Attachment 9

Rate of return and forecast inflation

30 June 2017

2018–23 Water and Sewerage Price Proposal

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1 Summary

Icon Water has adopted the 2015 Industry Panel methodology to calculating the rate of return and forecast inflation, consistent with the terms of reference.

Icon Water recognises that there are alternative approaches to estimating the rate of return parameters, with varying approaches used by Australian regulators in different jurisdictions. Icon Water also notes that the approach to estimating some parameters has been the subject of appeals to the Australian Competition Tribunal and the Federal Court (Australian Competition Tribunal (2016a,b,c,d,e,f); Federal Court of Australia (2017)).

While deviations from the Industry Panel approach could be justified in a number of areas, Icon Water has chosen to adopt, in full, the 2015 Industry Panel methodology. Application of this methodology results in estimates for each rate of return parameter that are within the range of estimates used by other Australian regulators and an overall rate of return which results in fair and affordable pricing for water and sewerage services. Icon Water has also commissioned two expert reports to further assess the reasonableness of the values for the equity beta and market risk premium, which are the two parameters on which the Independent Competition and Regulatory Commission (ICRC) has specifically sought views in its Issues Paper (ICRC (2017)).

The 2015 Industry Panel methodology results in a rate-of-return of 6.07 per cent (nominal, post-tax 'vanilla' weighted average cost of capital (WACC)), estimated at 31 March 2017, and a forecast inflation rate of 2.5 per cent.

Box 1-1: Key points

Icon Water has adopted, in full, the 2015 Industry Panel methodology for calculating the rate of return and forecast inflation. This results in a rate of return of 6.07 per cent, estimated at 31 March 2017, and a forecast inflation rate of 2.5 per cent. The individual components of the WACC, compared with the values originally estimated by the Industry Panel, are set out in the table below.

WACC Parameter	Industry Panel (31 May 2013)	Icon Water (31 March 2017)
Risk free rate	3.22%	2.78%
Debt margin	3.13%	2.08%
Debt raising cost	0.125%	0.125%
Equity beta	0.7	0.7
Market risk premium	7.23%	7.03%
Gearing	60%	60%
Cost of debt	6.48%	4.99%
Cost of equity	8.28%	7.71%
Nominal post-tax 'vanilla' WACC	7.20%	6.07%

Source: Industry Panel (2015): 65; Icon Water estimates.

2 Background

The return on capital reflects the cost that a firm incurs in financing its capital through debt and equity funds. In a regulatory context, the return on capital is calculated for each year of the regulatory period as the rate of return (or the WACC) multiplied by the regulatory asset base (RAB). Given the capital intensive nature of regulated firms, the return on capital usually comprises a substantial proportion of the total revenue requirement and resulting prices. For example, in the 2015 Industry Panel decision, the return on capital accounted for approximately 35 per cent of the total revenue requirement for water and 27 per cent of the total revenue requirement for sewerage[1].

In estimating the appropriate rate of return for Icon Water, it is first important to establish the appropriate reference point and application method.

2.1 Reference point for estimating the rate of return

The reference point used by most Australian regulators in estimating the rate of return is the 'benchmark efficient entity'.[2] The benchmark efficient entity reflects a hypothetical efficient firm operating in a competitive market for the services in issue. The benchmark efficient entity is used by regulators to encourage efficient outcomes consistent with those in a workably competitive market.

The benchmark efficient entity approach is consistent with the overarching objective of the *Independent Competition and Regulatory Commission Act 1997* (ICRC Act) (part 4, section 19L):

> The objective of the commission, when making a price direction in a regulated industry, is to promote the efficient investment in, and efficient operation and use of regulated services for the long term interests of consumers in relation to the price, quality, safety, reliability and security of the service.[3]

Regardless of Icon Water's actual costs, the benchmark efficient entity approach compensates Icon Water for the costs an efficient firm would incur in providing the regulated services. Consistent with the ICRC Act, this provides Icon Water with the incentive to make efficient investment decisions and to seek out operating efficiencies, which are in the long-term interests of consumers.

The benchmark efficient entity approach is also consistent with section 20 of the ICRC Act which, in relation to the rate of return, states that:

> In making a decision under subsection (1), the commission must have regard to:
>
> (d) an appropriate rate of return on any investment in the regulated industry; and

[1] Industry Panel, 2015: 103.

[2] See for example, Industry Panel, 2015: 69-70, IPART, 2013: 9, ERTas, 2015: 34, AER, 2013b: 7, ESCOSA, 2016: 115, QCA, 2014: 20-21,ERA, 2013: 53.

[3] ACT Government, 1997: 27.

> (i) the borrowing, capital and cash flow requirements of people providing regulated services and the need to renew or increase relevant assets in the regulated industry.[4]

The benchmark efficient entity approach ensures that Icon Water earns an appropriate rate of return reflecting the costs that it would face were it operating in a competitive environment. This is consistent with the principles of competitive neutrality agreed by the Council of Australian Governments (COAG (1995)) and set out in ACT Government policy (ACT Department of Treasury (2010)). Any advantages or disadvantages associated with public ownership are removed under this approach providing appropriate incentives for efficient investment.

The benchmark efficient entity approach also meets the borrowing, capital and cash flow requirements of Icon Water to renew or increase water and sewerage assets. Efficient financing costs allow Icon Water to secure the financing required over the long-term to renew or increase relevant assets, while also ensuring it is not over-compensated.

The benchmark efficient entity reference point was used in the 2015 Industry Panel decision for the following reasons:

- Consistent with the requirements of the Act – In the Panel's view, the benchmark efficient entity approach is more consistent with section 20(2) of the Act (in particular section 20(2)(i)) than the firm-specific approach because using efficient financing costs allows the regulated service provider to attract the necessary investment capital to maintain a reliable service while minimising the costs to consumers.

