7 RATE OF RETURN ON CAPITAL

The building block approach to determining TasWater's Notional Allowed Revenue (NAR) requires the Regulator to calculate a return on TasWater's capital. Australian regulators generally use a weighted average cost of capital (WACC) to determine the rate of return on capital. The WACC is calculated as the cost of equity multiplied by the proportion of capital that is assumed to be funded by equity plus the cost of debt multiplied by the proportion of capital that is assumed to be funded by debt. The cost of equity is also referred to as the return on equity.

The Regulator received one submission, from TasWater, that addressed the rate of return on capital. The issues raised by TasWater are addressed in this chapter.

7.1 Regulator's decisions

The Regulator has made the following decisions:

1. Continue to use a nominal vanilla WACC with a post-tax return on equity and a pre-tax return on debt.

2. Set the $WACC_{EXISTING}$ at 3.79 per cent and the $WACC_{NEW}$ at 5.28 per cent based on the following:

    a. a gearing ratio of 60 per cent;

    b. the prevailing risk free rate set using a 40 trading day average of the yield on 10-year Australian Government bonds as at 6 May 2022;

    c. an equity beta of 0.65;

    d. a market risk premium of 6.0 per cent;

    e. the cost of debt calculated as set out in 7.9.3.3 using a BBB+ credit rating and using a mix of one third A rated and two thirds BBB rated yield on corporate bonds, as published by the RBA;

    f. debt issuance costs of 0.08 per cent.

3. Not accept TasWater's proposal to review the cost of debt on an annual basis.

4. Not accept TasWater's proposal to calculate the cost of debt on a mean-reverting basis.

7.1.1 Changes to draft decisions set out in the Regulator's Draft Report

Due to increases in the cost of debt and equity since the release of the Regulator's Draft Report, TasWater's WACCs have increased as set out in Table 7.1 of this Report.

7.1.2 New decisions not in the Regulator's Draft Report

The Regulator has rejected TasWater's proposal that the cost of debt be updated on an annual basis and that the cost of debt include future interest rates based on historical average. More details on these decisions is provided in section 7.9.3.4.2 of this Report.

7.2 Regulator's WACCs

The Regulator's WACC components, calculated using data available as at 6 May 2022, and the resultant existing and new asset WACCs, are set out in Table 7.1 below.

The allowance for the return on capital is very sensitive to the assumptions adopted for inflation. This is because, using the nominal WACC, increases in the value of the RABs due to inflation are deducted from the return on capital. Bond yields include an expected inflation rate and, in calculating the return on capital using the nominal WACC, this implicit inflation rate needs to be the same as the inflation forecasts that are adopted.

In the weeks before the WACCs were calculated for the Regulator's Draft Report, there was a sharp increase in 10-year Australian Government bonds yields in response to expectations of higher inflation. This may not have been fully reflected the inflation forecasts in RBA's *Quarterly Statement on Monetary Policy* published earlier on 3 February 2022, though it did include higher forecast inflation than in the RBA's November 2021 statement. The RBA's latest Statement, published on 5 May 2022, includes higher inflation forecasts.

The 40 day average yield on 10-year Australian Government bonds, which is a key component of the WACC, has been increasing since the Draft Report. The Regulator's allowance for the return on capital, TasWater's NAR and maximum price increases, in this Final Report and Price Determination are therefore markedly higher from those set out in the Regulator's Draft Report.

Table 7.1 Regulator's WACCs for the fourth regulatory period calculated on 6 May 2022

WACC component	Value
Gearing	60%
Risk free rate (equity)	2.83%
Cost of debt	4.24%
Debt issuance costs	0.08%
Total cost of debt (Pre-tax)	4.32%
Market risk premium	6.00%
Equity beta	0.65
Statutory return on equity$_{(Existing)}$	3.00%
Cost of equity$_{(New)}$	6.73%
WACC$_{EXISTING}$	3.79%
WACC$_{NEW}$	5.28%

7.3   Calculating the WACC

The basic WACC formula is as follows:

$$\frac{E}{D+E}*Re+\frac{D}{D+E}*Rd$$

Where:

Re	=	Expected return on equity (costs of equity) is conventionally quoted as a **post**-tax value
Rd	=	Expected return on debt (the cost of debt) is conventionally quoted as a **pre**-tax value
D	=	Proportion of capital assumed to be funded by debt
E	=	Proportion of capital assumed to be funded by equity

This formula is referred to as a "vanilla" WACC. However the WACC can also be calculated on a real or nominal basis or on a pre-tax or post-tax basis resulting in a number of different WACC types and formulae.

In line with other regulators, the Regulator uses a benchmark WACC based on a notional efficient business rather than a WACC calculated using TasWater's actual financial information. This is on the premise that a benchmark WACC incentivises TasWater to efficiently finance its operations. The benchmark WACC would be one which would apply to an efficient business providing the same or similar services in a competitive market.

The WACC is a forward looking value and the derivation of some of the components is the subject of ongoing studies and vigorous debate between academics, regulators, regulated entities and other stakeholders.

The lack of certainty, and often conflicting supporting evidence, for some of the WACC parameters means that the final value and/or method of deriving the WACC involves discretion and judgement on the part of the Regulator. Also, regulators are bound by different legislative requirements in determining the prices or revenue that is to apply in other jurisdictions. This can result in different WACC parameter values across different jurisdictions and/or industries.

ESCOSA stated, in its *SA Water Regulatory Water Determination 2020,* that jurisdictions select rate of return methodologies to suit their own requirements and circumstances and that there are limitations and risks in cross-jurisdictional comparisons.[83]

ECOSA also stated that:

> As a matter of law, regulators must use the rate of return methodologies that meet their legislative requirements and objectives.[84]

In determining a benchmark WACC, the Regulator has considered the rate of return methodologies and parameter values used in other jurisdictions having regard to meeting the pricing principles set out in Section 68 of the *Water and Sewerage Industry Act 2008* (Industry Act).

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[83]   SA Water, *Regulatory Determination 2020, Final Determination* June 2020, page 277 available at:
https://www.escosa.sa.gov.au/ArticleDocuments/21489/20200611-Water-SAWRD20-FinalDetermination-StatementOfReasons.pdf.aspx?Embed=Y

[84]   Ibid.

