Appendix E

Regulatory rate of return and financial viability

The return on capital invested in water and sewerage assets is one of the key building blocks and is calculated by multiplying the value of our regulated asset base by the regulatory rate of return (also referred to as the weighted average cost of capital).

It is the measure of the opportunity cost of investment in regulated assets required to provide regulated services. The rate of return ensures an efficient business remains viable for the long-term, that is, it has sufficient revenue to service its debt obligations and ensure an incentive exists for ongoing investment by the regulated business. Given this, an appropriate rate of return is in the long-term interest of our customers.

The rate of return outcome needs to facilitate:

- price stability for customers across the regulatory period
- a reasonable return to owner, for the significant investment in regulated assets
- maintenance of our financial viability and the incentive for long-term investment, a regulatory objective as stated in the *Essential Services Commission Act 2002*, Section 6.

ESCOSA's guidance paper on the cost of funding and using assets was released in November 2018 and detailed the proposed methodology to be used in determining the rate of return for the 2020-24 regulatory period.

Using this methodology and applying market data as at June 2019, we forecast a rate of return of 2.52 per cent (post-tax real). This rate of return does not meet financial viability requirements, nor does it meet the other criteria previously noted.

We have proposed minor amendments to the current methodology and based on our proposed method, we forecast a rate of return of 3.59 per cent (post-tax real and applying market data as at June 2019). This better aligns with interstate water utility peers and provides a return that maintains our financial viability at a minimum level of acceptance.

Method

Our proposal is to amend the following rate of return parameters to improve the methodology and ensure the resulting return meets the criteria previously noted:

- inflation estimate used to adjust the rate of return from a nominal (including inflation) to real (excluding inflation)
- short-term averaging period of the risk-free rate.

We propose a minimum threshold for financial returns, and that the rate of return be considered in light of a minimum acceptable financial viability. This ensures our business maintains appropriate financial viability and there is incentive for long-term investment.

Table E.1 compares the proposed changes to the key parameters used in the method to calculate the rate of return.

Table E.1: Key parameters in the rate of return calculation

Parameter	ESCOSA — 2020 proposed method	SA Water — proposed method
Cost of debt estimation		
Debt risk premium	10-year BBB Proxy Bond (sourced from the Reserve Bank of Australia (RBA) Series of Credit Spreads)	10-year BBB Proxy Bond (sourced from the RBA Series of Credit Spreads)
Averaging period	10-year trailing average	10-year trailing average
Debt raising cost	0.125%	0.125%
Cost of equity estimation		
Risk-free rate	10-year CGB (nominal)	10-year CGB (nominal)
Averaging period	20 days	60 days
Market risk premium	6.0%	6.0%
Equity beta	0.60 — 0.70	0.70
Other		
Inflation	10-year average: RBA forecast for first year and mid-point of RBA inflation target band for remaining nine years (2.5%)	One-year RBA forecast; inflation estimate capped at inputted risk-free rate minus 0.15%
Credit rating	BBB	BBB
Gearing	60%	60%
Gamma	0.50	0.50

Based on market information as at 30 June 2019, the resulting rate of return outcomes under the proposed methods are provided in Table E.2. Note that the final rate of return outcome for the 2020-24 regulatory period will be determined in May 2020 and could vary significantly with market movements.

Table E.2: Rate of return forecast based on June 2019 market inputs

Parameter	ESCOSA 2020 proposed method	SA Water proposed method
10-yr BBB rate	4.53%	4.53%
Debt raising cost	0.125%	0.125%
Cost of debt	**4.66%**	**4.66%**
Risk-free rate	1.39%	1.63%
Market risk premium	6.0%	6.0%
Equity beta	0.7	0.7
Cost of equity	**5.59%**	**5.83%**
Inflation estimate	**2.45%**	**1.48%**
Post-tax nominal rate of return	5.03%	5.13%
Post-tax real rate of return	**2.52%**	**3.59%**

Comparison of regulatory rates of return with other jurisdictions

ESCOSA's current methodology generates rate of return outcomes that differ to other regulatory decisions, submitted pricing proposals and regulator published market updates, that use a post-tax real rate of return methodology (see Figure E.1). ESCOSA's methodology provides a significantly lower rate of return compared to our interstate peers.

