Water

SA Water Regulatory Determination 2020: Guidance paper 5

The cost of funding and using assets

November 2018

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Related reading

This Guidance Paper should be read in conjunction with the Framework and Approach paper and other Guidance Papers released by the Commission for SA Water Regulatory Determination 2020. Those papers and other information about SA Water Regulatory Determination 2020, are available on the Commission's website:

https://www.escosa.sa.gov.au/industry/water/retail-pricing/sa-water-regulatory-determination-2020

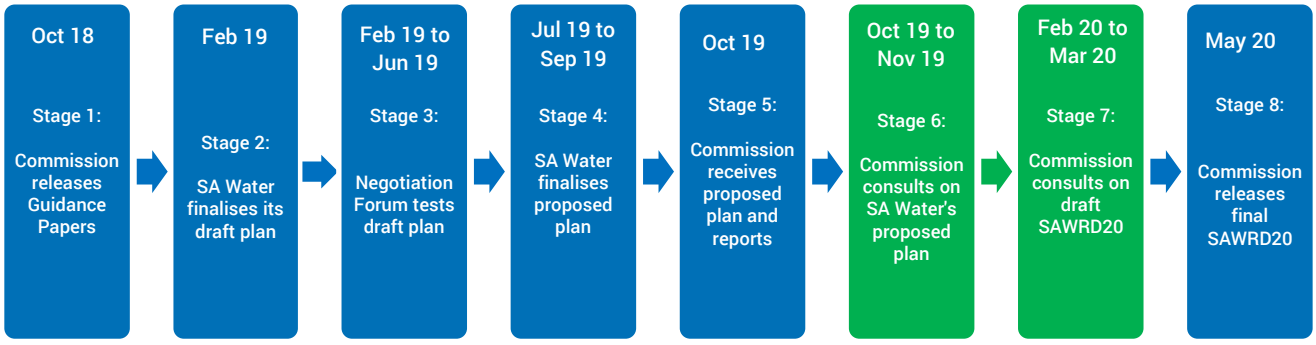
Timing for this review and upcoming consultation opportunities

While the Commission remains responsible for making the final regulatory determination, which will require SA Water to provide the water and sewerage retail services valued by customers for the lowest sustainable cost, the review process will involve multiple opportunities for stakeholders to be involved prior to that final determination.

Input from a diverse range of stakeholders is important, as it helps the Commission to make better informed and more inclusive decisions. The Commission will therefore draw on the full range of evidence provided by all stakeholders in making the final determination.

The timing of the key stages in SA Water Regulatory Determination 2020 are illustrated below, with the Commission's key consultation stages shown in green.

SAW RD20 review timeline



SA Water Regulatory Determination 2020 (SAW RD20) will set maximum revenues and minimum service standards for SA Water's drinking water and sewerage services, as well as setting pricing requirements for other miscellaneous retail services, to apply from 1 July 2020 to 30 June 2024.

SAW RD20 will challenge SA Water to:

- provide water and sewerage services at the lowest sustainable price for the quality and reliability levels valued by customers, and
- have in place sound long-term asset management, operating and financing strategies, which support the provision of those services for customers of today and tomorrow.

Those intended outcomes are consistent with the Commission's primary objective of protecting the long-term interests of consumers with respect to the price, quality and reliability of essential services.

Purpose of this document

In July 2018, the Essential Services Commission (**Commission**) established its framework and approach for SA Water Regulatory Determination 2020 (**SAW RD20**), which is intended to deliver the lowest sustainable prices for the services that SA Water's customers value.[1]

This is the fifth of a series of Guidance Papers released by the Commission to explain the requirements, methodology and process that will apply to SAW RD20. This Guidance Paper explains how the Commission will determine the efficient cost of funding investment in SA Water's regulated assets (return on regulated assets) and the efficient cost of using those assets (regulatory depreciation).

This Guidance Paper:

- explains the importance of those costs in determining SA Water's drinking water and sewerage revenues
- describes how the Commission has determined those costs in the past
- provides a summary of the past trends in those costs
- outlines the issues that need to be considered and resolved for SAW RD20, including through stakeholder consultation and the Negotiation Forum process (outlined in Guidance Paper 1), and
- contains a series of technical appendices regarding estimation of the regulatory rate of return.

It should be read in conjunction with Guidance Paper 2 – SA Water's revenues and prices, which provides an explanation of the cost-based (building block) approach to setting revenues and discusses the risks that SA Water faces in providing drinking water and sewerage services, which is relevant to determining the regulatory rate of return.

[1] SA Water Regulatory Determination 2020, Framework and approach, July 2018, available https://www.escosa.sa.gov.au/projects-and-publications/projects/water/sa-water-regulatory-determination-2020-framework-and-approach

Why is the cost of funding and using assets important?

As discussed in Guidance Paper 2 – SA Water's revenues and prices, around 40 percent of SA Water's costs of providing drinking water and sewerage services relates to the cost of funding new and existing assets (the return on regulated assets) and around 23 percent relates to the cost of using assets (regulatory depreciation). These fixed costs make up the majority (approximately two thirds) of SA Water's total regulated revenue. The remainder relates to the day to day operations of the business.

Customers pay for SA Water's assets over the period in which they operate; they are not paid for by customers in total at the time they are built. This recognises that the assets will benefit customers over many decades and that those costs should therefore be shared by customers of today and tomorrow.

There are two types of costs that relate to the provision of assets:

- return on regulated assets, which reflects the cost of either borrowing money (interest payments on debt) or investments by shareholders, and
- regulatory depreciation (return of assets), which reflects the wear and tear of using assets over time.

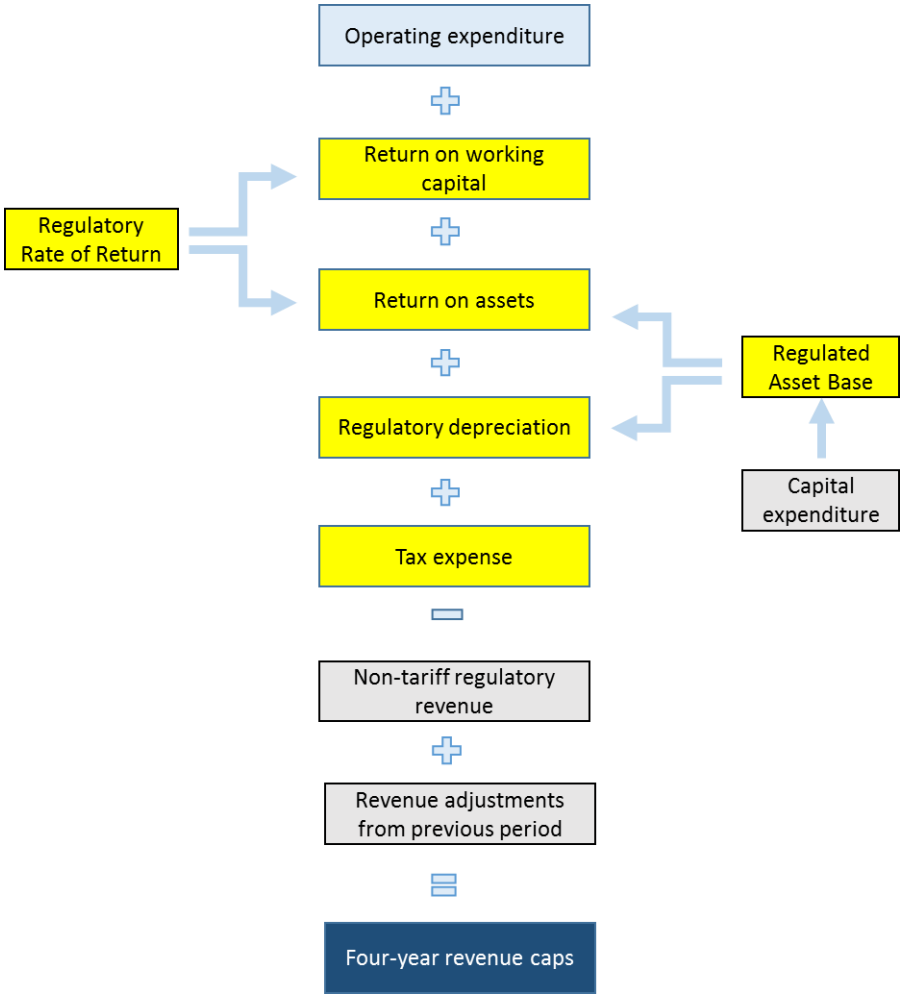
The return on regulated assets is dependent on the regulatory rate of return and the value of regulated assets. Regulatory depreciation is dependent on the value of regulated assets and the time period over which customers derived benefits from those assets (asset lives).

The Commission expects the Negotiation Forum to consider the risk/reward trade off when negotiating service levels and regulated revenues for SAW RD20. It does not expect the Negotiation Forum to negotiate the individual parameters of the cost of equity, nor those of the cost of debt. A more general discussion about the profitability of SA Water, relative to the risks of the business, is likely to inform the Commission's determination of the cost of equity and, in particular, the value of equity beta. The Commission expects SA Water to include analysis of its current financial viability and profitability in its proposed regulatory business plan and to explain clearly to stakeholders, including the Customer Negotiation Committee, how its proposals impact upon its financial position.

There are two, relatively immaterial, costs that are related to those items that are also discussed in this paper. The first is the return on working capital, which is the efficient return on short-term assets (working capital) that SA Water needs to cover its day-to-day expenses. The second is tax expense, which is the amount of tax that is payable on profits from drinking water and sewerage services.

Those cost inputs are highlighted in Figure 1 below.

Figure 1: Return on assets, regulatory depreciation, return on working capital and tax expense



Return on regulated assets

The return on SA Water's regulated assets represents the efficient cost of investing in new and existing regulated assets. It is calculated as a product of the regulatory rate of return and the value of regulated assets.

Large infrastructure businesses like SA Water will use a combination of debt and equity to fund investments. Using debt to fund all investments raises risks to a business that it will be unable to meet its interest repayments to banks in the future. Using only equity is a more expensive way to finance investments, as investors typically require a higher return on investments than banks do for lending, to reflect the higher risk of uncertain returns, and as debt holders have priority over the assets of the company if it is ever wound up. In determining SA Water's revenues, the Commission will assess the efficient cost of financing SA Water's investments, using a combination of debt and equity to calculate a Weighted Average Cost of Capital (WACC). The components of WACC are calculated in the context of the risk that is commensurate with the nature of the business conducted by SA Water.

The Commission will also determine the reasonable amount of depreciation that should be recovered from customers over the next four years. In both cases, the Commission needs to take a long-term perspective, as SA Water's decisions to invest in infrastructure are long-term decisions (of up to 100 years).

The returns to investors are post-tax, which means that the tax that should be paid on income earned on investments must be included in the revenue that SA Water can collect from its customers.