7.4   Legislative requirements

Section 68(1A) of the Industry Act requires the rate of return on assets required to provide regulated services transferred to the previous regulated entities before 1 July 2011 to incorporate return on debt that takes into account the prevailing rate of interest for commercial loans and a pre-tax rate return on equity, not taking into account inflation, of three per cent.

For all other assets used to provide regulated services, the Industry Act requires that the rate of return must be no more than a rate that reflects the regulatory and commercial risks involved in providing the regulated services.

Therefore, Section 68(1A) requires two separate WACCs:

▪   one WACC for assets transferred to the previous regulated entities before 1 July 2011 and used by TasWater to provide regulated services (referred to as WACCEXISTING); and

▪   another WACC for all other assets funded and owned by TasWater to provide regulated services (referred to as WACCNEW).

7.5   Type of WACC

The Regulator used a real pre-tax WACC for the first and second water and sewerage price investigations and accepted TasWater's proposal to use a nominal vanilla WACC for the third regulatory period. TasWater proposed the use of a post-tax nominal vanilla WACC for the third regulatory period on the basis that the AER uses a post-tax vanilla WACC in its Post Tax Revenue Model and it is the most common form of WACC used by other Australian regulators therefore facilitates easier comparison. In addition, to avoid confusion and simplify the analysis of financial information TasWater also proposed the use of nominal dollars and considered a nominal WACC should be used for nominal values. The Regulator concurred with TasWater's view and accepted TasWater's proposal to use this form of the WACC.

A nominal vanilla WACC includes a post-tax return on equity and a pre-tax return on debt. This required the inclusion of a tax allowance and inflation adjustment in the NAR which are discussed in Chapter 2 of this Report.

TasWater has not proposed to change the form of the WACC and used a nominal vanilla WACC in its proposed price and service plan for the fourth regulatory period. Furthermore, the Regulator has not received any representations to change the form of the WACC and there has been no change in circumstances that would trigger a review of the form of the WACC. The Regulator will therefore continue to use a nominal vanilla WACC in calculating the rate of return component of TasWater's NAR for the fourth regulatory period.

7.6   WACC formulae

The following sections specify the formulae for the $WACC_{NEW}$ and the $WACC_{EXISTING}$.

7.6.1   WACC$_{NEW}$

The nominal vanilla $WACC_{NEW}$ is calculated using the following formula:

$$WACC_{NEW} = R_dG + Re(1-G)$$

Where:

R_d = Total cost of debt

= COD + DISSC

$$COD \quad = \quad \text{Cost of debt}$$

DISSC   Debt issuance costs

$$G \quad = \quad \text{Gearing ratio}$$

$$R_e \quad = \quad \text{Cost of equity}$$

$$= \quad RFR_e + \beta_e * MRP$$

$$RFR_e \quad \text{Risk free rate (cost of equity)}$$

$$\beta_e \quad = \quad \text{Equity beta}$$

$$MRP \quad = \quad \text{Market risk premium}$$

7.6.2 WACC$_{EXISTING}$

The nominal vanilla WACC $_{EXISTING}$ is calculated using the following formula:

$$WACC_{EXISTING} \quad = \quad R_d G + EXISTING\ R_e(1-G)$$

Where:

$$R_d \quad = \quad \text{Total cost of debt}$$

$$= \quad COD + DISSC$$

$$COD \quad = \quad \text{Cost of debt}$$

DISSC   Debt issuance costs

$$G \quad = \quad \text{Gearing ratio}$$

$$EXISTING\ R_e \quad = \quad \text{3\% nominal pre-tax return on equity}$$

7.7 TasWater's proposed WACCs

TasWater's proposed WACC components and the resultant WACCs are included in Table 7.2 below.

Table 7.2 TasWater's proposed WACC parameter values and WACCs

WACC component	Value
Gearing	60%
Risk free rate (equity)	1.67%
Cost of debt	4.85%
Debt issuance costs	0.10%
Total cost of debt (pre-tax)	4.95%
Market risk premium	6.50%
Equity beta	0.68
Statutory return on equity $_{(Existing)}$ (pre-tax nominal)	3.00%
Cost of equity$_{(New)}$ (post-tax)	6.02%
WACC$_{EXISTING}$	4.17%
WACC$_{NEW}$	5.41%

7.8 WACC components

The following sections discuss individual WACC components, set out the Regulator's assessment of TasWater's proposed method of determining each WACC component, specify the WACC component values for the fourth regulatory period that the Regulator applied in the Draft Report and provide the Regulator's responses to issues raised in submissions on the Draft Report.

7.8.1   Gearing ratio

The gearing ratio refers to the percentage of the business funded by debt. To ensure customers do not bear the cost associated with an inefficient financing structure, most regulators use a benchmark gearing ratio. This may be different to a business' actual gearing ratio. Regulators generally use a 60 per cent gearing ratio and the Regulator has used a 60 per cent gearing ratio in all previous pricing investigations.

The AER monitors the gearing estimates of a set of comparator companies. In Table 2 and Table 3 of the AER's *Return of return annual update, December 2020*[85] show average estimated gearing based on market and book values respectively.[86] Based on market values the five and 10 year average gearing estimates are 52 and 55 per cent respectively. Based on book value, the five and 10 year average gearing estimates are 71 and 70 per cent respectively.

TasWater has used a 60 per cent gearing ratio in its proposed WACC calculations. Based on the AER's recent findings, Regulator in the Draft Report, accepted TasWater proposal to continue to use a 60 per cent gearing ratio.

7.8.2   Risk free rate

The risk free rate (RFR) refers to a theoretical rate of return on an investment with no risk. The RFR is used to calculate the cost of equity. It is generally accepted practice, by both finance market practitioners and regulators, to use the return on a government security as proxy for the RFR, with the yield on 10-year Australian Government bonds commonly used.

For the third regulatory period, the Regulator used an equally weighted, 40 trading day average and 10-year weighted average, of the yields on 10-year Australian Government bonds as the RFR for the calculating a benchmark rate of return for both debt and equity.

However, as pointed out in TasWater's WACC proposal[87], as the rate of return for equity is entirely forward looking, the RFR used in calculating the cost of equity should be at the prevailing rate.

TasWater's proposed RFR was calculated using the yield on five-year rather than 10-year Australian Government bonds on the basis that a five year term satisfies the present value principle ie the net present value of cash flows over the regulatory period should equal the initial investment amount.