- Consistent with the approach used by the majority of Australian regulators – When applying the building block methodology, most regulators aim to provide the service provider with a return on capital that reflects the efficient financing costs of a benchmark efficient entity and the risks involved in delivering the regulated services.

- Consistent with the competitive neutrality principles and the allocated efficiency principle – To be consistent with competitive neutrality principles set out in COAG's Competition Principles Agreement (CPA) and the ACT Government's competitive neutrality policy and the allocative efficiency principle, more generally, the rate of return applied to regulated service providers should reflect the opportunity cost of capital. This rate of return will be the same irrespective of that business' ownership and, in the Panel's view, can best be approximated using the benchmark efficient entity approach.[5]

To ensure the rate of return meets the objectives of the ICRC Act and to maintain consistency with the 2015 Industry Panel decision and widely accepted Australian regulatory practice, Icon Water has adopted the benchmark efficient entity reference point for estimating the rate of return.

In its 2017 Issues Paper, the ICRC asks if there is a better alternative to the current benchmark efficient entity approach for estimating an allowed rate-of-return for Icon Water.[6] For the reasons set out above, it is Icon Water's view that the benchmark efficient entity is the appropriate reference point for estimating the allowed rate of return.

[4] ACT Government, 1997: 27-28.

[5] Industry Panel, 2015: 60-70.

[6] ICRC, 2017: 28.

2.2 Application of the WACC

Icon Water moved to a post-tax revenue model for the 2013–18 regulatory period, where taxation and inflation effects are included in the cash flows. Consistent with this approach, Icon Water applied a nominal post-tax 'vanilla' WACC. This approach was accepted by the ICRC in its 2013 decision and by the Industry Panel in its 2015 decision[7]. Icon Water has used the same approach for the 2018–23 regulatory period.

The post-tax nominal 'vanilla' WACC is calculated using the following formula:

$$Post\text{-}tax\ nominal\ vanilla\ WACC = R_e * \frac{E}{V} + R_d * \frac{D}{V}$$

Where:

R_e = required return on equity

R_d = required return on debt

E/V = proportion of capital financing that is equity

D/V = proportion of capital financing that is debt

Based on the benchmark efficient entity reference point, the gearing ratio (D/V) is set at 60 per cent. This is consistent with the gearing ratio used in the 2015 Industry Panel Decision and that used by all other Australian regulators.[8]

The approach used to estimate the return on equity and the return on debt are set out in section 3 and section 4, respectively. Section 5 brings together all of the WACC parameters to calculate a single point estimate of the rate of return. Throughout these sections, comparisons are made to Australian regulatory decisions and methodology guidelines. The decisions and guidelines used as comparators and the reasons they were chosen are set out in Table 2-1 below.

[7] This approach is also used by the QCA and by the AER in the context of electricity and gas.

[8] Industry Panel, 2015: 78; IPART, 2017: WACC Parameters cell G24; ESC, 2016c: 53; ERTas, 2015: 46; ESCOSA, 2016: 125; QCA, 2014: 21; AER, 2017a: 3-9; ERA, 2016: 33.

Table 2-1: Australian regulatory comparators

Regulator	Source material	Reason
Independent Pricing and Regulatory Tribunal (IPART)	Review of WACC Methodology 2013 and Spreadsheet WACC Model February 2017.	Most recent views on WACC methodology and most recent parameter values.
Essential Services Commission of Victoria (ESC)	Melbourne Water and Goulburn-Murray Price Reviews 2016 and 2018 Water Price Review Guidance Paper.	Most recent water decisions and future approach to water reviews.
Tasmanian Economic Regulator (ERTas)	Water and Sewerage Price Determination 2015.	Most recent water decision.
Essential Services Commission of South Australia (ESCOSA)	SA Water Regulatory Determination 2016.	Most recent water decision.
Queensland Competition Authority (QCA)	SEQ Retail Water Long-term Regulatory Framework 2014 and 2016 Final Decision of DBCT Management's Undertaking.	Most recent views on water rate of return and more recent views on market-wide rate of return parameters.
Australian Energy Regulator (AER)	AER 2013 Rate of Return Guidelines and 2017 Final decision for TasNetworks.	Most recent views on rate of return methodology and most recent parameter values.
Economic Regulatory Authority of Western Australia (ERA)	Inquiry into the Tariffs of Water Corporation, Aqwest and Busselton Water 2013 and Final Decision on Dampier to Bunbury Natural Gas Pipeline 2016.	Most recent water decision and most recent views on market-wide parameter values.

3 Return on equity

There are a number of financial models that can be used to calculate the return on equity, all based on differing theoretical assumptions and with varying strengths and weaknesses. The most widely used approach by Australian regulators is the Sharpe Lintner capital asset pricing model (SL-CAPM). However, despite its widespread use there is also general acceptance that no single model, by itself, can provide an appropriate return on equity in all market conditions.[9]

Consistent with the approach used in the 2015 Industry Panel Decision and by other Australian regulators, Icon Water has adopted the SL-CAPM for calculating the return on equity. Icon Water has also adopted the 2015 Industry Panel approach to estimating the individual parameters of the SL-CAPM which are the risk free rate, equity beta and market risk premium (MRP). The remainder of this section discusses each of the inputs to the SL-CAPM and compares the resulting values to those adopted by other Australian regulators.

3.1 Risk free rate

The risk free rate is the basis for calculating the return on equity and reflects the return an investor would expect to earn in the absence of default risk. A premium is added to the risk free rate to calculate the total return on equity and hence the risk free rate has a substantial impact on the resulting return on equity estimate.

Consistent with the 2015 Industry Panel Decision, the risk free rate is estimated using Commonwealth Government Securities (CGS) with a 10 year term to maturity and an averaging period of 40 consecutive business days. For the purposes of this submission, the risk free rate estimated for the 40-day averaging period ending 31 March 2017 is 2.78 per cent. Icon Water recognises that this estimate will be updated to ultimately reflect the risk free rate commensurate with prevailing market conditions as close as possible to the start of the 2018–23 regulatory period.