The cost of equity

The cost of equity forms part of the regulatory rate of return. The key considerations of an efficient cost of equity are:

- How much equity should be used to finance investments?
- What return should equity holders earn, based on the level of risk that they face?

Utility regulators typically assume that 40 percent of investments is funded through equity and 60 percent is funded through debt.[2] This is based on evidence drawn from the proportions of funds used in similar, asset-intensive, businesses. The Commission proposes to adopt that ratio for SAW RD20.

In relation to returns on regulated assets, it is important to consider the risks that an investor in SA Water would face as those risks will drive the expected returns. Any risks that can be mitigated by the business or can be diversified by an investor by holding other investments should not be included within the equity component of that return. Based on the analysis of risk, discussed in Guidance Paper 2 – Revenue Regulation and Pricing Principles, there are few risks that SA Water faces relative to other types of businesses, due to it being a monopoly business supplying an essential service and due to the regulatory arrangements that apply to it. The return that any investor would expect from SA Water would be lower than it would for most other businesses, given those few risks.

The Commission will adopt a technical method for calculating the return on equity, called the Capital Asset Pricing Model (CAPM).[3] Further information about CAPM is provided in the Appendices 1 and 2.

In the previous two regulatory determinations, the Commission calculated the cost of equity by establishing forecasts of the components of the cost of equity, using the CAPM. One of those components, the Risk Free Rate, was calculated as an average of Commonwealth bond rates over a 20-day period, just prior to the making of each of the determinations. It relied on short-term market observations.

SA Water have proposed changing part of the calculation of the cost of equity. The reasons why SA Water is proposing the change are primarily for price stability, but there may be unintended consequences if this change were to be introduced. The technical details of this are discussed in Appendix 1.

Noting those matters, the Commission nevertheless remains open to further consideration of this issue and invites SA Water to make the case for a trailing average cost of equity in its draft business proposal. The Commission expects any proposal by SA Water for a long-term cost of equity to be supported by:

- evidence that customers prefer long-term price stability
- analysis to show that adopting a long-term cost of equity is the best way to reduce price volatility, and
- information about the long-term impacts on revenues and prices of adopting that approach, relative to using the prevailing Risk Free Rate.

In relation to other aspects of the cost of equity, the Commission intends to calculate the components of CAPM consistent with its previous regulatory determination (SAW RD16), but it will consider possible changes in estimating equity beta (ß), as outlined in Appendix 1. The equity beta is a key parameter of the cost of equity and is dependent on the level of risk that shareholders of SA Water face, relative to the risks faced by shareholders generally. Those risks are discussed in Guidance Paper 2 – SA Water's Revenues and Prices.

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2 A summary of those regulatory decisions is set out in Appendix 2.

3 Use of the CAPM is consistent with the terms of the First Pricing Order issued under the Water Industry Act 2012, which is available at http://www.escosa.sa.gov.au/ArticleDocuments/482/120930-WaterIndustryAct-FirstPricin.pdf.aspx?Embed=Y

The cost of debt

The cost of debt will depend on the timing of SA Water's investments – past investments will be financed by debt that has a given interest rate and future investments may have a different interest rate.

The Commission's approach to calculating SA Water's cost of debt assumes that a benchmark efficient entity will issue debt with a maturity of 10 years and, that 10 percent of its total debt is refinanced (renegotiated with banks) every year. This is based on benchmark management practices used by large infrastructure businesses.[4] Under this approach, SA Water can manage the risk of interest rates being high at any point in time. It delivers a more stable overall cost of debt than an approach that assumes it refinances all of its debt at the same time. For the customer, this translates to more stable pricing, noting, however, that long-term debt is more expensive than short term debt and that customers can expect to pay more.[5]

The Commission's guidance is that it will continue to use the cost of debt methodology that was adopted in its previous regulatory determination as it reflects the way a benchmark efficient entity would be likely to finance itself.

The value of the Regulated Asset Base

The value of SA Water's regulated asset base (RAB) is used to determine both the return on regulated assets and regulatory depreciation. Consistent with general regulatory practice and the National Water Initiative Pricing Principles,[6] the Commission proposes to determine the value of the RAB by rolling forward the starting RAB value at 1 July 2016, to include actual inflation, prudent and efficient capital expenditure, depreciation and asset disposals since that date and include forecasts of those amounts to 30 June 2024.

The total value of SA Water's drinking water and sewerage assets was approximately $12 billion at 1 July 2016. The Commission notes that the RAB value is currently the subject of an independent Inquiry and, should the Government vary the starting value as a result of the Inquiry's findings, that the Commission's proposed methodology can incorporate such a variation.

Depreciation

The costs of using regulated assets are recovered through maximum revenues over time, to reflect the period in which those assets provide benefits to customers (their economic lives).

The Commission will determine a depreciation amount based on the values of SA Water's existing assets and forecast values of efficient capital expenditure to be incurred during the next regulatory period. Those values will be depreciated on a straight line basis over the remaining lives of the regulated assets, meaning that their values are expected to decline over time in an even manner from year to year.

Calculating depreciation is largely a mechanical exercise as it depends primarily on existing inputs. However, as discussed in Guidance Paper 4 – Prudent and efficient expenditure, all stakeholders will have the opportunity to comment on SA Water's proposed forecast efficient capital expenditure following the release of SA Water's regulatory business plan, which will help determine an efficient amount of depreciation.

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4 Essential Services Commission, *SA Water Regulatory Rate of Return 2016-2020: Final Report to the Treasurer*, May 2015, p 2-3, available at https://www.escosa.sa.gov.au/ArticleDocuments/424/20150331-SAWaterRegulatoryRateReturn2016-2020-Rep.pdf.aspx?Embed=Y.

5 For example, for BBB-rated bonds over the 12 months from Sep 2017 to Sep 2018, three year bonds were 1.13 percent cheaper on average than ten year bonds. Given 60 percent debt weighting, this translates to 0.68 percent in the WACC and, an annual impact of approximately $70m or $70 per customer.

6 See Principle 1 of the National Water Initiative Pricing Principles, available at http://www.agriculture.gov.au/SiteCollectionDocuments/water/national-water-initiative-pricing-principles.pdf.

Tax

The regulatory building block model adopted by the Commission incorporates an allowance for tax as one of the cost building blocks. It uses a post-tax (that is, reduced) rate of return to reflect the fact that an allowance for tax has already been made within the revenue cap determination.

As discussed in Guidance Paper 2 – SA Water's Revenues and Prices, tax comprises a small proportion of SA Water's total regulated costs (around 1 percent) and need not be a focus for the Negotiation Forum.

Current regulatory approach

General approach to calculating the regulatory rate of return

As discussed in the previous section, the Commission calculates the regulatory rate of return using a weighted average cost of capital (WACC) approach. The regulatory rate of return is applied to the value of the RAB to determine the return on regulated assets. It is also applied to the value of working capital, which is the capital that SA Water requires to cover its day to day expenses, and for which a commensurate rate of return is appropriate.

In making SAW RD16, the Commission developed the following principles for determining the regulatory rate of return.

> *General principle*: The rate of return should reflect the prudent and efficient financing strategy of an incumbent large water utility, which minimises expected costs in the long term, on a risk-adjusted basis.
>
> *Supporting principle 1*: The rate of return should reflect a long-term obligation on the utility to provide reliable and secure water and sewerage services to consumers. It should not solely reflect the new entrant cost of capital.
>
> *Supporting principle 2*: The rate of return should provide an incentive for SA Water to incur prudent and efficient investment in regulated assets and financing costs.
>
> *Supporting principle 3*: The approach to setting the regulatory rate of return should be based on consistent principles over time and should be predictable. It should change only to reflect material changes in evidence or regulatory practice.
>
> *Supporting principle 4*: The assumed prudent financing strategy should not depend on the ownership of the regulated business (that is, the approach is indifferent to whether the entity is in Government or private ownership).

The Commission considers those principles to be consistent with the determination of the lowest sustainable cost of delivering drinking water and sewerage services and intends to apply them in determining the regulatory rate of return for SAW RD20.

The method for calculating the components of the regulatory rate of return (the cost of debt and cost of equity) were summarised in the previous section and are discussed in more detail in Appendix 1.

Regulated Asset Base

The rate of return is applied to the value of the drinking water and sewerage services RAB to determine a return on assets for each year of the regulatory period, for each type of service.

The initial values of SA Water's drinking water and sewerage RABs were determined by the Treasurer of South Australia in 2012.[7] Since then, the RABs were adjusted at the commencement of the second revenue determination (rolled forward) to reflect:

- the addition of prudent and efficient new capital investments and the removal of assets that were disposed of
- the depreciation of assets to reflect the appropriate decline in the value of the asset over time. That decline in value is assumed to occur evenly over the economic life of the asset (straight-line depreciation), and
- an inflation adjustment, to maintain the real value of assets (indexation)

The indexation of the RAB requires the regulatory rate of return to be calculated in real terms (removing the impact of inflation), to avoid inflation being counted twice, through the rate of return and the RAB.

Depreciation

The RAB also provides the foundation for the calculation of the return of capital (regulatory depreciation). The different classes of assets that make up the RAB have different asset lives and agreed opening values, used to calculate regulatory depreciation through the straight-line method. Regulatory Depreciation and RAB are discussed further in Appendix 6: Regulatory depreciation and the RAB.

Tax

The post-tax revenue approach utilising the building block allows for the recovery of an amount to reflect the efficient tax that could be expected, as outlined under the Corporate tax rate. This assumes a corporate tax rate of 30 percent of net profit is paid, and includes a separate cash flow as part of the tax allowance of the building block approach, rather than as part of the regulatory rate of return.

The methodology used to calculate the tax allowances under SAW RD16 is based on the Australian corporate taxation regime, adjusted to reflect the estimated value to equity holders of associated imputation credits.

How has SA Water performed to date?

Information about the actual returns earned by SA Water, including comparisons to interstate water utility businesses, is available through the National Performance Report (NPR).[8]

The 14 major water and sewerage utilities in Australia that are comparable to SA Water are all in public ownership. The measure of financial performance in the NPR is the economic rate of return.[9] SA Water ranks as having the seventh highest economic rate of return among the 14 major comparable utilities, with an average for the four years since the commencement of regulation of 4.05 percent per year.[10] There is no apparent trend over time in SA Water's economic rate of return since 2013-14.

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7 Second Pricing Order, available at https://www.escosa.sa.gov.au/ArticleDocuments/487/130517-WaterIndustryAct-SecondPrici.pdf.aspx?Embed=Y

8 See National Performance Report, available at http://www.bom.gov.au/water/npr/

9 The Economic real rate of return is the ratio of the utility's business revenue, less operating expenses, to the value of its operational assets for the business during the reporting year. Business revenue includes all developer cash and asset contributions, but excludes grants for acquisition of assets and gain/loss on disposal of assets. The value of operational assets is the written down replacement cost (unless otherwise specified).