Under our proposed method, the rate of return outcome would better align with other jurisdictions as illustrated in Figure E.2, albeit these outcomes are still lower.

Averaging period of the risk-free rate in the cost of equity

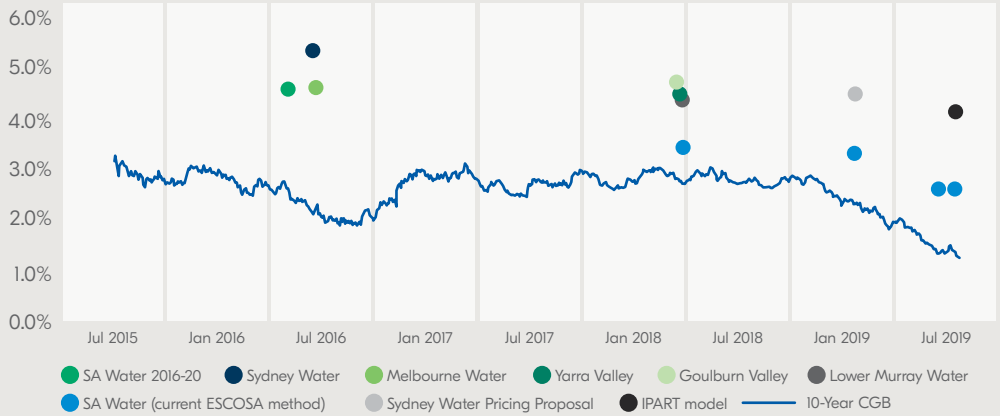
As part of the cost of equity calculation, the risk-free rate is currently estimated based on a short-term averaging period of 20 days. ESCOSA considers this averaging period provides the best estimate of the interest rates in the regulatory period.

Given the volatility in the Commonwealth Government Bonds (CGB), using such a short averaging period could lead to lottery-style outcomes. Figure E.3 shows the volatility of the 10-year CGB.

In June 2019, ESCOSA issued a further guidance paper on the averaging period of the risk-free rate. This paper concludes there is little difference in forecasting accuracy between alternative short-term averaging periods and ESCOSA is "open to the use of an approach where the regulated entity can choose an averaging period somewhere between twenty and sixty days and must do so no later than three months before the start of the regulatory period."

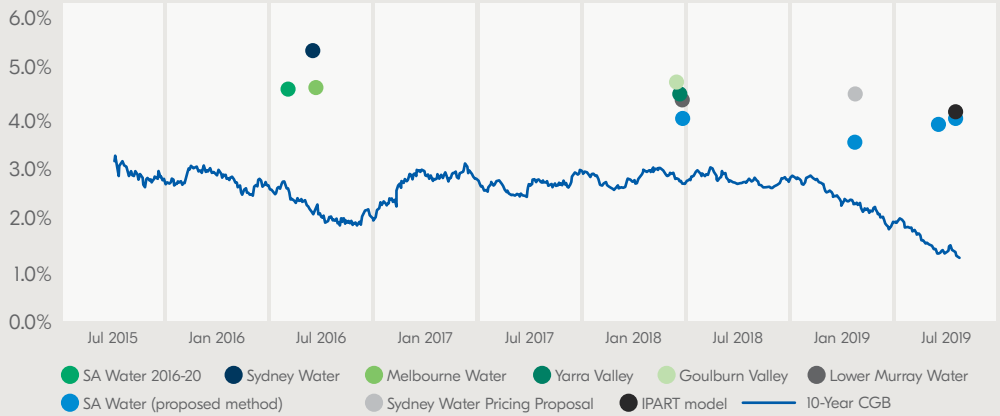
We propose using a 60-day averaging period, which would, to some extent, smooth the volatility of interest rates while ensuring the risk-free rate is still a fair representation of current market rates which is deemed to be the best estimate of future interest rates.