As shown in Table 3-1, the approach to calculating the risk free rate is similar among Australian regulators, although with variations to the term to maturity and the length of the averaging period:

- With the exception of IPART and the ERTas, all regulators use an averaging period of between 20 and 40 business days as close as practicably possible to the commencement of the regulatory period. IPART and ERTas also use a long-term averaging period of 10 years. Both take the midpoints of the short-term and long-term estimates to determine a point estimate of the WACC.
- With the exception of QCA and the ERA, all regulators use CGS with a 10-year term to maturity for estimating the risk free rate.

[9] See, for example: AEMC, 2012: 38-71;AER, 2013a: 55; SFG, 2014: 370; Australian Competition Tribunal, 2016d: 719-735.

This concern led the AEMC to review the rules for electricity and gas requiring reliance solely on the SL-CAPM and amend them to instead require consideration of all relevant estimation methods, financial models, market data and other evidence: AEMC, 2012: 38-71.

The Tribunal recognised the shortcomings of the SL-CAPM, including in particular its low beta bias, but concluded that the AER's use of the SL-CAPM as the foundation model did not involve any error, in circumstances where the AER's implementation of the model recognised its empirical limitations: Australian Competition Tribunal, 2016d: 719-735.

While the estimates presented in Table 3-1 are for differing time periods and hence are not directly comparable, a comparison of the methodologies demonstrates that the Industry Panel approach adopted by Icon Water is not out of step with Australian regulatory practice. Icon Water also notes that the length of the averaging period has only a minor impact on the risk free rate estimate. For example, using an averaging period of 20 business days instead of the 40 business day averaging period used by the Industry Panel would increase the risk free rate from 2.78% to 2.81% (estimated at 31 March 2017).

Table 3-1: Regulatory approaches to the risk free rate

Regulator	Methodology	Estimate
IPART	10-year CGS with a 10-year averaging period and 40-day averaging period.	2.8% to 4.3%[1]
ESC	10-year CGS with an averaging period of 10 to 40 days as close as practically possible to the start of the regulatory period.	3.2%[2]
ERTas	Midpoint of 10-year CGS over 40 business days and over previous 10 years.	3.28%[3]
ESCOSA	10-year CGS with an averaging period of 20 business days as close to the commencement of the regulatory period as possible.	2.53%[4]
QCA	Five-year CGS with an averaging period of 20 business days just prior to the annual update.	1.824[5]
AER	10-year CGS with an averaging period of 20 business days as close as practicably possible to the commencement of the regulatory control period	2.85%[6]
ERA	For equity a five-year CGS with an averaging period of 20 business days just prior to the start of the regulatory period	1.80%[7]

Source: 1: IPART (2017); 2: ESC (2016c)(converted to nominal assuming an inflation rate of 2.5%); 3: ERTas (2015); 4: ESCOSA (2016); 5: QCA (2016); 6: AER (2017a); 7: ERA (2016).

3.2 Equity beta

The equity beta measures the degree of systematic risk associated with an equity investment in a particular industry or business. Under the SL-CAPM, risk is measured relative to the market. An equity beta of one implies that the business' returns vary with economic conditions by the same amount as the overall market. An equity beta between zero and one implies the business' returns tend to vary in the same direction as the overall market but not by as much. The equity beta is used to scale the MRP up or down to reflect the businesses' risk premium (above the risk free rate) that equity holders would require to hold that particular business as part of a well-diversified portfolio.

Consistent with the 2015 Industry Panel decision, Icon Water has set the equity beta at 0.7. This value is consistent with the equity beta used by IPART, ESC (Goulburn-Murray Water), ESCOSA, AER and ERA (BDP Gas) but above the value used by ESC (Melbourne Water), QCA, ERTas and ERA (Aqwest and Busselton Water).[10] The equity beta of 0.7 used by the ERA is for gas transmission. Similarly, the AER has used an equity beta of 0.7 for electricity and gas. The AER concluded that conceptually energy and water networks face similar levels of systematic risk and hence it is desirable to have similar regulated returns between these two industries:

> Because these industries face similar levels of systematic risk, different returns between these two industries could cause investment distortions.[11]

In Icon Water's view, the Industry Panel equity beta estimate of 0.7 is reasonable when compared with the approach taken by other Australian regulators.

Table 3-2: Regulatory approaches to equity beta

Regulator	Methodology	Estimate
IPART	Range of 0.6 to 0.8, with a default position at the midpoint	0.7[1]
ESC	From 2018, the ESC will set the total cost of equity based on a new "PREMO" framework	0.65-0.7[2]
ERTas	Same equity beta as previous regulatory period	0.65[3]
ESCOSA	Taking into account latest research and evidence, equity beta of 0.7 remains appropriate	0.7[4]
QCA	Based on comparator entities	0.65[5]
AER	Range of 0.4 to 0.7 based on empirical analysis using a set of Australian energy firms. Selection of point estimate based on empirical estimates of overseas energy networks and the theoretical principles underpinning the Black CAPM.	0.7[6]
ERA	In 2013, an empirical survey was undertaken resulting in a large range and the ERA adopted 0.65. In 2016 the equity beta was based on an updated empirical analysis.	0.65-0.7[7]

Source: 1: IPART (2017); 2: ESC (2016c) and ESC (2016b); 3: ERTas (2015); 4: ESCOSA (2016); 5: QCA (2014); 6: AER (2017a); 7: ERA (2013) and ERA (2016)

In its Issues Paper, the ICRC (2017) asks specifically whether the current value of the equity beta parameter continues to be appropriate.[12] While regulatory precedent suggests that this is the case, Icon Water has also commissioned an expert report from HoustonKemp Economists. This report, which is provided as Appendix 1 to this attachment, establishes 0.6 to 1.0 as a reasonable range for the equity beta of a benchmark efficient water utility and concludes that there is strong support for the continued adoption of the Industry Panel's estimate of the equity beta of 0.7 and, indeed, that such an estimate is conservative.