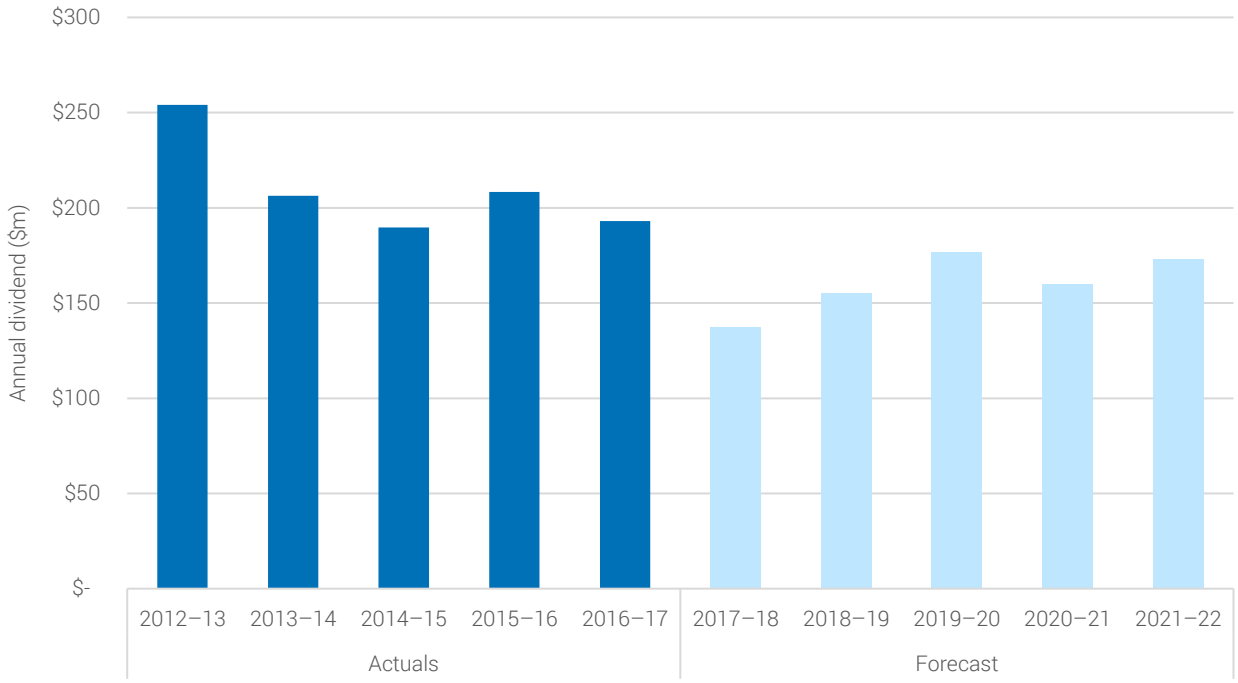
10 The range observed for comparable utilities over the same four year period was 0.2 percent to 9.09 percent.

Comparisons between the businesses in SA Water's peer group over time can be helpful for understanding SA Water's performance relative to its peers. However, where the characteristics of SA Water and other water utilities are markedly different, it is likely to be more helpful to consider trends in SA Water's own historical performance, rather than its performance against its peer group.

The South Australian Government receives 95 percent of SA Water's profits each year as a dividend. As SA Water's revenue is determined through Regulatory Determinations, any savings SA Water achieves during a regulatory period flow through to increased profit which, given the dividend payout ratio, is expressed through increased dividends. At the commencement of a new regulatory period, the savings from efficiencies are handed back to customers (as indicated by decreases in dividends for the first year of a regulatory period, compared with the previous year), so that the regulatory cycle and timing of savings and efficiencies lead to annual dividend fluctuations.

SA Water has consistently paid dividends to its owner, as shown in Figure 2 below.

Figure 2: Trends in SA Water's dividends to the South Australian Government



Compared with 2017-18, the budget papers' forecast increase in dividends in 2018-19 and 2019-20 of approximately $20 million each year (relative to 2016-17) are attributed to budget savings in those years, including net electricity savings expected as a result of SA Water's Project Zero[11] and operating expenditure savings required by the South Australian Government:[12] The overall downward trend over the ten years depicted reflects a higher starting point due to a lower debt-equity ratio in 2012-13 and lower risk-free interest rates reflected in the lower return to equity.

The forecast expenditure savings flow through to increased profits (as revenues are fixed under SAW RD16), which translate into higher than expected dividends to the State Government. Those expenditure savings are expected to be passed through to customers from 1 July 2020 through lower revenues under SAW RD20. The decrease in the forecast dividend in 2020-21 reflects that expected reduction in revenue.

[11] Information about Project Zero is available in Guidance Paper 4: Prudent and efficient expenditure.

[12] See 2018-19 South Australian State Budget: Agency Statements – Volume 4, page 222, available at https://cdn.service.sa.gov.au/statebudget/201819/2018-19_agency_statement_volume_4.pdf?q=584491

What needs to be considered for SAW RD20?

Regulatory rate of return

The Commission must set a regulatory rate of return that is commensurate with the non-diversifiable risk faced by SA Water. As discussed in Guidance Paper 2 – Revenue regulation and pricing principles, SA Water faces few risks relative to other businesses. The Commission expects the Customer Negotiation Committee to test SA Water on a reasonable return, having regard to those risks, based on the entire package of proposals that SA Water puts forward to the Negotiation Forum.

The calculation method for each parameter of the regulatory rate of return is expected to be consistent with SAW RD16, unless the Commission considers there to be compelling evidence for change.

Three parameters of the regulatory rate of return have a substantial influence on the revenue outcome. The range of settings for these parameters, utilised by regulators in Australia is outlined in Table 1, and discussed in the following text.

Table 1: Parameters of the regulatory rate of return: SAW RD16 compared to other regulatory determinations

Parameter	SAW RD16 setting	Other regulatory determinations
Beta	0.7	0.6 to 0.7
Credit rating	BBB	BBB- to BBB+
Inflation	RBA forecast for first year, RBA target band (2.5 percent) for the following nine years	▶ Assumed rate of 2.5 percent ▶ RBA forecast for first two years, RBA target band for remaining eight years ▶ RBA forecast for first year, then forecasts for remainder of regulatory term. ▶ Difference between real and nominal bonds (the break-even bond yield approach)

Equity beta

Equity beta is a measure of the relative risk, or the volatility of returns faced by equity investors. It is used as an input to the CAPM to calculate the returns that investors require in order to be compensated for that risk. It refers to the degree to which the returns for a particular company move in unison with the wider market. Equity beta of 1.0 perfectly coincides with the direction and magnitude of movement of the market, while an equity beta < 1.0 indicates less coincident volatility, and > 1.0 indicates more coincident volatility than the market. In rare cases, a negative equity beta might be observed, indicating that the price of a particular stock is countercyclical to the market.

The cost of equity in the CAPM is sensitive to changes in equity beta; the greater the beta, the greater the risk and, therefore, the cost of equity – as risk and returns move together. Each 0.1 movement in the equity beta for SA Water has an annual revenue impact of approximately $29 million, or approximately $29 per customer (around 3 percent of total revenue). Equity beta estimates for SA Water cannot be directly observed as its equity is not publicly traded, so must be indirectly estimated from data drawn from the equities market, based on observations from comparable companies. The equity beta estimates for Australian regulatory decisions is not uniform, forming a range between 0.6 to 0.7.

A detailed discussion of the range of equity beta, and the evidence available, is in Appendix 3.

Credit rating

A credit rating is assigned to companies by credit rating agencies to reflect the risk that is faced by a provider of debt finance to the company. Standard and Poor's and Moody's are the two largest credit rating agencies. The Commission (as is common in regulatory practice) uses credit ratings as part of the process of calculating the benchmark cost of debt to be used in determining the maximum allowable revenue for a regulated firm.

The credit rating has a substantial effect on the revenue allowance. For example, while the gap between A- and BBB credit ratings varies, it typically results in a higher cost associated with a BBB rating in the order of 50 to 60 basis points.[13] A 50 basis point change would have an annual revenue impact on SA Water of approximately $35 million, or $35 per customer per year. Bond prices for A- credit ratings are also publicly reported by the RBA.

All regulators in Australia currently assume a benchmark credit rating, and adopt a credit rating of BBB or BBB+. In the UK, credit ratings for regulated water and sewer providers are as high as A-, despite a broadly similar regulatory structure.[14] The Commission assigned a BBB benchmark credit rating in SAW RD16 and BBB+ in SAW RD13 to SA Water. The change was due to a lack of available pricing information for BBB+ bonds for SAW RD16. An explanation of the Commission's position, and salient points to consider in setting a likely credit rating, are discussed in Appendix 4.

Inflation

Inflation estimates are used to adjust the WACC from nominal to real, given the real, post-tax framework for calculating the regulatory rate of return.

The method of calculation for expected inflation is not consistent among regulators. Details of the Commission's past approaches, and alternatives, are outlined in Appendix 5.

[13] Source: RBA, Aggregate Measures of Australian Corporate Bond Spreads and Yields, available at http://www.rba.gov.au/statistics/tables

[14] For example, Dwr Cymru Welsh Water Investor's page, available at https://www.dwrcymru.co.uk/en/Investors.aspx

Appendix 1: Calculation of the WACC and its components

Most economic regulators of water utilities in Australia assume that the capital structure of the Benchmark Efficient Entity [15] is 60 percent debt and 40 percent equity.[16] The formula for WACC is:

$$WACC_{real}^{post-tax} = \frac{1 + (k_e \frac{E}{V} + k_d \frac{D}{V})}{(1 + i_{exp})} - 1$$

Where:

k_e	=	cost of equity
k_d	=	cost of debt
i_{exp}	=	adjustment for expected inflation
E	=	market value of equity
D	=	market value of debt
V	=	market value of the firm (V = E + D)

For the purposes of calculating the WACC, regulators do not use the actual costs borne by a firm but, rather, use the concept of a Benchmark Efficient Entity is used. See Appendix 7 for more detail.

For SAW RD16, the Commission adjusted the method for recovering the cost of debt from the prevailing cost at the time of the determination, to a trailing average approach to cover the cost of debt efficiently incurred over an average of the previous ten years. The rationale behind this change was that, as a mature business with ongoing debt-funding requirements, the ten-year trailing average better reflected the likely debt-financing behaviour of the benchmark efficient firm, as well as to reduce the volatility in the WACC with each regulatory reset.

The cost of equity is currently calculated using the Capital Asset Pricing Model (CAPM), arising from a requirement to use the National Water Initiative (NWI) Pricing Principles.[17] This requires the use of CAPM for any new capital expenditure. Regulators, however, have applied the CAPM to determine one single rate of return on equity, rather than applying differing rates of return.

