

## MEMORANDUM

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To: Essential Services Commission of South Australia

From: The Allen Consulting Group

Date: 17 August, 2006

**Re: Brief analysis of SFG's 'Response to Final Decision, Access Arrangements for SA Gas Distribution: Cost of Capital Issues'**

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### 1. Introduction

This brief note summarises the arguments put forward in SFG Consulting's (SFG) 'Response to Final Decision, Access Arrangements for SA Gas Distribution: Cost of Capital Issues', dated 21 July 2006. In this note we:

- Make an initial assessment of SFG's response;
- Assess whether SFG addresses the issues put in Escosa's Final Decision and ACG's earlier 'Advice in relation to SFG report on rate of return for gas distribution'; and
- Indicate whether SFG has provided substantial new theoretical points or empirical data.

In the remainder of this note we address the points raised in SFG's new paper according to the headings and numbering applied by SFG.

### 2. Recognising uncertainty in WACC parameter estimates

SFG's paper continues to propose that a valid 'probability distribution of the WACC' can be generated through estimating 'an appropriate distribution of each uncertain parameter'. No further guidance is provided on how the regulator can do this, nor on how a regulator should choose a cut-off in such a subjective probability distribution to correspond to an 'economically' reasonable range.

SFG claims that if the regulator applies a point estimate, this 'implies a standard error of the parameter estimate is zero'. This is not an appropriate comment, since a point estimate is based on judgement, which is standard practice in business and finance. As noted in our previous advice, any attempt to place the point estimate onto a probability distribution is bound to be subjective, which is demonstrated by the different results obtained by using parameter ranges applied by SFG/Envestra and the Commission.

SFG claims that Monte Carlo simulation is a standard technique used in many applications in finance, but does not mention that it is not applied by business practitioners to derive estimates of the cost of capital. A leading finance textbook

provides no role to Monte Carlo analysis for this task, and suggests that only the sensitivity of NPV to alternative discount rates can be examined after a distribution of cash flows has been derived using the technique.<sup>1</sup>

SFG reiterates that certain Australian and New Zealand regulators have applied Monte Carlo analysis, but does mention application by regulators outside of Australasia, which appears to be negligible.

### **3. Equity beta**

SFG ignores ACG's clear statement in our earlier Advice that we do not believe fine distinctions can be made between the betas of electricity, gas, distribution or transmission businesses. SFG claims that 'in its recent Final Decision in relation to gas distribution, the QCA, on advice from ACG, adopted an equity beta of 1.1 [which] is to be compared with the QCA's estimate of 0.9 for electricity distribution'.<sup>2</sup> However, SFG does not mention that the beta of 1.1 was at the top of the range provided to the QCA by ACG (whose best estimate was 1.0), and that the QCA chose this point.

SFG also ignores the point made in our earlier Advice explaining that our recommendation of a equity beta value of 0.9 for Queensland electricity distribution was based on the specific regulatory arrangements impacting on electricity distribution in Queensland, and not on the basis of price cap vs revenue cap, as is wrongly implied by SFG.

SFG concludes that 'there appears to be little difference between SFG, ACG, and the QCA in terms of the equity beta that is appropriate'. However, both the QCA and ESCOSA chose estimates of equity beta that lay within the bounds estimated by ACG (0.8 and 1.1), but not ACG's preferred point estimate. SFG claims that ESCOSA has not articulated why it has chosen a different value.

SFG contends that a degree of conservatism must be applied by regulators when setting WACC parameters, but does not demonstrate that the resulting WACC applied by ESCOSA is not conservative except in relation to SFG's own subjective Monte Carlo analysis.

After noting ESCOSA's concerns about potential biases in beta adjustment techniques (based on ACG's Advice), SFG agrees that 'estimates of beta are subject to a degree of statistical imprecision', but declares that the debate is 'live' and this is why a range should be applied.

### **4. The value of Franking Credits: Gamma**

SFG's response document claims that ACG has made an error in its assumed mechanics of how dividend imputation works:

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<sup>1</sup> R. Brealey, S. Myers, G. Partington and D. Robinson (2000), *Principles of Corporate Finance*, p.292.

<sup>2</sup> SFG (21 July, 2006), p.21.

The view expressed (twice) by ACG – that the rebate provision allows superannuation funds to redeem franking credits that could not previously be redeemed – is false... The rebate does not apply to taxpayers whose marginal rate is lower than the corporate tax rate, as ACG state. Rather, it applies to taxpayers who have zero taxable income. That is, the ACG premise is that the rebate provision affects superannuation funds, but it does not. The rebate provision applies only to entities with no taxable income, such as charities and some welfare recipients.<sup>3</sup>

These assertions by SFG are incorrect, and deserve a more detailed response here. ACG did not state that imputation credits had no value to superannuation funds prior to 1 July, 2000, but rather that the total value that superannuation funds derived from franking credits increased after that date. Prior to that date superannuation funds often could not utilise all their imputation credits, and The New Business Tax System legislation aimed to rectify this anomaly. The intention of this legislation is clear from the *Press Release* issued by the Treasurer, which stated at Attachment M.<sup>4</sup>

The government will legislate to refund excess imputation credits. This will be fairer to low income earners and remove investment distortions for superannuation funds.

