

Our work in regulating the Scottish water industry:
The calculation of prices

volume **3**

**WATER INDUSTRY
COMMISSIONER
FOR SCOTLAND**

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Foreword

My role is to promote the interests of customers of Scottish Water. In 2001, I set challenging efficiency targets for Scottish Water. In 2003, I challenged Scottish Water to build on the solid start that it had made. I am now increasingly confident that over the next two years we will see further significant improvements in the performance of the Scottish water industry.

By 2006, I expect Scottish Water to have been able to reduce its inherited level of operating costs by some £145 million annually in real terms. Customers' bills will consequently be around 15% lower (over £40 a year for the average household) than they would otherwise have been.

Scottish Water has also made important progress in gaining a better understanding of its assets and costs. This should ensure that the efficiency of the industry in Scotland relative to that of the companies south of the border continues to improve.

Rigorous, objective regulation is therefore beginning to deliver real value to customers. However, it is important that we continue to build on this early success. I therefore welcome the Ministers' proposals that the current regulatory regime should be strengthened. These proposals are consistent with normal regulatory practice in other utilities and in the water industry south of the border. In particular, I believe that the introduction of the proposed Water Industry Commission for Scotland will help to depersonalise regulation. I also believe that giving the Commission the power to decide, rather than to advise, on prices should help to make regulation more transparent, and should improve people's understanding of the impact on their bills of decisions by Ministers and the regulator.

The proposed right of appeal to the Competition Commission that will be available for Scottish Water should also reassure stakeholders that the targets set in the *Strategic Review of Charges 2006-10* are challenging but achievable. I will shortly publish our proposals on how we will set targets for and monitor improvement in operating cost efficiency. This is in the interests of both current and future customers.

Scottish Ministers have asked me to prepare this second full Strategic Review of Charges on the basis that the final outcome could be the first determination of prices for the water industry in Scotland by the new Water Industry Commission for Scotland. In order to ensure that the outcome is consistent with regulatory best practice, I am preparing this Review according to the Better Regulation Task Force Principles of accountability, transparency, proportionality, consistency and targeting. As such, I intend to publish the key information submissions that I receive from Scottish Water, as well as the tools that I will use to complete my analysis, including my financial and tariff basket models.

Notwithstanding the cost reductions already achieved by Scottish Water, there will still be considerable scope for further improvement after 2006. I want to ensure that customers get value for money today without compromising future prices or the service levels that future generations receive. To that end, I intend to set further operating and capital cost efficiency targets for Scottish Water. These will be challenging but achievable and will ensure that prices paid by customers are as high as is necessary to ensure a sustainable industry – but no higher than they need to be.

This is the third volume concerning our work in regulating the Scottish water industry. It describes our proposed approach to setting prices in the *Strategic Review of Charges 2006-10*. I propose to use the regulatory capital value method of price setting; this will ensure that stakeholders can more easily compare the financing of the industry in Scotland with that south of the border. It will also be easier to monitor Scottish Water's progress in delivering its capital programme and improving its operating cost efficiency.

Proposals by the Scottish Executive to introduce a licensing framework will bring benefits to all customers. I would expect that separating Scottish Water's retail and wholesale activities will increase the transparency of cost allocation within the business and identify further significant opportunities for efficiency. It is also likely that the customer service offered by the retail arm of Scottish Water is likely to improve in response to market

pressures. This volume also discusses our proposed approach to the setting of a wholesale price. The wholesale price needs to be set at a level that favours neither the retail nor the wholesale business of Scottish Water. I would welcome the views of stakeholders about how this can be best achieved.

I have included a number of questions for consultation. Responses from stakeholders will be important if I am to ensure that the *Strategic Review of Charges 2006-10* establishes proportionate and consistent targets for the water industry in Scotland. I am keen to facilitate debate about our proposed approach to the Review and, more generally, the challenges that still face the water industry in Scotland. I am therefore holding a number of stakeholder information days over the next 18 months. I encourage stakeholders to come to express their views. These views will help to inform the Strategic Review of Charges and will ensure that the process achieves the best possible outcome for customers.



Alan D A Sutherland

Water Industry Commissioner for Scotland

September 2004

Executive summary

Introduction

We are committed to the principles of the Better Regulation Task Force: transparency, accountability, proportionality, consistency and targeting. Our approach to this second full Strategic Review of Charges covering the period from 2006-10 takes full account of these principles. In this third volume we discuss how we propose to calculate the prices that customers will have to pay in the next regulatory control period. We have identified a number of questions for consultation. These questions are set out at the end of the relevant chapters and are reproduced under chapter headings at the end of this Executive Summary. All responses to this consultation should be received by 31 October 2004. These should be sent to :

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or by email to :

SRCmethodology@watercommissioner.co.uk

We will publish a summary of responses, and our conclusions, on our website www.watercommissioner.co.uk on 19 November 2004.

For many customers of water and sewerage services, price is the single most important issue. This volume therefore examines:

- the costs that have to be recovered by Scottish Water;
- the way prices are calculated;
- how adjustments to prices are made when circumstances change; and
- how financial risk is managed in the public sector.

Where costs are incurred

Rain water may well fall from the sky, but turning that raw water into a reliable, high-quality water and sewerage service is a costly and complex operation.

Treating water and transporting it through pipes to customers is asset intensive – there are more than 20 metres of water main for every household in Scotland. According to Scottish Water's 2003 regulatory return, it would cost some £32 billion to replace all of the water industry's assets in Scotland. This is more than £6,000 for every person in Scotland.

Customers, however, are not primarily concerned with how the service is delivered or the assets that are employed. They want a reliable and high-quality service to be available on demand. In particular, they want to be assured that the service they receive for the amount they pay represents value for money.

The Scottish Executive's consultation Paying for water services 2006-10

In June 2004 the Scottish Executive launched a consultation on the principles of charging for water. The consultation was prompted by the negative reaction of some customers to the introduction of broadly cost-reflective charging (including higher standing charges) and the harmonisation of charges across Scotland. Although this benefited many customers (households in the North, and properties with higher rateable values in the North and lower rateable values in the East), a large number of small business customers who did not use much water saw significant percentage increases in their charges and as a result were critical of the changes.

The Executive's proposals in *'Paying for water services 2006-10'* are presented in two sections: 'Proposed principles of charging' and the 'Application of principles'. The consultation makes proposals on the principles of charging in four areas:

- **Charging for services:** The Scottish Executive suggests that, subject to safeguards, customers should pay for the service they receive;

- **Harmonised charges:** The Executive believes that, since Scottish Water provides services on a national basis, it is right that customers should pay for those services on a consistent basis throughout the country;
- **Cost reflectivity:** The Executive suggests that charges for similar types of customer should broadly reflect both the fixed and variable costs of supplying those customers (subject to the principles of harmonisation and affordability); and
- **Making changes to charging structures:** The Executive proposes to gradually introduce changes in tariffs over a number of years.
- **Funding expansion of the public networks:** The Executive sets out proposals that will share the cost of growth in the network between existing and future customers.

Our response to the consultation

We agree with the principles of charging proposed by the Scottish Executive. The first three of these principles are fully consistent with the principles that we applied at the time of the last Strategic Review of Charges. On the proposals for making changes to charging structures we would note that there is no easy way to implement these changes. While we recognise that it is not desirable to increase bills sharply, we are also aware that introducing changes more slowly requires those who are currently paying more than their fair share to continue to pay (at least) a little more in the interim. We regard this as a political question and would welcome clear guidance from Ministers.

The consultation also considers the application of the principles of charging. The issues it addresses include:

- **Cross subsidies:** A cross subsidy exists when one group of customers pays more (in percentage terms) relative to their cost of supply than another group of customers. The Executive differentiates between desirable cross subsidies (resulting from the policy to harmonise charges across Scotland or to link household charges to Council Tax bands) and unintended cross subsidies. The Executive has commissioned work to understand the nature and extent of any unintended cross subsidies. In the consultation, the Executive also seeks views on how quickly any such cross subsidies should be unwound;
- **Household charging:** The Executive proposes to discontinue the current system of discounts and to use the proceeds to provide more targeted support to those in receipt of Council Tax benefit;
- **Non-household charging:** The Executive proposes to introduce new methods of charging for unmeasured customers and for surface and property drainage in the 2010-14 regulatory control period;
- **The balance between charging and borrowing:** The Executive proposes to keep the total level of borrowing by Scottish Water broadly constant in real terms; and

Depreciation

The effectiveness and value of assets declines over time and customers should bear these costs as they receive the benefit from use of the assets. Although effective asset management can help to reduce costs, asset replacement costs will continue to have a major impact on customers' bills.

The water and sewerage industry has two broad types of asset. These are termed infrastructure (essentially the water mains and sewers) and non-infrastructure (treatment plants, offices, vans, computers, etc). From a regulatory point of view, the depreciation policy of the water and sewerage business has to strike a balance between current and future customers. We therefore allow for an appropriate depreciation charge to be recovered from customers' charges. There are two types of depreciation charge: a standard depreciation charge on the non-infrastructure and an infrastructure renewals charge.

Infrastructure renewals charge

Infrastructure assets such as sewers and water mains usually have very long lives. It is particularly difficult to

assess these lives accurately. This is because different types of construction (each with a different expected life) have been interconnected throughout the network. For that reason we rely on the portfolio effect¹ and treat the whole infrastructure network as a single system. The complete asset will never become obsolete or require replacement at any one time; instead, it is replaced in parts as different elements come to the end of their useful lives.

Traditional methods of depreciation for discrete assets, which have observable discrete asset lives, do not work. To overcome the problem, the industry has introduced infrastructure renewals accounting. Under infrastructure renewals accounting, an infrastructure renewal charge is charged to a company's revenue each year. The infrastructure renewal charge is calculated as the average of the forecast capital expenditure on the infrastructure assets over the next 15-20 years.

Non-infrastructure depreciation

We propose to use the same approach to non-infrastructure depreciation as Ofwat uses for the water and sewerage companies in England and Wales. The depreciation charge will be calculated using the straight-line method. We believe that current cost accounting using the Modern Equivalent Asset (MEA) valuation for a fixed asset is the most appropriate for regulatory purposes. This approach ensures that:

- customers bear reasonable costs for the use of assets;
- Scottish Water is fairly remunerated for its capital expenditure; and
- Scottish Water is provided with the incentive to invest in new technology and more cost-effective assets.

These assets will be grouped into five categories:

- very short (assets having a life of up to five years);

- short (assets having a life of six to 15 years);
- medium (assets having a life of 16 to 30 years);
- medium/long (assets having a life of 31 to 50 years); and
- long (assets having a life exceeding 50 years).