In past determinations, the Commission has employed the Sharpe-Lintner CAPM to determine the cost of equity according to the following formula:

$k_e = r_f + ß_L \times MRP$

Where

k_e = cost of equity

r_f = risk free rate

$ß_L$ = the levered or equity beta (which reflects the systematic risk of an equity)

MRP = market risk premium, which is calculated as the total market return less the risk-free rate.

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15 See Appendix 7 for an explanation of the Benchmark Efficient Entity.

16 See Table 2 in Appendix 2 for further information. It is noted that the ERA (1) adopted a gearing ratio of 55% debt and 45% equity. in *The efficient costs and tariffs of the Water Corporation, Aqwest and Busselton Water, Final Report*, November 2017, page 343, available at https://www.erawa.com.au/cproot/18490/2/Inquiry%20into%20efficient%20costs%20and%20tariffs%20of%20the%20Water%20Corporation,%20Aqwest%20and%20Busselton%20Water%20-%20Final%20Report.pdf

17 See *Water Industry Act 2012 (Section 35) Pricing Order for the Regulatory Period 1 July 2013 – 30 June 2016*, known as the First Pricing Order, available at https://www.escosa.sa.gov.au/ArticleDocuments/482/120930-WaterIndustryAct-FirstPricin.pdf.aspx?Embed=Y

The various components of the Sharpe-Lintner CAPM (SL-CAPM) calculated for the derivation of the cost of equity are:

- The expected risk-free interest rate, where the interest rate on Commonwealth Government bonds is used as a proxy for future rate expectations.
- The expected market risk premium (MRP) over the risk-free rate, for which future expectations cannot be observed - so the long-term MRP is used, based on the theory that the MRP reverts to the mean for Australia.[18]
- Equity beta, (ß) which is a measure of the strength of the relationship between the level of volatility of the returns of a particular firm compared with the volatility of the overall market. The ß value used is, therefore, the proxy for the level of risk that the Benchmark Efficient Entity might face, and is drawn from market evidence for comparable firms.

Other CAPM models include the Black CAPM and the Fama-French CAPM. All have strengths and weaknesses, although the SL-CAPM is the most commonly used as its simplicity and transparency are valued as benefits.

Additional finance-related costs that should be recognised are working capital and tax. The working capital component of the revenue allowance addresses the funding cost associated with the mismatch in the timing of SA Water's revenue, and its expenditure cash flows. The tax allowance reflects the tax obligations of the Benchmark Efficient Entity. As the revenue determination is conducted on a post-tax basis, tax is reflected as a distinct cash flow rather than as an integral component of the rate of return. The rationale behind the use of the Benchmark Efficient Entity approach is outlined in Appendix 7.

SA Water's preference for a long-term cost of equity

SA Water has indicated to the Commission that it has a preference for using a long-term approach in calculating the cost of equity. It has argued that such an approach would make prices more stable over time and that this could be achieved by calculating a long-term (trailing average) Risk Free Rate. SA Water has stated that its customers prefer price stability and, as such, calculating a more stable cost of equity would be in customers' long-term interests.

Under the CAPM approach, the Risk Free Rate can vary significantly between four-year regulatory periods, which may result in revenues and prices increasing or decreasing at the commencement of each regulatory period. The nominal Risk Free Rate under SAW RD16 (of 2.53%) is low compared to historical averages and it may increase by the time the Commission makes SAW RD20. However, that increase is likely to be more than offset by the expected reduction in the cost of debt (as the trailing average cost of debt rolls in more years of low interest rates), putting an overall downward pressure on revenues and prices.

There are arguments for and against using a long-term Risk Free Rate to determine the cost of equity. While it may deliver more stable pricing outcomes to customers, it is less likely to reflect the forecast Risk Free Rate for the next regulatory period, compared to using the prevailing Risk Free Rate at the time of making SAW RD20. Unlike the cost of debt, where future costs will be impacted by debt that has been raised in the past, the cost of equity is an entirely forward-looking concept. Using historical averages to forecast the Risk Free Rate for the next period may not reflect the actual cost of equity for SA Water.

[18] Equity risk premiums in Australia and overseas are discussed in Bianchi, R. Drew, M. and Walk, A., The Equity Risk Premium in Australia (1900 – 2014), *Financial Planning Research Journal*, 2016, page 87, available at https://www.griffith.edu.au/__data/assets/pdf_file/0029/205688/FPRJ-V2-ISS1-pp80-99-the-equity-risk-premium-in-australia.pdf.

Appendix 2: The components of the cost of funding and using assets

The building block approach that the Commission will use for calculating SA Water's maximum drinking water and sewerage revenue is outlined in Guidance Paper 2: SA Water's Revenues and Prices. The components of the return on and of assets, collectively the cost of funding and using assets, are summarised below:

Table 2: Components of the cost of funding and using assets

Parameter	SAW RD16 setting	Other Australian[19] regulator's range
Averaging period for risk-free rate of interest observations	20 business days	20 to 60 days
Cost of debt	10-year trailing average	▶ Hybrid trailing averages ▶ 'On the day' approach ▶ 10-year trailing average
Basis for WACC	Post-tax real	Pre and post-tax real and post-tax nominal
Corporate tax rate	30 percent	30 percent
Form of CAPM	Sharp-Lintner CAPM (SL-CAPM)	Mainly SL-CAPM; also partial use of Black CAPM with the SL-CAPM
Market Risk Premium	6.0 percent	6.0 to 7.5 percent
Gamma (proportion of dividend imputation utilised)	0.5	0.25 to 0.5
Gearing	60 percent	60 percent
Risk-free interest rate (RFR)	Commonwealth Government bonds (CGB's)	CGBs
Bond term for calculation of Risk Free Rate	10-year	▶ 10-year ▶ Hybrid of 10-year and another term
Debt raising costs	12.5 basis points (bps)	10.8 to 12.5 bps

The parameters above are explained further below.

[19] Obtained from recent regulatory decisions

Averaging period for risk-free rate of interest (RFR) observations

The purpose of the averaging period is to shield against the risk that short-term volatility in the Risk Free Rate will determine the outcome of the Risk Free Rate at the time of the determination. An average of the observations from the previous 20 days is consistent with the Commission's past practice and some other regulators. [20]

No regulator adopts a period shorter than 20 business days, but 40 or 60 days is sometimes used. The longer the averaging period, the lower the likelihood of the influence of short-term volatility, but the less current is the data. [21] There is no predictable cost impact through the length of averaging period.

The 60-day period is used by ERA, on the basis that it allows the regulated entity the best chance of being able to refinance its debt to the rates that will be applied to its cost of debt in the forthcoming regulatory period. Where the cost of debt is set 'on the day' (short-term averaging period), this helps to overcome the practical difficulty faced by the regulated utility of being able to refinance a large tranche of debt within a short period of time. Consequently, the utility has a better chance of achieving the regulated cost of debt.

This is not a consideration for SA Water, due to the 10-year trailing average cost of debt. SA Water does not need to refinance to match a cost of debt set 'on the day' of the determination.

Cost of debt: 10- year trailing average period

For SAW RD16, after consultation with stakeholders, the Commission adopted a 10-year trailing average cost of debt, based on a rolling average of ten-year bonds. This was considered to be in the best long-term interests of consumers as it replicated the likely debt financing strategy of a benchmark incumbent water utility, absent regulation, where long-term assets are financed by long-term debt.[22]

Some other regulators in Australia, such as the AER,[23] have also adopted the trailing average cost of debt. The Commission considers that this approach remains in the best interests of customers.

There is no long-term cost impact through the trailing average approach, although at any specific time the trailing average may be above or below the prevailing cost of debt. That is, customers are not necessarily paying a cost reflective cost of debt at a specific time, but do so in the longer term.

Post-tax real basis of WACC

The post-tax framework treats tax as a discrete cost. This is more accurate than assessing its impact through the regulatory rate of return under a pre-tax framework.

The real basis of WACC is necessary as the RAB is adjusted for inflation at each regulatory determination. If inflation was included in the WACC (that is, the WACC was nominal rather than real), the effect of inflation would be counted twice.

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[20] For example, the QCA and AER use a 20-day averaging period, see [20] QCA, Position Paper, Long-term framework for SEQ water retailers – weighted average cost of capital (WACC), August 2014, page 11, available at http://www.qca.org.au/getattachment/a61eda28-464f-4bdc-b99a-df55a0593e9a/WACC-Paper.aspx and AER, (1) *Better Regulation – Rate of Return guideline*, December 2013, page 15, available at https://www.aer.gov.au/system/files/AER%20Rate%20of%20return%20guideline%20-%20December%202013.pdf, In this approach, the business nominates the 20-day period in advance, but it is to be as close as practicable to the commencement of the upcoming regulatory period

[21] For example, IPART uses a 40-day averaging period, see IPART (1), *Review of our WACC method*, *Final Report, February 2018*, page 19, available at https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-administrative-legislative-requirements-sea-wacc-methodology-2017/final-report-review-of-our-wacc-method-february-2018.pdf page 32 and ERA uses 60-days, see ERA, (1) ,page 18,.

[22] ESCOSA, (3) *SA Water Regulatory Rate of Return 2016-2020: Final Report to the Treasurer*, page 29, available at http://www.escosa.sa.gov.au/ArticleDocuments/424/20150331-SAWaterRegulatoryRateReturn2016-2020-Rep.pdf.aspx?Embed=Y.

[23] AER, Draft rate of return guidelines, Explanatory Statement, July 2018, page 329, available at https://www.aer.gov.au/system/files/AER%20-%20Draft%20rate%20of%20return%20guidelines-%20explanatory%20statement%20-%20%2010%20July%202018_0.pdf

Corporate tax rate

A 30 percent corporate tax rate applies in Australia, is used by all regulators in Australia, and both previous SA Water determinations. This is not proposed to change for SAW RD20, unless the corporate tax rates change in the meantime. To the extent that benchmark efficient entities have an effective tax rate of less than 30 percent, there is a cost impact on customers as the tax allowance is part of the overall revenue allowance to be recovered from customers.

There is concern that the corporate tax rate is not reflective of the true situation for regulated businesses. The AER has received preliminary advice from the Australian Tax Office that there is a material discrepancy between the tax allowances that the AER sets for regulated businesses, against the actual tax payments that the ATO receives from regulated businesses.[24]

Form of CAPM – Sharpe Lintner CAPM model

Although the Commission must use CAPM for calculating the cost of equity, it may choose which CAPM model to apply. The options are Sharpe-Lintner, Black, and Fama French. Previous SA Water determinations have used the Sharpe-Lintner CAPM, which is calculated as:

$$k_e = r_f + \beta_L \times MRP$$

Where

k_e = cost of equity

r_f = risk free rate

β_L = the levered or equity ß (which reflects the systematic risk of an equity)

MRP = market risk premium, which is calculated as the total market return less the risk-free rate.