[10] Icon Water recognises that the QCA has used an equity beta of 0.55 for Seqwater and SunWater, however, considers these are not comparable for the reasons discussed in section 3.2.

[11] AER, 2013a: 44-45. See also ACCC, 2011: 34.

[12] ICRC, 2017: 28.

In establishing a reasonable range, HoustonKemp undertook an analysis of market data and a review of decisions on equity beta by other Australian jurisdictional regulators and concluded the following.

- Analysis of prevailing equity betas of comparable US and UK water businesses strongly supports an equity beta range of 0.6 to 1.0, with eight of the twelve comparable water utilities having an equity beta estimate in excess of 0.7.
- There is a high degree of consistency in the equity beta decisions made by Australian jurisdictional regulators, with regulators determining an equity beta of between 0.65 and 0.70 for metropolitan Australian water utilities.
- IPART's decision to set an equity beta of 0.7 for Sydney Water and the ESC's decision to set an equity beta of 0.65 for Melbourne Water are particularly relevant for Icon Water because:
    - IPART and the ESC have comparable WACC objectives which is to promote the long-term interests of consumers by ensuring efficient investment in regulated services
    - Sydney Water and Melbourne Water are closely comparable businesses to Icon Water, providing regulated water and wastewater services to a predominantly urban and industrial customer base
    - IPART and the ESC, in making their decisions, had regard to market evidence on the prevailing equity beta of a benchmark water and wastewater business.
- QCA's decisions for Seqwater and SunWater, which set an equity beta of 0.55, have limited relevance for Icon Water because, as acknowledged by the QCA, the equity beta for these companies was below that of a typical water business due to the characteristics of the customers served by the water service company.

In addition, HoustonKemp highlights the low beta bias of the SL-CAPM which suggests that the need to set a point estimate for the equity beta at the top of a range increases when that equity beta range is substantially less than 1. This approach is consistent with that used by the AER and endorsed by the Australian Competition Tribunal.[13]

Given the strong regulatory precedent and the analysis undertaken by HoustonKemp, it is Icon Water's view that an equity beta of at least 0.7 is appropriate.

3.3 Market risk premium

The MRP is the amount by which the required return on a broadly diversified 'market' portfolio exceeds the risk free rate. Within the SL-CAPM, the MRP is multiplied by the equity beta to determine an equity premium, which is then added to the risk free rate to determine the total return on equity. Consistent with the 2015 Industry Panel Decision, Icon Water proposes that the MRP be calculated using a 40 day average of Bloomberg's daily implied MRPs. For the purpose of this submission, the MRP calculated for a 40 day averaging period ending 31 March 2017 is 7.03 per cent. Icon Water recognises that the use of this approach will require the MRP to be updated as close as possible to the start of the 2018–23 regulatory period to ensure the MRP is commensurate with prevailing market conditions.

Table 3-3 sets out the MRP estimates used by other regulators in Australia. It is important to note that, while the risk free rate is estimated by nearly all regulators using an averaging period of 20 or 40 business days as close as practicably possible to the commencement of the regulatory period, not all regulators have updated the methodology for estimating the MRP to reflect prevailing market conditions. Despite the risk free rate being at historically low levels, some regulators continue to rely

[13] See for example, AER, 2013b: 15, AER, 2013a: Appendix C, Australian Competition Tribunal, 2016d: [779].

on an MRP that reflects long-term average conditions. Regulators that do consider current market prices or forward-looking conditions in determining the MRP estimate include IPART, QCA, the AER and ERA. Icon Water's MRP estimate of 7.03 per cent is within the range established by these regulators.

Table 3-3: Regulatory approaches to market risk premium

Regulator	Methodology	Estimate
IPART	Long-term averages based on historical excess returns and current market data based on implied MRP methodologies adjusted for imputation credits	6.0% to 9.3%[1]
ESC	From 2018, the ESC will set the total cost of equity based on a new 'PREMO' framework	6.0%[2]
ERTas	Historical approach	6.0%[3]
ESCOSA	Historical approach	6.0%[4]
QCA	Consideration of a range of information including historic estimates, DGMs, survey and independent expert reports and conditional information	6.5%[5]
AER	Estimate a range based on historical excess returns, DGMs, survey evidence and conditioning variables. Select a point estimate based on regulatory judgement	6.5%[6]
ERA	ERA establishes a range based on relevant historic and forward looking evidence of 5.4% (informed by Ibbotson averaged excess premium) to 8.8% (DGM estimates) and then determines a point estimate based on forward looking indicators and judgement	7.4%[7]

Source: 1: IPART (2017); 2: ESC (2016c); 3: ERTas (2015); 4: ESCOSA (2016); 5: QCA (2016); 6: AER (2017a); 7: ERA (2016).

While a comparison of relevant regulatory decisions in Australia confirms that the Industry Panel's Bloomberg approach results in a reasonable estimate, Icon Water recognises that there are a number of alternative approaches to estimating the MRP. The ICRC has also sought views, in its 2017 Issues Paper, on whether it is appropriate to rely solely on the current single Bloomberg implied measure of the MRP to estimate the MRP.[14]

Therefore, to further assess the reasonableness of the MRP value derived from the Industry Panel's methodology, Icon Water has commissioned an expert report from Professor Stephen Gray of Frontier Economics. The Frontier Economics report identifies the different regulatory approaches to estimating the MRP, the estimates derived under each approach and the resulting point-estimate of the MRP that is consistent with the prevailing conditions in the market for equity funds. Frontier Economics' findings are summarised in the following sections. The full Frontier Economics report is provided at Appendix 2.

3.3.1 Regulatory practice in Australia

Regulators in Australia recognise that the MRP varies over time and that the regulatory task is to adopt a forward-looking estimate of the MRP that is commensurate with the prevailing conditions in the market for equity funds.

