7 RATE OF RETURN ON CAPITAL

The building block approach to determining TasWater's Notional Allowed Revenue (NAR), which is discussed in Chapter 10, 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.

7.1 Regulator's intended decisions

The Regulator has made the following draft decisions:

1. Continue to use a nominal vanilla WACC.
2. Continue to use a gearing ratio of 60 per cent.
3. Use a 40 trading day average of the yield on 10-year Australian Government bonds as at 30 April 2022 as the prevailing risk free rate in calculating the cost of equity.
4. Accept TasWater's proposal to use a BBB+ credit rating and use a mix of one-third A rated and two-thirds BBB rated yield on corporate bonds as published by the RBA.
5. Require TasWater calculate a cost of debt based on the information available in April 2022 using the method set out in Section 7.5.3.
6. Require TasWater to apply a Market Risk Premium of 6.0 per cent.
7. Require TasWater to apply an equity beta of 0.65.
8. Require TasWater include debt issuance costs of 0.08 per cent.
9. Require TasWater apply a $WACC_{EXISTING}$ of 3.63 per cent and a $WACC_{NEW}$ of 4.75 per cent.

7.2 Regulator's draft WACCs

The Regulator's draft WACC components, calculated using data available as at 22 February 2022, and the draft 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 weeks before the WACCs in Table 7.1 were calculated, there was a sharp increase in 10-year Australian Government bonds yields in response to expectations of higher inflation. This is reflected, for example, in the RBA's *Quarterly Statement on Monetary Policy* published on 3 February 2022 which included higher inflation forecasts than in the November 2021 statement.

As a result, the 40 day average yield has been increasing. This 40 day average yield is a key component of the WACC. The WACCs that will be included in the Regulator's Final Report, issued in

May 2022, are therefore likely to be different from the WACCs calculated on 22 February 2022 as presented below in Table 7.1. In turn, this implies the Regulator's allowance for the return on capital, and the maximum price increases, in the Final Report and Price Determination are also likely to be different.

Table 7.1 Regulator's draft WACCs for the fourth regulatory period calculated as at 22 February 2022

WACC component	Value
Gearing	60%
Risk free rate (equity)	1.91%*
Cost of debt	3.97%*
Debt issuance costs	0.08%
Total cost of debt (Pre-tax)	4.05%*
Market risk premium	6.0%
Equity beta	0.65
Statutory return on equity$_{(Existing)}$)	3.00%
Cost of equity$_{(New)}$	4.56%*
WACC$_{EXISTING}$	**3.63%*#**
WACC$_{NEW}$	**4.75%*#**

*Different values will be obtained if the same approach were applied around the time of the completion of the Final Report and the making of the Price Determination.

The WACC$_{EXISTING}$ and WACC$_{NEW}$ are discussed in section 7.4

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.[69]

ECOSA also stated that:

> As a matter of law, regulators must use the rate of return methodologies that meet their legislative requirements and objectives.[70]

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).

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 $WACC_{EXISTING}$); and
- another WACC for all other assets funded and owned by TasWater to provide regulated services (referred to as $WACC_{NEW}$).

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.

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69 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

70 Ibid.

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 therefore intends to 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	=	Cost of debt
DISSC		Debt issuance costs
G	=	Gearing ratio
R_e	=	Cost of equity
	=	$RFR_e + \beta_e * MRP$
RFR_e		Risk free rate (cost of equity)
β_e	=	Equity beta
MRP	=	Market risk premium

7.6.2 $WACC_{EXISTING}$

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

$WACC_{EXISTING}$	=	R_dG + EXISTING $R_e(1-G)$
Where:		
R_d	=	Total cost of debt
	=	COD + DISSC
COD	=	Cost of debt
DISSC		Debt issuance costs
G	=	Gearing ratio
EXISTING R_e	=	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

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

In the following sections, the Regulator discusses the individual WACC components, assesses TasWater's proposed method of determining each WACC component, and specifies the Regulator's proposed WACC component values for the fourth regulatory period.

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*[71] show average estimated gearing based on market and book values respectively.[72] 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 considers 60 per cent is an appropriate benchmark gearing ratio and intends to accept TasWater continuing 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.

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

[72] 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.

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[73], 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 is 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.*[74] 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;
- 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 discussions to date and the lack of a consensus, the Regulator proposes to continue to use a 10-year term.

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

The Regulator considers that using a 40 trading day average of the yield on 10-year Australian Government bonds is 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. The Regulator intends to accept TasWater's method of calculating the cost of debt and therefore does not require a separate RFR for that calculation.