Other CAPM models include the Black CAPM and the Fama-French CAPM.

While most regulators currently use the Sharpe-Lintner (SL) model, it is known to underestimate the returns of low- ß assets while overestimating the returns to high ß assets.[25] While the SL-CAPM was designed to calculate returns for an asset in the context of *all* risky assets, most regulators, including the Commission, use the sharemarket as the proxy for these assets.[26] This is an assumption for which the impacts are unknown, given that the returns for *all* risky assets are not known. Fama and French refer to the empirical record for accuracy of the SL-CAPM as poor – "poor enough to invalidate the way it is used in applications".[27]

The AER uses the Black CAPM to inform ß estimates for subsequent use in the SL-CAPM.[28] While this may offer more empirical accuracy, its use requires the estimation of an additional model parameter – the premium over the Risk Free Rate that might apply to a zero ß investment (zero ß premium). The zero ß premium, estimated by the AER at between 1.5 to 3.0 percent, recognises that an investment of zero systematic risk still carries with it, an element of risk, such as default risk. However, using one model to estimate parameters for another may lead to estimation errors.[29]

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24 The AER has instigated a regulatory tax review, see Initial Report: Review of regulatory tax approach, available at https://www.aer.gov.au/system/files/AER%20-%20Tax%20Review%202018%20-%20Initial%20Report%20-%2028%20June%202018%20-%20FINAL%20PUBLIC.pdf

25 NERA Economic Consulting, (1) *Review of the Literature in Support of the Sharpe-Lintner CAPM, the Black CAPM and the Fama-French Three-Factor model*, March 2015, page iii, available at http://www.competitiontribunal.gov.au/__data/assets/pdf_file/0004/28651/C.40-Public.pdf.

26 NERA, (1), pate iii

27 Fama, Eugene, F., and Kenneth R. French. 2004, "The Capital Asset Pricing Model: Theory and Evidence." *Journal of Economic Perspectives,* 18(3): 25-46.

28 AER (1), page 13

29 SFG Consulting, *Cost of equity in the Black Capital Asset Pricing Model – Report for Jemena Gas Networks, ActewAGL, Networks NSW, Transend, Ergon and SA Power Networks*, page 18, available at https://www.ergon.com.au/__data/assets/pdf_file/0018/228420/SFG-Report-Black-CAPM.pdf.

Estimation of the zero risk premium is complex ,and the model assumes that otherwise, stock betas entirely explain variation in stock returns – though there is evidence that this is not the case, and that it continues to underestimate returns for value stocks, and those with small market capitalisations.[30]

Both the SL-CAPM and Black model have a number of simplifying assumptions that may be unrealistic. Those assumptions are that investors:

- can borrow or lend unlimited amounts at the risk free rate
- share the same time horizon for their investments, and form the same opinion about the investments' prospects
- pay no tax, or at least the same level of tax, irrespective of asset class
- do not pay transaction costs, and
- participants have perfect information.

The Fama-French Model (FFM), accounts for three factors, which may affect the cost of equity. These are proxies for undiversifiable risks, and are:

1) the excess return to the market portfolio.
2) the difference in return for firms with a high book-to-market ratio relative to firms with a low book-to-market ratio.
3) the difference in return between firms with a small market capitalisation compared with firms with a large market capitalisation.

Despite better empirical accuracy from the Fama-French Model, no Australian regulator has adopted its use. It is a far more complex model than the SL-CAPM, and the information for its inputs is not readily available. In the United States, Kenneth French maintains a data bank for model inputs[31] which is publicly available. There is no equivalent in Australia, and its absence makes it difficult to use here.

The Fama-French Model has also been criticised for being an ex-post efficient model (one that searches for data after the event to explain that event) whereas the CAPM is the only method to define an ex-ante efficient portfolio.[32] In other words, the Fama-French Model results may be the result of data mining, rather than an intuitive financial relationship as assumed in the SL-CAPM. It is also uncertain as to whether or not the Fama-French Model satisfies the definition of a CAPM.[33]

As with the SL-CAPM, the FFM and SL-CAPM models assume that zero beta assets do not achieve a premium over the Risk-Free Rate – an assumption for which the evidence does not concur, as it shows it to be positive.[34]

Irrespective of the model chosen, compromises must be made.[35]

30 NERA (1) page vi.
31 See Kenneth R. French, *Current Research Returns*, available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.
32 Smith, T. and Walsh, K. Why the CAPM is Half-Right and Everything Else is Wrong, Journal of Accounting, Finance and Business Studies, Vol. 49, Supplement, 2013, pp. 73 – 78.
33 Smith and Walsh, page 75.
34 NERA (1) page 23.
35 NERA Economic Consulting, *The FAMA-French Three-Factor Model: A report for the Energy Networks Association*, October 2013, pp. iv-vi, available at https://www.erawa.com.au/cproot/11755/2/Attachment%201%20-%20NERA%20Report%20-%20Fama-French%20Model.pdf.

In recognition of the SL-CAPM downward bias of MRP estimates in low β assets,[36] IPART implements an adjustment – the Vasicek adjustment, to increase beta for low-beta stocks.[37] However, the Vasicek adjustment is complex and opinion is divided as to whether it improves the outcome.[38]

The choice of CAPM is a matter of weighing up the compromises. There is a preference for simplicity and transparency and, ideally, some stability in approach. On that basis, the Commission proposes to continue to adopt the SL-CAPM.

Market risk premium

The Market Risk Premium (MRP) is the total return to shareholders, less the Risk-Free Rate. In the SL-CAPM it is described as the expected return, yet it can only be observed retrospectively.

In general, Australian regulators have adopted the historical MRP drawn from the equities market, which is approximately six percent per annum[39]. This is based on the expectation that MRPs cannot be forecast but, revert to the mean over time, despite short-term volatility. The ERA and IPART have partially incorporated the Dividend Growth Model (DGM) to account for future expectations of MRP.

The MRPs adopted by Australian Regulators are provided in Table 3.

Table 3: Market Risk Premiums adopted by regulators in Australia

Regulator	MRP (percent per annum)
ESCOSA	6.0
AER	6.0[40]
IPART	6.0 to 9.1 range – midpoint selected[41]
ERAWA	5.0 to 7.5[42]
ESCV	The CAPM is no longer used[43]
QCA	7.0[44]
OTTER	6.5[45]
ICRC	6.5[46]

36 Bias in the SL-CAPM is well documented. For example, see SFG Consulting, page 8,12.

37 IPART (1) , page 48

38 AER (1) page 251

39 For example, see Bianchi, R. Drew, M. and Walk, A., The Equity Risk Premium in Australia (1900 – 2014), *Financial Planning Research Journal,* July 2016, page 89, available at https://www.griffith.edu.au/__data/assets/pdf_file/0029/205688/FPRJ-V2-ISS1-pp80-99-the-equity-risk-premium-in-australia.pdf

40 AER, Draft rate of return guidelines: Explanatory Statement, July 2018, page 199, available at https://www.aer.gov.au/system/files/AER%20-%20Draft%20rate%20of%20return%20guidelines-%20explanatory%20statement%20-%20%2010%20July%202018_0.pdf

41 IPART, Water NSW Review of prices for rural bulk water services from 1 July 2017 to 30 June 2021, available at https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-legislative-requirements-water-bulk-water-review-of-prices-for-waternsws-rural-bulk-water-services-from-1-july-2017-formerly-state-water-corporation/draft-report-waternsw-prices-for-rural-bulk-water-services-from-1-july-2017-march-2017.pdf

42 ERAWA, page 25

43 ESC Victoria, Water Pricing Framework and Approach 2 PREMO – A New Incentive Framework, page 9, available at https://www.esc.vic.gov.au/sites/default/files/documents/Water-Pricing-Framework-and-Approach-Final-Paper-Oct-2016.pdf

44 QCA, Final Report, Seqwater Bulk Water Price Review 2018-21, March 2018, page 62, available at http://www.qca.org.au/getattachment/d0395075-14be-4c8c-b379-e97f1f0ca7d7/Final-report.aspx

45 OTTER, 2018 Water and Sewerage Price Determination Investigation – Final Report, May 2018, page 163, available at http://www.economicregulator.tas.gov.au/Documents/2018%20Water%20and%20Sewerage%20Price%20Determination%20Investigation%20Final%20Report.pdf

46 ICRC, Final report: Regulated water and sewerage services prices 2018-23, Report 1 of 2018, May 2018, page 112, available at http://www.icrc.act.gov.au/wp-content/uploads/2016/03/Report-1-of-2018-Final-Report-Water-Sewerage-Services-2018-23.pdf

Gamma (proportion of dividend imputation credits utilised)

Gamma is a measure of the value of dividend imputation credits to the likely owners of the Benchmark Efficient Entity. Gamma is a function of the distribution rate to shareholders, and the utilisation rate by those shareholders. Therefore, if the distribution rate is 0.9 and the utilisation rate is 0.5, gamma is (0.9 * 0.5 = 0.45)

The SAW RD16 gamma of 0.5 is at the high end of a band of regulators' decisions from 0.25 to 0.5, on a scale where 1 indicates all dividend imputation credits are utilised, and zero indicates none are. If gamma is closer to 1, the implication is that shareholders are receiving dividend imputation credits and will 'top up' the returns received from dividends. This means that, in order to receive a specific return, such an investor will be prepared to accept a lower dividend.

Not all investors can utilise imputation credits. For example, foreign shareholders cannot receive them, while others, such as superannuation companies, are likely to receive a benefit from them. Taxation records are one way of indicating the extent of the imputation benefit. Analysis of 'dividend drop off' (reduction in share price after a share trades ex-dividend) is another method of measuring the value of the imputation credit.

In the post-tax revenue modelling approach, gamma is accounted for as a separate cash flow as part of the tax allowance of the building block approach, rather than as part of the regulatory rate of return.

Recent studies vary in their conclusions on gamma.[47] [48] The Commission will review that evidence before making a decision on whether or not to depart from its current gamma estimate of 0.5.

Gearing

In SAW RD16, the Commission adopted a gearing assumption of 60 percent debt and 40 percent equity. This was considered to be representative of the Benchmark Efficient Entity, consistent with general regulatory practice in Australia and other parameters of WACC were set in that context.

Unless new evidence emerges to suggest that a change is warranted, the Commission proposes to utilise this gearing assumption.

Risk free rate

While the Risk-Free Rate does not need to be separately estimated for cost of debt calculations under a trailing average approach (where observed debt costs are inclusive of a Risk Free Rate), it must be estimated for calculating the cost of equity under a CAPM approach.

