retail business, rather than the segment of the business which has customers on the regulated tariff, for three reasons. First, this avoids the issue of allocating revenue, costs and capital expenditure amongst these segments, which for some items may require an allocation which is not currently being performed by the businesses, and which may require an arbitrary allocation on the basis of volume or customers, rather than value. Second, given that customers switch between the default tariff and market offers in response to market conditions, the allocation of customers amongst the regulated and contestable segments will be conditional upon the estimated retail margin, creating another circularity. Third, in estimating the margin which allows a normal return to be earned on the asset base, we are estimating the profit margin which would prevail in a competitive market, which necessarily implies that the same margin prevails for both the regulated and contestable segments.

3.7.3 Base case analysis

In the left hand panel of the table below we summarise the bottom-up analysis under our base case assumptions, where the estimated EBIT margin is contained in the 10th row of the first panel. The estimated EBIT margin is 7.1%. This is the margin which equates the present value of expected cash flows to the estimated asset value of $185 million. It also presents the expected distributions to equity and debt holders, which have a present value of $148 million and $37 million, respectively.

[18] Further discussion of this long-term growth rate assumption is provided on in Section 3.5.2.

Table 11. Estimation of retail margin according to the bottom-up approach

	Base case				Lower bound				Upper bound			
Year	0	1	2	3	0	1	2	3	0	1	2	3
Book value of assets (end of year)	105.33	106.50	107.61	108.70	105.33	106.50	107.61	108.70	105.33	106.50	107.61	108.70
Value over time (end of year)	185.04	192.71	198.20	203.66	177.48	184.85	190.12	195.36	222.84	232.02	238.62	245.19
PJ		7.271	7.440	7.661		7.271	7.440	7.661		7.271	7.440	7.661
Customers (million)		0.224	0.226	0.228		0.224	0.226	0.228		0.224	0.226	0.228
Debt at the end of the year	37.01	38.54	39.64	40.73	35.5	36.97	38.02	39.07	44.6	46.40	47.72	49.04
Estimation of margin												
Growth in debt over forecast horizon		4.15%	2.85%	2.76%		4.15%	2.85%	2.76%		4.12%	2.84%	2.76%
EBIT margin (%)	**7.09%**	**7.09%**	**7.09%**	**7.09%**	**6.84%**	**6.84%**	**6.84%**	**6.84%**	**8.32%**	**8.32%**	**8.32%**	**8.32%**
Income statement, cash flows and valuation ($m)												
Revenue		207.10	259.49	269.18		206.55	258.80	268.45		209.87	262.97	272.78
Operating costs excluding D&A		189.89	238.50	247.42		189.89	238.50	247.42		189.89	238.50	247.42
EBITDA		17.21	21.00	21.75		16.66	20.30	21.03		19.99	24.47	25.36
Depreciation and amortisation		2.53	2.60	2.67		2.53	2.60	2.67		2.53	2.60	2.67
EBIT		14.68	18.39	19.08		14.13	17.70	18.36		17.45	21.87	22.69
Interest		2.38	2.48	2.55		2.28	2.38	2.44		2.86	2.98	3.07
Pre-tax profit		12.30	15.92	16.53		11.85	15.32	15.92		14.59	18.89	19.62
Income tax expense		3.69	4.78	4.96		3.55	4.60	4.78		4.38	5.67	5.89
Net profit after tax		8.61	11.14	11.57		8.29	10.73	11.14		10.21	13.22	13.73
Capital expenditure and change in working capital		3.69	3.72	3.76		3.69	3.72	3.76		3.69	3.72	3.76
Borrowings/repayments to debtholders		1.53	1.10	1.09		1.47	1.05	1.05		1.84	1.32	1.31
Net cash flows to equityholders including imputation benefits		9.91	12.32	12.82		9.49	11.81	12.30		11.98	14.84	15.43
Net cash flows to debtholders		0.84	1.38	1.45		0.81	1.32	1.40		1.03	1.66	1.75
NPV of cash flows to equityholders (end of year)	148.03	154.17	158.56	162.93	141.98	147.88	152.10	156.29	178.28	185.62	190.89	196.15
NPV of cash flows to debtholders (end of year)	37.01	38.54	39.64	40.73	35.50	36.97	38.02	39.07	44.57	46.40	47.72	49.04
Firm value	185.04	192.71	198.20	203.66	177.48	184.85	190.12	195.36	222.84	232.02	238.62	245.19
Leverage	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000
Value decomposition												
Value	185.04	192.71	198.20	203.66	177.48	184.85	190.12	195.36	222.84	232.02	238.62	245.19
Debt	37.01	38.54	39.64	40.73	35.50	36.97	38.02	39.07	44.57	46.40	47.72	49.04
Equity	148.03	154.17	158.56	162.93	141.98	147.88	152.10	156.29	178.28	185.62	190.89	196.15
Book-to-market assets	0.57	0.55	0.54	0.53	0.59	0.58	0.57	0.56	0.47	0.46	0.45	0.44
Book-to-market equity	0.46	0.44	0.43	0.42	0.49	0.47	0.46	0.45	0.34	0.32	0.31	0.30
Value0/Revenue		0.89	0.71	0.69		0.86	0.69	0.66		1.06	0.85	0.82
Value0/EBITDA		10.8	8.8	8.5		10.7	8.7	8.4		11.2	9.1	8.8
Value0/EBIT		12.6	10.1	9.7		12.6	10.0	9.7		12.8	10.2	9.8
Price0/Earnings		17.2	13.3	12.8		17.1	13.2	12.7		17.5	13.5	13.0
Value0/GJ		25	25	24		24	24	23		31	30	29
Value0/Customer		824	819	810		791	786	777		993	987	976