[14] ICRC, 2017: 28

Prior to 2013, the MRP was typically derived with primary reference to evidence of long-run historical excess market returns. Over this period, the risk free rate remained relatively close to its historical average. Thus, a MRP estimate based on historical averages was paired with a risk free rate close to its historical average to produce an allowed return on equity. In this sense, the prevailing market conditions were consistent with the average historical market conditions and there was relatively little dispute about the return on equity allowances.

However, since 2012 government bond yields have fallen dramatically to historical lows. Thus, the prevailing conditions now differ materially from the historical average conditions and this point has been recognised in the regulatory setting.

In 2013, a number of regulators in Australia, including the AER, IPART and the ERA undertook major reviews of their rate of return methodologies. These reviews confirmed that the appropriate regulatory task is to estimate a forward-looking MRP commensurate with the prevailing conditions in the market. The higher recent MRP estimates reflect the view that the decline in government bond yields in recent years has not been matched by a one-for-one decline in the total required return on equity. Rather, the fall in government bond yields has been at least partially offset by an increase in the MRP – resulting in a relatively stable estimate of the required return on equity. This has also been recognised by international regulators with examples provided in Frontier Economics' report (see Appendix 2).

3.3.2 Approaches to estimating the MRP

Regulators in Australia have regard to a number of methods for estimating the MRP.

Historical excess returns

A number of Australian regulators, including the AER, ERA, QCA and IPART, are explicit that they use amongst other approaches historical excess returns to set the allowed MRP. This approach involves calculating the average difference between the observed return on the market and the risk free rate over a long period (typically 50 to 100 years or more). By definition, this approach reflects the average market conditions over the historical period that is considered.

Dividend growth model (DGM)

The DGM involves forecasting future dividends on the market portfolio and then solving for the discount rate that equates the present value of those dividends with current stock prices. This approach provides a direct estimate of the forward-looking required return on the market portfolio. Subtracting the current risk free rate then produces a forward-looking estimate of the MRP. A number of regulators, such as the AER, ERA, QCA and IPART use estimates from this approach to inform their MRP determinations.

Historical real returns (Wright approach)

This involves taking the average real return on a broad stock market index over a long historical period and increasing it for expected (forward-looking) inflation to obtain an estimate of the nominal required return to the market. Subtracting the current estimate of the risk free rate then produces an estimate of the MRP. Both the AER and ERA give some weight to the Wright approach. The AER uses the Wright approach as a cross-check on its allowed return on equity.

Survey evidence

Another potential source of evidence on the MRP are surveys of finance academics, market practitioners and company executives. The precise questions asked of respondents can vary from one survey to another but typically the surveys seek to elicit the participant's expectations of the MRP over some future horizon or the MRP the participants have actually used in that year. There are a number of potential shortcomings with survey evidence including survey design issues, sampling bias, inconsistency with investors' views, outdated results, and lack of clarity around how respondents have

formulated MRP estimates and what risk free rates are used in conjunction with the MRP estimate. For these reasons, regulators in Australia place either limited or no weight on survey evidence.

Estimates by valuation experts

These estimates are likely to be more useful than surveys because they are being used for the same purpose as in the regulatory setting – as an input in the estimation of the required return on equity and given they are prepared for a commercial purpose there is arguably a commercial incentive for these MRP estimates to be accurate. However, the information in independent expert valuation reports must be interpreted carefully. Recent studies of MRP estimates used in independent expert valuation reports have shown that while it has been common to adopt a headline MRP between 6.0 per cent and 6.5 per cent over the past decade or so, since the Global Financial Crisis (GFC) many experts have applied an uplift to either the risk free rate or to their overall cost of equity estimate. Estimates by valuation experts have been considered by the QCA and the AER has stated that it would have regard to MRP evidence from independent valuation reports in its *Rate of Return Guidelines* (AER, 2013b).

Conditioning variables

A number of observable variables have been identified in the finance literature and by some regulators in Australia as possible indicators of different market conditions and, therefore, as indicators of the MRP in those market conditions. These indicators are referred to as 'conditioning variables'. The AER and ERA have used conditioning variables to provide directional evidence on the MRP while IPART uses conditioning variables more directly to inform its estimate of the MRP.

3.3.3 A forward–looking estimate commensurate with prevailing market conditions

The Frontier Economics report presents estimates for each of the approaches set out above. All estimates are adjusted for imputation credits and are consistent with a gamma of 0.25.[15] With the exception of the historical excess returns method, all estimates are consistent with the current risk free rate of 2.8 per cent. The estimates derived under the historical excess returns approach are commensurate with the average market conditions over the relevant historical period. The resulting MRP estimates are presented in Table 3-4.

Table 3-4: Summary of MRP estimates

Estimation method	MRP estimate
Mean historical excess returns	6.2%
Dividend growth model	8.2%
Wright approach	8.2%
Surveys	6.8%
Independent expert valuation reports	8.3%
Market indicators	7.0%

[15] It is important to note that the Industry Panel's estimate of the MRP did not make any adjustment for imputation credits. Icon Water has adopted the same approach as the Industry Panel.

To distil these various estimates into a single regulatory MRP, Frontier Economics first separates the approaches according to whether they use historical data or current market prices and forward-looking information.

The two approaches that use historical information are the historical excess returns and Wright approaches. These approaches represent the end points of a spectrum in that:

- The historical excess returns approach assumes that the MRP is constant over time, and the total required return on equity rises and falls one-for-one with changes in the risk free rate
- The Wright approach assumes that the real return on equity is constant over time such that the MRP moves to offset any changes in the risk free rate.

Frontier Economics' view is that reality lies between these two extremities and therefore an equal weight is applied to each approach to conclude that the historical evidence supports a MRP of 7.2 per cent.