The term over which the risk free rate is calculated has been subject to extensive discussion by regulators, regulated entities and stakeholders. Most recently, the AER has re-examined the issue in its *Rate of return, Term of the rate of return & Rate of return and cashflows in a low interest rate environment, Final working paper, September 2021*.[88] Submissions supporting a five-year term were primarily on the basis that it aligned with the regulatory period and therefore ensured the satisfaction of the present value principle. Submissions supporting the continued use of a 10-year term cited the following reasons:

- the need for stability and consistency in the regulatory process, with no change to finance theory that warranted a change in the applicable term;

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[85] https://www.aer.gov.au/system/files/AER%20-%20Rate%20of%20return%20annual%20update%20-%202%20December%202020%20FINAL%2811739206.2%29.pdf

[86]   The market value uses comprises the market value of equity and book value of debt. The book value of debt is used due to the lack of liquidity in the Australian corporate debt market and because bank debt is not traded.

[87]   TasWater's proposed PSP, Appendix 12.

[88] https://www.aer.gov.au/system/files/Term%20of%20the%20Rate%20of%20return%20and%20Low%20Interest%20Rate%20Environment%20-%20Final%20working%20paper%20-%20September%202021_0.pdf (pages 24-39).

- consistency with standard commercial practices;

- it reflects academic literature;

- investors invest for the long term in long-lived assets and no evidence that investors limit their timeframes to that of the regulatory period; and

- the present value principle should be based on the life of the assets not on the regulatory period.

The majority of submissions supported the continued use of a 10-year term with a number of submissions advocating a term longer than 10-years based on long asset lives for infrastructure intensive businesses. Several submissions stated that the AER had not provided sufficient justification and evidence to change to a five-year term. The AER decided to maintain using the 10-year Australian Government bond. The Regulator considers that the aim of calculating a benchmark cost of equity is to replicate competitive market outcomes and the method should be similar to that used by finance practitioners. Setting a risk free rate based on bonds with a term similar to the regulatory period means that the regulatory process is influencing prices, and not standard market practice. Based on the recent discussions on this issue and the lack of a consensus, the Regulator proposed in the Draft Report to continue to use a 10-year term.

The Regulator noted TasWater's criticism of the Regulator not using prevailing rates in calculating the RFR for the cost of equity in the previous price investigation.

In the Draft Report, the Regulator considered that using a 40 trading day average of the yield on 10-year Australian Government bonds was appropriate as it reduces short term fluctuations in rates.

TasWater has not proposed a risk free rate for calculating the cost of debt as it proposed the use of the RBA's 10-year corporate bond yield data to calculate the cost of debt. In the Draft Report, the Regulator accepted TasWater's method of calculating the cost of debt and therefore did not require a separate RFR for that calculation.

7.8.3   Total cost of debt

The total cost of debt is the sum of the applicable cost of debt and debt issuance costs (DISSC) with the total cost of debt reflecting, as far as practicable, the debt management strategy of a benchmark efficient business.

7.8.3.1   Debt issuance costs

Economic regulators generally include an allowance for debt issuance costs to compensate a business for costs related to raising or refinancing debt such as legal fees, underwriting fees, and credit rating fees.

TasWater proposed a debt issuance cost allowance of 10 basis points (0.1 per cent) noting that the AER, in its 2020 draft determination for AusNet Services[89], had allowed debt issuance costs of 8.16 basis points.[90] TasWater rounded this amount to 10 basis points, as this was the amount the Regulator allowed for debt issuance costs for the third regulatory period.

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[89] Australian Energy Regulator, *DRAFT DECISION, AusNet Services Distribution Determination 2021 to 2026, Overview*, September 2020 available at: https://www.aer.gov.au/system/files/AER%20-%20Draft%20decision%20-%20AusNet%20Services%20distribution%20determination%202021-26%20-%20Overview%20-%20September%202020.pdf

[90] Ibid, pages 32-33.

The Regulator noted that in its AusNet Services draft determination, the AER had calculated debt issuance costs of 7.9 basis points but accepted AusNet Services' proposed draft estimate of 8.16 basis points as it did not consider the difference material. In its revised proposal, AusNet Services proposed debt issuance cost of 7.93 basis points, which the AER accepted. The AER also calculated benchmark debt issuance costs of 7.98 basis points in 2020 in its SA Power Networks final determination[91] but accepted SA Power Networks' proposal of 8.50 basis points on the basis that the difference was not considered material.

In the Draft Report, the Regulator considered the AER's calculated benchmark estimates (7.90 and 7.98 basis points) and the values proposed by the regulated entities (7.93, 8.16 and 8.50 basis points), were appropriate indicators of efficient debt issuance costs for the fourth regulatory period. The Regulator reached this conclusion on the basis that the values are relatively current ie calculated within the last two years, and three of the values are debt issuance costs proposed by regulated entities.

Consequently, in the Draft Report, the Regulator set debt issuance costs of eight basis points ie the median of the five values, 7.98, rounded up to eight basis points (0.08 per cent), as the efficient debt issuance cost for the fourth regulatory period.

7.8.3.2   Credit rating and data source

Economic regulators generally use a credit rating of BBB or BBB+[92] for regulated businesses on the basis that BBB- is the minimum rating for investment grade debt. The Regulator has, to date, used a BBB credit rating for determining the cost of debt. After considering credit ratings used by other regulators and due to the difficulty in obtaining yield information for BBB+ corporate debt. The Regulator used the derived yield of 10-year corporate bonds as provided in the RBA's statistical table F3 for the second and third regulatory periods and noted other regulators also use the RBA's corporate debt yield in calculating a cost of debt.

TasWater's proposal calculated the cost of debt using a derived BBB+ rating of the yield on RBA's corporate bond data. TasWater proposed to achieve a BBB+ rating using one-third A rated and two-thirds BBB rated corporate bond yields. This is the method used by the AER[93] to determine a benchmark credit rating of BBB+ due to a lack of publicly available price information for BBB+ corporate debt.