Figure E.1: Comparison of post-tax rate of return (current ESCOSA method)



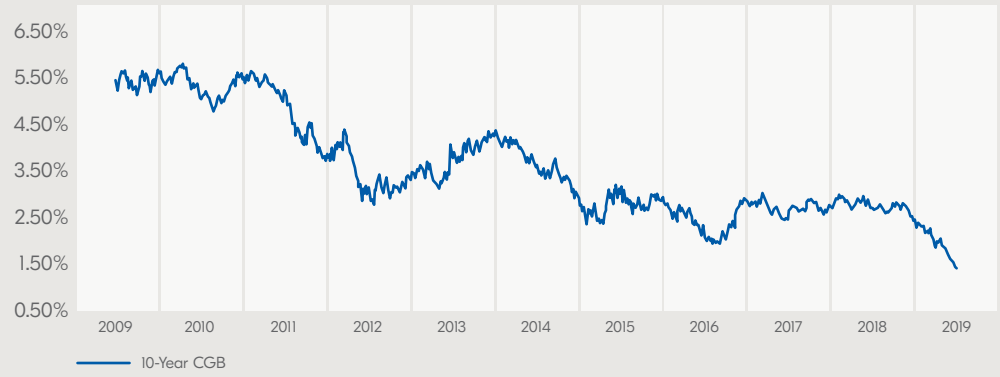
Source: Reserve Bank of Australia, SA Water Regulatory Determination 2016, 2016-20 Review of price of Sydney Water, Melbourne Water Price Review 2016, 2018 Goulburn Valley Water determination, 2018 Yarra Valley Water determination and 2018 Lower Murray Water determination, Sydney Water Pricing Proposal 2020-24, IPART – WACC Bi-annual update and current ESCOSA method.

Figure E.2: Comparison of post-tax rate of return (SA Water proposed method)



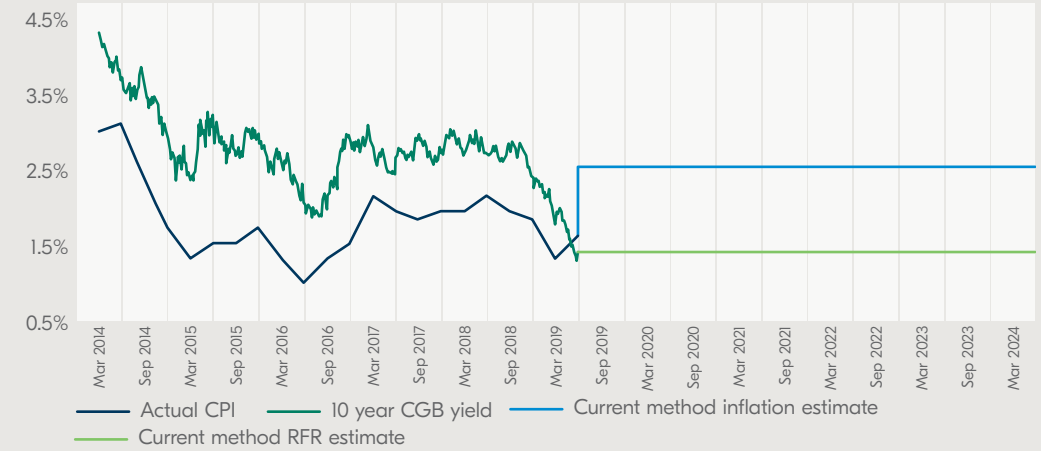
Source: Reserve Bank of Australia, SA Water Regulatory Determination 2016, 2016-20 Review of price of Sydney Water, Melbourne Water Price Review 2016, 2018 Goulburn Valley Water determination, 2018 Yarra Valley Water determination and 2018 Lower Murray Water determination, Sydney Water Pricing Proposal 2020-24, IPART – WACC Bi-annual update and SA Water proposed method.

Figure E.3: 10-year Commonwealth Government Bond Yield



Source: Reserve Bank of Australia.

Figure E.4: Current method inflation and RFR estimate



Source: Reserve Bank of Australia, Australian Bureau of Statistics and current ESCOSA methodology.