Table 11. Estimation of retail margin according to the bottom-up approach (continued)

	Base case				Lower bound				Upper bound			
Year	0	1	2	3	0	1	2	3	0	1	2	3
Income statement (%)												
Revenue		100.00	100.00	100.00		100.00	100.00	100.00		100.00	100.00	100.00
Operating costs excluding D&A		91.69	91.91	91.92		91.94	92.16	92.16		90.48	90.69	90.70
EBITDA		8.31	8.09	8.08		8.06	7.84	7.84		9.52	9.31	9.30
D&A		1.22	1.00	0.99		1.23	1.01	1.00		1.21	0.99	0.98
EBIT		7.09	7.09	7.09		6.84	6.84	6.84		8.32	8.32	8.32
Interest expense		1.15	0.95	0.95		1.10	0.92	0.91		1.36	1.13	1.12
Pre-tax profit		5.94	6.13	6.14		5.74	5.92	5.93		6.95	7.18	7.19
Income tax expense		1.78	1.84	1.84		1.72	1.78	1.78		2.09	2.15	2.16
Net profit after tax		4.16	4.29	4.30		4.01	4.14	4.15		4.87	5.03	5.03
Income statement ($ per GJ)												
Revenue		28.48	34.88	35.14		28.41	34.78	35.04		28.86	35.34	35.61
Operating costs excluding D&A		26.12	32.06	32.30		26.12	32.06	32.30		26.12	32.06	32.30
EBITDA		2.37	2.82	2.84		2.29	2.73	2.75		2.75	3.29	3.31
D&A		0.35	0.35	0.35		0.35	0.35	0.35		0.35	0.35	0.35
EBIT		2.02	2.47	2.49		1.94	2.38	2.40		2.40	2.94	2.96
Interest expense		0.33	0.33	0.33		0.31	0.32	0.32		0.39	0.40	0.40
Pre-tax profit		1.69	2.14	2.16		1.63	2.06	2.08		2.01	2.54	2.56
Income tax expense		0.51	0.64	0.65		0.49	0.62	0.62		0.60	0.76	0.77
Net profit after tax		1.18	1.50	1.51		1.14	1.44	1.45		1.40	1.78	1.79
Income statement ($ per customer)												
Revenue		922.67	1148.75	1178.83		920.20	1145.67	1175.67		935.02	1164.13	1194.61
Operating costs excluding D&A		845.98	1055.80	1083.55		845.98	1055.80	1083.55		845.98	1055.80	1083.55
EBITDA		76.68	92.95	95.27		74.21	89.87	92.11		89.04	108.33	111.06
D&A		11.28	11.52	11.71		11.28	11.52	11.71		11.28	11.52	11.71
EBIT		65.40	81.43	83.56		62.93	78.35	80.41		77.76	96.81	99.35
Interest expense		10.59	10.96	11.15		10.16	10.51	10.70		12.76	13.20	13.43
Pre-tax profit		54.81	70.47	72.41		52.77	67.84	69.71		65.00	83.62	85.92
Income tax expense		16.44	21.14	21.72		15.83	20.35	20.91		19.50	25.08	25.78
Net profit after tax		38.37	49.33	50.69		36.94	47.49	48.79		45.50	58.53	60.14