The Risk-Free Rate aims to reflect the return that an investor would seek for an asset with zero risk of default, and where returns match expectation. In reality, the closest approximation to a zero default risk, and where returns in terms of bond coupon payments are unlikely to differ from expectation, is the Commonwealth Government bond (CGB) which is, therefore, used to indicate the Risk-Free Rate.

As the trailing average cost of debt methodology relies on observed yields for the cost of debt, it is now necessary only to estimate the Risk-Free Rate for the cost of equity.

The six percent MRP which is added to the Risk Free Rate, has been calculated as a long-term premium over the 10-year CGB. The Market Risk Premium would need to be higher if the CGB for calculating the Risk-Free Rate is shortened, so that the total assumed return on equity is maintained (assuming longer term bonds carry higher interest rates than shorter term bonds). Therefore, the Commission proposes to maintain the use of 10-year CGBs to estimate the Risk-Free Rate in the CAPM.

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47 See QCA, *Estimating gamma for regulatory purposes, report for Aurizon network*, Frontier Economics, November 2016, available at http://www.qca.org.au/getattachment/b1850921-abba-42b1-93df-551f93f81f85/Estimating-gamma-for-regulatory-purposes-Fronti.aspx

48 AER, *Discussion paper: Value of imputation credits*, March 2018, page 5, available at https://www.aer.gov.au/system/files/AER%20-%20Gamma%20Discussion%20Paper%20-%20March%202018.pdf

The Risk-Free Rate is calculated by Australian regulators as follows:

Table 4: Methods of calculating the Risk Free Rate, used by Australian regulators

Regulator	WACC framework
ESCOSA	Ten year CGB
AER	Ten year CGB[49]
IPART	Ten year CGB[50]
ERAWA	Nominal yield on 5-year Australian CGB[51]
ESCV	Real Risk-Free Rate estimated based on average nominal yield on 10-year CGB, accounting for market estimates of inflation.[52]
QCA	Based on CGS with term to maturity of one year.[53]
OTTER	Based on CGB, but a weighted average of the 40-day trading average of the 10-year CBB and a time weighted average of the 10-year CGB with a 10-year averaging period.[54]
ICRC	Ten year CGB [55]

Debt raising costs

Debt raising costs of 12.5 basis points (bps) was included in SAW RD16 to reflect the transaction costs associated with raising debt financing in the bond market. The costs are tempered by the long debt terms assumed, as fewer transactions are implied than if shorter-dated bonds are used.

The 12.5 bps was set based on interstate regulators decisions, and was supported by SA Water its 2016 regulatory business proposal. The Commission is not aware of any evidence to suggest that a change is required but will remain open to new evidence and submissions through the consultation process.

49 AER, (1), page 15.
50 IPART (1), page 24.
51 ERAWA (2), page 343.
52 ESCV (2), page 103.
53 QCA (1), page 11
54 OTTER, page 45, 119
55 ICRC (1), page 65

Appendix 3: Equity beta

Equity beta is assumed to reflect only systematic, or economy-wide risk. It is assumed that risks that are specific to the industry or business itself (unsystematic risk), may be diversified away by an investor who will not, therefore, seek to be financially rewarded for taking on unsystematic risk.

The Commission set equity beta (ß) at 0.7 in SAW RD16 to reflect the likely level of systematic risk (economy-wide risk) that a Benchmark Efficient Entity would face in a market and regulatory environment, similar to that faced by SA Water. This represented a reduction from the ß of 0.8 used in RD13, to reflect the change in WACC methodology to the trailing average cost of debt, and the introduction of revenue caps, rather than price caps – both of which reduce the level of systematic risk faced by SA Water. The ß reflects an assumed leverage of 60 percent debt. The higher the leverage, the higher the beta, as the component of profit left over for equity holders is reduced by a known amount to service debt. The profit is expected to be more variable than the debt cost (assuming the quantity of debt is unchanged), leaving most of the variability to be absorbed by the equity returns.

The current ß sits at the upper end of a narrow range of ß in recent regulatory decisions in Australia – compensating for the well-documented downward bias in under-pricing for low beta stocks in the Sharpe-Lintner CAPM. IPART compensates for this bias through a mathematical adjustment, the Vasicek adjustment, to the SL-CAPM. Nothing over the course of SAW RD16, or expected in SAW RD20, materially changes the exposure to systematic risk for SA Water. However, in July 2018 the AER flagged a change in its position on equity beta; moving from 0.7 to 0.6, based on:

- market evidence collected for comparable firms[56]
- conceptual considerations of the risks of energy network businesses relative to the market portfolio
- the theoretical underpinnings of the Black CAPM (which does not share the known under-pricing of low beta stocks with the SL-CAPM), and
- the value of stability and predictability to industry and consumers.

The ß of 0.6 settled on by the AER is a mid-point of a range between 0.4 and 0.8 that the AER had identified from market evidence.

The AER acknowledged this represents a drop from 0.7 in 2013 which was itself a reduction from 0.8 it had used previously. At that time of the change from 0.8 to 0.7, the AER noted that its longer term estimates were actually lower than 0.7 but, in order to promote stability and predictability, decided not to make a larger change.[57]

In Australia, market evidence for water companies is even more scarce than it is for electricity distribution companies. If a 'first principles' approach is taken to the conceptual considerations of the risks for a monopoly water supplier compared with the market portfolio, it could be argued that ß should not be higher than it would be for an electricity distribution company, and perhaps lower. Such an argument could be made in the case for SA Water on the basis that:

- The nature of the water and sewerage services it provides, as essential services with very limited competition, are not likely to be affected much by systematic risks, and probably less so than electricity distribution companies.
- The revenue cap form of regulation applied to SA Water allows a specified revenue amount to be collected by the utility, irrespective of demand changes for its services. A revenue cap means that revenue remains stable despite economy-wide factors, or systematic risk, which ß measures the firm's susceptibility to. A price cap, in contrast, exposes the utility to demand risk which, at least in part, reflects systematic risk.

[56] AER, Draft rate of return guidelines, Explanatory Statement, July 2018, page 242
[57] AER, page 244.

An issue is the known under-pricing of low-beta assets in the SL-CAPM. IPART compensates for this bias through a mathematical adjustment, the Vasicek adjustment.[58] This adjustment, which increases its effect the further ß deviates from 1.0, will increase the ß of a company at 0.6, by approximately 0.05.[59]

One study in 2013, specifically to estimate beta for Australian water utilities, concluded that equity beta of 0.9 is appropriate, based on US and UK empirical data (where water utilities are publicly listed).[60] A second study in 2015, also based on UK and US data estimated the average beta at 0.73, and a range between 0.59 and 0.88.[61]

Equity beta is based on a trailing average of pricing data, but there is no standard timeframe for this. Beta estimates change over time. A comparison of equity beta is also sensitive to the nature of the companies in the sample, including the regulatory regimes they operate under.

A look at the equity betas of listed US water companies in August 2018[62] yielded the following results:

Table 5: Listed US water utilities and associated equity beta scores

Listed Utility	Equity beta	Debt:equity ratio	ß re-levered to 60% debt
American Water Works Company Inc (AWK)	0.12	58:42	0.13
American States Water (AWR)	0.10	11:89	0.22
Aqua America (WTR)	0.33	52:48	0.4
Artesian Resources Corporation (ARTNA)	-0.04	70:30	-0.03
California Water Service Inc (CWT)	0.53	43:57	0.76
Connecticut Water Service Inc (CTWS)	-0.12	46:54	-0.16
Consolidated Water Company CWCO)	0.76	6:94	1.79
Global Water Resources Inc (GWRS)	-0.10	94:6	-0.02
Middlesex Water Company (MSEX)	0.40	34:66	0.66
Pure Cycle Water Corporation (PCYO)	0.49	3:97	1.19
SJW Corporation (SJW)	0.04	48:52	0.05
York Water Company (YORW)	0.31	43:57	0.44
Average	**0.235**		**0.45**

58 IPART (1), *Review of our WACC method*, *Final Report, February 2018*, page 19, available at https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-administrative-legislative-requirements-sea-wacc-methodology-2017/draft-report-review-of-our-wacc-method-october-2017.pdf

59 IPART (1), page 49, Based on IPART's analysis of airport proxy firms.

60 SFG Consulting, (2) *Estimation of beta for Australian water networks*, April 2013, page 5, available at https://www.accc.gov.au/system/files/Estimation%20of%20beta%20for%20Australian%20water%20networks%20SFG.pdf.

61 Houston Kemp Economists, *Equity Beta for a Benchmark Australian Water Network Service Provider – A report for Sydney Water*, June 2015, available at https://www.ipart.nsw.gov.au/files/sharedassets/website/trimholdingbay/sydney_water_s_proposal_to_ipart_on_prices_to_apply_from_1_july_2016-_appendix_7_expert_report_on_the_wacc.pdf.

62 Beta values from Reuters.com finance 27 August 2018, for example, see https://www.reuters.com/finance/stocks/financial-highlights/AWK Reuters calculate beta monthly, using five-year trailing average prices.

While the list of companies above represents water companies listed on major US exchanges, Reuters lists the sector average beta which these companies are in, at 0.65. It is unclear which other companies are in the sector, and why they are contributing to an increased average beta.

While most of the companies above operate in the same core businesses as SA Water, the one with the highest beta, Consolidated Water Company, is headquartered in the Cayman Islands and operates seawater desalination plants and water distribution systems in the Cayman Islands, the Bahamas, Belize, the British Virgin Islands and Indonesia and is, therefore, the least similar to SA Water. Others, such as Middlesex Water Company operate mainly regulated water and sewerage services, although this company has fewer than half the number of customers as SA Water, with fewer than half of those customers being regulated through a price cap. Its operating revenue in Q1 2018 was $31.2m.[63]

In the UK, OFWAT (the economic regulator), regulates ten regional water and sewerage providers, seven regional water only providers, and nine small water and sewerage providers.[64] The form of regulation is through setting the price and service packages of the regulated companies.[65]

All but three of the water and sewer providers are private companies. One, Welsh Water is a not-for-profit company which lists, among their corporate priorities, the aim of reducing financing costs, in recognition that financing costs are the industry's biggest costs.[66] Two regional water and sewer providers, which are the closest business models to SA Water are listed below, with their associated equity betas, are listed below, with one water only company (Bristol).[67]

Table 6: Listed UK water utilities and their associated beta scores

Listed utility	Equity beta	Debt:equity ratio	ß re-levered to 60% debt
Severn Trent PLC (SVT.L)	0.92	85:15	0.35
South West Water Limited (Pennon Group PLC) (PNN)	0.75	6:94	1.76
Bristol Water PLC (BTW)	0.50	58:42	0.53
United Utilities Group PLC (UU)	0.86	61:39	0.84
Average	**0.72**		**0.87**

The betas for US and UK companies are quite different from each other, even when re-levered to reflect the target capital structure of 60 percent debt and 40 percent equity. While the sample size is small, it does represent the closest approximation to the SA Water's business.