Inflation estimate

Our maximum allowable revenue in a regulatory period is set in real terms (excluding inflation) and customer prices are adjusted annually to reflect actual inflation. However, the methodology to calculate the regulatory rate of return uses nominal inputs (including inflation) and the resultant rate of return is in nominal terms. Therefore, it is necessary to convert this nominal rate of return into a real rate of return and this is done by estimating future inflation for the regulatory period. This creates a significant inflation risk that can lead to material impacts on revenue.

The current ESCOSA methodology assumes a long-term view of inflation (10-years) to be in line with the term of the underlying risk-free rate (RFR) (10-year CGB). ESCOSA's inflation estimate combines the use of the Reserve Bank of Australia (RBA) forecast of inflation for one year ahead and the midpoint of the RBA inflation target band (2.5 per cent) for the balance nine years. Given current Australian financial markets (for example CGB rates) and economic conditions (for example inflation), this is clearly illogical.

The theoretical logic for using a long-term inflation forecast is to match the term of the underlying RFR, but the methodology uses a RFR at a point in time and this rate is assumed for the entire four-year period. This is a fundamental flaw as the point-in-time RFR is based on market expectation of inflation at that same point in time, with the midpoint of the RBA inflation target band (2.5 per cent) having no relevance.

The market rate of the 10-year CGB (nominal) was 1.32 per cent as at June 2019 (Figure E.3) and using an inflation estimate of 2.45 per cent (current ESCOSA inflation estimation method) implies the real (excluding inflation) risk-free interest rate for the 2020-24 regulatory period is negative 1.10 per cent which is not logical. The estimate assumed in ESCOSA's current methodology (and assumptions) is represented in Figure E.4.

The ESCOSA guidance paper states there is a structural decline in yields since 2009, driven by the fall in the neutral real interest rate caused by a decline in the economy's potential growth rate and an increase in the risk aversion of households and firms. However, this still does not support the assumption of a negative real risk-free rate to determine an appropriate rate of return.

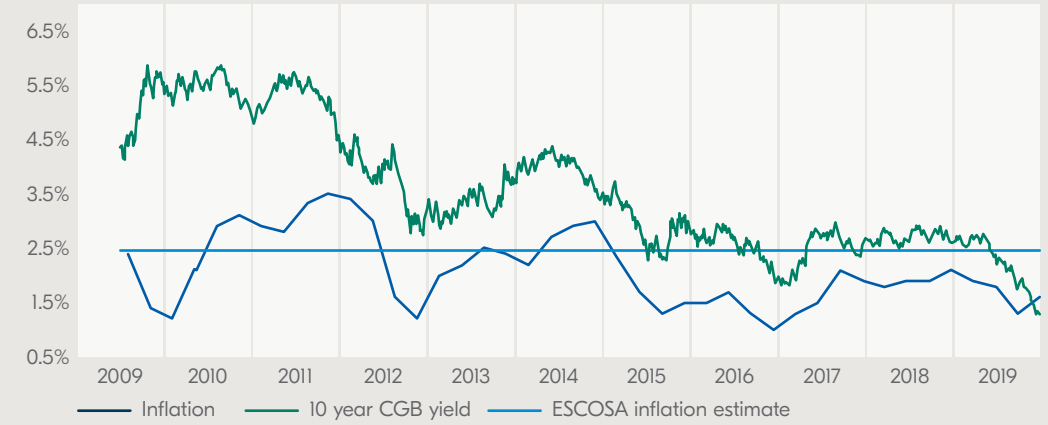
The assumption of a negative real interest rate on 10-year CGBs is not supported by the historic information as shown in Figure E.5. In its assessment, ESCOSA noted that Commonwealth Government indexed bonds may suffer from biases and premiums, but as inflation indexed bonds are the only directly observable real (excluding inflation) 10-year risk-free rate, the information obtained from these bonds should not be ignored. Based on this information, it is clearly substantially different from the real (excluding inflation) risk-free rate assumption used in ESCOSA's current methodology (movement of inflation indexed bonds maturing in 2027 and 2030 is given in Figure E.6).