The AER monitors the credit rating of 23 electricity network business and Table 25[94] of its *Rate of return instrument, Explanatory Statement* shows a predominately BBB+ credit rating for network businesses over the 12 years to 2018. The AER's Rate of *Return Annual Update* for both 2019 and 2020 include a benchmark credit rating of BBB+ for each year. The ERA has also used a BBB+ credit based on the credit rating of a sample of 13 energy network businesses from 2013 to 2017 in which the median credit rating was BBB+ for four out of the five years.[95]

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[91] Australian Energy Regulator, Final determination, SA Power Networks, available at: https://www.aer.gov.au/system/files/Final%20decision%20-%20SA%20Power%20Networks%20distribution%20determination%202020-25%20-%20Attachment%203%20-%20Rate%20of%20return%20-%20June%202020%20.pdf (pages 3-14).

[92] Based on Standard and Poor's classification system.

[93] Australian Energy Regulator (AER), *Rate of Return Instrument, Explanatory Statement*, December 2018.

[94] Ibid, page 284.

[95] Economic Regulation Authority of Western Australia, *Final Gas Rate of Return Guidelines Explanatory Statement, Meeting the requirements of the National Gas Rule*, 2018, page 22.

In the absence of published credit ratings for Australian water utilities, the Regulator considered energy network businesses are the most appropriate comparators. Based on the AER's and ERA's findings, the Regulator considered that BBB+ is an appropriate benchmark credit rating for the cost of debt. In the Draft Report, the Regulator accepted TasWater's use of RBA corporate bond yields, BBB+ rating, and method of calculating the benchmark cost of debt.

7.8.3.3   Method of calculating the cost of debt

Historically, regulators have used an 'on the day' approach to calculating the cost of debt as prevailing market conditions market prices incorporate all information available regarding future prices and, therefore, theoretically represent the efficient expected cost of debt.

Under this approach, the actual debt costs a business incurs could be materially different to those determined through the regulatory process as it is unlikely a business would refinance its entire debt portfolio at one time.

To reflect the fact that businesses generally stagger their debt maturities to manage refinancing risk, regulators have changed from using an 'on the day' approach to a moving average approach (referred to as a trailing average) as this better aligns with the expected debt management practice of a benchmark efficient business.

All Australian regulators now use some form of trailing average in calculating the cost of debt. The most common form of the trailing average approach assumes ten equally weighted tranches of debt each with a 10-year maturity (ie every year, 10 per cent of a business's debt matures and is refinanced with new 10-year debt). The cost of debt is calculated as the average of the yield over a 10-year period with each year's yield contributing 10 per cent to the final value.

For the second and third price investigations, the Regulator used a combination of a weighted average and on the day approaches combining a 40 trading day average combined with a 10-year weighted average to determine the RFR and the DRP. The method resulted in greater weighting being given to rates that are more recent.

TasWater's proposal was informed by Marsden Jacob and Associates (MJA) analysis[96] which included a net present value (NPV) analysis[97] of the cost of debt using a 100 per cent trailing average compared to a 100 per cent on the day rate for all borrowings, and borrowing for new capex only. MJA's analysis found that in most instances the trailing average approach was superior to an on the day approach.

Where prices are reset on a four-year basis, MJA's analysis found that neither a 100 per cent trailing average nor a 100 per cent on the day approach meet the NPV = 0 pricing principle although the trailing average shows smaller deviations. As the deviations are opposite in sign, the overall difference could be reduced by some weighted combination of a trailing average and on the day approaches. However, as the relevant weights are not clear from the analysis, TasWater considered that all weight should be placed on the trailing average approach as this shows the smallest deviation. Based on MJA's analysis, TasWater therefore proposed using a trailing average, calculated at the start of the regulatory period using the simple average of the previous 10 years' yields, in calculating the cost of debt.

TasWater's proposed cost of debt uses the RBA's estimates of yields on 10-year corporate bonds as provided by the RBA (Table F3 data). MJA noted that while the target tenor (ie the length of time remaining before a financial contract expires) is 10 years, the effective tenor is less than this due to the residual maturity of the bonds used to calculate the values being less than 10 years. Therefore, to obtain

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[96]   Appendix 12 of TasWater's proposed PSP.

[97]   NPV = 0 ie the present value of the resulting revenues net of cash costs is equal to the initial investment.

the values for debt with a ten year maturity the TasWater proposed adjusting the RBA values using linear interpolation.

The trailing average approach involves recalculating the cost of debt for each year of the regulatory period, replacing the oldest 10 per cent of debt with new debt. This is achieved by taking an average (with the averaging method varying between regulators) of the corporate yields over the previous 10 years and using the resultant value in calculating the regulated prices or revenue for the following year. Over a four-year regulatory period, 40 per cent of the 10-year debt at the start of the regulatory period is replaced with new 10-year debt.

TasWater's rate of return is set for the duration of the regulatory period (ie prices are not updated annually). Therefore, a trailing average equal to a simple average of interest rates for the last 10 years would mean that by the end of the regulatory period, 40 per cent of those interest rates would no longer apply under a 10-year debt maturity profile.

An alternative approach is to replace 40 per cent of the oldest debt with new debt at prevailing rates. In light of TasWater's analysis and that of other regulators who either use a trailing average, or include a trailing average approach, in determining the applicable regulated cost of debt, the Regulator decided in the Draft Report to use a forward-looking cost of debt, which replicates an annually updated trailing average, notwithstanding that the calculation is carried out at the start of regulatory period.

As prices are determined prospectively, the 10 per cent of debt that matures during each year of the regulatory period would be included in the cost of debt at an 'on the day' rate as this is the best estimate of the rate at which new debt will be issued or maturing debt refinanced. Therefore, under the proposed approach, 40 per cent of debt that will mature during the four-year regulatory period is progressively replaced with debt at prevailing rates. The Regulator considered that this method will provide better incentives regarding efficient capex than a static cost of debt that retains the cost of debt that has matured.

TasWater proposal stated that the use of 'on the day' rates increases price volatility between regulatory periods due to the fluctuations in market conditions. The Regulator considered that the method discussed above would result in less volatility than TasWater's proposed method, namely a simple average of 10-year yields calculated at the start of the regulatory period, due to the inclusion of prevailing rates which are most likely closer to the values that will apply at the start of the next regulatory period.

As stated in the 2018 Final Investigation Report, the Regulator acknowledged the potential for greater variability in the cost of debt between regulatory periods where the cost of debt incorporates prevailing rates.[98] However, the Regulator also considered that the cost of capital should reflect current and expected market conditions over the regulatory period. Businesses and customers accept that markets conditions change and consequently prices will vary. In addition, the cost of debt is only one input into the calculation of the rate of return and, in turn, the NAR and any change will only have a proportional impact on customer's prices.