The management of financial risk in the public sector

Risk management is the process of identifying, evaluating and responding to risks. Water and sewerage businesses are exposed to operational, legal and asset risks that could affect their compliance with public health or environmental standards and to financing risks. In the Strategic Review of Charges 2006-10 we will seek to minimise the exposure of Scottish Water's customers to these risks. One of the main ways in which we can reduce customers' exposure to risk in the public sector model is to adopt the Regulatory Capital Value (RCV) approach to price setting.

We are also keen to ensure that there are effective controls on access to borrowing. We have therefore commissioned a report from ING Barings on the privatised companies' access to debt. If there are no such controls, the incentives to achieve efficiency targets on time are reduced.

We propose to extend our risk analysis to include the financial ratios that we target in the financial model.

Managing financial risk in the private and public sectors

The purpose of regulation is to seek to ensure that monopoly businesses act in the customer interest. In the private sector, the regulator seeks to establish a balance between the interests of customers and those of finance providers. In doing so, it is the regulator's duty to ensure that an efficient business can fund its operations. In the public sector, the regulator focuses on ensuring that

¹ The portfolio effect is discussed in *'Principles of Corporate Finance'* by Brealey and Myers. Please reference the seventh international edition from page 187 onwards.

customers receive a value for money service, and on the delivery of environmental, public health and government policy objectives. These objectives apply over the short, medium and long term.

In both the public and private sectors, economic regulators seek to establish a tight budgetary constraint on the regulated body. In other words, clear statements are made about the outcomes for customers that the body must deliver and about the amount of money that can be spent. This can be achieved by fixing the maximum return available (unless targets are beaten) or by limiting the total cash funds that may be consumed.

A properly tight budgetary constraint will focus management attention on delivering ongoing improvements in value for money to customers.

Other differences in financial risk

The private sector cost of capital is higher than Scottish Water's cost of debt. Ofwat has recently set a nominal, pre-tax cost of capital of 8.3% [5.1%, real, post-tax]. This compares with Scottish Water's average new borrowing rate of just over 4% nominal pre-tax. Indeed, shareholders of the privatised companies can improve their return further by ensuring that the company performs better than the targets set by the regulator. However, shareholders do also have to absorb risks that are currently borne by the customers of Scottish Water. These would include the costs of any external shocks such as the drought in summer 1995.

In the event of such a shock or underperformance by the business (whether caused by management or external operational factors) a private utility can:

- withhold dividend payments to shareholders;
- seek a rights issue; and
- obtain debt in the private markets.

Private utilities do not have the easy option of increasing charges to customers. The presence of private equity acts as a significant 'shock absorber', which protects customers of the water companies in England and Wales. This is because prices set by Ofwat will not

normally be influenced by a change in borrowing by an individual company.

The Glas Cymru model

It is not necessary to adopt an equity based or private sector model in order to manage financial risk. Welsh Water, for example, has established a structure that protects customers from financial risk, without a traditional shareholder acting as a shock absorber. Glas Cymru is a not-for-profit company limited by guarantee which is wholly debt financed. Glas Cymru has no shareholders. In this case the risk is borne by the providers of the debt finance.

If there is an unforeseen shock, which could have been avoided or limited through proper management, customers will not suffer because Ofwat is under no obligation to increase the cash value of the return on capital allowed to Welsh Water.

Current situation for Scottish Water

In contrast, if Scottish Water is faced with an unforeseen shock, it must either:

- seek unplanned public expenditure in the form of a loan; or
- increase charges to customers immediately.

Customers are currently particularly exposed to any shortfall in Scottish Water's performance against targets. This is because there are no transparent incentives to perform and its budgetary constraints are not truly tight. Scottish Water can seek to use contingency margins within public expenditure limits and the cost of this extra borrowing would be passed on to customers.

We believe that Scottish Water's customers are entitled to a similar level of protection from shocks as customers south of the border. We therefore propose to set prices on the assumption that Scottish Water has achieved both its operating and capital efficiency targets and has delivered the capital programme in full. We propose to make adjustments to reflect any shortfall in performance

in order to ensure that customers are not disadvantaged.

How we propose to determine charges for the 2006-10 period

The role of a regulator is to set prices that are sufficiently high – but no higher – to ensure the sustainable delivery of the desired level of service. We will therefore scrutinise costs carefully.

The costs faced by customers can be categorised into three main areas:

- running costs;
- costs associated with the use of existing and new assets; and
- costs of public private partnership (PPP) contracts.

We use a financial model to establish an appropriate level of revenue that is consistent with:

- meeting these costs; and
- ensuring that Scottish Water should be able to deliver the level of service to customers that will be defined by the Quality and Standards process².

This model allows us to ensure that an appropriate balance is struck between current and future customers. We will also seek to ensure that customers in general are protected from unnecessary fluctuations in their charges.

In calculating prices for customers, we use a tariff basket to divide the identified revenue requirement between customer groups. The detail of how much each customer group will pay will depend on the result of the Scottish Executive's consultation, *'Paying for water services 2006-10'*.

The RCV method of price setting

At this review we are proposing to make some changes to our approach to price setting. We propose to introduce a Regulatory Capital Value (RCV) for Scottish Water. Scottish Water will receive an appropriate rate of return on this RCV. Efficient investment in new assets will be added to the RCV. Depreciation (reflecting the costs of using existing assets) will reduce the RCV.

These changes are limited to the approach to meeting the costs of new and existing assets. We do not believe that this revised approach has any immediate material impact on the prices faced by customers, on the resources available to Scottish Water, or on the implications for public expenditure. The changes are designed principally to allow greater transparency. They bring the approach to price setting for Scottish Water into line with that for the English and Welsh water and UK energy sectors. As such, we will be able to make more direct comparisons in financial ratios than was previously possible.

The RCV is a proxy for the current value of Scottish Water's above-ground asset base. This value will change over time to reflect the ageing of assets (the cost of which is recognised by the infrastructure renewals and depreciation charges) and investment in new assets.

The rate of return is the cost associated with managing and financing the above-ground asset base. The cash cost of replacement is covered by the depreciation charge.

The revenue that Scottish Water should be allowed is calculated as follows:

Return allowed on the Regulatory Capital Value + allowable operating costs + depreciation on non-infrastructure assets + the infrastructure Renewals Charge (IRC) + the costs of PPP contracts.

² See the Scottish Executive's consultation document, *'Investing in water services 2006-10'*.

The product of the RCV and the allowed rate of return will give the total return allowed on the RCV. This ensures that customers only contribute towards those assets that have been created and which are providing a benefit to customers.

The allowed level of revenue includes an appropriate allowance for operating costs. Our assessment of operating costs will take into account inflation, the scope for efficiency and an allowance for efficient new operating costs. It is important to highlight that our assessment of efficiency includes a detailed comparison of both the relative level of cost incurred and the relative level of service delivered.

We will allow for asset costs in two ways, that is the allowed cash return on the RCV and an allowance for depreciation. The allowance for depreciation and the Infrastructure Renewal Charge ensures that sufficient funds are available to replace assets that are at the end of their useful lives.

The PPP contracts effectively swapped initial capital costs, financing and maintenance costs and operating costs over the life of an asset for a series of annual payments. We propose to scrutinise these costs carefully. Our analysis of the appropriate level of these PPP costs will be allowed in our calculation of revenue.

One important feature of the regulatory capital method of price setting is that we do not have to take decisions about how much extra borrowing Scottish Water should seek. The method of financing (whether from retained surplus or from new debt) will not have an impact on the price paid by customers. However, if debt increases as a proportion of the RCV, future customers will face either higher prices or a service that is less able to absorb operational or legislative shocks.

Monitoring of the RCV and the ratio of total debt to the RCV should therefore provide stakeholders with a useful indicator of the financial performance of the water industry in Scotland. Stakeholders can reasonably expect the RCV to increase in line with the profile that is established at the start of the regulatory period. Smaller increases would suggest that the capital programme is making less progress than was expected at the start of

the regulatory period; larger increases would suggest that better progress had been made.

If the capital programme is on target, the ratio of debt to RCV should indicate whether Scottish Water is making sufficient progress towards the efficiency targets that we set in the *Strategic Review of Charges 2006-10*. We propose to use our performance reports to monitor these financial indicators.

The introduction of price caps

In this Review, we also propose to determine a series of price caps rather than a general cap on revenue. We believe that the introduction of a price cap is in the general interest of customers. A price cap largely insulates customers from the impact of changes in the customer base or volumes of consumption during a regulatory period. We will translate the required revenue into a series of price caps for our tariff baskets. The weightings of these tariff baskets will reflect the guidance that we receive from Ministers as a result of the principles of charging consultation.

A customer will be better placed to understand the maximum price that they are likely to have to pay by looking at their use of the water and sewerage service and the price cap for the relevant tariff basket.

The introduction of regulatory accounts

In the last Strategic Review of Charges, we commented on the advantages to be gained from a proper accounting and legal separation between Scottish Water's core and non-core activities. We were therefore pleased when the *Water Industry (Scotland) Act 2002* limited the remit of this Office to promoting the interest of customers of the core business. This will require us to be able to distinguish between the core and non-core functions of Scottish Water. The current *Water Services (Scotland) Bill* would also require us to differentiate between Scottish Water's wholesale and retail functions.

Scottish Water's statutory accounts are not sufficient to provide the information that we now require. In particular, they only detail the financial performance of

Scottish Water as a whole and, as such, are unable to provide a specific breakdown of costs by activity.

Other regulators have overcome these limitations by introducing a set of parallel, regulatory accounts. These accounts are tailored to provide the specific information required for effective regulation. We propose to adopt the practice of other regulators by asking Scottish Water to complete regulatory accounts.

In particular we propose to adopt Ofwat's regulatory accounting guidelines (RAGs) as the basis for our Regulatory Accounting Guidelines. Where we amend or develop these guidelines for application in Scotland we will do so simply to ensure that they are fully consistent with Scottish Water's statutory duties. However, in so doing, we will endeavour to ensure that they remain as consistent as possible with the original Ofwat guidelines. This will be important to our detailed comparison of the financial performance of the industry in Scotland.

Financial modelling

We have built a financial model to allow us to calculate the revenue that Scottish Water requires to carry out its core functions. There is also a tariff basket model, which translates the revenue collected from customers to the tariffs they will pay. Ernst and Young LLP has audited the financial model.

The model is constructed in Microsoft Excel© and consists of a series of linked spreadsheets. The model goes forward to March 2025. We have also developed a detailed user manual which will be available on our website.

Input information

We require robust and detailed information for the financial model. We provided Scottish Water with the input tables for the financial model as a part of the business plan guidance, which we issued in June 2004.

The model also contains financial assumptions, including information on interest rates and inflation expectations. In the Strategic Review we propose to use

two indexes to measure inflation, namely:

- the Consumer Price Index (CPI) for all non-asset costs; and
- the Construction Output Price Index (COPI), to assess the impact of increases in prices on investments.