The estimated EBIT margin of 7.1% translates into estimated EBITDA margins of 8.1% to 8.3% over three years, as shown in the left hand side of the lower panel of Table 11. These margin estimates correspond to EBIT margins of $2.02 to $2.49 per GJ and $65 to $84 per customer, and EBITDA margins of $2.37 to $2.84 per GJ and $77 to $95 per customer.

In the last section of the first panel of Table 11 we present valuation multiples, computed as the market value at year zero, relative to revenue, earnings, GJ and customers over three years. These multiples range from 0.69 to 0.89 for Value/Revenue, 8.5 to 10.8 for Value/EBITDA, 9.7 to 12.6 for Value/EBIT and 12.8 to 17.2 for the price/earnings ratio (that is, equity value relative to net profit after tax). Historically the Australian equity market has traded on a price/earnings ratio of approximately 15 times. The price/earnings ratio reflects the market's expectations for expected earnings growth and the cost of equity capital. Given that standard electricity retailers are expected to grow at lower risk than the typical listed firm, and are assumed to be exposed to the same level of systematic risk (that is, the assumed equity beta is one) the normal outcome is a price-earnings ratio which is less than the average in the broader market. This is what we observe from year three onwards as operating costs are expected to rise by 30% over forecast years one to three.

3.7.4 Reasonable range – Margins under alternative asset base estimates

In Table 12 we present the reasonable range for the EBIT margin estimated according to the bottom-up approach, where the upper and lower bounds are a function of the assumed asset base. More detail on these ranges estimates is presented in the sections on the right hand side of Table 11.

As an upper bound we estimated an asset base of $223 million, derived from the average multiple of $29.88 per GJ observed for the 2006 to 2010 transactions. The estimated EBIT margin is 8.3%, which translates to an EBITDA margin of 9.3% to 9.5% over three years. In dollar terms this implies an estimated EBIT margin of $2.40 to $2.96 per GJ and $78 to $99 per customer, and an EBITDA margin of $2.75 to $3.31 per GJ, and $89 to $111 per customer over three years.

As a lower bound we estimated an asset base of $177 million, derived from the average multiple of $23.80 from all 12 transactions. The estimated EBIT margin is 6.8%, which translates to an EBITDA margin which ranges from 7.8% to 8.1% over three years. This results in an estimated EBIT margin of $1.94 to $2.40 per GJ and $63 to $80 per customer over three years, and an EBITDA margin of $2.29 to $2.75 per GJ and $74 to $92 per customer over three years.

These alternative asset base assumptions result in an estimated range for the EBIT margin of 6.8% to 8.3%. Taking averages over three years we also have the following ranges: EBITDA margin of 7.9% to 9.4%, EBIT margin of $2.24 to $2.77 per GJ and $74 to $91 per customer, and EBITDA margin of $2.59 to $3.12 per GJ and $85 to $103 per customer.