It is important to SFG's position to show that the value of imputation credits was not materially different post 1 July 2000, because ACG's earlier Advice had stated that the gamma estimate of zero obtained by Cannavan *et al.*<sup>5</sup> was made redundant, even before it had been published, due to significant changes in Australian taxation provisions relating to the refunding of excess imputation credits. In considering the likely impact of the rebate provision, SFG suggests that the analysis of post 1 July 2000 data might be significant if ACG's premise were correct.<sup>6</sup>

If the July 2000 rebate provision had actually substantially increased the value of franking credits to resident superannuation funds (as under the premise of the ACG analysis) there would be good reason to separately examine the data before and after this date. That is, if it really were true that the value of franking credits to a significant component of the investor base were altered, there is the possibility that this would affect estimates of gamma. However, the rebate provision did not change the value of franking credits to superannuation funds at all.

Examination of the latest Taxation Statistics summary published by the Australian Taxation Office (ATO) indicates that there has in fact been a significant shift in 'refundable imputation credits' recorded for Australian 'Funds' (i.e. superannuation funds run by trustees on behalf of fund members), which have risen from zero in 1999-2000, to \$982 million in 2000-01 and \$2,225 million in 2003-04.<sup>7</sup> Furthermore,

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<sup>3</sup> SFG (21 July, 2006), pp.24-25.

<sup>4</sup> Treasurer of the Commonwealth of Australia (21 September, 1999) *Press Release No. 058 – The New Business Tax System*, Attachment M, Refunding Excess Imputation Credits.

<sup>5</sup> Cannavan, D., F. Finn and S, Gray (2004), 'The Value of Dividend Imputation Tax Credits in Australia', *Journal of Financial Economics*, 73, pp.167-197.

<sup>6</sup> SFG (21 July, 2006), pp.25-26.

<sup>7</sup> ATO (2006), taxation Statistics 2003-04: A summary of tax returns for the 2003-04 income year and collections for the 2004-05 financial year, table 7.7, p.109. The ATO's 'Fund tax glossary' defines this as, 'The amount of imputation credits relating to dividends (or non-share dividends) paid, where a fund is eligible for a refund of excess imputation credits.'

We are not alone in proposing the hypothesis that this tax change could be expected to have a significant impact on the valuation of imputation credits in Australia.<sup>8</sup>

SFG continues to maintain that ACG's statistical results are unreliable, but has omitted to comment on the additional tests that we undertook in our Advice to demonstrate the robustness of the result for the last two years of available data.<sup>9</sup> The fact that ACG could not find a statistically positive theta in the first three years of the new tax regime does not necessarily mean that the statistical tests are unreliable, or that the market misvalued imputation credits for three years. Similarly, SFG's assertion that we considered only the last two years of the data as relevant misrepresents our position. On the contrary, we advised caution in the light of these results, which implies maintenance of the gamma estimate of 0.50 that has generally been applied by Australian regulators.

On the consistency of gamma estimates and the CAPM, the new paper by SFG presents the same analysis that it provided in its earlier paper. SFG denies that it has not demonstrated that its proposed approach is theoretically and practically superior. The fact that SFG had previously stated that use of a personal tax level CAPM is impractical, and would add unnecessary complexity to regulatory processes is avoided.<sup>10</sup>

## **5. Inconsistency between assumptions for the market risk premium, gamma and observed dividend yields**

The debate around SFG's so-called inconsistency between assumptions for the market risk premium (MRP), gamma and observed dividend yields has been continuing for some time. In our Advice we demonstrated that by taking a general empirical view the level of tax paid relative to economic income is likely to be in the order of 15%, which resolves the 'inconsistency' referred to by SFG.

In this response SFG has stated that there are two problems with our analysis:<sup>11</sup>

1. The concept of 'economic income' used by ACG and ESCOSA is inconsistent with the use of the Officer-WACC framework; and
2. The relevant effective tax rate is that which applies to firms that pay franked dividends, and the effective tax rate for those firms is 29%.

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<sup>8</sup> David Beggs and Christopher Skeels (September 2005) 'Market Arbitrage of Cash Dividends and Franking Credits', research Paper 947, University of Melbourne, also saw this date as being significant: "Importantly, the year 2000 tax change that allowed for a tax rebate of unused franking credits was of special interest. This tax regime change permanently increased the value of franking credits to the marginal investor, and raised the estimated gross drop-off ratio" (p.18).