Other proposed assumptions are outlined in Table 1 below:

Table 1: Other proposed assumptions in the financial model

Title	Assumption	Value
Trade debtors	Number of days	35
Stocks	Percentage of operating expenditure excluding PPP	2%
Prepayments and accrued income	Percentage of revenue	5%
Other debtors	Percentage of revenue	2%
Trade & capital creditors	Percentage of capital expenditure	17%
Accruals and deferred income	Percentage of operating expenditure including PPP	30%
Other creditors	Percentage of operating expenditure including PPP	7%

Financial ratios

One of the key considerations of our modelling is the financial sustainability of Scottish Water. The model will automatically calculate key financial ratios. Our proposed move to use the Regulatory Capital Value method of price setting will allow us to make direct comparisons of Scottish Water's financial sustainability with that of the companies south of the border. We will compare Scottish Water's financial ratios (as far as possible³) with those used by Ofwat in its last two price reviews.

Ofwat set out a list of the financial ratios that it had taken into account in setting price limits at the 1999 review in its report, '*Final determination: Future water and sewerage charges 2000-05*'. These ratios are shown in Table 2.

³ For example, comparisons using equity are unique to the private sector and account needs to be taken of the PFI contracts in Scotland.

Table 2: Ofwat's target ratios for 2000-05

	Water and sewerage companies	Large water only companies	Small water only companies
Historic cost interest cover	Min 2x	Min 2.25x	Min 2.5x
Average gearing (D/D+E)	45-55%	45-55%	45-55%
Cash interest cover (EBITDA Basis)	Min 3x	Min 3.4x	Min 3.75x
Cash interest cover (EBIDA Basis)	Min 2x	Min 2.25x	Min 2.5x
Debt payback period (EBITDA Basis)	Max 5 yrs	Max 5 yrs	Max 5 yrs
Debt payback period (EBDA Basis)	Max 7 yrs	Max 7 yrs	Max 7 yrs
Cashflow to capex ratio (EBIDA Basis)	Min 40%	Min 40%	Min 40%

In 'Future water and sewerage charges 2005-10: Draft limits', Ofwat outlined the financial indicators that it has used to set prices for the next regulatory period. Table 3 shows these ratios.

Table 3: Ofwat's draft target ratios for 2005-10

	Target
Cash interest cover (funds from operations/gross interest)	Around 3 times
Adjusted cash interest cover (funds from operations less capital charges/gross interest)	Around 1.6 times
Adjusted cash interest cover (funds from operations less capital maintenance expenditure/gross interest)	Around 2 times
Funds from operations/debt	Greater than 13%
Retained cash flow/debt	Greater than 7%
Gearing (net debt/regulatory capital value)	Below 65%

How we propose to use these ratios in the Strategic Review of Charges 2006-10

Where Ofwat has stated that a target is "around" a certain level, we assume that the ratio for Scottish Water should be within 25% of the target. We would change price limits to ensure that Scottish Water remains compliant with each of these ratios, except debt/RCV (leverage). This is because Scottish Water has no equity finance.

We also propose to publish the two debt payback period ratios and the cashflow to capital expenditure ratio that Ofwat used for the 2000-05 regulatory period. It would be desirable for Scottish Water to remain within these targets. However, we will not change price limits to ensure compliance with the targets for these ratios. This reflects the capital market's view that these ratios are

now outdated. We believe that it is useful to continue to monitor these ratios to ensure consistency in our approach to financial sustainability.

Setting an initial RCV

There are four broad approaches that regulators can use to establish the initial RCV of a regulated utility in the private sector:

- **An accounting approach.** The RCV takes into account the asset value of the company;
- **A market value approach.** The RCV adopts the value placed on the company by the financial markets;
- **A comparator approach.** The RCV is set through comparison with a similar company that has an RCV; and
- **A discounted cash flow approach.** The RCV is calculated by using financial valuation techniques.

Most UK regulators used the second approach to estimate the initial RCV of their regulated businesses. It is obviously not possible to apply this method for a public corporation such as Scottish Water.

However, there are precedents for the establishment of a RCV for a public sector organisation⁴. For example, in Australia regulators have tended to use asset based approaches. We could potentially set the RCV by one of four common asset based approaches:

- **Depreciated actual cost:** this approach is straightforward to implement but will tend to understate (possibly significantly) the replacement costs of assets;
- **Depreciated indexed historical cost:** this approach is certainly preferable to depreciated actual cost, but it does not take account of changes in technology;
- **Depreciated Optimised Replacement Cost (DORC):** this approach is theoretically the best asset based approach; however, it is very

⁴ See the Scottish Executive's consultation document, 'Investing in water services 2006-10'. Manchester Airport has a regulatory capital value set by the CAA.

information intensive and can be regarded as quite subjective; and

- **Modern equivalent asset value:** this approach has many of the advantages of DORC, but is less subjective as it does not try to assess the reductions in cost that could be achieved by optimising the design of the water and sewerage network.

A second option would be for us to use a comparator approach. This would have the advantage of being consistent with the approach Ofwat used to set the initial RCV of the water only companies. To use this approach, we would need to identify companies that are broadly comparable to Scottish Water. Two sets of information would need to be available for the comparator company:

- First, a financial measure that is also available for Scottish Water should be available for the comparator. This financial measure could be the book value of debt, the book value of fixed assets or the current cost accounting value of fixed assets; and
- Second, a financial measure that is relevant to estimation of the RCV should be available for the comparator. If the comparator were regulated and had an RCV this could be the RCV itself. If the comparator had no RCV it could be an equity value for the firm.

The water and sewerage companies in England and Wales would provide the most obvious comparators for Scottish Water. We believe that there are a number of ways that we could look to set an initial RCV for Scottish Water based on comparison with the companies south of the border.

The options would include setting the initial RCV for Scottish Water by making comparisons with:

- asset bases (in terms of both value and structure);
- non-infrastructure capital investment;
- Welsh Water's debt to RCV ratio;
- companies' funding costs to RCV ratio (ie debt and dividends); and

- assets relative to the type and number of customers served.

The options would also include comparing the factors outlined above historically with those for Scottish Water today. This would reflect the opportunity that the companies south of the border have had to transform their operations.

The final option that we propose to consider is the discounted cash flow method of asset valuation. We would use our financial model to calculate the current value of Scottish Water. We are not, however, optimistic about this approach as we believe that it would be difficult to establish an appropriate discount rate.

Setting the allowed rate of return

In the private sector, a regulator sets an allowed rate of return. This is often referred to as the cost of capital. The regulator will set this rate of return to reflect current and expected market conditions. The regulator has a duty to set an appropriate rate of return such that an efficient company can properly finance its functions. A company may choose a mix of debt and equity funding, but its rate of return (unless it outperforms efficiency targets) is capped.

In the public sector the regulator cannot set the rate of return based on his observation of the cost of capital in the market. Scottish Water's cost of debt is set by Government. As a public sector organisation it has no contributed equity capital, although it does generate and reinvest trading surpluses.

The allowed rate of return is the rate of return that we believe Scottish Water requires to meet the objectives that have been set by Scottish Ministers. If we set the allowed rate of return at too low a level, there is a risk that Scottish Water would not have sufficient funds to meet its obligations. This could result in debt increasing to unsustainable levels. This would penalise future customers to the benefit of current customers. Alternatively, it could result in delays to the promised environmental, public health or customer service benefits. Customers would certainly pay lower charges if the rate of return was set too low, but they would also receive a poorer service.

If we set the allowed rate of return at too high a level, customers will pay more than they need to. This would act as a disincentive on management to achieve efficiency targets. Failure to achieve efficiency targets means that customers pay more than is necessary in the medium term. Alternatively, if efficiency targets were achieved in full the level of outstanding debt would decline significantly relative to the asset value of the company. This would penalise current customers to the benefit of future customers.

The weighted average cost of capital

The market value of a firm is equal to the market value of the equity plus the market value of the debt. The Weighted Average Cost of capital (WACC) is the overall cost of capital for a firm. It takes account of the capital structure of the firm (ie the market value of its debt and equity) and the rates of return it pays on both its debt and equity.

In order to calculate a WACC a regulator therefore has to decide an appropriate rate of return for both debt and equity. He also has to assign an appropriate market value to the debt and equity of the firm. His calculation of the rate of return is further complicated by both taxation and inflation.

Debt and equity are treated differently for tax purposes. Interest charges are an allowable expense for the purpose of corporation tax. The corporation tax advantages of debt are recognised in the post-tax Weighted Average Cost of Capital calculation. This is shown in Figure 1.

Figure 1: Post-tax Weighted Average Cost of Capital

$$\text{WACC} = \left[r_D^* \left(\frac{D \times (1-t)}{D + E} \right) \right] + \left[r_E^* \left(\frac{E}{D + E} \right) \right]$$

Where:
 r = return
 D = debt
 E = equity
 t = corporation tax rate

The investor is therefore concerned with the real rate of return – that is the return after having adjusted for the effect of inflation.

The formula for calculating the real rate of return is shown in Figure 2.

Figure 2: Formula for calculating the real rate of return

$$\text{Real rate of return} = \text{nominal rate of return} - \text{inflation rate}$$

It is important to differentiate between the real rate of return (the return after inflation) and the nominal rate of return (the return before account is taken of inflation).

Applicability of WACC to a Public Corporation

Assessing the WACC for a public corporation is problematic. This is because the regulator cannot easily observe costs of debt or equity and, moreover, estimating the market value of the organisation is difficult.

Setting an allowed rate of return for Scottish Water

Scottish Water does not borrow directly from the capital markets nor does it borrow at commercial rates. Scottish Water does generate surpluses and therefore has retained earnings, which it can invest to achieve the outputs set by Scottish Ministers. It does not currently pay dividends and therefore all of the surplus generated can be reinvested for the benefit of current and future customers. These retained earnings differ from retained earnings in the private sector in that they are not reinvested with the specific goal of generating increased surpluses in the future.

To set an allowed rate of return for Scottish Water based on the same principles used by the regulators of private sector utilities, we would need to estimate an allowed rate of return on debt and an allowed rate of return on 'customer retained earnings'. Scottish Water should be allowed to earn a return when it uses customer retained earnings as a source of funds.

Although it may seem feasible to estimate a WACC for Scottish Water, issues arise because Scottish Water does not have debt or equity that is publicly traded. We

are not therefore able to establish a market-based measure of equity or debt returns for Scottish Water in the way that we would for a private sector company.

The WACC approach is further complicated because regulators have tended to regard the RCV as a proxy for the enterprise value (market values of the debt plus the equity) of the regulated business. The market value of the equity is therefore equal to the RCV minus the outstanding net debt.