Table 12. Margin summary and valuation metrics according to the bottom-up analysis

	Year 1 ranges			Year 2 ranges			Year 3 ranges			2010 report (avg)		
	Low	Base	High	Low	Base	High	Low	Base	High	Low	Base	High
EBITDA margin												
% sales	8.1	8.3	9.5	7.8	8.1	9.3	7.8	8.1	9.3	12.9	13.9	16.0
$/GJ	2.29	2.37	2.75	2.73	2.82	3.29	2.75	2.84	3.31	2.87	3.13	3.67
$/Customer	74	77	89	90	93	108	92	95	111	103	112	132
EBIT margin												
% sales	6.8	7.1	8.3	6.8	7.1	8.3	6.8	7.1	8.3	11.4	12.5	14.5
$/GJ	1.94	2.02	2.40	2.38	2.47	2.94	2.40	2.49	2.96	2.54	2.80	3.34
$/Customer	63	65	78	78	81	97	80	84	99	91	100	120
Value ($m)	177	185	223	185	193	232	190	198	239	167	189	233
Book-to-mkt assets	0.59	0.57	0.47	0.58	0.55	0.46	0.57	0.54	0.45	0.71	0.63	0.51
Value multiples:												
$/GJ	24	25	31	24	25	30	23	24	29	22	25	31
$/Customer	791	824	993	786	819	987	777	810	976	785	885	1094
$/Revenue	0.86	0.89	1.06	0.69	0.71	0.85	0.66	0.69	0.82	0.99	1.10	1.33
$/EBITDA	10.7	10.8	11.2	8.7	8.8	9.1	8.4	8.5	8.8	7.7	7.9	8.3
$/EBIT	12.6	12.6	12.8	10.0	10.1	10.2	9.7	9.7	9.8	8.7	8.9	9.2
Equity multiple:												
$/NPAT	17.1	17.2	17.5	13.2	13.3	13.5	12.7	12.8	13.0	11.2	11.5	12.0

4. Conclusion

We have performed analysis using three techniques in order estimate the EBIT margin which provides an expected return to a standard gas retailer which is consistent with cost of capital assumptions of the Tribunal and the CAPM which states that expected returns are determined by systematic risk, also termed economic, market or non-diversifiable risk. We summarise our results in Table 13.

Our estimated reasonable range for the EBIT margin is 5.2% to 6.2%. The upper and lower bounds are equally-weighted averages of the three upper and lower bound estimates from three estimation techniques. The estimated ranges for each technique were 3.6% to 4.9% for the expected returns approach, 5.1% to 5.4% from a benchmarking analysis and 6.8% to 8.3% for the bottom-up analysis.

The EBIT margin range of 5.2% to 6.2% translates to an EBITDA margin range of 6.3% to 7.3%, on average, over the three forecast years. This also implies an EBIT margin of $1.67 to $2.02 per GJ and $55 to $67 per customer, and EBITDA margins of $2.02 to $2.37 per GJ and $67 to $78 per customer. The corresponding estimates from our 2010 report are an EBIT margin of 7.6% to 9.3%, $1.64 to $2.06 per GJ and $59 to $74 per customer; and an EBITDA margin of 9.2% to 10.9%, $1.98 to $2.40 per GJ and $71 to $86 per customer.[19]

