

1. Glossary

IRR – Internal rate of return

RAB – Regulated Asset Base

WACC – Weighted Average Cost of Capital

2. The Link between RAB calculation and Cost of Capital

Regulators should seek to set prices, revenues and profits to enable investors to:

1. Recover the capital invested;
2. Earn a reasonable rate of return; and
3. Be compensated for inflation.

The first is done through depreciation (which can be viewed as return *of* capital). The second is done through the WACC (return *on* capital). The third can be done in two ways. To understand the issue note the Fisher formula tells us:

$$(1+n) = (1+r) \times (1+i)$$

Where n is the nominal rate of return, r is the real rate of return and i is the rate of inflation. Note that this implies:

$$n = r + i + r \times i$$

Where the $r \times i$ term captures some interaction between inflation and the real rate of return.

Utilities regulators (including Ofwat) have typically set a real WACC and indexed RAB for inflation. Telecoms regulators, on the other hand, have usually set a nominal WACC and used current cost asset valuation. Each is consistent with the principles espoused above, though the particular inflation index for which investors are compensated differs.

The utilities model compensates investors for inflation by indexing depreciation *and* by applying a real WACC to an indexed RAB (resulting in indexed assets+ indexed depreciation). The second term captures the interaction term in the Fisher formula.

By contrast, the telecoms model compensates investors for inflation solely by applying a nominal WACC to a current cost asset valuation – the i and $i \times r$ terms in the Fisher formula are compensated through the same channel.

To illustrate the different regulatory frameworks, if the same set of assumptions (real cost of capital, general price inflation and asset price inflation) is used in to calculate the nominal cost of capital – the result will be the same for both models. This would mean that the IRR on an investment is the same under the “Telecoms” and “Utilities” models.

However, if we consider changes in Asset price inflation or General price inflation: Under the “Telecom” model, when asset price inflation fluctuates the IRR’s will fluctuate accordingly. Under the “Utilities” model, when asset price fluctuates the resulting IRR’s stays the same.

Under the “Utilities” model, when general price inflation fluctuates the IRR fluctuates accordingly, while for a “Telecom” model leaves IRR;s un changed.

The “Telecoms” model compensates for asset price inflation, whereas the “Utilities” model does so for general price inflation. Therefore, it is better to use the telecoms model if it is anticipated that asset price inflation will differ from general price inflation e.g. if rapid technological change and Capital expenditure is anticipated (This is turn is dictated by the general Quality and service objectives set for the regulated industrial sector in each market).

3. Calculating the WACC

Regulators typically justify their final allowed rate of return on the basis of a ‘bottom-up’ analysis of the cost of capital. The WACC is a weighted average of the costs of equity and debt. The table below summarizes the key parameters of the WACC set by Ofwat at its most recent (2009) price control.

Gearing (debt: RCV)	57.5%
Cost of equity	
Risk-free rate	2.0%
Equity beta	0.9
Equity risk premium	5.4%
Cost of equity (post-tax)	7.1%
Cost of debt	
Cost of debt (gross of tax shield)	3.6%
WACC – gross of tax shield (Vanilla)	5.1%
WACC – post-tax	4.5%

UK regulators typically have reference to market evidence in applying a CAPM framework to estimate the cost of equity. Within the CAPM, Ofwat sets the risk-free rate based on current spot rates for index-linked gilt yields, with the aim of being consistent with the long-run historic trend of UK index-linked gilts with five and ten-year maturity. The equity beta is estimated from stock prices of listed companies,

while the equity risk premium is based on long-run historic stock market returns data, taking into account the prevailing economic conditions.

The cost of debt was estimated by Ofwat based on the cost of companies' existing debt and an assessment of likely future debt costs. Debt costs were derived from yields on debt markets. Small companies were allowed a slightly higher cost of debt since small companies have access to less competitive and more limited sources of finance and are therefore more exposed to risks associated with the cost of debt finance.

By providing reassurance to investors that a reasonable rate of return will be earned on their investment, the regulator can encourage investment into the industry. As stated in our main report, in the UK most regulators consider whether the proposed price control package will enable the regulated company to achieve a set of financial ratios (gearing, interest coverage, dividend coverage) over the price control period that are consistent with investment grade credit ratings. A good credit rating, which is a result of strong financial ratios, would signal the ability to meet interest and dividend payment obligations and aid a company in raising debt and equity finance. This 'financeability' test is an important way of checking whether the WACC is high enough – if the ratios are not strong enough then the WACC needs to be increased, but if the ratios are too high then the WACC can be decreased. The financial ratios used in financeability tests by Ofwat at PR09 are summarized in the table below.

Ratio	WaSCs	WoCs
Cash interest cover (funds from operations: gross interest)	About 3 times	About 3.5 times
Adjusted cash interest cover (funds from operations less capital charges: net interest)	About 1.6 times	About 1.8 times
Funds from operations:debt	About 13%	About 17%
Retained cash flow:debt	About 8%	About 10%
Gearing (net debt: regulatory capital value)	Below 65%	Below 60%

It must be stressed that this Ratio analysis is a final step in evaluating the regulatory framework for the water sector in the UK and that this analysis does not impact the WACC calculation method; these ratios are used as an "industry benchmark" to help decide whether the WACC is too high or too low for a certain water company and helps set efficiency targets.

4. Calculating the RAB

The RAB starts with a direct measure of the value placed on each company's capital and debt by the financial markets following privatisation. This initial RAB is calculated as the average of the market value of each water and sewerage company for the first 200 days for which the shares were listed, plus the total value of debt at privatisation. A proxy for the initial market value was used for the water only companies that were

not privatised in 1989 (and hence no market information was available). This initial value was taken as the opening value of the RAB for 1990.

This initial value is rolled forward each year taking into account the movement in general price inflation and using this formula:

$$RAB = \text{Opening RAB} + \text{Capex} + \text{Infrastructure Renewals Expenditure (IRE)} - \text{Infrastructure Renewals Charge (IRC)} - \text{Grants \& Contributions} - \text{Current Cost Depreciation}$$

Capital expenditure to enhance and maintain the network, which is assumed in setting price limits, is added to the RAB. Any capital grants or contributions towards the cost of the new assets are deducted. Current cost depreciation (based on the Modern Equivalent Asset Value of the assets) is deducted from the RCV each year. Any cost incurred by the company for maintaining and replacing the infrastructure assets are captured in IRE and netted off against the deduction of the charge levied upon customers for infrastructure renewal (IRC). Grants and contributions are received from the government and current cost depreciation is the cost of renewing and maintaining non-infrastructure assets for the network.

5. Summary

The draft regulation, if passed in its current format, will have little meaning if measures such as the WACC and RAB are not placed in appropriate regulatory economic context. Our report suggests that prices, revenues and profits should be controlled such that investors have sufficient incentives to invest in the first place – failure to provide these incentives would lead to under investment in an industry that has high capital expenditure. The economic principles behind the stylised examples of the utilities and telecoms regulation models above hold true anywhere – what needs to be decided is which model is the most appropriate for the Estonian water industry. If asset price inflation differs from general price inflation then, it would be prudent to utilise a model similar to the telecoms one. Once this decision has been made, then the regulator knows whether to use a real or nominal WACC and whether to index asset bases or use current cost asset valuation.