The market value of the equity would normally be estimated using the dividend growth model or calculating the NPV of future cash flows. The dividend growth model cannot be used because Scottish Water does not pay dividends. The NPV approach requires an appropriate discount rate to be established in order to discount cash flows that will occur in the future. However, it would be difficult to justify the use of a discount rate that is different from the allowed rate of return. The NPV approach cannot therefore be used since we need a market value to establish the allowed rate of return, but need an allowed rate of return to use the NPV method of establishing a market value. There are, however, four approaches that we could consider:

Ofwat's assessment of the allowed cost of capital

At each periodic review Ofwat establishes an allowed Weighted Average Cost of Capital for the water companies south of the border. Ofwat's current proposed allowed rate of return for the water and sewerage companies is 5.1% real and post-tax.

A possible approach for Scotland would be to use Ofwat's allowed rate of return. We believe that such an approach would not be in the customer interest. Most obviously, the cost of Scottish Water's debt (both the current overall cost and the cost of new debt) is lower than Ofwat's estimate of the cost of debt for the companies south of the border. This would suggest that Ofwat's WACC would significantly overestimate the appropriate rate of return for the water industry in Scotland.

Long-term average borrowing rates

A second possible approach for establishing an allowed rate of return for Scottish Water would be to apply an average of observed historic real borrowing costs. This would have the advantage that it is relatively straightforward to apply. If we were to use this method, we believe that it would not be appropriate to allow extra costs associated with embedded debt to be recovered from customers.

There would still be a potential issue about the rate of return that should be allowed on customer retained earnings. Retained surpluses represent an important source of funds for Scottish Water.

The Treasury Green Book⁵

The 2003 edition of the Green Book reduced the HM Treasury estimate of the appropriate discount rate for public sector projects to 3.5% real. However, HM Treasury did not update the 6% real estimate for the cost of capital included in the 1997 edition of the Green Book.

A third possible approach to setting the allowed rate of return for Scottish Water would be to take the discount rate of 3.5% real as the allowed rate of return. There are two advantages of this approach. It uses a rate of return that is established by Government and it should therefore be sufficient for Scottish Water to fund its efficient operation. Secondly, this approach could cover both the debt and customer retained earnings portions of the Regulatory Capital Value.

However, setting an allowed rate of return at 3.5% real would currently be quite significantly higher than the observed cost of new debt to Scottish Water. This could have the effect of encouraging Scottish Water to increase its borrowing and may delay the necessary improvements in efficiency. The effect of this could be reduced if we regarded the 3.5% real rate as the return pre-tax rather than post-tax.

⁵ *'The Green Book' Appraisal and Evaluation in Central Government*, HMSO, 2003

Hybrid approach

A fourth potential approach would be to apply a modified version of the WACC approach. We would combine an observed real cost of debt with an estimate of an appropriate rate of return on the customer retained earnings (the equity portion of Scottish Water's RCV) in order to produce an allowed rate of return.

The future real rate of interest on debt for Scottish Water could be estimated as described above. We propose that the pre-tax allowed rate of return on the customer retained earnings should be set at the post-tax allowed rate of return for debt. In real terms this rate is likely to be low. Valuing customer retained earnings in this way will replicate within a public sector capital structure the equity buffer that protects customers south of the border from operational or legislative shocks⁶.

An additional advantage of this approach is that there would be no incentive for Scottish Water to seek to change its current ratio of debt to regulatory capital value. If the return on the customer retained earnings is greater than the return on debt, Scottish Water would have an incentive to pay down debt. In contrast, if the return on the customer retained earnings is lower than the return on debt, Scottish Water would have an incentive to take on more debt.

This approach should also help stakeholders to monitor Scottish Water's performance. The level of its outstanding debt relative to its RCV should be in line with the forecasts that are included in the Strategic Review of Charges. If the level of debt to RCV declines, either Scottish Water has outperformed its efficiency targets or it has not delivered its capital programme as planned. Conversely, if the level of debt relative to its RCV increases, Scottish Water is either ahead of schedule in delivering the capital programme or has underperformed relative to its efficiency targets.

We currently favour the hybrid WACC approach outlined above.

Depreciation and additions to the RCV

The value of the RCV changes over time to reflect efficient new investment and depreciation of existing assets. Since the RCV is central to the determination of Scottish Water's revenue requirement, it is important that the initial RCV that we establish continues to be representative of the value of its asset base.

Revenue requirement = operating costs + Public/Private Partnerships (PPP) + Infrastructure Renewals Charge (IRC) + depreciation + cash return on the regulatory capital value

Depreciation and additions play a role in this calculation through the impact they have on the RCV, and, in the case of depreciation, as a separate component of the revenue requirement.

Treatment of additions to the asset base

Additions affect the price cap by increasing the RCV. As the rate of return remains constant (it is a percentage of the RCV), any increase in the RCV increases the amount of return allowed in Scottish Water's revenue requirement, and hence increases prices.

The key role of the RCV in price setting is to reflect the value of the physical assets used to provide a service to customers. When Scottish Water makes an investment in its assets – be it simply to replace or maintain assets that have worn out, or to enhance the asset base – this should be reflected in an increase in the RCV. In increasing the RCV, we are ensuring that the return earned on total assets will increase in recognition of the investment made.

If Scottish Water has made additions to the RCV which have increased its value (net of depreciation), then the return component of the revenue requirement will be higher and prices will also be higher. Providing capital expenditure has been justifiably incurred in order to provide service to customers, then it is reasonable that customers should remunerate this investment in the RCV.

It is very important, however, that customers are only required to remunerate justifiable expenditure. We

⁶ This issue is discussed in detail in Chapter 4.

therefore need to ensure that only appropriate and efficiently procured capital investment is added to the RCV.

Treatment of depreciation

The role of depreciation is a little more complicated. It can affect prices in two ways:

- It is deducted from the RCV and hence represents the amount by which the value of the assets has fallen. Again, assuming a constant rate of return, any reduction of the RCV would reduce the amount of return allowed in Scottish Water's revenue requirement; or
- The expected depreciation charge is added to the cash return and operating costs to determine the revenue requirement.

Depreciation can therefore influence Scottish Water's revenue requirement either directly, or indirectly (by affecting the level of return).

Rolling forward the RCV

The process of adjusting the RCV from its starting value to reflect changes in the asset base is known as 'rolling forward'. In the Strategic Review of Charges we will have to set the level of efficient new investment and the appropriate depreciation charge. We would adjust the RCV before the next regulatory period to reflect any extra or inefficient investment.

Figure 3 outlines how the change in the RCV is calculated for each year of the regulatory control period.

Figure 3: Rolling forward the RCV

Closing RCV (previous year)	
+	Indexation
+	Capital expenditure (excluding IRE)
+	Additions
	Infrastructure renewals expenditure (IRE)
-	Infrastructure renewals charges (IRC)
-	Grants and contributions
-	Depreciation
-	Disposals
=	Closing RCV

In order to ensure that the RCV does not decrease in real terms as a result of general price rises in the industry itself, we adjust the RCV each year to take account of inflation.

Interim determinations and logging up and down

In Scotland, a Strategic Review of Charges is carried out every four years, while in England and Wales a price review is carried out every five years. The period of time between regulatory reviews is referred to as the regulatory control period. At a regulatory review, the regulator sets price caps or revenue caps for the next regulatory control period.

In order to set price caps or revenue caps, the regulator forecasts the costs that the regulated company will incur over the next regulatory control period, if it carries out its functions efficiently. The revenues recovered by the company must be sufficient to cover these costs.

Owat uses two mechanisms to adjust the regulatory price settlement in the event that assumptions made at the periodic review need to be revised. The first is an 'interim determination of the price limit', which takes place during a regulatory control period. The second is the approach of 'logging up and down' at a regulatory review.

The proposed change in the regulatory framework to create a Water Industry Commission with a power to determine prices will, we believe, make it necessary to introduce both the possibility of an interim determination and the logging up and down process. This will ensure that Scottish Water is properly able to finance its functions and can recover the costs of any unexpected expenditure that results from uncertainty rather than underperformance. We propose to introduce a similar framework to adjust prices in Scotland.

What are 'interim determinations'?

An interim determination is a reconsideration of a firm's price limits that is undertaken between formal price reviews. The reconsideration is carried out in the light of

a particular set of circumstances or factors that were not taken into account at the last review. Either the firm or the regulator may initiate an interim determination. If Ofwat knows that there is significant uncertainty about a particular area of the periodic review, it can notify an item. This allows either the regulator or the regulated company to revisit the price limit if better information becomes available. An example would be the rate at which households opt for meters. An example pertinent to Scotland may well be the split between the wholesale and retail businesses.

What is logging up and down?

Whereas an interim determination occurs between reviews, logging up and logging down is an adjustment that takes place at the end of the regulatory control period to reflect differences in cost from the original determination. Such differences will have an impact on prices only in the next regulatory period.

Price caps and tariff baskets

We propose to establish tariff baskets to cover the core services provided by Scottish Water. The use of tariff baskets will also help to ensure that the principles of charging determined by Scottish Ministers are applied in a transparent way. They will also bring the price setting process more into line with the other utility regulators in the UK, such as Ofgem and Ofwat.

The detail of the tariff baskets will be available on our website early in 2005. This will give customers better access to information about bills and will help strengthen the regulatory regime.

Table 4 presents a summary of Scottish Water's tariffs.

Table 4: Summary of tariffs

	Type of tariffs		
	Fixed £ per annum	Fixed – based on rateable value (pence per £ of RV)	Volumetric (pence per m ³)
WATER			
Unmetered domestic	✓		
Metered domestic	✓		✓
Unmetered non-domestic	✓	✓	
Metered non-domestic	✓		✓
SEWERAGE			
Unmetered domestic			
Wastewater (including foul and surface water drainage)	✓		
Metered domestic			
Sewage	✓		✓
Surface water drainage	✓		
Unmetered non-domestic			
Sewage	✓	✓	
Surface water drainage		✓	
Metered non-domestic			
Sewage	✓		✓
Surface water drainage		✓	
Trade effluent	✓		✓ ⁷

A definition of tariff baskets

A tariff basket includes all of the tariffs that impact on customers who receive a particular service. For example, if measured non-domestic water customers were considered as a group, all of the tariffs that impact on them would be included. Such a tariff basket would therefore include the standing charges relating to the different sizes of connection available and the volumetric tariff. The balance of tariffs within the basket will be determined by the number and type of connections, amount consumed and by increases or decreases in the tariffs included in the basket.

Total revenue is determined by adding together the output of each tariff basket. The revenue from an individual tariff basket is assessed by calculating the sum product of the relevant customer base and relevant tariffs.

⁷ Trade effluent is charged for using both volume and strength.