With respect to the term of the debt, the Regulator accepted TasWater use of linear interpolation to calculate a cost of debt with an exact 10-year maturity in the Draft Report.

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[98] Tasmanian Economic Regulator, *2018 Water and Sewerage Price Determination Investigation Final Report*, page 169, available at:
https://www.economicregulator.tas.gov.au/Documents/2018%20Water%20and%20Sewerage%20Price%20Determination%20Investigation%20Final%20Report.pdf

In the Draft Report, the Regulator applied the following approach to determine a BBB+ cost of debt for the four year regulatory period:

1. Calculate the average of yields of the RBA's non-financial corporate BBB rated bonds with a target tenor of 10 years over a recent two month period adjusted using linear interpolation to have a 10-year maturity.

2. Calculate the simple average of monthly values of the previous nine, eight, seven, and six years of yields of the non-financial corporate BBB rated bonds with a target tenor of 10 years adjusted using linear interpolation to have a 10-year maturity.

3. Calculate an average of the following for non-financial corporate BBB rated bonds:

90 per cent: monthly average bond yield over the past nine years	+	10 per cent: recent 2 month average bond yield
80 per cent: monthly average bond yield over the past eight years	+	20 per cent: recent 2 month average bond yield
70 per cent: monthly average bond yield over the past seven years	+	30 per cent: recent 2 month average bond yield
60 per cent: monthly average bond yield over the past six years	+	40 per cent: recent 2 month average bond yield

This process was repeated for A rated bonds and a weighted average was obtained based on the A rated value (one third) and the BBB rated value (two thirds).

Based on the above approach, the Regulator calculated a cost of debt, excluding debt issuance costs, of 3.97 per cent and a total cost of debt, including debt issuance costs (0.08 per cent) of 4.05 per cent in the Draft Report.

7.8.4   Submissions on Draft Report

TasWater's submission on the Draft Report raised the following issues in relation to the cost of debt:

7.8.4.1   *Debt repricing profile*

In its submission, TasWater proposed changing the cost of debt repricing profile.

TasWater considered that, by averaging monthly rates over the nine years preceding the new cycle, the Regulator's approach implicitly assumes that debt is issued at least once every month. TasWater also claimed that this approach will lead to estimation errors if the cost of debt in the tenth year preceding the new cycle is different from the cost of debt expected in the first year of the new cycle (which TasWater considered highly likely).

To address this issue TasWater proposed that the weighting of debt should be 90 per cent for the cost of debt over the nine years preceding the new cycle, 5 per cent for the cost of debt in the tenth year preceding the new cycle, and 5 per cent for the cost of new debt issued over the first year of the new cycle (predicted by the cost in the two months before the new cycle). Parallel adjustments would also be required for years two, three and four.

7.8.4.1.1   *Regulator's analysis and decision*

The cost of debt for regulatory purposes is for a benchmark efficient firm that uses a hypothetical 10 year repricing profile. The method proposed by TasWater effectively extends this profile to 11 years. The Regulator considers TasWater proposal adds extra complexity and would not result in a more accurate estimate of debt costs over the regulatory period.

The Regulator therefore has not accepted TasWater proposed changes.

7.8.4.2   *Annual review*

TasWater also proposed an annual review of the cost of debt in each year of the regulatory period.

7.8.4.2.1   Regulator's analysis *and decision*

As prices for all four years are determined as the start of the next regulatory period, rather than being updated annually, there is no reason to update the cost of debt annually as this cannot affect prices over the period.

The Regulator therefore has not accepted TasWater's proposal to update the cost of debt annually.

7.8.4.2.2   *Mean reverting interest rates*

TasWater proposed that, in the absence of an annual update to the cost of debt, the Regulator should use an average of historical rates rather than current rates when calculating the cost of debt on the basis that interest rates are mean reverting. TasWater stated that rates will revert to 'normal values over time' and proposed using the average of BBB corporate bond yields calculated by the RBA from January 2005 to February 2022.

### 7.8.4.3   *Regulator's analysis and decision*

The Regulator considers that an average of historical interest rates is unsuitable as an estimate of future rates for the following three reasons:

- The hypothesis that over the long term interest rates are mean reverting is subject to continued discussion among finance practitioners and academics.

- The trend over the past four decades in Australia has been decreasing interest rates.

- It is arbitrary to determine what time period should be considered in calculating an average interest rate.

Selecting the time period over which the rates are averaged will result in materially different values. Based on the earliest data from the RBA ie 1969 to the present (21 April 2022), the average 10 year Government bond yield is 7.56 per cent. However, the 30 year average rate is 5.05 per cent, while the 20 year average rate is 3.95 per cent. Applying TasWater's suggested approach would result in an average interest rate of 3.68 per cent.

With regard to the RBA's corporate debt yields, the longest period available is the range suggested by TasWater ie 17 years. The average over this period is 5.9 per cent. However this includes the relatively high yields during the Global Financial Crisis (GFC) which form a disproportionality high number of values compared to the impact of the GFC on Government bond yields. Therefore, using a simple average over the period would not reflect the secular trend which, like Government bonds yield, is for declining yields as shown in Figure 7.1.

Figure 7.1 RBA BBB corporate bonds yields
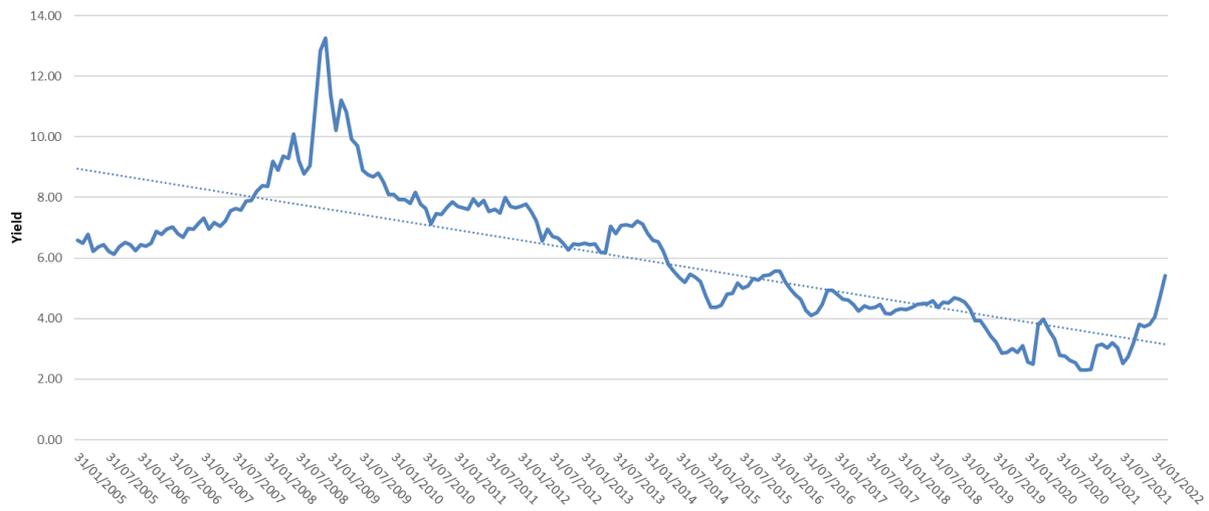
Financial commentators have suggested that the period of relatively low interest rates is the new secular trend and therefore historical averages may have no connection to future rates and are not an appropriate guide to forecast future interest rates.