Table 13. Average margin summary and valuation metrics

	Year 1 ranges			Year 2 ranges			Year 3 ranges			2010 report (avg)		
	Low	Base	High	Low	Base	High	Low	Base	High	Low	Base	High
EBITDA margin												
% sales	5.6	6.0	6.4	5.4	5.7	6.1	5.4	5.7	6.1	9.2	9.9	10.9
$/GJ	1.55	1.66	1.77	1.82	1.95	2.10	1.83	1.96	2.11	1.98	2.14	2.40
$/Customer	50	54	57	60	64	69	61	66	71	71	76	86
EBIT margin												
% sales	4.4	4.7	5.1	4.4	4.7	5.1	4.4	4.7	5.1	7.6	8.3	9.3
$/GJ	1.20	1.31	1.42	1.47	1.60	1.75	1.48	1.61	1.76	1.64	1.80	2.06
$/Customer	39	42	46	49	53	58	50	54	59	59	64	74
Value ($m)	104	115	128	108	119	134	111	123	138	95	108	128
Book-to-mkt assets	0.85	0.94	1.04	0.87	0.91	0.84	0.86	0.89	0.84	1.40	1.41	1.45
Value multiples:												
$/GJ	14	16	18	14	15	17	14	15	17	12	14	17
$/Customer	462	510	571	459	507	567	454	502	561	444	504	602
$/Revenue	0.45	0.57	0.47	0.38	0.45	0.39	0.38	0.44	0.39	0.57	0.65	0.76
$/EBITDA	9.0	9.5	9.9	7.4	7.9	8.2	7.2	7.6	7.9	5.9	6.2	6.6
$/EBIT	11.5	12.0	12.4	9.1	9.6	9.9	8.8	9.3	9.6	7.1	7.4	7.7
Equity multiple:												
$/NPAT	14.0	16.3	14.0	11.9	12.6	11.9	11.8	12.1	11.9	8.8	9.2	9.7

[19] These are the corresponding estimates from the 2010 report if the bottom-up approach had been applied on the basis of transaction multiples per energy unit and had been given equal weight

5. References

ActewAGL, 2013a, "Review of Regulated Retail Tariffs and Charges for Gas 2013-2016: Response to IPART Issues Paper," 21 January.

ActewAGL, 2013b, "Response to Review of regulated retail prices and charge for gas 2013-16," 20 May.

AGL, 2009. "AGL Submission to IPART Issues Paper: Review of regulated retail tariffs and charges for gas 2010 – 2013," 18 December.

AGL, 2013a. "Response to the Independent Pricing and Regulatory Tribunal Review of regulated retail prices and charges for gas 2013 to 2016, Issues Paper," 21 January 2013.

AGL, 2013b. "Review of regulated retail prices and charges for gas, 2013 to 2016 – AGL's Revised Pricing Proposal," 20 May 2013.

Brailsford, Tim, John Handley and Krishnan Maheswaran, 2008. "Re-examination of the historical equity risk premium in Australia," *Accounting and Finance,* 48 (1), 73 – 97.

Brailsford, Tim, John Handley and Krishnan Maheswaran, 2012. "The historical equity risk premium in Australia: Post-GFC and 128 years of data," *Accounting and Finance,* 52, 237–247.

Dunn, Peter, Scott Francis and Jason Hall, 2009. "Leveraged superannuation," *Accounting and Finance,* 49 (3), 505 – 530.

EnergyAustralia, 2013. "Response to the Issues Paper for Regulated Retail Prices and Charges for Gas 2013-16," 21 January.

Energy Supply Association of Australia, 2013. "Review of regulated retail prices and charges for gas 2013 to 2016 – Issues Paper," January.

Essential Services Commission of South Australia, 2011. "2011 Gas standing contract price path inquiry: Final inquiry report & final price determination," June.

McLennan Magasanik Associates, 2008. "Costs of gas supply for a second tier retailer supplying small customers in Queensland," November.

Origin Energy, 2013. "Submission to the Independent Pricing and Regulatory Tribunal on the review of regulated gas retail tariffs and charges from 2013 to 2016, Gas – Issues Paper," 21 January.

Queensland Competition Authority, 2008. "Review of small customer gas pricing and competition in Queensland," November.

Queensland Competition Authority, 2013. "Draft determination: Regulated retail electricity prices 2013 – 14," February.

SFG Consulting, 2009. "The association between changes in electricity demand and GDP growth," prepared for the Independent Pricing and Regulatory Tribunal, 2 October.

SFG Consulting, 2012. "Methodology for estimating retail electricity margins," October.