Table 5: The use of weighted average tariffs

	% increase (D)	% of total revenue (E)	Weighted % increase (D x E)
Tariff A	5%	50%	2.5% (A)
Tariff B	-5%	20%	-1% (B)
Tariff C	20%	30%	6% (C)
Weighted average (A+B+C)	-	-	7.5%

The weighted average increase provides a reasonable indication of the impact on customers, as it takes account of the relative size of the impact from each tariff change. We would scrutinise very carefully any material divergence in tariff changes within a basket.

It is important to emphasise that changes in the current balance of tariff baskets will be made to reflect the outcome of the Scottish Executive's consultation, 'Paying for water services 2006-10' and the ministerial guidance which we will receive in January 2005.

Our proposed approach to tariff baskets

In England and Wales tariff baskets are defined in condition B of the companies' operating licences. Scottish Water's duties are set out in statute and there is no equivalent licensing regime in Scotland. We therefore propose to describe our proposed tariff baskets in detail in our *Strategic Review of Charges 2006-10*.

We propose that there should be eight or ten separate tariff basket items:

- domestic unmeasured water;
- domestic unmeasured wastewater;
- non-domestic unmeasured water;
- non-domestic unmeasured wastewater;
- measured water (possibly split 20mm connection and other);
- measured wastewater (possibly split 20mm connection and other);

- surface water drainage (excluding unmeasured domestic); and
- trade effluent.

We believe that it may be worth considering the introduction of two separate tariff baskets to include tariffs (except surface drainage) for customers with a standard metered connection. There are four principal reasons why we consider that this may be worthwhile:

- measured customers with a standard connection are more like households than other measured customers;
- monitoring prices for this group separately should help to ensure that their interests are properly protected in the event that Parliament approves the current Water Services (Scotland) Bill;
- it should be easier to reflect the outcome of the 'Paying for water services' consultation in the tariff basket weightings; and
- the extra tariff baskets should improve the predictability of prices for a large number of smaller businesses.

There are two principal reasons why we should restrict the number of tariff baskets to eight:

- Scottish Water would have less flexibility in managing the expectations of its business customers; and
- greater complexity is introduced to price setting.

On balance we believe that the advantages outweigh the two potential disbenefits.

Treatment of large customers

Larger customers in England and Wales can benefit either from an inset appointment or negotiation on price with their existing supplier. Ofwat considers that pricing arrangements for larger customers could significantly

distort tariff baskets and put at a disadvantage those who can neither benefit from competition nor negotiate.

Excluding large customers from the tariff basket has the effect that shareholders pay for these discounts.

In the public sector model in Scotland, the cost of any discount to one customer has to be paid by all other customers. Special agreements should only be entered into when everyone gains from the agreement. We would therefore propose that special agreements remain in the tariff basket.

Standard customers

In the *Strategic Review of Charges 2002-06*, we illustrated the effect of our recommendations with reference to a number of standard customers. We propose to develop our use of standard customers to help customers to understand better the likely impact of the Review on the bill that they pay.

A customer's bill will vary depending on the relative use of the services provided. For example, the bill for a domestic customer with no meter will be based on the Council Tax band of the property, whereas charges for a business customer with a meter will be based on:

- the size of the water connection;
- the amount of water consumed;
- an assumed size of the waste water connection;
- the assumed amount of waste water discharged; and
- the rateable value of their property (for draining surface water from the property).

The customer's bill will be the sum product of the relevant factors and the appropriate tariffs.

Scottish Water has more than approximately 140,00 non-domestic customers. These customers will each require a quite different mix of services from the water and sewerage undertaker, so the impact of tariff changes will impact on their total bills in different ways.

It is clearly important that our set of standard customers is representative of the actual customer base. This ensures that all customers can find a 'match' that will illustrate the likely impact of tariff changes on their bill.

Table 6 shows the standard customer descriptions that we used in the *Strategic Review of Charges 2002-06*. It also shows the proposed new name for these customers for the *Strategic Review of Charges 2006-10*.

Table 6: Standard customers used at the 2002-06 Review

Name in 2002-06 Review	Proposed name for 2006-10	Water		Sewerage		
		Meters	Volume (m ³)	Meters	Volume (m ³)	RV
Newsagent	High Street newsagent	1 x 20 mm	30	1 x 20 mm	28.5	£5,000
Garage	Garage	1 x 20 mm	100	1 x 20 mm	95	£10,000
Restaurant	Large restaurant	1 x 20 mm	500	1 x 20 mm	475	£100,000
Commercial	Large office	1 x 25 mm	900	1 x 25 mm	855	£750,000
Retail	Retail group	2 x 20 mm 20 x 25 mm 1 x 35 mm	4,500	2 x 20 mm 20 x 25 mm 1 x 35 mm	4,275	£1,700,000
Food manufacturer 1	Food manufacturer 1	2 x 25 mm 1 x 80 mm	50,000	2 x 25 mm 1 x 80 mm	47,500	£100,000
Food manufacturer 2	Food manufacturer 2	2 x 25 mm 1 x 50 mm 1 x 100 mm	100,000	2 x 25 mm 1 x 50 mm 1 x 100 mm	95,000	£260,000
Manufacturing	Large manufacturer /pharmaceuticals	1 x 150 mm	175,000	1 x 150 mm	166,250	£1,225,000
Brewers	Brewers	2 x 25 mm 1 x 100 mm 1 x 150 mm	600,000	2 x 25 mm 1 x 100 mm 1 x 150 mm	150,000	£500,000

Unmeasured customers

Our 2001 set of standard customers did not include unmeasured customers who pay according to their rateable value. We therefore propose to include four unmeasured non-domestic customers in our list of standard customers, as shown in Table 7.

Table 7: Proposed additional standard unmeasured non-domestic customers

Customer name	Rateable value
Small newsagent /grocer	£200
Local hairdresser	£920
Sports club	£2,250
Supermarket	£30,000

Measured customers

Our review of the customer information provided by Scottish Water suggests that metered customers are reasonably well represented within the existing standard customers. We therefore propose to add only four additional standard customers.

The proposed additions are outlined in Table 8.

Table 8: Proposed additional standard metered customers

Name	Water		Sewerage		
	Meters	Volume (m ³)	Meters	Volume (m ³)	Rateable value
Warehouse	1 x 20mm	10	1 x 20mm	9	£500
Large house	1 x 20mm	110	1 x 20mm	104	Band H
High School	1 x 25mm	2,000	1 x 25mm	1,900	£18,000
Hotel	1 x 50mm	15,000	1 x 50mm	14,250	£75,000

Standard trade effluent customers

It is more difficult to define standard trade effluent customers than it is to define water customers or customers who discharge standard-strength sewage. There are just over 2,000 customers in Scotland who have trade effluent agreements. They range from a small garage to a large petrochemical firm.

The six additional standard customers that we propose are shown in Table 9.

Table 9: Proposed additional standard trade effluent customers

Standard customer name	Volume ??		Load ??		Average Strengths ??	
	Annual	Daily	Total suspended solids	Biological oxygen demand	Total suspended solids	Settled chemical oxygen demand
Bakery	200	0.55	0.5	0.75	575	1600
Clothing manufacturer	12000	32.9	1	1	20	300
Abattoir	90000	246.6	150	250	600	1500
Electronics Business	550000	1507	15	50	10	75
Printers	10000	27.4	5	40	100	2500
Distillery	150000	411.0	7	55	15	200

Method for setting retail and wholesale prices

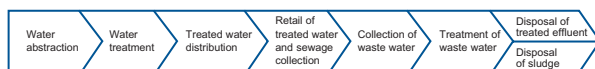
The proposed competition framework would allow new entrants to obtain a licence to provide retail services to non-domestic customers. These new entrants would be retail specialists who would buy water and sewerage services wholesale from Scottish Water. To determine appropriate wholesale prices we would first need to define the wholesale and retail activities.

Defining the retail and wholesale activities

Wholesale is the selling of goods or services to merchants, usually in large quantities and for resale to consumers. Retail is the selling of goods or services directly to consumers. Our initial view is that retail activities would include all matters relating to:

- retail pricing and tariffs;
- the billing process;
- collection of charges;
- debt follow up and debt management;
- meter reading, customer meter operations and ownership;
- call and correspondence handling;
- responses to customer enquiries, complaints or requests for information;
- key account management;
- liaison with the wholesaler to deal with customer issues; and
- marketing.

Scottish Water currently handles all aspects of the water and sewerage service. Its activities can be represented in a value chain. Retail is a relatively small part of what Scottish Water does.

Figure 4: Scottish Water's value chain

The Bill would require Scottish Water to establish a retail subsidiary. Scottish Water would be required to treat that retail subsidiary no differently from any potential new entrant.

We would expect that new entrants, as focused, specialist retailers, could improve the level of service offered to customers. For example, they could offer customers multiple payment alternatives (in method of payment and frequency), could combine the bills of various locations into one single bill (for multi-site customers), or could offer advice about how to reduce consumption. Further opportunities could exist if the retailer were already providing the customer with another utility service, as they would benefit from economies of scope, and could offer their customers a single bill that covers a number of utility services.

Possible approaches to setting wholesale prices

There are four approaches to setting wholesale charges that we intend to consider:

- the efficient component pricing rule;
- the long run marginal cost approach;
- accounting approaches; and
- comparator approaches.

The efficient component pricing rule

Economists developed the 'Efficient Component Pricing Rule' (ECPR) during the 1980s as a method of setting charges for access to an essential facility. The ECPR applies the concept of 'avoidable costs'. An avoidable cost is the cost that a company no longer has to bear if it ceases to supply a customer.

ECPR was developed to set an access price when the incumbent would provide retail services itself – not to set a wholesale price for an arm's length subsidiary company. The separation of Scottish Water's retail arm is important because otherwise there would be a risk of challenge from new entrants that the retail business [with access to cheap Government borrowing] has an unfair advantage.

The long run marginal cost approach

A second approach to access pricing would be to set the access charge at the 'long run marginal cost' (LRMC) of providing access to the network. The LRMC is a measure of those costs that could arise in the future if demand were to change. There are two potential problems with using LRMC. These are that there is insufficient information on the very long-term investment needs of the water industry in Scotland and the approach does not take account of central overheads. Modifying LRMC to take account of central overheads is possible but is likely to result in the same answer as the accounting approach.

The accounting approach

We would use our proposed regulatory accounts to define the accounting costs of the wholesale and retail businesses. These accounting costs would include all:

- direct and indirect operating costs (indirect costs include items such as shared legal, IT, and head office functions);
- direct and indirect capital expenditure; and
- financing costs.

The comparator approach

We also propose to analyse other network utility industries that have wholesale and retail activities. In both the gas and electricity industries there has been structural separation between the vertical components of the businesses. The monopoly elements of the businesses have been separated from those elements that are subject to competition.

