Attachment 10.3

The Required Return on Equity for Regulated Gas and Electricity Network Businesses

A report by SFG Consulting

2016/17 to 2020/21 Access Arrangement Information

Australian Gas Networks

Updated estimate of the required return on equity

Report for SA Power Networks

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1. Background and conclusions

Overview and instructions

1. SFG Consulting (**SFG**) has been retained by a number of businesses, including SA Power Networks, to prepare a series of reports on the estimation of the required rate of return on equity under the new National Electricity Rules (**NER**). SFG prepared a report dated 6 June 2014 and titled *The required return on equity for regulated gas and electricity network businesses* and a further report dated 25 February 2015 and titled *The required return on equity for the benchmark efficient entity*.

2. SFG has now been retained to update the estimates from our previous report to account for new data that has become available since the previous report was prepared. In particular, this report uses an updated estimate of the risk-free rate based on a 20-day averaging period that begins on 9 February 2015.

2. Risk-free rate

3. In this report we adopt a 20-day averaging period beginning on 9 February 2015. The average yield on 10-year Commonwealth government bonds (expressed as an annualised return) is 2.55% p.a.

3. Market risk premium

Historical excess returns

4. The historical excess return estimate of MRP uses annual data, updated at the end of each calendar year. Consequently, no additional data has become available since our previous report and this estimate remains unchanged.[1]

Wright estimate

5. The Wright approach begins with a long-term historical estimate of the average real return on a broad market portfolio. This calculation also uses annual data, so the average real return on the market portfolio remains unchanged from our previous report. This real return is then converted into a nominal return using expected inflation. We adopt the same inflation estimate as in our previous report, 2.5% p.a. Consequently, the resulting estimate of the required return on the market remains unchanged from our previous report, as set out in Table 1 below.

6. Under the Wright approach, the MRP is estimated by subtracting the contemporaneous risk-free rate from the estimate of the nominal market return. Since this report adopts a lower risk-free rate, the estimate of MRP rises accordingly.

Dividend discount model

7. As for the Wright approach, the DDM produces an estimate of the required return on the market portfolio. No additional data has become available since our earlier report, in which case the estimate of the required return on the market remains unchanged, as set out in Table 1 below.

8. Under the DDM, the MRP is estimated by subtracting the contemporaneous risk-free rate from the estimate of the nominal market return. Since this report adopts a lower risk-free rate, the estimate of MRP rises accordingly.

Independent expert reports

9. In our previous report, we noted that independent expert reports uniformly quote estimates of MRP that do not include imputation credits. We adopted a (conservative) estimate of 6% for this ex-imputation MRP. We continue to adopt that estimate in this report.

10. Our previous report also demonstrated how to convert an ex-imputation estimate of MRP into a with-imputation estimate of MRP, as required by the Australian regulatory process. This procedure is set out in Officer (1994) and is currently used by IPART. This procedure depends, in part, on the contemporaneous risk-free rate. Since we adopt a different risk-free rate in this report, our independent expert report estimates of the required return on the market and MRP vary somewhat from our earlier report.

[11] The calculations throughout this report have all been performed using numbers computed to many decimal places. All intermediate calculations are reported to two decimal places. Consequently, figures may not add exactly due to rounding errors. That is, the final calculations have been performed using inputs with many decimal places of accuracy, rather than as calculations based on the rounded (to two decimal places) estimates of various inputs.

Summary

11. Our updated estimates of MRP, are summarised in Table 1 below. As for our previous report, we adopt an estimate of theta of 0.35, and an estimate of gamma of 0.25.

12. We apply the same relative weights to the various estimates as were employed in our previous report, for the same reasons as set out in our previous report.

13. We consider that the final estimates set out in Table 1 below are commensurate with the prevailing conditions in the market for equity funds in February 2015.

Table 1
Estimates of the required return on the market and MRP

Method	MRP	Required return on the market	Weighting
Historical excess returns	6.56%	9.11%	20%
Historical real returns (Wright)	9.09%	11.64%	20%
Dividend discount model	8.82%	11.37%	50%
Independent expert valuation reports	6.92%	9.47%	10%
Weighted average	**8.23%**	**10.78%**	**100%**

Source: Risk-free rate of 2.55% for 20-day period beginning 9 February 2015. Gamma set to 0.25, theta to 0.35. Calculation methods and justification for weighting scheme is set out in SFG (2014).

4. Financial models

Sharpe-Lintner CAPM

14. For the Sharpe-Lintner CAPM, we adopt a risk-free rate of 2.55% and an expected return on the market of 10.78%, which equates to a market risk premium of 8.23%, as set out above. We maintain the CAPM beta estimate of 0.82 from our previous report. This produces an estimate of the required return on equity of 9.28%:

$$\begin{aligned} r_e &= r_f + \beta\left(r_m - r_f\right) \\ &= 2.55\% + 0.82\left(10.78\% - 2.55\%\right) = 9.28\%. \end{aligned}$$

Black CAPM

15. For the Black CAPM, we adopt the zero-beta premium of 3.34% from our previous report. Adding this to the risk-free rate of 2.55% provides an estimate of the required return on a zero-beta asset of 5.89%. Consequently, the required return on equity is estimated as:

$$\begin{aligned} r_e &= r_f + \beta\left(r_m - r_f\right) \\ &= 5.89\% + 0.82\left(10.78\% - 5.89\%\right) = 9.89\%. \end{aligned}$$

The Fama-French three-factor model

16. When estimating the Fama-French model, we revise our estimates of the risk-free rate (2.55%) and the required return on the market portfolio (10.78%), as set out above. In all other respects, we adopt the same parameter values as in our previous report.

17. Consequently, the Fama-French model produces an estimate of the ex-imputation required return on equity of 9.88%:

$$\begin{aligned} r_e &= r_f + \beta \times MRP + s \times SMB + h \times HML \\ &= 2.55\% + 0.78\left(10.78\% - 2.55\%\right) - 0.19\% + 1.15\% = 9.88\%. \end{aligned}$$

Dividend discount model

18. As in our previous report, we use the dividend discount model to estimate the required return on equity for the benchmark firm by using the fact that the risk premium for comparable firms averages 94% of the risk premium of the market. This implies a dividend discount model estimate of the with-imputation required return of the benchmark comparable firm of 10.29%.[2]

Aggregation of available evidence

19. The estimates of the (with-imputation) required return of the benchmark firm are set out in Table 2 below. We apply the same weights to each estimate for the same reasons as set out in our earlier report. The resulting estimate of the required return on equity for the benchmark firm is 9.91%.

[2] 2.55 + 0.94 × 8.23 = 10.29.

Table 2
Estimates of the required return on equity for a benchmark efficient entity

Method	Required return on equity	Weighting
Sharpe-Lintner CAPM	9.28%	12.5%
Black CAPM	9.89%	25.0%
Fama-French model	9.88%	37.5%
Dividend discount model	10.29%	25.0%
Weighted average	**9.91%**	**100%**

20. We have also been asked to compute the overall required return on equity based on a simple equally-weighted average over the estimates from the four relevant financial models. The simple average is 9.83%.

References

SFG Consulting, 2014, *The required return on equity for regulated gas and electricity network businesses*, 6 June.

SFG Consulting, 2015, *The required return on equity for the benchmark efficient entity*, 25 February.