Further, when discussing current monetary policy and inflation targeting on 25 July 2019, the RBA Governor noted while the Monetary Board is strongly committed to delivering an average rate of inflation between two and three per cent, it would be some time before inflation is comfortably back within the target range. The Governor's comments further substantiates the argument that using the midpoint of the RBA target range to determine the inflation estimate for the 2020-24 regulatory period is not suitable.

In addition, it should be noted that although the long-term average for inflation since the RBA commenced inflation targeting is close to 2.5 per cent, the average is lower when shorter timeframes are considered (refer Figure E.7) with the past five years averaging 1.67 per cent.

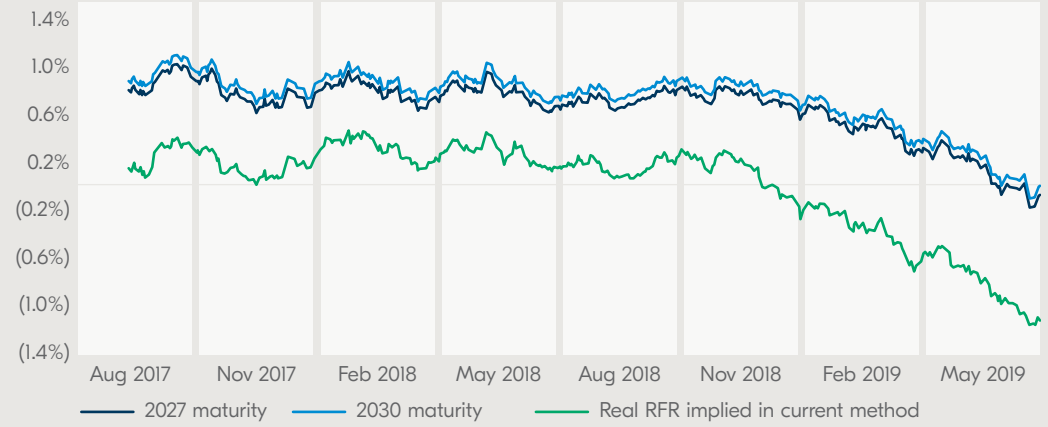
Given the evidence available, it is not appropriate or logical to use an inflation estimate for the 2020-24 regulatory period referencing the RBA inflation target band.

Figure E.5: Risk-free rate vs actual CPI



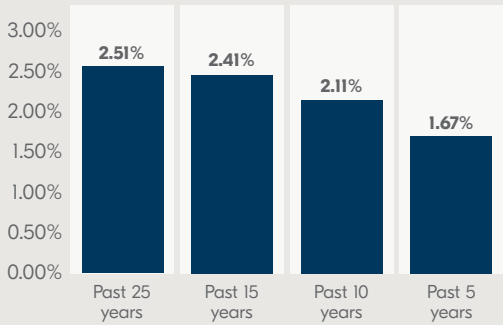
Source: Reserve Bank of Australia and Australian Bureau of Statistics.

Figure E.6: Inflation indexed bonds vs current model implied real risk-free rate



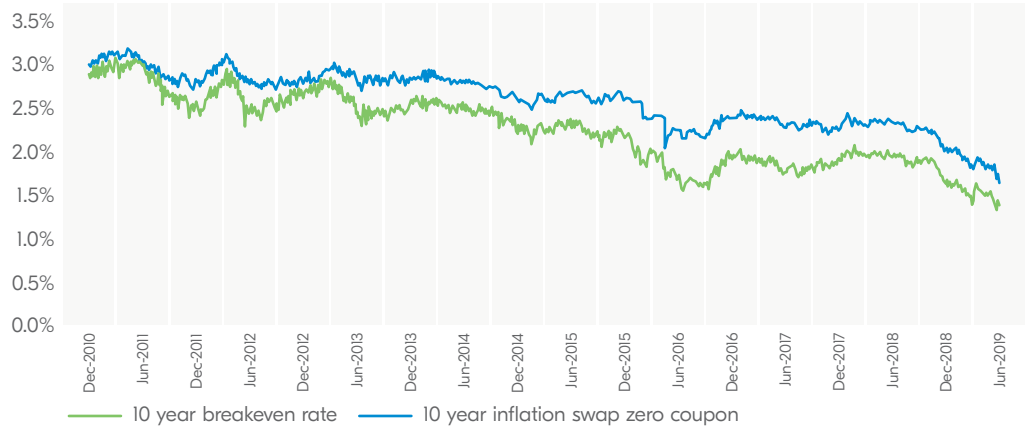
Source: Reserve Bank of Australia and current ESCOSA methodology.