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

[74] 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).

Using data available as at 22 February 2022, the risk free rate is 1.91 per cent, calculated using a 40 trading day average.

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[75], had allowed debt issuance costs of 8.16 basis points.[76] 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.

The Regulator notes 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[77] but accepted SA Power Networks' proposal of 8.50 basis points on the basis that the difference was not considered material.

The Regulator considers the AER's calculated benchmark estimates (7.90 and 7.98) and the values proposed by the regulated entities (7.93, 8.16 and 8.50), as set out above, are appropriate indicators of efficient debt issuance costs for the fourth regulatory period. The Regulator has 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, the Regulator proposes a 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+[78] for regulated businesses on the basis that BBB- is the minimum rating for investment grade debt. The Regulator has, to date, used a

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75 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

76 Ibid, pages 32-33.

77 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).

78 Based on Standard and Poor's classification system.

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 calculates the cost of debt using a derived BBB+ rating of the yield on RBA's corporate bond data. TasWater proposes 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[79] 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[80] 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.[81]

In the absence of published credit ratings for Australian water utilities, the Regulator considers energy network businesses are the most appropriate comparators. Based on the AER's and ERA's findings, the Regulator considers that BBB+ is an appropriate benchmark credit rating for the cost of debt. The Regulator therefore proposes to accept 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.

While theoretically correct, this has created a situation where 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

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

[80] Ibid, page 284.

[81] 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.

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 [82] which included a net present value (NPV) analysis[83] 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 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 considers that all weight should be placed on the trailing average approach as this shows the smallest deviation. Based on MJA's analysis, TasWater therefore proposes 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 notes 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 the values for debt with a ten year maturity the TasWater proposes 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 proposes 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 considers 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.

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82 Appendix 12 of TasWater's proposed PSP.

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

TasWater proposal states the use of 'on the day' rates increases price volatility between regulatory periods due to the fluctuations in market conditions. The Regulator considers that method discussed above will 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 acknowledges the potential for greater variability in the cost of debt between regulatory periods where the cost of debt incorporates prevailing rates.[84] However, the Regulator also considers 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 accepts TasWater use of linear interpolation to calculate a cost of debt with an exact 10-year maturity

The Regulator therefore proposes the following approach to determine a BBB+ cost of debt for the four year regulatory period, the Regulator intends to apply the following calculations:

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:

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

The Regulator would then repeat the above process using A rated bonds and then obtain weighted average of 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.

[84] 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

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[85], ERA[86] and IPART[87] 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

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

[86] 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).

[87] 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).

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*[88], 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
- 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.

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

TasWater proposes a MRP of 6.5 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*.[89] 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 which it increased to 6.1 after allowing for imputation credits.

TasWater has 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 proposes 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.

As noted above, the AER determined a benchmark MRP of 6.1 in its 2018 report. In its 2018 rate of return explanatory statement,[90] 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'.[91]

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.

89 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

90 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).

91 Ibid, page 109.

IPART use 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.[92] 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[93] proposes 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.

The Regulator has considered other regulators' decisions and the supporting evidence and has concluded that most weight should be placed on historical returns and less weight on DGMs. The Regulator considers 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 considers survey results[94] 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.

In summary, the Regulator concurs with the AER and the ERA in that the benchmark MRP estimate is based consideration of a number of factors and considers a benchmark MRP of 6 per cent appropriate and intends to require TasWater to use an MRP of 6 per cent for the fourth regulatory period.

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.

The Regulator considers 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 considers AusNet Services, a listed regulated electricity network services provider as the closest comparator as it has one activity, electricity network operation. Other potential listed

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92 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).

93 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).

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

comparators are involved in a range of activities, such as electricity generation, which alters the risk of their returns.

The Regulator considers 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.*[95] The Regulator will therefore take into consideration international beta estimates but will place most weight on Australian beta estimates.

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.*[96] At the time the Regulator considered that then listed Australian energy distribution businesses ie APA Group, Ausnet Services, Duet Group[97] 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 proposes 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[98] and 0.78[99] respectively.

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

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

96 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).

97 Duet Group is included in the listed group but was subsequently delisted in May 2017.

98 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).

99 Ibid, page 156.

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.

As such, in determining a forward-looking benchmark equity beta, the Regulator considers that, while most weight should be placed the longest time period betas, some weight should be placed on more recent values to reflect the prevailing and expected economic conditions. As to Australian comparators, the Regulator agrees with MJA in that delisted companies are valid comparators.

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.*

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 intends to retain the equity beta at 0.65.