While we recognise that there are differences both in terms of cost structure and in the extent to which the industries have been opened up to competition, we believe that there could be important lessons to be learned. These would include:

- What does a gas retailer do that a water retailer does not?
- What are the costs of the gas retailer?
- Why should the water retailer's costs be different?

Proposed method

We currently favour the accounting approach to determining the wholesale price. In our view this approach is most likely to ensure that a proper balance is struck between the wholesaler and the retailer.

Connection charging regime

Throughout the utility industry, issues have arisen in relation to the allocation of costs for new connections between existing and prospective customers. In Scotland, the mechanism for establishing how costs should be shared between existing and prospective customers is currently being redefined by the Scottish Executive through changes set out in the *Water Environment and Water Services (Scotland) Act*. The outcome of this process will impact on customer charges in the period of the next Strategic Review.

For both existing and new customers, the allocation of the costs associated with new connections needs to be both equitable and transparent. This requires a careful assessment of the impact of connection charging regimes, particularly where network capacity is limited. For the water industry in Scotland, the impact of limitations of the network capacity on new development confirms the need for robust connection charging arrangements to be in place.

Scottish Water's current connection charging policy

For domestic (or household) customers, current legislation⁸ requires Scottish Water to provide a connection to the public network for either new or existing properties, where it is practical to do so at 'reasonable cost'. Scottish Water currently interprets reasonable cost for new households as being a maximum of £1,500 per property, split £1,000 for waste water and £500 for water.

For first-time household water connections, Scottish Water defines the reasonable cost threshold as £500. For first-time household waste water connections, a sliding scale operates based on the Council Tax band of the property, ranging from £1,995 for a Band A house to £5,985 for a Band H.

In effect, the existing customer base funds the contribution towards the cost of connection. The process for establishing the level of the provision is not, however, transparent and appears to have evolved through custom and practice.

For non-domestic (industrial or commercial) customers there is no direct equivalent of the reasonable cost contribution. However, for waste water connections only, Scottish Water currently provides a connection allowance of £23,600 per hectare of land connected.

A number of issues have arisen in relation to Scottish Water's connection charging mechanism, including the following key concerns:

- The cost to customers of the 'reasonable cost' contribution. This is equivalent to almost 2% of a customer's bill;
- The reasoning behind the reasonable cost contribution. In particular, it is not clear why customers, including the vulnerable, should fund the installation of water and waste water services to new houses. This is not consistent with the approach taken in the electricity, gas and telephone industries.

⁸ *The Water (Scotland) Act 1980, The Sewerage (Scotland) Act 1968, The Water (Scotland) Act 1980 and the Water Environment and Water Services (Scotland) Act 2003.*

- The impact of the connection charging policy on new development. This contribution would appear to increase demand that cannot realistically be met. Moreover, similar problems do not appear to exist to the same extent in other utility models where developers fund a larger proportion of the connection costs.

Our current understanding is that the Scottish Executive proposes to bring forward regulations under the *Water Environment and Water Services (Scotland) Act 2003* by the end of 2005. These regulations will revise the mechanism by which Scottish Water determines reasonable cost for both new development and first time provision. Consequently, these changes will have an impact on the period of the *Strategic Review of Charges 2006-10*.

The Scottish Executive is currently considering whether the introduction of an infrastructure charge (as is levied south of the border) is appropriate in Scotland. This could go some way to financing local network reinforcement work that cannot be attributed to specific development.

Questions for consultation

Chapter 3: An introduction to depreciation

1. Is the proposed approach to depreciation for the *Strategic Review of Charges 2006-10* appropriate? In particular:
2. Is the proposed method of determining asset life, through a five stage classification from 'very short' to 'long', adequate?
3. Is straight line depreciation the most appropriate mechanism for assessing the annual reduction in value of Scottish Water's assets?
4. Does the proposed use of MEA valuation provide a suitable method for estimating the economic value of Scottish Water's assets or would other methods give a better estimation?

Chapter 4: Managing risk in the public sector

5. Do respondents agree that we should extend risk analysis to cover the financial ratio comparisons?
6. Do respondents agree that access to borrowing should require Scottish Water to conform to the same disciplines and control, that apply in the private sector?
7. Do respondents agree that customers should not pay for a failure to meet agreed targets?
8. Are there other factors that we should take into account in minimising the risks to customers both now and in the future?

Chapter 5: How we propose to set prices

9. Do customers agree that the regulatory capital method of price setting will help to facilitate comparisons between the water industry in Scotland and south of the border? If not, what are the alternative methods they would suggest?
10. Do customers agree that it would be better to set a series of price caps rather than the current system of setting a single revenue cap?
11. Are there other actions we should consider to improve the transparency of the price setting process?

Chapter 6: Regulatory accounts and accounting separation

12. Do respondents agree with our proposal to require Scottish Water to submit regulatory accounts?

Chapter 7: Financial modelling

13. Do respondents agree with the financial assumptions that we propose to make?
14. Do respondents agree with our proposal to use the Ofwat ratios as the primary indicator of financial sustainability? If not, which ratios should we use?

Chapter 8: Establishing an initial RCV

15. Do stakeholders agree that there are broadly three ways to establish an initial RCV for Scottish Water?
16. Which method would stakeholders see as the most reliable, and why?

Chapter 9: Allowed Rate of Return

17. Do respondents agree that it would not be appropriate to adopt the rate of return allowed for the private sector water industry south of the border by Ofwat?
18. Do respondents agree that the hybrid approach described above should be used to set the allowed rate of return for Scottish Water? If not, what other method would respondents suggest? In particular how could the suggested method facilitate monitoring and avoid any incentive for any stakeholder to seek to change the ratio of debt to RCV?
19. Do respondents agree that we should make an allowance for embedded debt for this regulatory control period, but only make such allowances in the future if there has been a material change in the rate of inflation?

Chapter 10: Regulatory capital value – treatment of depreciation and additions

20. We would welcome the views of stakeholders on the content of this Chapter. There are no specific consultation questions.

Chapter 11: Interim determinations and logging up and down

21. Do stakeholders believe that there should be a process to adjust prices during a regulatory control period? If so, should we seek to introduce a process for interim determinations?
22. Do stakeholders believe that it is appropriate to adjust prices in the next regulatory control period to

reflect actual outcomes in the previous period? If so, should we seek to introduce a similar process to Ofwat's logging up and down?

23. What factors should trigger an interim determination? At what level of materiality should an interim determination be triggered?
24. Are there other relevant changes in circumstance that we should consider introducing?
25. What is the most effective method for consulting with customers about a potential price change?
26. Would customers prefer the regulator to revised prices downwards during a regulatory period (eg in the event of slow delivery of outputs) even if prices are likely to increase by a greater percentage in the future as a consequence?

Chapter 12: Setting price caps: the role of the tariff basket

27. Do you agree that the proposed approach for the tariff basket items is appropriate for Scotland?
28. Do you agree that we should introduce more tariff baskets than Ofwat?
29. Do you agree that we should establish tariff baskets for metered water and wastewater customers with a standard connection?
30. Do you agree that the proposed method for calculating the weighted average price increase is the most appropriate method to use? If not, which alternative method would be more appropriate and why?

Chapter 13: Standard customers

31. Is a target date of the end of December for announcing tariffs (which will come into effect on 1 April in the following year) acceptable, given that details about tariff baskets and their weightings will be included in the *Strategic Review of Charges 2006-10*?

32. We would like to hear your views on the proposed changes to the standard customers used in the *Strategic Review of Charges 2002-06*. Do you feel that our proposals will make it easier to identify the customer group represented? Are there any other changes you would like to see being made?
33. We would like to hear your views on the proposed additions and changes to the standard customers, as detailed previously. Do you consider that we have achieved broad representation of the customer types? Are there any other customer types that we should add to the lists?
34. Are there any other customer types that are not properly represented in the revised list?
35. Do respondents consider that the criteria that we propose to use in assessing different approaches to setting wholesale prices (ie that the approach should be theoretically sound, practical, consistent with Scottish Executive policy and flexible) are appropriate?
36. What are respondents' views on the ECPR, LRMC, accounting cost and comparator approaches to the setting of wholesale prices?
37. Do respondents agree that the split between wholesale and retail activities should be a notified item?

Chapter 15: Connection charging regime

38. Are there any lessons from England and Wales that you want to propose for application in Scotland?

Section 1: Chapter 1

Introduction

1.1 Introduction

We are committed to the principles of the Better Regulation Task Force: transparency, accountability, proportionality, consistency and targeting. Our approach to the second full Strategic Review of Charges covering the period from 2006-10 takes full account of these principles. It also responds to some of the concerns raised by stakeholders in the last four years.

Our programme of work was described in a recent publication, *Our work in regulating the Scottish water industry: Setting out a clear framework for the Strategic Review of Charges (Volume 1)*. In that document we explained that we intended to publish a detailed description of our approach to the next Strategic Review of Charges in five volumes. Volume 2 covered the background to the next Review and outlined some of the changes in the institutional framework that will impact on the next Review. Volume 2 was published on 16 August 2004.

In this volume (volume 3) we discuss the calculation of prices. For many customers of water and sewerage services, price is the single most important issue. In order that stakeholders can fully understand how prices are calculated, this publication:

- explains the costs that have to be recovered;
- discusses in detail the calculation of prices;
- explains how adjustments to prices are made when circumstances change;
- seeks views on the calculation of wholesale and retail prices; and
- discusses the management of risk in the public sector.

Some of these issues are included because they provide important background information for stakeholders. For other issues we outline our proposals to implement regulatory best practice in Scotland,

explain why we are making these changes now and seek the views of stakeholders on our proposals.

1.2 Where costs are incurred

Rain water may well fall from the sky, but it is clear that turning that raw water into a reliable, high-quality water and sewerage service is a costly and complex operation.

- There are the significant environmental costs of abstracting the water;
- Capital costs associated with the treatment plant and the distribution system are also significant; and
- In addition there are the operating costs associated with manpower, chemicals and energy used to treat the water, make it safe and pump it along the pipeline to the customer. Some of these costs are fixed (eg capital costs and manpower), others are variable (eg energy and chemicals).

Treating water and transporting it through pipes to customers is asset intensive – there are more than 20 metres of water main for every household in Scotland. According to Scottish Water's 2003. Regulatory Return, it would cost some £32 billion to replace all of water industry's assets in Scotland. This is more than £6,000 for every person in Scotland.

Customers, however, are not concerned with how the service is delivered or the assets that are employed. They want a reliable and high quality service to be available on demand. In particular, they want to be assured that the service they receive for the amount they pay represents value for money.

For the money that they pay, customers receive the following main services:

- access to the public water and sewerage network;
- treatment of water and sewerage; and
- customer service and billing.