The listed UK utilities have notably higher betas than their US counterparts. While water and sewer are their core businesses, they are sometimes involved in other businesses. For example, Severn Trent PLC includes a renewable energy business. Its debt:equity ratio was approximately 90:10 in March 2018.[68]

63 See Middlesex Water, First Quarter 2018 Financial Results, available at https://www.middlesexwater.com/news/middlesex-water-company-reports-first-quarter-2018-financial-results

64 OFWAT, Licences and licensees, available at https://www.ofwat.gov.uk/regulated-companies/ofwat-industry-overview/licences/

65 OFWAT, Price Reviews, available at https://www.ofwat.gov.uk/regulated-companies/price-review/

66 See Glas Cymru Welsh Water, Company Information, available at https://www.dwrcymru.co.uk/en/Company-Information/Glas-Cymru.aspx

67 Beta values from Reuters.com

68 London Stock Exchange, Servern Trent PLC Fundamentals, available at https://www.londonstockexchange.com/exchange/prices/stocks/summary/fundamentals.html?fourWayKey=GB00B1FH8J72GBGBXSET1

Pennon Group had a debt:equity ratio of 73:27 in March 2018. (This varies slightly from the figures in Table 3 as those figures are drawn from the 2017-18 annual report.) A high debt ratio would be expected to increase a businesses' exposure to systematic risk and, therefore, its equity beta.

The evidence from the UK, albeit based on few cases, is conflicting with that from the US. Betas from individual companies for both countries vary substantially, so the difference in the averages between countries may be due to chance. Further, given the industry average of 0.65 for both US and UK quoted by Reuters, there may be insufficient evidence to move outside the range of beta used by Australia Regulators.

Beta would be expected to be sensitive to the regulatory regimes that companies operate under. Both the US and UK regulators employ price caps rather than revenue caps. In Australia, a mix of revenue caps and price caps are used. Recent beta estimates and the accompanying regulatory regime are outlined below.

Table 7: Beta and revenue caps applying to recent Australian regulatory decisions

Regulator	ß with revenue cap	ß without revenue cap
ESCOSA	0.7	
ESCV		0.65
QCA		0.65
IPART		0.7
AER	0.7 (proposed to reduce to 0.6)	
ERAWA		0.7
OTTER		0.65
Average	**0.7**	**0.67**

Consequently, it would appear that the theoretical reduction in systematic risk that should be delivered by a revenue cap form of regulation is not being recognised in regulatory decisions.

Based on SA Water's likely exposure to systematic risk compared with other companies, a beta towards the lower end of the range (0.6 to 0.7), appears appropriate. However, the Commission will seek stakeholder input, including through the Negotiation Forum's discussions on risks and returns, before reaching a final decision.

Appendix 4: Credit rating

In SAW RD13, the Commission assumed a benchmark credit rating of BBB+.[69] As the benchmark gearing ratio assumed for SA Water points to a credit rating firmly in the BBB band, the decision was taken in SAW RD13 to utilise the RBA data and assume a credit rating of BBB. However, by SAW RD16 the availability of information on market rates applying to BBB+ bonds was inadequate, while the RBA began to publish information on the rates observed for BBB bonds. Consequently, a BBB rating was used for SAW RD16.

The AER has found a different solution to the issue of the lack of information on BBB+ bonds. They will estimate the yield of a BBB+ bond by using a weighted average of 10-year BBB and A-rated yield curves published by the RBA, Thomson Reuters and Bloomberg. The weighting used is two thirds BBB and one third A.[70]

In making a credit rating assessment, the credit rating agencies exercise judgement, based on a framework of risk metrics. These assess financial risk and business risk, taking into account such things as the quality and source of revenue, level of gearing, political or management risk, and the volatility of income. In arriving at a credit rating for a company, ratings agencies use both metrics and also a degree of subjective judgement.

There is a fundamental difference between the recovery of debt for SA Water and unregulated companies, in that the cost of debt is almost guaranteed to be recovered by the revenue, through the trailing average approach. Under the current regulatory approach, where expected debt costs over the regulatory period are set at the time of the regulatory determination, the only small risk that remains is in the outer years of a regulatory period, if the actual cost of debt deviates significantly from the rate which is anticipated at the time of the regulatory determination. Even then, this risk only applies to debt that is raised during the regulatory period. This risk could be removed if the cost of debt is set each year of the regulatory period to account for actual debt prices for the latest year. This approach, however, would need to be weighted against the certainty of debt cost over the regulatory period which is provided under the current approach.

Note, however, that companies that receive an allowance for the cost of debt which is based on the prevailing rates of return at the time of the determination, rather than the trailing average approach, do face risks as the allowed cost of debt is not likely to match their actual cost of debt unless the company refinances all its debt at the time of the determination at the prevailing rates.

For unregulated companies, an assessment of risk which takes into account such things as interest coverage ratios is important as none of the company's income is guaranteed and, as such, there needs to be a 'safety buffer' to enhance the likelihood of debt holders being repaid. Such a risk is not faced by a revenue-regulated company where the allowed revenue is guaranteed to cover all prudently incurred operating and capital expenditure, as well as debt costs, plus a margin for the cost of equity.

Therefore, the Standard and Poor's and Moody's risk profiles have to be applied with care and judgement, in recognition of the fundamental differences between a revenue-regulated company (especially with a trailing average cost of debt) and an unregulated one. For example, a business risk profile needs to account for the monopoly nature of the essential service which is supplied, while the financial risk profile needs to account for the near-guaranteed return to debt holders. While a 60 percent debt holding may be significant in an unregulated company without a guaranteed income to service it, such a gearing level is not a concern for a revenue-regulated company which is allowed to recover its full prudent debt costs. Therefore, under such circumstances there is a strong case for an investment grade credit rating which is higher than that which applies to companies with similar metrics, but operate in a competitive market.

[69] Each ratings agency uses a slightly different labelling and classification system of credit ratings. The Commission and other regulators have adopted the Standard and Poor's classification of BBB-category to reflect the minimum investment grade.

[70] AER, page 17

Such a credit rating would account for the nature of the business and the regulatory regime the monopoly business must work within. It is consistent with a Benchmark Efficient Entity concept: unsystematic business risks are not accounted for by equity holders who may diversify that risk, but it is an important consideration for debt holders, where the only relevant risks relate to the probability of being repaid. Therefore, debt holders are concerned with both systematic and unsystematic risk.

Appendix 5: Inflation

Inflation in SAW RD16 was estimated as the geometric average of the RBA inflation forecast for the first year, and the midpoint of the RBA's target band (2.5 percent) for the following nine years. This produced an inflation value for SAW RD16 of 2.45 percent, per year. The rationale behind this approach is that the RBA has policy levers to keep inflation within its target band in the longer term but short-term economic factors will cause inflation to be outside of this band in the near term, which are modelled in the RBA's inflation forecasts. As the accuracy of forecasts decreases the further out the projections are, the Commission deemed it prudent to utilise forecasts for the first year only.

Ten years of inflation expectations are incorporated, as that matches the expectations inherent in the price of a 10-year bond. The 10-year bond is used within the WACC model to estimate the Risk Free Rate, and the MRP is estimated as a premium over that Risk Free Rate, it is for consistency that the 10 years of inflationary expectations are incorporated, rather than for the four years of the determination.

This delivers the best theoretical underpinning for adjusting from nominal to real WACC. One shortfall, however, is that the 10-year inflation expectations may differ from the best estimate of inflation for the four years of the regulatory period. The impact of this is that the annual revenue adjustments which are made for inflation may differ from initial expectations, if actual inflation differs from initial expectations. However, as the determination is made in real numbers, this does not have a real impact on the amount SA Water's customers pay. The revenue allowance changes each year in response to observed inflation, to deliver, in present value (PV) terms, the revenue allowance anticipated at the commencement of the determination.

While the RBA has policy levers to help deliver the target rate, the market may have a different assumption reflected in the bond price. Accordingly, the market view of inflation may be observed through the RBA bond price data, which includes yield data for inflation-indexed Commonwealth Government securities. Such an approach would keep the parameters of the WACC formula consistent,

However, the parameters of the WACC formula may not need to be consistent. The Commission's trailing average debt cost has inbuilt inflation expectations that differ from the forward-looking cost of equity. Therefore, consistency of inflation expectations is only important in the WACC formula if both debt and equity are forward-looking – that is, debt and equity are to be assessed 'on the day' of the determination and have expectations for inflation embedded in them. The cost of raising new debt is not calculated with the 'on the day' approach, but reflects the cost that an incumbent utility is likely to incur through the trailing average approach. The cost of equity calculation remains forward-looking.

The most consistent inflation calculation approach with the WACC model is the Break-Even Inflation (BEI) method, which measures inflation as the difference between the yields of inflation linked bonds and a nominal bond of the same term.

Some regulators, such as IPART and the AER, had moved away from the Break-Even Inflation method on the basis of concerns about the liquidity of the market for inflation – linked bonds,[71] and biases and premiums.[72] The ERA has maintained its use of the Break Even Inflation method.

Each of the methods has advantages and disadvantages. While the Commission's current method has delivered inflation results that have been above CPI over SAW RD16, the Break-Even Inflation method predicted lower values.

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[71] IPART, 'Review of our WACC method', Draft Report Research, October 2017, page 74, available at https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-administrative-legislative-requirements-sea-wacc-methodology-2017/draft-report-review-of-our-wacc-method-october-2017.pdf

[72] AER (3) Final position paper: Regulatory treatment of inflation – Final position, December 2017, Page 11, available at https://www.aer.gov.au/system/files/AER%20-%20Final%20position%20paper%20-%20Regulatory%20treatment%20of%20inflation%20-%20December%202017%20-%20Web%20upload.PDF

Regulators in Australia estimate inflation as shown in Table 8.

Table 8: Methods for estimating inflation used by Australian regulators

Regulator	Inflation estimation method	Basis of determination
ESCOSA	Average of RBA forecast for the first year and the RBA target band (currently 2.5 percent) for the next nine years.	Post-tax real
AER	Average of RBA forecasts for the first two years and the RBA target band (currently 2.5 percent) for the next eight years.[73]	Post-tax nominal[74]
IPART	Estimates inflation for the regulatory period rather than the next 10 years, using the RBA's Statement of Monetary Policy for the first year's estimate.[75]	Post-tax real[76]
ERA	Difference between the on-the-day nominal and real, five-year risk-free rate of return[77]	Pre-tax real[78]
ESCV	Variable according to proposals from businesses, but generally zero.[79]	
QCA	Assumes a general inflation rate of 2.5 percent.[80]	
OTTER	Assumes a general inflation rate of 2.5 percent[81]	
ICRC	Assumes a general inflation rate of 2.5 percent[82]	

Over the SAW RD16 period to date, inflation as measured through the CPI, has been just under 2.0 percent, yet SAW RD16 used a forecast of 2.45 percent. SA Water has stated that a systemic mismatch between forecast and actual inflation has impacted on its budgeting. At the time of the commencement of SAW RD16, the RBA's Break-Even inflation calculation was at 1.6 percent. No inflation forecasting method is empirically perfect, so the Commission is open to the merits of any methods that stakeholders and SA Water propose through the consultation and negotiation process.