Figure E.7: Average inflation



Source: Australian Bureau of Statistics.

Figure E.8: Inflation expectation based on bond breakeven approach and market inflation swap approach



Source: Bloomberg.

The two approaches commonly used to derive the current market expectations for inflation are the bond breakeven approach (difference between nominal Commonwealth Government bonds and inflation indexed Commonwealth Government bonds) and the inflation swap approach. As at June 2019, these two methods imply a market expectation for inflation of 1.38 per cent and 1.67 per cent respectively (Figure E.8).

We propose moving from an inflation estimate mainly based on the RBA midpoint for the long-term forecast to the RBA one-year inflation forecast to determine the real rate of return. To avoid an illogical real risk-free rate that is not positive, we also propose, irrespective of what methodology is used, the inflation estimate be capped at 0.15 per cent less than the RFR used in the rate of return calculation.

This approach would prevent a negative RFR and, based on June 2019 market inputs, it would result in an inflation estimate of 1.48 per cent, which is consistent with recent inflation and the current market expectation of inflation (of 1.38 per cent and 1.67 per cent). Our proposal is represented in Figure E.9.

Equity beta

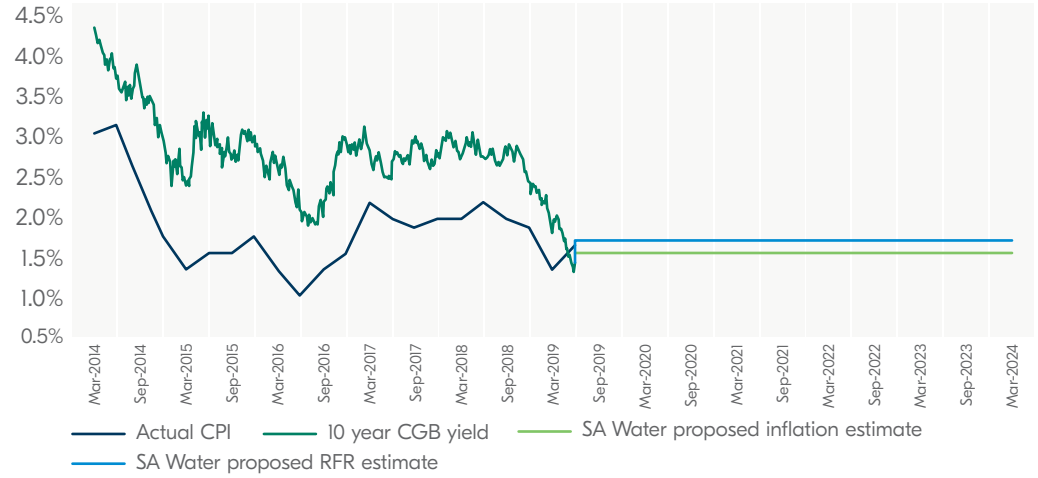
The equity beta measures the risk of a firm's returns, compared to that of the market. It represents the systematic or market-wide risk of a security that cannot be avoided by holding it as part of a diversified portfolio. In its guidance paper, ESCOSA commented that it considers a beta towards the lower end of the range of 0.6 to 0.7 appears appropriate. A beta of 0.7 was used by ESCOSA in the 2016-20 regulatory determination to calculate the rate of return.