When a property is connected to the water supply this increases the value of that property. A clear example of this is that land for development that is already connected to the water mains will sell for a higher price than identical land that is not connected. The connection therefore has value in its own right, and the extent of the use of that pipe is a secondary factor. It would seem reasonable, therefore, that a customer who benefits from the service should contribute towards the costs of providing the service.

The same economics apply to the provision of water and sewage treatment facilities. The largest elements of cost are capital investment and manpower. These costs are essentially fixed. Other costs, including power and sludge disposal costs, tend to be variable.

The customer service charge reflects the billing costs, the customer service provided (including call centres, key account managers and customer literature) and, if appropriate, meter operation and reading costs. These costs are relatively fixed in nature, and do not vary significantly according to the customer's water use. (Although costs will clearly be higher in absolute terms for a large customer who merits a more personalised service, in proportion to that customer's total bill they may well be relatively modest.)

1.3 The recovery of costs

The cost of water and sewerage services could potentially be recovered from general taxation or through direct charges to customers. If costs were recovered through general taxation, customers would not receive bills and the services would be 'free at the point of delivery'. The costs of the water and sewerage industry would be met in the same way that the costs of health, education and law services are met.

Customers in Scotland pay for their water and sewerage service through charges. This ensures that there is a visible link between what customers as a whole pay and the services they receive. Customers can observe and understand the cost implications of their demands for more water, better quality water and a more reliable

service. If water and sewerage services were funded through general taxation the impact of customer demands on costs would be less transparent. This is unlikely to be in the general customer interest.

1.4 Structure of this volume

1.4.1 Volume 3 is presented in three sections.

Section 1 outlines the background to tariff setting. It comprises four chapters. Chapter 2 reviews proposals in the Scottish Executive's consultation, 'Paying for water services 2006-10'. It also addresses issues of cross-subsidy between customer groups. Chapter 3 discusses the benefit customers receive from use of the industry's assets is recognised and paid for in charges. It is, therefore, an introduction to depreciation. Chapter 4 discusses managing financial risk within the public sector.

Section 2 describes the process by which prices are fixed and amended if circumstances change. It comprises seven chapters. Chapter 5 outlines the changes that we propose to make to the way in which the resources required by Scottish Water are assessed. These changes include introducing a regulatory capital value and rate of return for Scottish Water.

Chapter 6 describes the introduction of regulatory accounts. Regulatory accounts will play an important role in ensuring that we can monitor and report effectively on Scottish Water's performance.

Chapter 7 discusses the financial model that we will use to determine the revenue that Scottish Water should be allowed to raise through charges. Chapter 8 discusses general issues relating to the introduction of a regulatory capital value and seeks views on how we intend to establish an initial value. In Chapter 9, we consider issues relating to the rate of return that should be allowed to Scottish Water and, again, we seek views on our proposed approach. Chapter 10 covers much of the technical detail that underpins the on-going use of the regulatory capital value approach. In particular, this chapter explains the rolling forward of the regulatory

capital value to reflect the use of existing assets and investment in new assets. In Chapter 11, we outline our proposed approach if circumstances change and Scottish Water needs more or fewer resources. We propose that our approach should be broadly similar to that used by the Office of Water Services (Ofwat).

Section 3 discusses charges and in particular options for setting wholesale prices and proposed changes to the connection charging regime. It contains four chapters. Chapter 12 discusses our proposed approach to the development of a tariff basket for Scotland. In Chapter 13 we describe new 'standardised customers', which we intend to add to those that we used in the *Strategic Review of Charges 2002-06*.

Chapter 14 seeks views on the potential approaches to the calculation of wholesale prices that we have identified. The final chapter, Chapter 15, discusses proposed changes to the connection charging regime.

1.5 Response to consultation

We have identified a number of questions for consultation. These questions are set out at the end of the Executive Summary. All responses to this consultation should be received by 31 October 2004. These should be sent to:

Katherine Russell
Water Industry Commissioner for Scotland
Ochil House
Springkerse Business Park
Stirling FK7 0JX

or by email to:

SRCmethodology@watercommissioner.co.uk

We will publish a summary of responses, and our conclusions on our website

www.watercommissioner.co.uk on 19 November 2004.

Section 1: Chapter 2

The Scottish Executive's consultation *Paying for Water Services 2006-10*

2.1 Introduction

In this chapter we review the Scottish Executive's consultation, *Paying for Water Services 2006-10*, and provide our response. We then outline how this consultation will impact on the *Strategic Review of Charges 2006-10*. We believe that it is important to put discussion of the consultation into context and, therefore, we also briefly revisit the context of the *Strategic Review of Charges 2002-06*, outline the principles that underpinned our advice and recommendations to the Scottish Ministers and then consider the reaction of stakeholders to the implementation of the recommendations included in the last Strategic Review.

2.1.1 Background to the consultation

The Scottish Executive's decision to consult on principles of charging for water arose in response to a number of developments concerning water charging in Scotland.

- In August, 2003 the Water Customer Consultation Panels called for a public consultation on the principles of water charging. This call followed a very negative reaction – largely by the small business community – to the introduction in April 2003 of higher fixed charges for metered customers and of minimum charges for non-metered customers. The small business community also called for an investigation in water charging.
- We were unfortunately unable to reach agreement with Scottish Water on its proposed scheme of charges for 2004-05. We referred the scheme to the Minister for Environment and Rural Affairs, along with our proposed amendments. In our letter to the Minister we suggested that a consultation on the principles of charging could improve understanding about how and why customers pay for water and sewerage services.

The Minister approved our proposed amendments to Scottish Water's scheme of charges. In February, 2004, the Deputy Minister for Environment and Rural Affairs

confirmed his intention to consult on the principles of charging for the water industry in Scotland.

In July 2004, the Minister for Environment and Rural Affairs launched two consultations. These consultations sought the public's views on the quality of future water services, and how customers should pay for those services. The two documents that launched the consultations were:

- *Investing in Water Services 2006-14*, which sought views on the scale and content of Scottish Water's next investment programme; and
- *Paying for Water Services 2006-10*, which sought views on the approach that should be adopted to charging different customer groups for water services.

Stakeholders generally welcomed the launch of the consultations, which will inform the guidance that Ministers are to provide to this Office in January 2005. This guidance will be taken fully into account when we set prices for the next regulatory period.

2.2 The Strategic Review of Charges 2002-06

In our initial interim Strategic Review of Charges, December 1999, we highlighted the fact that customers served by the former North of Scotland Water Authority would face much higher bills than those served by the other two authorities. In 2000, there was a number of calls for the Scottish Executive to intervene and to reduce customers' bills.

The proposal to create Scottish Water offered two principal benefits:

- a potential catalyst for much improved efficiency; and
- the opportunity to harmonise charges across Scotland.

The Minister asked us to provide advice on charges both for the three authorities and for the then proposed Scottish Water. Our analysis showed that customers throughout Scotland would face smaller increases in charges than would otherwise have been necessary and would therefore benefit from the creation of Scottish Water.

The *Strategic Review of Charges 2002-06* contained recommendations that:

- there should be a significant improvement in the efficiency of the water industry in Scotland;
- there should be a move to more broadly cost-reflective charging; and
- that prices should be harmonised throughout Scotland for both domestic and non-domestic customers.

We recognised that there would have to be progress in each of these areas or new entrants could find it easier to cherry-pick customers. The water industry has significant fixed costs. All connected customers make a contribution towards these fixed costs. If a customer leaves the network, for whatever reason, this will increase charges to other customers. If the service is provided inefficiently, larger customers may find it possible to make alternative arrangements for their water and/or effluent service. This would increase bills to other customers.

2.2.1 Need for improved efficiency

We explained in the Review that, as a monopoly, Scottish Water should benefit from economies of scale and scope. However, we expressed concern that inefficiency of the water industry in Scotland could make it seem attractive to opt for an alternative supply arrangement. We pointed out that this could lead to inefficient investment by customers and that it could further increase prices to those customers who remained with the public water supplier.

2.2.2 Harmonisation of charges

In his commissioning letter for the Strategic Review, the Minister said that our advice about charges for Scottish Water should assume harmonisation of tariffs for domestic customers by 2006. Our analysis and consultation with stakeholders, however, suggested that it would be better to harmonise tariffs for all customers. This would bring the Scottish water industry into line with other utilities, which charge a harmonised set of tariffs throughout their principal areas of operation. Without harmonised tariffs for all customers there would have been:

- additional incentives for higher-banded households to switch to a meter;
- understandable concerns from the business community in the North; and
- an increased risk of competition developing whereby a few customers benefit, to the detriment of the majority.

2.2.3 Broadly cost-reflective charging

Many of the costs of providing water and sewerage services are fixed. If the number of customers falls, the unit cost of the service will increase. Remaining customers will have to pay more as a consequence. We explained this in some detail in the *Strategic Review of Charges 2002-06*:

“It is therefore important that charges are not set at a level that is so much greater than the cost-reflective price that some customers are encouraged to adopt alternative solutions to their water and sewerage service needs. This could result either from significant inefficiency or if tariffs are not broadly reflective of the costs of supply. The outcome is that some customers go “off-network”, i.e. opt for service from a non-public sector provider. All customers suffer if a large customer is forced to seek private solutions to their individual needs in this way. The loss of the contribution from a large customer to the essentially

fixed costs of the industry has to be borne by all other customers. In essence, the unit costs for other customers are increased. A simple example may illustrate.

- There are ten customers, one of whom accounts for 50% of the total costs of supply. The other nine customers are identical;
- Fixed costs of supply are £18 million;
- Variable costs of supply are £1.8 million; and
- Prices are equal to costs.

The largest customer therefore pays 50% of the £18 million fixed cost and 50% of the £1.8 million of variable cost. His bill is therefore equal to £9.9 million (£9 million + £0.9 million). Each of the remaining nine customers would face a bill of £1.1 million. (This comprises a ninth share of the remaining fixed costs of £9 million and a ninth share of the remaining variable costs of £0.9 million.)

If this large customer were to opt to leave the network, the only costs that would not be incurred by the supplier are the £0.9 million of variable costs. The total costs faced by the remaining nine customers have now increased to £2.1 million from £1.1 million. The increase of £1 million results from the ninth share of the fixed costs of £9 million, which were previously paid by the large customer who has now left the network.

It is, therefore, desirable to ensure that prices are not set above the level of economic value provided. If this is achieved, it should not be attractive to a customer to seek an off-network solution. It should not be economically viable to replicate water or sewerage infrastructure on a single site.

An efficient industry, which properly understands both the service it provides and its costs, should not be particularly vulnerable to such off-network competition.”¹

¹ *Strategic Review of Charges 2002-06*, pages 40-41.