73 AER (3), pages 11-12,
74 AER, (1) page 9.
75 IPART (1), page 71
76 IPART (1), page 76
77 ERAWA (2), Rate of Return Guidelines, page 32, available at https://www.erawa.com.au/cproot/11953/2/Rate%20of%20Return%20Guidelines.PDF.
78 ERA, (1), page 380, 394.
79 ESCV (1) page 30
80 QCA (2) Final Report – SunWater Irrigation Price Review: 2012-17, Volume 1, May 2012, page 201, available at http://www.qca.org.au/getattachment/54737c81-1c5d-42d0-aa91-d2a2ad2b7951/SunWater-Irrigation-Price-Review-2012-17-Volume-1.aspx.
81 OTTER, page 45, 119
82 ICRC (1), page 135

Appendix 6: Regulatory depreciation and the RAB

Regulatory depreciation reflects the cost of using SA Water's regulated drinking water and sewerage assets. It is dependent on the value of SA Water's regulated asset base (RAB) and the length of lives of those assets.

For each financial year, the RAB value is updated (rolled forward) for inflation, asset acquisitions and disposals, and depreciation. Only 'direct control' assets, that are necessary for the regulated business, are included in the RAB.

Through this process, the following principles are applied:

- new capital expenditure is recognised as an asset immediately in the year that it is incurred rather than on an as-commissioned basis
- capital expenditure is net of customer contributions and gifted assets
- half of capex is added to the asset base on the first day of each year and the remaining half on the last day of the year, to replicate a mid-year timing assumption - this is to reflect a scenario under which all capital expenditure and asset disposals occur evenly throughout the year.
- the straight line method of depreciation is used for all new capex and existing assets, with the asset useful lives and remaining lives provided by SA Water

The annual revenue impact of regulatory depreciation ($m Dec 2014) in SAW RD16 is as follows:

Table 9: Revenue impact of depreciation over RD16

	2016-17 $'000	2017-18 $'000	2018-19 $'000	2019-20 $'000	TOTAL
Drinking water	177.4	180.6	183.7	187.0	**728.7**
Sewerage	95.3	98.3	101.5	104.5	**399.6**
Total	**272.7**	**278.9**	**285.2**	**291.5**	**1,128.3**

Averaged across SA Water's 750,000 water customers and 580,000 sewerage customers, the impact is approximately $210 per customer per year.

Appendix 7: Additional information – Defining the Benchmark Efficient Entity approach

The weighted average return on capital is currently set by the Commission with reference to the rates that could be expected to apply, in the open market, for a Benchmark Efficient Entity facing similar risks to SA Water. Therefore, SA Water's ownership by the state government and the cost and benefits associated with that, such as financing costs, are not relevant in determining SA Water's cost of equity. This results in the provision of an essential service at a price that can be sustained by an efficient operator, but not higher.

In previous regulatory determinations made by the Commission in respect of SA Water, the Commission has adopted the Benchmark Efficient Entity approach. The Commission has previously outlined the characteristics of a Benchmark Efficient Entity in the principles for setting SA Water's regulatory rate of return, as follows: [83]

General principle: The rate of return should reflect the prudent and efficient financing strategy of an incumbent large water utility, which minimises expected costs in the long term, on a risk-adjusted basis.

Supporting principle 1: The rate of return should reflect a long-term obligation on the utility to provide reliable and secure water and sewerage services to consumers. It should not solely reflect the new entrant cost of capital.

Supporting principle 2: The rate of return should provide an incentive for SA Water to incur prudent and efficient investment in regulated assets and financing costs.

Supporting principle 3: The approach to setting the regulatory rate of return should be based on consistent principles over time and should be predictable. It should change only to reflect material changes in evidence or regulatory practice.

Supporting principle 4: The assumed prudent financing strategy should not depend on the ownership of the regulated business (that is, the approach is indifferent to whether the entity is in Government or private ownership).

The general principle detailed above refers to a risk-adjusted basis for setting the rate of return for an incumbent large water utility. In this case, risk refers to systematic or market-wide risk associated with an incumbent large water utility. Such risk is dealt with in revenue determinations through the equity beta, a component of the capital asset pricing model (CAPM). It does not refer to further risks in the cost of capital, such as business specific risks (which, under the CAPM, should not be rewarded, as they can be diversified away).

Principle four underpins the concept of the 'benchmark efficient entity'. Principle 4 is a principle that the Commission and most (but not all) other regulators have adopted when making regulatory determinations.

In its submission to the draft SAW RD20 Framework and Approach paper, Uniting Communities specifically rejected principle four, while broadly supporting the adoption of the other principles by the Commission.[84]

However, to change principle four may introduce a level of economic inefficiency if government ownership implies that cross subsidies between tax payers and SA Water's consumers may exist.

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[83] ESCOSA, (3) *SA Water Regulatory Rate of Return 2016-2020: Final Report to the Treasurer*, page 21, available at http://www.escosa.sa.gov.au/ArticleDocuments/424/20150331-SAWaterRegulatoryRateReturn2016-2020-Rep.pdf.aspx?Embed=Y.

[84] Uniting Communities, Submission to: Essential Services Commission of South Australia, RD20 Draft Framework and Approach, February 2018, available at: http://www.escosa.sa.gov.au/ArticleDocuments/1171/20180216-Water-SAWRD2020-FA-Draft-Submission-UnitingCommunities.pdf.aspx?Embed=Y.

There are other potential implications accompanying the suggested change to principle four, which include:

- In the case of a change of ownership, the regulatory framework does not change – the efficient firm benchmark is retained.
- The adoption of the Benchmark Efficient Entity avoids the potential situation of having to apply the utility's actual cost of capital outside of the parameters of the Benchmark Efficient Entity approach, even though this may be less favourable for consumers. For example, if the utility is sold and the new owner of the utility has a higher cost of debt than the Benchmark Efficient Entity, that would not need to be reflected in the regulatory rate of return, as the Benchmark Efficient Entity would be able to finance itself at a lower cost.
- Utilities are provided with an incentive to outperform the cost of capital awarded to a Benchmark Efficient Entity, rather than be penalised for it.
- Using the Benchmark Efficient Entity approach allows the Commission to exclude from maximum revenues any potential costs that may be associated with Government ownership that are non-commercial, such as social programmes which are expected to be funded separately by Government.

Other Australian regulators apply the principles of the Benchmark Efficient Entity approach differently, as follows:

ERAWA[85]

The ERA defines a benchmark entity, for the purposes of regulating water utilities as:

'a pure play service provider operating within Australia without parental ownership, with a similar degree of risk as that which applies to the service provider in respect of the provision of the water services.'

Importantly, the ERA regards the benchmark as a single entity rather than one operating in a fragmented, competitive market. Only under such conditions would a firm be willing to commit to the highly capital-intensive, long-term nature of the asset investment required to deliver such services to a sizeable customer base, thus delivering economies of scale but also enabling a higher level of gearing of the assets, and the ability to access overseas capital markets. In addition, a large firm will not be characterised by regulatory exemptions, which may apply to smaller firms.

IPART[86]

IPART defines the benchmark entity as

'*a firm operating in a competitive market and facing similar risks to the regulated business*.'

As the entity is hypothetical, its cost of capital cannot be directly observed. IPART relies on proxy information to determine the industry-specific WACC parameters.

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85 Economic Regulation Authority (ERA) (1*), Inquiry into the efficient costs and tariffs of the Water Corporation, Aqwest and Busselton Water – Final Report*, page 330, 10 November 2017, available at https://www.erawa.com.au/cproot/18490/2/Inquiry%20into%20efficient%20costs%20and%20tariffs%20of%20the%20Water%20Corporation,%20Aqwest%20and%20Busselton%20Water%20-%20Final%20Report.pdf

86 IPART (1), *Review of our WACC method*, *Final Report, February 2018*, page 19, available at https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-administrative-legislative-requirements-sea-wacc-methodology-2017/draft-report-review-of-our-wacc-method-october-2017.pdf

AER[87]

The definition of the benchmark efficient entity for the AER is:

> '*a pure play, regulated energy network business operating within Australia*.'

This is used to inform the formation of:

- the benchmark gearing ratio
- the benchmark credit rating, and
- the benchmark debt term.

ESC Victoria[88]

In regulating metropolitan water businesses, the ESCV uses a benchmark debt margin drawn from lending rates advised by the Treasury Corporation of Victoria (TCV), reflecting the fact that the water businesses it regulates all borrow from TCV. Such debt rates are lower than rates available through private debt markets.

In a more recent paper,[89] the ESCV stated that its objective is to establish:

> *'a reasonable annual revenue requirement sufficient to meet the expenditure that would be incurred by a prudent service provider acting efficiently to achieve the lowest cost of delivering on validated service outcomes, taking into account a long-term planning horizon.'*

Such a definition determines the following parameters for the ESCV:

- 60 percent debt funding, 40 percent debt
- 10-year trailing average debt portfolio
- debt raising costs of 0.15 percent, as applied by the TCV, and
- variable cost of equity according to the ESCV's PREMO incentive scheme, with higher rates awarded for businesses with higher rates of ambition to deliver lower costs.

QCA[90]

QCA incorporates benchmark assumptions without actually defining the benchmark. Its key assumptions include:

- 60:40 debt:equity
- MRP of 6.5 percent per annum
- credit rating BBB
- beta of 0.65
- debt raising costs of 10.8 basis points per annum, and
- gamma 0.47.

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87 AER, (1) *Better Regulation – Rate of Return guideline*, December 2013, page 7, available at https://www.aer.gov.au/system/files/AER%20Rate%20of%20return%20guideline%20-%20December%202013.pdf.

88 ESCV (1), 2009 *Water Price Review Final Decision*, page 65, available at https://www.esc.vic.gov.au/wp-content/uploads/esc/f3/f3f8deaa-d639-45e3-a5ec-af64c9654434.pdf.

89 ESCV (2), *Water Pricing Framework and Approach, October 2016*, page 24, available at https://www.esc.vic.gov.au/wp-content/uploads/2016/10/Water-Pricing-Framework-and-Approach-Final-Paper-Oct-2016.pdf.

90 QCA (1), *SEQ Retail Water Long-Term Regulatory Framework – Overview – Part A: Final Report*, September 2014, page 11, available at http://www.qca.org.au/getattachment/452c52a2-98e1-4de5-837d-318acddf7ae2/Part-A.aspx.