The other approaches use current and forward-looking information. For these approaches, Frontier Economics assigns the following weights:

- 50 per cent weight to the DGM estimates on the basis that DGM estimates are the most reliable form of forward-looking evidence, consistent with the fact that they are commonly given material weight in regulatory determinations
- no weight to survey estimates because Frontier Economics considers this evidence to be unreliable and inappropriate
- 25 per cent weight to estimates from independent expert valuation reports on the basis that this is relevant evidence, although somewhat less reliable and not as well accepted as DGM estimates
- 25 per cent weight to estimates from market indicators for the same reason as above.

This weighting produces a forward-looking estimate of 7.9 per cent.

To arrive at a final MRP estimate, Frontier Economics gives equal weight to the historical and forward-looking estimates on the basis that:

- the historical estimates have the advantage of being based on large data sets such that the resulting estimates are statistically precise. Their disadvantage is that they can only reflect the long-run average MRP, which is an issue if the prevailing market conditions differ from the long-run average
- the forward-looking estimates have the advantage of being commensurate with the prevailing market conditions but they are based on less data, require some assumptions and are less statistically precise.

Therefore, a mid-point estimate of 7.5 per cent, in Frontier Economics' view, represents an estimate of the MRP that appropriately reflects the data and evidence available.

Based on relevant regulatory precedent and Frontier Economics' expert opinion that the preferred estimate for the MRP is 7.5 per cent, Icon Water considers that the MRP of 7.03 per cent based on the 2015 Industry Panel methodology is a conservative estimate of the MRP.

3.4 Total return on equity

Under the SL-CAPM, the return on equity is calculated as the risk free rate plus the product of the equity beta and MRP:

$$Return\ on\ equity = risk\ free\ rate + equity\ beta * MRP$$

As at 31 March 2017, Icon Water's estimate of the return on equity is 7.71 per cent (2.78 per cent + 0.7 * 7.03 per cent). As the return on equity at 31 March 2017 based on Frontier Economics' preferred estimate for the MRP is 8.03 per cent (2.78 per cent + 0.7 * 7.5 per cent), Icon Water's estimate of the return on equity is conservative.

4 Return on debt

There are a number of different methodologies used by Australian regulators for estimating the return on debt (see Table 4-1 for a summary of these). However, Icon Water notes that the Industry Panel's 'on-the-day' approach, which reflects the prevailing cost of debt at the commencement of the regulatory period, is no longer used on its own by any Australian regulator.

ESCOSA, QCA and ESC use an average of the historical cost of debt prevailing in each year over a period of 10 years, an approach referred to as the 10-year trailing average cost of debt. The AER has also determined to adopt the 10-year trailing average approach but to gradually transition from the 'on-the-day' approach to this 10-year trailing average approach over a period of 10 years.[16]

Some regulators use a variation of the 10-year trailing average approach. The ERA uses a hybrid trailing average under which a risk free rate estimated using an 'on-the-day' approach is combined with a 10-year trailing average debt risk premium. IPART and ERTas use both the 10-year trailing average and the 'on-the-day' approach to establish a range for the cost of debt, with the point estimate of the WACC based on the midpoint of these values.

Consistent with the estimation of all other parameters, Icon Water has adopted the 2015 Industry Panel approach to estimating the cost of debt in this submission. Icon Water is, however, monitoring the outcome of the recent Federal Court decision which dismissed the AER's application on the cost of debt and confirmed the Australian Competition Tribunal's ruling that the AER's imposition of a gradual transition to the trailing average cost of debt was in error. The ultimate outcome of the proceedings remains uncertain at the time of preparation of this submission as remittal of the matter to the AER will be required to enable the AER to remake its decision on the return on debt. Having regard to the similarities in the AER's regulatory framework to that governing the ICRC's determination of the return on debt,[17] Icon Water will consider the implications (if any) of that outcome, once known, for the ICRC's price direction.

The Industry Panel's approach adopted by Icon Water involves estimating the prevailing debt margin and adding to this the prevailing risk free rate and debt raising costs. To estimate the prevailing debt margin, the Industry Panel used the 40-day average (approximated by 2-month average) credit spreads for 10-year BBB Australian corporate bonds from the Reserve Bank of Australia (RBA). The Industry Panel used the same risk free rate for calculating the cost of debt as it did for the cost of equity. This is discussed in section 3.1 above. The Industry Panel set debt raising costs at 12.5 basis points. Icon Water has taken the same approach.

For the purposes of this submission, the debt margin calculated at 31 March 2017 is 2.08 per cent. Combined with the risk free rate of 2.78 per cent and a debt margin of 0.125 per cent gives a total cost of debt of 4.99 per cent. Icon Water recognises that this estimate will be updated to ultimately reflect the debt margin and risk free rate commensurate with prevailing market conditions as close as possible to the start of the 2018–23 regulatory period.

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[16] More specifically, the AER adopts a gradual transition to the trailing average approach over a 10 year period under which the return on debt for year 1 is estimated using an 'on-the-day' approach and 10% of the return on debt is updated each year using the then prevailing return on debt.

[17] The national electricity and gas objectives are substantively similar to the ICRC's statutory objective in making a price direction (set out in section 19L of the ICRC Act), while the Industry Panel's benchmark efficient entity reference point adopted by Icon Water on the basis that it promotes the ICRC's statutory objective (and discussed in section 2.1 above) is substantively similar to the AER's allowed rate of return objective.

Given the current low prevailing cost of debt relative to significantly higher historic values, the Industry Panel's methodology adopted by Icon Water gives the lowest estimate of the debt margin compared with other approaches used by Australian regulators. It gives a result equal to the first year of the AER's gradual transition to the 10-year trailing average methodology, which is equivalent to the prevailing rate. However, all other methodologies, which take into account higher historic values for the cost of debt, will result in a higher a cost of debt value than the Industry Panel methodology.