We believe a beta of 0.7 should be used to calculate the rate of return for the 2020-24 regulatory determination because:

1. There is regulatory precedence in Australia to use a beta of 0.7 for water utilities (refer Table E.3).
2. As part of its current review of the equity beta assumption, the Independent Pricing and Regulatory Tribunal (IPART) has estimated an equity beta of 0.74 [1].
3. There is academic research that indicates the Sharpe-Linter CAPM model (used to estimate the return on equity component of the rate of return) tends to underestimate the cost of equity for low-equity beta stocks (such as regulated natural monopoly firms) [2]. It is suggested the risk of underestimating the required return on equity is substantially greater if an equity beta at the bottom of its range is adopted as opposed to choosing a point estimate at the top of its range [3].

1 https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-administrative-legislative-requirements-sea-wacc-methodology-2017/fact-sheet-estimate-equity-beta-1-april-2019.pdf (page 7)
2 See for instance: SFG Consulting, 2015 Beta, Beta and the Black Capital Asset Pricing Model, 13 February; NERA, 2015, Review of the Literature in Support of the Sharpe-Lintner CAPM, the Black CAPM and the Fama-French Three-Factor Model, March; HoustonKemp, 2016, The cost of equity: response to the AER's draft decisions for the Victorian electricity distributors, January. In recent rulings, the Australian Competition Tribunal accepted evidence of a low beta bias – see Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, para.731
3 https://www.ipart.nsw.gov.au/files/sharedassets/website/trimholdingbay/sydney_water_s_proposal_to_ipart_on_prices_to_apply_from_1_july_2016-_appendix_7_expert_report_on_the_wacc.pdf

Figure E.9: SA Water proposed method inflation and RFR estimate



Source: Reserve Bank of Australia, Australian Bureau of Statistics and SA Water proposal.

Table E.3: Equity beta applied by Australian regulators for water utilities

Year	Regulator and review	Equity beta
2019	Independent Pricing and Regulatory Tribunal — Sydney Water pricing proposal 2020-24	0.70
2018	Queensland Competition Authority — Seqwater Bulkwater Price Review 2018-21	0.77
2018	Independent Competition and Regulatory Commission — Icon Water Regulated Water & Sewerage services prices 2018-23	0.70
2017	Economic Regulatory Authority — The efficient costs & tariffs of the Water Corporation, Aqwest and Busselton Water	0.70
2016	Independent Pricing and Regulatory Tribunal — Review of Prices for Sydney Water 2016-20	0.70

Financial viability

Financial viability refers to our stand-alone capacity to finance our activities, including day to day operations and appropriate capital investments to replace, renew and expand infrastructure.

Based on a rate of return of 2.52 per cent (current ESCOSA methodology) we assess that we will be below the acceptable benchmark range (Baa2 (Moody's) or BBB (Standard & Poor's)). Under our proposed method that derives a 3.59 per cent rate of return, we would be within the benchmark BBB rating which aligns with ESCOSA's assumption used to calculate the rate of return.

Context

Under the *Public Corporations Act 1993*, our Board of Directors is responsible for protecting the long-term viability of the Corporation. The objectives of ESCOSA listed in the *Essential Services Commission Act 2002* includes facilitating maintenance of the financial viability of regulated industries and the incentive for long-term investments.

ESCOSA has not released any guidance on how it will assess financial viability. For some time, we have used an internal financial viability model to carry out this assessment and provide appropriate assurances to our Board whether the long-term viability of the Corporation is maintained.

The financial viability assessments do not take into consideration the final outcome of the independent inquiry into water prices and the potential impact this may have on our regulated asset base and related operating cash flows.

Assessment method

In assessing our financial viability, we follow the practice adopted by most regulators that assess financial viability based purely on quantitative factors. This approach excludes the qualitative factors that rating agencies apply in their formal ratings, however it is highly indicative, simple and transparent.

We assess our financial viability based on the following:

- A suite of four financial ratios (refer Table E.4). The value of these ratios is converted to a credit rating score based on the benchmarks consistent with those used by Moody's.
- As a minimum we have targeted a benchmark credit rating of Baa (Moody's) or BBB (Standard & Poor's). This approach is consistent with the assumptions used by ESCOSA in determining the rate of return. Our actual cost of debt is equivalent to a private sector Baa2/BBB rated borrower.