<sup>9</sup> For the financial years 2004 and 2005 we found that for alternative sub-samples of the 'large cap' (over \$500 million) group the general result of a theta at or above 0.74 held. In addition, we extended the analysis to a group of smaller cap (below \$500 million) companies and found that for these years for various sub-samples a theta in the range of 0.75 to 0.95 was observed.

<sup>10</sup> See SFG (2004), *Response to the QCA Paper: Cost of Capital for Regulated Entities*, submission prepared for ENERGEX Limited and Ergon Energy Corporation Limited.

<sup>11</sup> SFG (21 September, 2006), p.42.

A fundamental problem with SFG's approach is that it moves between the empirical world and the world of the Officer CAPM, which is framed in terms of a constant perpetuity. SFG does this selectively. To support its case, SFG draws on empirical evidence in relation to accounting effective tax rates, but appears to deny that evidence in relation to economic effective tax rates (as advocated by ACG) is admissible as this must lie outside the Officer CAPM's perpetuity framework. Thus, SFG only admits those aspects of empirical evidence that appear to support its case. For example, SFG states that the relevant tax rate is that observed for companies paying franked dividends, but it does not consider that consistency would require it to also refer to the dividend yield that is observed for companies paying franked dividends (which might be expected to be higher). Instead, it refers to the average dividend yield of all companies.

## 6. Market risk premium (MRP)

In this section SFG continues to dispute the methodologies applied by Fama and French<sup>12</sup>, and Jagannathan *et al*<sup>13</sup>, who derived MRP estimates in longitudinal studies that indicated values below the historically realised MRP in the US. SFG maintains that there is a methodological flaw in that 'realised growth in dividend yields is not necessarily the same growth expectations which are embedded in equity prices'.<sup>14</sup> It is held that Easton *et al*<sup>15</sup> have recognised this point and estimated what the market was forecasting about future growth. However, the fundamental fact remains that Easton et al derive a mid-point estimate of 5.3% for the MRP. In fact all of the longitudinal studies included by SFG derive an MRP below the 6% that is applied by the Commission. SFG also includes an estimate of 7.7% basing estimated earnings growth on aggregate corporate earnings, which appears to be a flawed methodology given the aggregated nature of this variable. Again, SFG includes an estimate of the yield premium for BB-rated corporate bonds (now adjusted for a default premium) over the risk free rate for the period 1990-2006 of 2.1%. SFG again makes an unjustified comparison between this value and the lower confidence interval of the Fama and French estimated MRP, which is derived on the basis of a much longer period of time, and does not provide the distributional properties of the bond returns series.

Thus, SFG's contention that the forward looking MRP is equally likely to be greater than 6% continues to rest on SFG's reliance on historically observed, or realised MRPs. Furthermore, SFG's analysis of market volatility and the price of risk (Sharpe ratio) appears to be circular in that it begins with a historically realised long run MRP of 7%, derives a Sharpe ratio of 0.52 and uses this ratio, combined with a volatility range of 13.1%-13.9%, to conclude that a 7% MRP is appropriate. In the analysis,

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<sup>12</sup> Fama, E.F. and K.R. French (2002), 'The equity premium', *Journal of Finance*, 57 (2), pp.637-659.

<sup>13</sup> Jagannathan, R. E.R. McGrattan and A. Scherbina (2000) 'The declining US equity premium', *Reserve Bank of Minneapolis Quarterly Review*, 24 (4), pp.3-19.

<sup>14</sup> SFG (21 September, 2006), P.48.

<sup>15</sup> Easton, P., G. Taylor, P. Shroff and T. Sougiannis (2002), 'Using forecasts of earnings to simultaneously estimate growth and the rate of return on equity investment', *Journal of Accounting Research*, 40 (3), pp.657-676.

SFG introduces a 90% confidence interval with no justification for why this should be relevant.

SFG undertakes detailed analysis and critiques of recent studies by Lettau *et al*<sup>16</sup> and Sill<sup>17</sup>, whose work indicates that macroeconomic volatility has decreased and contends that this should result in a lower MRP. We mentioned these studies in our previous advice to draw attention to the fact that the dominant research paradigm in financial economics with respect to the MRP is to derive explanations for *why* the MRP has declined, given that there is broad agreement that it *has* in fact declined relative to historically observed levels. SFG cannot point to an equivalent academic research program that supports the hypothesis that the historically realised MRP is appropriate in the current market.

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<sup>16</sup> Lettau, M. S.C. Ludvigson, and J.A. Wachter (2006), ‘The declining equity premium: What role does macroeconomics play?’ *Review of Financial Studies*, forthcoming.

<sup>17</sup> Sill, K. (2005), ‘Macroeconomic volatility and the equity premium’, Working paper 06-1, *Federal Reserve Bank of Philadelphia*.