The Regulator considers that the most recent market rates are the most appropriate rates to use in the cost of debt as they factor in all market information currently available and that it is not necessary to speculate as to what future interest rates will be.

Consequently, the Regulator has decided to continue to use the method specified in the Draft Report to calculate the cost of debt. Based on the values as at 6 May 2022, and applying the method used for the Draft Report, the cost of debt is 4.24 per cent.

7.9 Cost of equity

The cost of equity is the return that investors require to compensate them for the risk of investing in the business. As it is an expected return it is not observable, it is generally calculated using financial models. Of the numerous models used to calculate the expected cost of equity, Australian regulators use the capital asset pricing model (CAPM), in particular the Sharpe Lintner CAPM.

The formula for the Sharpe Lintner CAPM is:

$R_e = RFR_e + \beta_e (R_m - RFR_e)$ where:

R_e	is the expected required return on equity
RFR_e	is the risk free rate with respect to equity
β_e	is the equity beta for the business - the expected returns of the business relative to returns of the entire market
$(R_m - RFR_e)$	is the market risk premium - the market return (for all businesses) less the risk free rate

The CAPM is based on the premise that investors will only be compensated for systematic risks (risks that affects the entire economy and therefore cannot be eliminated by diversification) as any non-systematic risk can be eliminated by holding a diversified portfolio of investments.

However, the Regulator is required under section 68 of the Industry Act to take into account the assumption that the return on equity is to be not more than a rate that reflects TasWater's actual regulatory and commercial risks. If the Regulator assesses that TasWater's regulatory and commercial risks are lower than those using the standard CAPM model, this has to be allowed for in determining the cost of equity.

7.9.1 Market risk premium

The market risk premium (MRP) is the expected return above the risk free rate that investors require to invest in a market portfolio. As the value is ex ante, ie forward looking, it is not directly observable. Consequently, determining the MRP continues to be the subject of considerable debate among academics, economic regulators, regulated entities and other stakeholders.

In 2018 the AER[99], ERA[100] and IPART[101] reviewed how the MRP should be determined. The AER and the ERA, comprehensively reviewed the finance literature, various studies and reports commissioned by regulators, as well as undertaking their own analysis. All three regulators concluded that there was no consistent view as to the best method to determine a benchmark MRP as the information available was inclusive and in some instances contradictory. The AER undertook further research for its *Rate of return Equity Omnibus, Draft working paper, July 2021*[102], which confirmed its previous finding that there is no consensus or definitive view on the best method of determining the MRP.

Due to the difficulty of establishing the return on all assets, regulators have generally used the return on equity markets as a proxy for the market portfolio. As expected market returns are not observable, the MRP is generally determined by reference to historic equity returns and implied returns based on current share prices and the use of some form of the Dividend Growth Model (DGM). To a lesser extent, regulators also use MRP surveys conducted by market practitioners to inform their decisions on the MRP value.

Each method has its own inherit weaknesses with the outcomes dependent on the underlying assumptions.

At a high level, values based on past returns are sensitive to:

- the time interval used;

- the choice of risk free asset; and

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[99] https://www.aer.gov.au/system/files/Rate%20of%20Return%20Instrument%20-%20Explanatory%20Statement.pdf (pages 220-275).

[100] Economic Regulation Authority of Western Australia *Final Gas Rate of Return Guidelines Explanatory Statement, Meeting the requirements of the National Gas Rules*, 18 December 2018 available at:
https://www.erawa.com.au/cproot/19969/2/2018%20Final%20Gas%20Rate%20of%20Return%20Guidelines%20Explanatory%20Statement.PDF (pages 29-32).

[101] Independent Pricing and Regulatory Tribunal, *Review of our WACC method,* Final Report, February 2018 available at https://www.ipart.nsw.gov.au/sites/default/files/documents/final-report-review-of-our-wacc-method-february-2018_0.pdf (Section 5.5).

[102] https://www.aer.gov.au/system/files/Equity%20omnibus%20-%20Draft%20working%20paper%20-%2015%20July%202021.pdf (Section 4).

- whether an arithmetic or geometric average is used.

Points of contention include whether the MRP is mean reverting and the relationship between the risk free rate and the MRP.

On the first point, the longer the time period the lower the standard error of the final value. However, changes in markets and the underlying economy mean that relying solely on the value from the longest period may be a misleading indicator of current expectations of future returns. To address this issue the MRP is often calculated over a number of discrete time periods. However the core issue remains, namely that this method does not measure investor risk expectations in the past but rather measures actual returns.

The DGM in its simplest form states that the price of a share is equal to the expected dividend in the next period divided by the difference between the expected return on equity capital and the dividend growth rate. There are multiple forms of DGMs with each form subject to assumptions made about the inputs eg multi period DGMs have been developed to allow for more than one dividend growth rate. Regulators generally place less weight on the outcome of DGMs due to the sensitivity of the results to the long run growth rate used and the accuracy of the future earnings and dividends.

Survey results show MRP values used by financial market practitioners. While surveys may indicate what MRPs are used in a market setting, there are few surveys and, in a small market such as Australia the results are based on a relatively small sample size and dependent on the type of respondents ie surveys do not indicate in what context the respondents use the MRP. Consequently, regulators have tended to place less weight or no weight on survey results, compared to either historical returns, or returns based on DGMs.