Table 4-1: Regulatory approaches to the return on debt

Regulator	Methodology	Estimate
IPART	Long-term averages (10 years) and current market data (40 days) using credit spreads for Australian non-financial corporations published by the RBA and includes debt raising costs of 12.5 basis points.	Debt margin of 2.4% to 3.2% (total cost of debt 5.2% to 7.5%)[1]
ESC	Immediate transition to 10-year trailing average cost of debt with roll-forward year reflecting the yields of the RBA 10-year BBB rated corporate bond.	5.3%[2]
ERTas	Midpoint of 10-year CGS over 40 business days and over previous 10 years.	5.81%[3]
ESCOSA	Immediate transition to 10-year trailing average cost of debt based on BBB credit rating plus debt raising costs of 12.5 basis points.	6.44%[4]
QCA	10-year debt risk premium based on a BBB benchmark credit rating plus debt raising costs of 10.8 basis points.	4.58%[5]
AER	Gradual transition to 10-year trailing average cost of debt.	5.10%[6]
ERA	Hybrid trailing average: prevailing risk free rate plus 10-year trailing average debt risk premium and is inclusive of debt raising costs of 12.5 basis points and hedging costs of 11.4 basis points.	5.06%[7]

Source: 1: IPART (2017); 2: ESC (2016a) (this value is for 2015/16); 3: ERTas (2015);
4: ESCOSA (2016) (this estimate is for 2018/19); 5: QCA (2016); 6: AER (2017a); 7: ERA (2016).

5 Return on capital

Consistent with the 2015 Industry Panel methodology, the return on capital is calculated by multiplying the rate of return by the value of the RAB and deducting the indexation adjustment.

5.1 Rate of return

Based on the methodology set out in section 2.2 and each of the parameters discussed above, the post-tax nominal 'vanilla' rate of return, estimated at 31 March 2017, is 6.07 per cent. Each of the parameters that make up the WACC and the methodology used are summarised in Table 5-1 below.

Table 5-1: Rate of return parameter values, estimated at 31 March 2017

WACC Parameter	Value	Methodology
Risk free rate	2.78%	40-day average of yields on 10-year CGS (RBA series ID: FCMYGBAG10D)
Debt margin	2.08%	40-day average (approximated by 2-month average) credit spreads for 10-year BBB Australian corporate bonds (RBA series ID:FNFCBBB10M)
Debt raising cost	0.125%	Industry Panel
Equity beta	0.7	Industry Panel
Market risk premium	7.03%	40-day average of Bloomberg's daily implied MRP
Gearing	60%	Industry Panel
Cost of debt	4.99%	Calculated as per Industry Panel methodology: risk-free rate + debt margin + debt raising costs
Cost of equity	7.71%	SL-CAPM as per Industry Panel methodology: risk-free rate + equity beta * MRP
Nominal post-tax 'vanilla' WACC	6.07%	Calculated as per Industry Panel methodology: cost of debt * gearing + cost of equity * (1-gearing)

5.2 Return on capital

Consistent with the 2015 Industry Panel Decision, the return on capital is calculated by multiplying the opening value of the RAB plus mid-year capex by the nominal post-tax 'vanilla' rate of return. The Industry Panel then deducts the value of the indexation adjustment (see *Attachment 8: Regulatory asset base*):

$$Return\ on\ capital_t = (Opening\ RAB_t + Forecast\ Capex_t * 50\%) * WACC_{post-tax\ nominal} - Indexation\ Adjustment_t$$

The value of the asset base for the rate of return calculation, the indexation adjustment and the resulting return on capital are presented in Table 5-2 for water and Table 5-3 for sewerage.

Table 5-2: Return on capital for water ($million, nominal)

	2018–19	2019–20	2020–21	2021–22	2022–23
Value of asset base for calculating return on capital	$1,528.17	$1,576.35	$1,624.35	$1,666.98	$1,700.76
Return on capital excluding indexation adjustment	$92.82	$95.75	$98.67	$101.25	$103.31
Indexation adjustment	$38.20	$39.41	$40.61	$41.67	$42.52
Return on capital including indexation adjustment	$54.62	$56.34	$58.06	$59.58	$60.79

Table 5-3: Return on capital for sewerage ($million, nominal)

	2018–19	2019–20	2020–21	2021–22	2022–23
Value of asset base for calculating return on capital	$893.43	$946.68	$986.86	$1,023.81	$1,054.61
Return on capital excluding indexation adjustment	$54.27	$57.50	$59.94	$62.19	$64.06
Indexation adjustment	$22.34	$23.67	$24.67	$25.60	$26.37
Return on capital including indexation adjustment	$31.93	$33.84	$35.27	$36.59	$37.69

6 Forecast inflation

There are a number of different approaches used to estimate forecast inflation for regulatory purposes. As shown in Table 6-1, there is no consensus among Australian regulators on a single approach to forecast inflation.

The AER is currently undertaking a review of the methodology for forecasting inflation for electricity and gas, with a final decision due in November 2017. The AER's Discussion Paper (AER (2017b)) and the accompanying ACCC/AER Working Paper (ACCC/AER (2017)) on forecast inflation identify four methods for estimating expected inflation.

- **RBA inflation target** (AER's current method): geometric average of the RBA's forecast headline inflation rate 1 and 2 years ahead and the midpoint of the RBA target inflation band for 3 to 10 years ahead.
- **Zero coupon inflation swaps**: estimates of the 10-year market expectations of inflation are calculated from an inflation swap-implied term structure of the expected inflation rates.
- **Bond break-even**: the 10-year bond breakeven inflation rate is implied by the difference between the yields-to-maturity on 10-year nominal CGS and 10-year indexed CGS.
- **Surveys**: this approach uses inflation expectations obtained from surveys of professional forecasters, market economists and other groups. In Australia, publicly available survey measures of expected inflation are limited to two years ahead.

The ACCC/AER Working Paper assesses these methodologies against a range of criteria and ranks the four estimation methods in the order they appear above, with the RBA inflation target method performing the best in their opinion. The AER Discussion Paper also discusses the inconsistency in the treatment of inflation in the roll-forward of the asset base (where actual inflation is used) and the post-tax revenue model (where forecast inflation is used).