Based on this model, we have determined a minimum rate of return of around 3.50 per cent would be required to remain within the acceptable benchmark range in the 2020-24 regulatory period. Our proposed methodology would see our financial viability within this range. The forecasted financial viability assessment under our proposed method and the current method is set out in Figure E.10.

We have incorporated our proposed changes to the regulatory rate of return in our revenue calculation for the 2020-24 regulatory period.

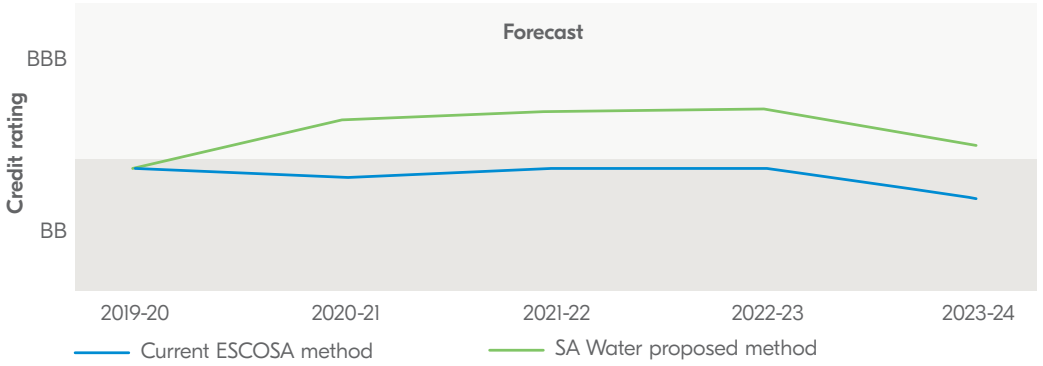
In addition to our internal financial viability assessment, we have assessed our financeability using the financial ratios adopted by the Independent Pricing and Regulatory Authority (IPART) to assess the financeability of regulated water utilities in New South Wales[4]. For each of these ratios, IPART has set a target ratio for a benchmark and actual test. We have used the target ratios of the actual test and the results of this assessment in the forward years under the current ESCOSA methodology and our proposed methodology are given in Table E.5 and E.6 respectively.

The assessment indicates under the current ESCOSA rate of return methodology, we would not be able to achieve the target for the Funds from Operations (FFO) over Net Debt ratio in the 2020-24 regulatory period. It should also be noted the ratio continues to deteriorate throughout the regulatory period. Under our proposed methodology, the target for all the ratios would be achieved in the 2020-24 regulatory period.

Table E.4: Financial viability ratios

Ratio	Benchmark range	Weightage
FFO interest coverage	2.5-4.5x	37.5%
Net debt / RAB (%)	55-70%	37.5%
FFO / net debt (%)	10-15%	12.5%
Retained cashflow / CAPEX	1.0-1.5x	12.5%

Figure E.10: Forecast financial viability assessment



Source: SA Water analysis.

Table E.5: Financeability assessment under current ESCOSA methodology

Forecast financial ratios	Target	2020-21	2021-22	2022-23	2023-24
Interest cover	> 1.8 x	2.24 x	2.29 x	2.29 x	2.34 x
FFO over net debt	> 6.0%	5.23%	5.15%	5.06%	4.93%
Gearing (net debt to RAB)	< 70%	52.4%	52.5%	53.2%	55.1%

Table E.6: Financeability assessment under SA Water proposed methodology

Forecast financial ratios	Target	2020-21	2021-22	2022-23	2023-24
Interest cover	> 1.8 x	2.59 x	2.63 x	2.61 x	2.63 x
FFO over net debt	> 6.0%	6.70%	6.51%	6.30%	6.03%
Gearing (net debt to RAB)	< 70%	52.9%	53.6%	54.8%	57.4%

4 https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-administrative-review-of-financeability-test-2018/legislative-requirements-review-of-financeability-test-2018/final-report-review-of-our-financeability-test-november-2018.pdf