TasWater proposed a MRP of 6.5 per cent based on its statistical analysis of the weights the AER placed on various estimators of the MRP in its *Rate of return instrument, Explanatory Statement, December 2018*.[103] The AER used four methods to determine the MRP:

1.   historical data;

2.   DGM;

3.   surveys; and

4.   estimates from other developed countries.

Placing most weight on historical data, the AER determined a MRP value of 6.0 per cent which it increased to 6.1 per cent after allowing for imputation credits.

TasWater reviewed the method the AER used to calculate its MRP and, contrary to the AER's approach, considers that the appropriate method for determining the weights to apply to the four methods is to minimise the mean squared error of the final value which is achieved by choosing individual components that have low correlation. Based on its analysis of the AER's data, TasWater proposed an equal weight should be given to the four methods which results in a median value of 6.4 per cent, which TasWater rounded to 6.5 per cent because all the values are estimates of the MRP and therefore are already rounded to some degree.

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[103] Australian Energy Regulator (AER), *Rate of Return Instrument, Explanatory Statement*, December 2018
      https://www.aer.gov.au/system/files/Rate%20of%20Return%20Instrument%20-%20Explanatory%20Statement.pdf

As noted above, the AER determined a benchmark MRP of 6.1 in its 2018 report. In its 2018 rate of return explanatory statement,[104] the ERA concluded that a MRP of 6.0 per cent was appropriate. The ERA contends the MRP value should be based on a range of relevant material and the relative contribution different methods should reflect their '…quality, including the potential to introduce bias…'[105]

Based on its evaluation of DGMs, the ERA concluded that it would place greater reliance on historic data than on DGMs. Furthermore, historical data is the basis for the MRP used by financial practitioners in Australia. The ERA stated that it had also use its regulatory judgement to take the following factors into account in determining a final MRP estimate:

- default spreads between the yield on corporate bonds and Australian Government bonds;

- interest rate swap spreads between interest rate swaps and Australian Government bonds;

- dividend yield;

- implied volatility; and

- debt risk premiums.

IPART uses a midpoint of a static historical MRP of 6 per cent and a current MRP recalculated every six months using a variety of methods including several variations of the DGM.[106] The inclusion of the current MRP in the benchmark MRP results in significantly increased volatility in the benchmark MRP which would invariably be reflected in prices.

The QCA in its draft 2021 Rate of return review report[107] proposed solely relying on historic data in determining a benchmark MRP. The QCA also proposes no longer considering the outcomes of DGMs due to the sensitivity of DGM's to input assumptions and modelling specifications, and considers that surveys may not contribute additional information in determining a benchmark MRP.

In the Draft Report, the Regulator considered other regulators' decisions and the supporting evidence and concluded that most weight should be placed on historical returns and less weight on DGMs. The Regulator considered that the volatility in the outcomes of DGMs and the subjectiveness of the model inputs make them a less reliable indicator of MRP than historical returns.

While acknowledging the limitations of surveys, the Regulator considered survey results[108] should be taken into consideration on the basis that the regulatory process is aiming to mimic an open competitive market therefore should take into consideration the values used by financial market practitioners.

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[104] Economic Regulation Authority (ERA) *Final Gas Rate of Return Guidelines Explanatory Statement, Meeting the requirements of the National Gas Rules*, 18 December 2018 available at

https://www.erawa.com.au/cproot/19969/2/2018%20Final%20Gas%20Rate%20of%20Return%20Guidelines%20Explanatory%20Statement.PDF (page 32).

[105] Ibid, page 109.

[106] Independent Pricing and Regulatory Tribunal, *Review of our WACC method,* Final Report, February 2018 available at https://www.ipart.nsw.gov.au/sites/default/files/documents/final-report-review-of-our-wacc-method-february-2018_0.pdf (Sections 5.5 - 5.6).

[107] Queensland Competition Authority (QCA), *Rate of return review*, Draft report, June 2021 available at http://www.qca.org.au/wp-content/uploads/2021/06/rate-of-return-review-draft-report.pdf (Section 6.4).

[108] https://assets.kpmg/content/dam/kpmg/au/pdf/2020/valuation-practices-survey-2019.pdf

In the Draft Report, the Regulator agreed with the AER and the ERA in that the benchmark MRP estimate is based consideration of a number of factors and considered a benchmark MRP of 6 per cent appropriate for the fourth regulatory period.

7.9.1.1 Submissions on Draft Report

In its submission, TasWater stated that the Regulator does not appear to have offered any reasons why TasWater's proposed approach of applying equal weighting across the four methods considered by the AER, resulting in a market risk premium of 6.5 per cent, was not accepted.

7.9.1.2 Regulator's analysis

The Regulator's reasoning for not placing equal weight on the various methods to determine the market risk premium and placing greater weight on historical returns was discussed on page 74 of the Regulator's Draft Report.

In summary, the Regulator considers that all methods used to determine the market risk premium have weaknesses. However, the method based on historical returns has fewer weaknesses and is also the most reliable.

7.9.1.3 Regulator's decision

As TasWater has not provided any additional evidence to support its initial proposal, and given the Regulator's reasons for placing greater weight on historical returns, the Regulator has decided to maintain a market risk premium, as specified in the Draft Report, of 6 per cent.

7.9.2 Equity beta

The equity beta measures the risk (volatility) of the returns from a class of business relative to the financial market as a whole. It should not reflect the risks of any particular business.

Due to the availability of data, similar companies listed on a stock exchange are typically used as comparators in determining a benchmark equity beta of unlisted regulated businesses. As there are no monopoly water and sewerage businesses listed on the Australian Stock Exchange, regulators have used listed electricity network businesses as comparators. However, due to the relatively small size of the Australian market, there are few suitable listed comparators.

Some regulators, such as IPART, use listed international business as comparators to inform its decision making while others such as the ERA consider that economic, political and regulatory differences invalidate international comparators.

In the Draft Report, the Regulator considered that listed Australian electricity network businesses are the most appropriate comparators as, like TasWater, they are monopoly providers of an essential service which has a low price elasticity of demand and where there are significant barriers of entry for new entrants. The Regulator considered that AusNet Services, a listed regulated electricity network services provider, to be the closest comparator as it has one activity, electricity network operation. Other potential listed comparators are involved in a range of activities, such as electricity generation, which alter the risk of their returns.