As with the rate of return, Icon Water has adopted the 2015 Industry Panel methodology for estimating forecast inflation. This approach takes the midpoint of the RBA's target band for inflation of 2 to 3 per cent, to determine a forecast inflation rate of 2.5 per cent. Icon Water notes that, in current market conditions, this approach results in a relatively high estimate of forecast inflation compared with approaches used by other Australian regulators. A higher estimate of forecast inflation results in a lower estimate of Icon Water's total revenue requirement and prices.

Table 6-1: Regulatory approaches to forecast inflation

Regulator	Methodology	Estimate
IPART	Geometric mean over 10 years using RBA statement on monetary policy for year 1 and the midpoint of the RBA target band (i.e. 2.5%) for the remaining 9 years.	2.4%[1]
ESC	ESC estimate	2.2%[2]
ERTas	No description of methodology	2.5%[3]
ESCOSA	Geometric mean over 10 years of the RBA inflation forecast for the first year and the midpoint of the RBA's target band for the following 9 years	2.45%[4]
QCA	Geometric 5 year average of RBA short-term forecasts for years 1 to 3 and the midpoint of the RBA target range for years 4 and 5	2.0%[5]
AER	Geometric average of 10 annual expected inflation rates using RBA forecasts of inflation for the first 2 years and the mid-point of the RBA target band for the remaining 8 years.	2.45%[6]
ERA	Treasury bond implied inflation: the approach uses the Fisher equation and the observed yields of 5-year Commonwealth Government Securities (CGS) (which reflect a market based estimate of the nominal risk free rate) and 5-year indexed Treasury bonds (which incorporate a market based estimate of a real risk free rate).	1.43%[7]

Source: 1: IPART (2017); 2: ESC (2016c); 3: ERTas (2015); 4: ESCOSA (2016); 5: QCA (2016); 6: AER (2017a); 7 ERA (2016).

Appendix 1 Benchmark equity beta

The report prepared by HoustonKemp Economists for Icon Water, *Equity beta for a benchmark Australian water network service provider*, is provided as a separate document.

Appendix 2 The market risk premium

The report prepared by Frontier Economics for Icon Water, *The market risk premium*, is provided as a separate document.

Abbreviations and acronyms

ACCC	Australian Competition and Consumer Commission
ACT	Australian Capital Territory
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
CGS	Commonwealth Government Securities
COAG	Council of Australian Governments
CPI	Consumer Price Index
DGM	dividend growth model
ERA	Economic Regulatory Authority of Western Australia
ERTas	Economic Regulation Authority of Tasmania
ESC	Essential Services Commission of Victoria
ESCOSA	Essential Services Commission of South Australian
GFC	Global Financial Crisis
ICRC	Independent Competition and Regulatory Commission
IPART	Independent Pricing and Regulatory Tribunal
MRP	market risk premium
QCA	Queensland Competition Authority
RAB	regulatory asset base
RBA	Reserve Bank of Australia
SL-CAPM	Sharpe Lintner capital asset pricing model

References

ACCC/AER (2017). ACCC/AER Working Paper No. 11, Best Estimates of Expected Inflation: a comparative assessment of four methods.

ACT Department of Treasury (2010). Competitive Neutrality in the ACT.

ACT Government (1997). ICRC Act.

AEMC (2012). Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012.

AER (2013a). Explanatory Statement Rate of Return Guideline, Appendices.

AER (2013b). Rate of Return Guideline.

AER (2017a). Final Decision, TasNetworks distribution determination 2017-19, Attachment 3 Rate of return.

AER (2017b). Regulatory Treatment of Inflation, Discussion Paper.

Australian Competition Tribunal (2016a). Application by ActewAGL Distribution [2016] ACompT 4.

Australian Competition Tribunal (2016b). Application by Jemena Gas Networks (NSW) Ltd [2016] ACompT 5.

Australian Competition Tribunal (2016c). Application by SA Power Networks [2016] ACompT 11.

Australian Competition Tribunal (2016d). Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1.

Australian Competition Tribunal (2016e). Applications by Public Interest Advocacy Centre Ltd and Endeavour Energy [2016] ACompT 2.

Australian Competition Tribunal (2016f). Applications by Public Interest Advocacy Centre Ltd and Essential Energy [2016] ACompT 3.

COAG (1995). Competition Principles Agreement. Canberra ACT, Council of Australian Governments.

ERA (2013). Inquiry into the efficient costs and tariffs of the Water Corporation, Aqwest and Busselton Water - revised final report.

ERA (2016). Final Decision on Proposed Revisions to the Acces Arrangement for the Dampier to Bunbury Natural Gas Pipeline 2016-2020, Appendix 4 Rate of Return.

ERTas (2015). Water and Sewerage Price Determination Investigation, Final Report, Chapter 4.

ESC (2016a). 2018 Water Price Review Guidance Paper.

ESC (2016b). Goulburn-Murray Water Price Review Final Decision.

ESC (2016c). Melbourne Water Price Review, Final Decision.

ESCOSA (2016). SA Water Regulatory Determination 2016 Final Determination. Adelaide, Essential Services Commission of South Australia.

Federal Court of Australia (2017). Australian Energy Regulator v Australian Competition Tribunal (No 2) [2017] FCAFC 79.

ICRC (2017). Issues Paper: Regulated water and sewerage services prices 2018-2023.

Industry Panel (2015). Industry Panel - Final Report, Industry Panel.

IPART (2013). Review of WACC Methodology, Final Report.

IPART (2017). Spreadsheet WACC Model Februrary.

QCA (2014). "SEQ Retail Water Long-Term Regulatory Framework – Overview – Part A."

QCA (2016). Final Decision, DBCT Management's 2015 draft access undertaking.

SFG (2014). The required return on equity for regulated gas and electricity network businesses.