The Regulator considered international businesses' are less valid comparators than Australian-listed companies. In addition to the factors mentioned above, the international equity betas are calculated relative to the market portfolio in each county, the composition of which may differ significantly from the Australian market, eg the Australian market contains a relatively high proportion of listed resource companies.

Furthermore, as stated in MJA's analysis, equity betas are affected by:

- the overall level of leverage in a market relative to the leverage of the company in question; and

- the weighting by industry sector in the market index used to calculate the equity beta.

The consequence of the numerous differences between international markets may result in more volatile, or biased beta estimates relative to Australian comparators. The difficulties of using international comparators has been discussed by other regulators, most recently by the AER in its July 2021, *Rate of return, Equity Omnibus, Draft working paper.*[109]

For the third regulatory period, the Regulator considered the equity beta for listed electricity companies used by the AER in its *Appendices to the Explanatory Statement Rate of Return Guideline 2013.*[110] At the time, the Regulator considered that then listed Australian energy distribution businesses ie APA Group, Ausnet Services, Duet Group[111] and Spark Infrastructure were the best comparators as they were the closest to an energy network business.

MJA considers that betas over the longest period provide the most reliable equity beta estimate. Furthermore, TasWater was critical of the Regulator's decision to exclude delisted Australian companies from companies the AER includes in its comparator groups. MJA considers the data from the full comparator group should be used with the value over the longest period available the relevant value. Consequently, for the fourth regulatory period, MJA proposed using a beta of 0.675 calculated using weekly returns over the longest period using a combination of equally weighted Australian and International beta values with values of 0.57[112] and 0.78[113] respectively.

TasWater proposes an equity beta of 0.68 in its proposed PSP.

Equity betas change due to a number of factors including:

- changes in the composition of companies that comprise the market;

- changes in the gearing level of companies that comprise the market;

- changes in the company or that affect the class of companies;

- changes in the economic environment; and

- changes in the regulatory environment in which the company or the class of companies operate.

The ESC used an equity beta of 0.65 in its Melbourne Water 2016 Price Review. IPART's August 2021 WACC update included an equity beta for water industry in the range of 0.6 to 0.8. ICRC has used an equity beta of 0.7 in its 2018 *Final report, Regulated water and sewerage service price 2018-23.* ESCOSA used an equity beta of 0.67 in its *SA Water Regulatory Determination 2020.*

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[109] https://www.aer.gov.au/system/files/Equity%20omnibus%20-%20Draft%20working%20paper%20-%2015%20July%202021.pdf (pages 6-41).

[110] https://www.aer.gov.au/system/files/AER%20Explanatory%20statement%20-%20appendices%20-%20rate%20of%20return%20guideline%20-%20December%202013_0.pdf (pages 35-77).

[111] Duet Group is included in the listed group but was subsequently delisted in May 2017.

[112] Australian Energy Regulator (AER) *Rate of Return Instrument, Explanatory Statement*, December 2018, https://www.aer.gov.au/system/files/Rate%20of%20Return%20Instrument%20-%20Explanatory%20Statement.pdf (Table 13, page 182).

[113] Ibid, page 156.

The Regulator used an equity beta of 0.65 in the CAPM for the third regulatory period. Based on the equity betas used by regulators in other jurisdictions and in the absence of any specifically commissioned analysis, the Regulator set the equity beta at 0.65 in the Draft Report.

7.9.2.1   Submissions on Draft Report

In its submission, TasWater stated that the Regulator's draft decision to adopt an equity beta of 0.65 is inconsistent with the longest-time period betas and that the median of cited regulatory decisions in the Draft Report provide further support to TasWater's proposed equity beta.

7.9.2.2   Regulator's analysis

The Regulator would only apply a different beta than 0.65 if a compelling case is made that this beta is not appropriate for calculating TasWater's cost of equity.

The Regulator agrees that most applicable betas are those for listed Australian companies and, as discussed in the Draft Report, international comparisons are less appropriate.

The Regulator notes the following information provided in the AER's *Rate of return, Annual Update, December* 2020[114] in determining a benchmark equity beta:

- information on Australian betas in Table 4 in the AER report, specifically:

  o   the longest average of firm estimates of 0 .56 (method proposed by TasWater);

  o   recent 5-year values of firm-level estimates of 0.55;

  o   the longest and recent 5 year values for the P8[115] (Spark infrastructure and AusNet Services) of 0.41 and 0.43 respectively;

- Figure 2 in the AER report which shows estimates based on all periods cluster around 0.5-0.6; and

- Figure 3 which shows international betas for the longest period have increased slightly but remain below one.

Consequently, based on the above evidence, a beta based on the longest period for Australian companies and would be in the range of 0.5 to 0.6.

With regards to other regulatory decisions, IPART does not include any Australian companies in its beta calculation for water businesses. Instead it relies on the betas for all the firms in the 'water and related utilities industries' as per the Thompson Reuters Business Classification system which includes only international companies some of which are involved in multiple industries aside from the provision of water and sewerage services.

The ICRC retained an equity beta of 0.7, as determined in its previous investigation, which was based on consideration of international betas, betas used by other regulators and a report by HoustonKemp for Icon Water which suggested a range of 0.6 - 1.0 and stated that due to estimation bias when beta estimates are substantially less than a beta of 1.0, betas should be set at the top of a range.

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[114]

https://www.aer.gov.au/system/files/AER%20-%20Rate%20of%20return%20annual%20update%20-%202%20December%202020%20FINAL%2811739206.2%29.pdf (Pages 9-13).

[115] The AER's benchmark equity beta data refers to eight portfolios (labelled P1 to P8) with different constituent firms and different time periods.

In its draft report[116] ESCOSA has used a beta of 0.65 based on the equity beta decisions for regulated water businesses in other Australian jurisdictions. However, in response to the requirements set out in a Pricing Order, ESCOSA adjusted its beta to 0.67.

7.9.2.3   Regulator's decision

The Regulator has assessed that TasWater has not provided any compelling additional information evidence to support its initial proposal, and has decided to retain an equity beta, as specified in the Draft Report, of 0.65.

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[116]https://www.escosa.sa.gov.au/ArticleDocuments/21489/20200611-Water-SAWRD20-FinalDetermination-StatementOfReasons.pdf.aspx?Embed=Y