2.2.4 Impact on customers

We explained that the existing tariff arrangements in each of the three water authorities were very different and that the impact of a move to harmonised and more broadly cost-reflective charges could have differing impacts for similar customers in each of the three areas. To illustrate the impact of such a move we developed a range of ‘standardised’ customers. We showed the impact of tariff changes on these customers in each of the former authority areas.

In this current Review, we propose to increase the number of standardised customers to ensure that we can illustrate the likely impact of tariff changes on the smallest business customers and on customers who are charged by their rateable value. This is discussed in more detail in Chapter 13.

2.2.5 Implementation of harmonisation and more broadly cost-reflective charges

The harmonisation of charges for non-domestic customers began in April 2002. The three water authorities worked with the Scottish Water transition team to identify relatively modest changes in tariffs that would bring the charging regimes used by the previous water authorities more into line with each other. These changes included the following:

- The North and West of Scotland Water Authorities increased standing charges for metered water customers considerably. West of Scotland Water Authority also increased standing charges for sewerage, but North of Scotland Water Authority did not introduce any standing charge for sewerage. These changes were consistent with the principles accepted by Scottish Ministers in their response to the Strategic Review of Charges. East of Scotland Water Authority had relatively higher standing charges for metered customers.

- East of Scotland Water Authority had previously offered lower standing charges to those customers who were judged by the authority to use less water. These customers were charged on the basis of 'virtual meters' – the size of the actual meter or connection was set aside. This policy was not consistent with the recommended move to more broadly cost-reflective charging. The authority introduced a minimum meter size of 20mm. As a result, there were significant increases in the standing charge for all of those customers who had previously benefited from a virtual meter. This had an impact on all of the authority's non-domestic customers.
- Each of the three water authorities made changes to bring their volumetric charges for water more into line with each other. East and West of Scotland Water Authorities increased their price per cubic meter of water. There was a small reduction by North of Scotland Water Authority.
- Each of the three authorities also made moves to bring their charging for sewerage and drainage more into line with each other. Each authority had had a different balance between its charges for foul water and drainage. West of Scotland Water Authority increased the volumetric charge for foul water and reduced the charge for surface drainage. The main change for customers in the area served by North of Scotland Water Authority was a reduction in the surface drainage charge. Customers of East of Scotland Water Authority saw the price per cubic meter of waste water decrease and the price for surface water drainage increase.

The method of calculating prices for customers who paid by rateable value in the areas served by the former West and North of Scotland Water Authorities did not change.

In its scheme of charges for 2003-04, Scottish Water proposed to introduce a sewerage standing charge and a minimum charge for rateable value customers. It was

also clear from our discussions with Scottish Water and our analysis of the impact of various tariff changes on customers that it would be better to harmonise charges for non-domestic customers immediately.

There was no method to harmonise charges that would not impact adversely on some customer groups. Phasing harmonisation would have required those customers who had paid more previously to continue to pay more, yet even in this case the increases (in percentage terms) for some customers were likely to be significant.

We approved the proposed 2003-04 scheme of charges because it was in line with our advice and recommendations to Ministers in November 2001. Our view remains that customers should pay tariffs that broadly reflect the costs of the service they receive. We understand that the Scottish Executive may want to provide support to particular groups of customers, but in the absence of any clear guidance to the contrary, we do not believe that our remit allows us to favour one group of customers to the detriment of any other.

2.3 Response to implementation of the recommendations contained in the Strategic Review of Charges 2002-06.

The combined effects of the harmonisation of charges, and the introduction of higher standing charges and of a minimum charge for customers charged on the basis of their rateable value had different impacts on customers in each of the three former authority areas.

The following table illustrates the impact on customers:

Table 2.1: Impact of harmonisation and broadly cost reflective charging by water authority area.

	East	North	West
Standing Charges	-	++	+
Volumetric Charges	+	--	+
Surface water drainage	++	--	-

- = reduction
 -- = big reduction
 + = increase
 ++ = big increase

Percentage increases in bills for some customers were very large, although the actual cash impacts were rather more modest. For example, the maximum increase for a small business customer who paid on a rateable value basis was £270. It should also be recognised that some businesses were still paying less than households for an identical service.

There was a large number of complaints from the small business community about the changes in tariffs. The issue received considerable media coverage and was debated by the Scottish Parliament. Perhaps not surprisingly, approximately 20% of non-domestic customers who benefited from the changes in tariffs did not comment publicly about the benefit they had received.

The small business community called for a parliamentary investigation into water charges. A report from the Water Customer Consultation Panels also called for a public debate on the principles of water charging. The Finance Committee of the Scottish Parliament decided to hold an inquiry into the water industry. We discussed the inquiry, and our response to it, in Volume 2, Chapter 8.

The Scottish Executive responded to these calls by committing to a consultation on the principles of water charging.

2.4 The Scottish Executive's consultation *Paying for Water Services 2006-10*

Paying for Water Services 2006-10 sets out the Scottish Executive's views on the principles that should underpin charging and the application of those principles. It invites respondents to express their views on the Executive's proposals and to make alternative proposals where they disagree with what has been suggested. Views expressed by customers and other interested parties will be taken into account in determining how Scottish Water will be funded between 2006 and 2010 and in establishing the principles of charging for the same period.

The Executive's proposals are contained in two sections of the consultation, 'Proposed principles of charging' and 'Application of principles', each of which are outlined below.

2.4.1 Proposed principles of charging

The Scottish Executive's consultation makes proposals on the principles of charging in four areas:

- Charging for services – should Scottish Water be funded out of general taxation or through customer charges?
- Harmonised charges – should prices reflect regional or local cost differences or should they be the same across the country?
- Cost reflectivity – to what extent should charges reflect costs?
- Making changes to charging structures – how quickly should any changes to charges be made?

Charging for services

The Scottish Executive believes that costs should be recovered from charges to customers, rather than through general taxation. It recognises that water and sewerage services have a public service element. The public service element arises because water and sewerage services help to safeguard public health and the environment, and support social and economic development.

However, the Scottish Executive argues that for business customers water is a resource like any other, and businesses should pay for it as they do for other services. Household customers benefit from a water and sewerage service in much the same way as other utility services and should therefore pay for their use of the service. It suggests, however, that the approach to charging for water and sewerage services needs to ensure that the service is affordable to low-income

groups. The Scottish Executive considers that this is important to protecting public health and promoting social inclusion.

Harmonised charges

The Scottish Executive believes that charges should be the same for similar customers, regardless of their location in Scotland. The Executive believes that, since Scottish Water provides services on a national basis, it is right that customers should pay for those services on a consistent basis throughout the country.

The consultation recognises the risk, particularly in the context of competition developing in the provision of water services, that customers who cost the least to serve will seek charges that reflect those lower costs. Those customers who cost more to serve would be left paying charges that reflected the higher costs. In order to prevent this situation, the Executive proposes that, should Parliament decide to introduce retail competition, all of Scottish Water's charges, including its wholesale charges, should be set on a harmonised basis.

Cost reflectivity

The Scottish Executive believes that charges paid by groups of similar customers should, as closely as possible, match the costs of providing services to them. There are two aspects to this cost reflectivity:

- Charges for a particular group of customers should be set to reflect the costs (across the whole country) of delivering service to that group.
- The fixed component of charges (ie the annual charge) should recover costs that are 'fixed' for Scottish Water (ie costs that do not increase with increasing consumption by customers). The variable component of charges (ie the charge that varies with consumption) should recover those costs that vary with the volumes of water supplied or waste water removed.

The Scottish Executive clearly outlines that the achievement of affordable charges for low-income households and the harmonisation of charges mean that some degree of cross subsidy between groups of customers is inevitable. It proposes that the principles of affordability and harmonisation should take precedence over the principle of cost reflectivity.

Making changes to charging structures

The Scottish Executive recognises that adopting the principles of charging proposed in the consultation may mean that a number of customers face a significant increase in their bills. The Executive recognises that some customers were distressed by the sudden and unexpected change in their water and sewerage bill when charges were harmonised. It therefore proposes that significant changes in the charges for any particular customer group should be introduced gradually, over a number of years.

2.4.2 Application of principles

Paying for Water Services 2006-10 also considers how the underlying principles outlined in the consultation might be applied in particular cases. It raises a number of specific issues.

Cross subsidies

A cross subsidy will exist when one group of customers pays more than the cost of supply and a second group of customers pays less. The 'additional' revenue collected from the group of customers that pay more than their cost of supply is used to meet the difference between the cost of supplying the second group of customers and the price they pay for the service.

The Scottish Executive highlights what it sees as a number of potentially desirable cross subsidies. These would include harmonisation of charges across the country and the link to Council Tax bands for domestic charges. This means that higher banded households

pay more than lower banded households even if they happen to live in an area that is relatively cheap to supply. Harmonisation and the link to Council Tax bands is likely to most benefit those customers who live in low-banded properties in rural areas.

The Executive explains in some detail that it has commissioned work to understand the extent of cross subsidies that exist between households and non-domestic customers and within the non-domestic sector. It points out the difference between the domestic/non-domestic revenue split in Scotland and in England and Wales. The Executive points out that in Scotland domestic customers contribute some 63% of the total revenue of Scottish Water, while domestic customers south of the border contribute between 66% and 79% of the total revenue of their local supplier. The Executive suggests that any significant cross subsidy may not be sustainable in the long term and that it may be appropriate to unwind any such cross subsidy over time.

Unlike the domestic sector, there is only one obvious example of cross subsidy that benefits non-domestic customers. This is the benefit provided to a number of charitable organisations whose total income is less than £50,000 a year. Other customers meet the costs of providing this benefit through modestly higher charges. The consultation explains, however, that only higher banded households and businesses are contributing to the cost of this benefit since lower banded households are already paying less than the cost of their supply.

In general, the Scottish Executive is seeking views on whether existing subsidies should be retained or gradually unwound. Unwinding cross subsidies would ensure that all customers pay charges that are more broadly reflective of the costs of serving them. However, for those who previously benefited from subsidies, their removal could lead to significant increases in charges. The Scottish Executive therefore proposes that, if cross subsidies are to be unwound, the following principles will apply:

- If cross subsidies are significant, these should be unwound over a period of years, to avoid sudden

sharp increases in charges for those customers who are currently benefiting from subsidies; and

- The implications of unwinding cross subsidies for different customer groups should be made clear in advance, so that there is no uncertainty about how charges will change in the coming years.

Household charging

Local authorities continue to carry out billing functions on behalf of Scottish Water for the majority of households (those without water meters). Local authorities collect water charges along with the Council Tax on a single bill.

The consultation highlights that the discounts that are available for Council Tax purposes also apply to water charges. The two most significant discounts are the single occupancy and second home discounts.

The Scottish Executive explains that the 50% discount that is currently available to owners of second homes is difficult to justify. This is because of the fixed-cost nature of the industry. Additionally, the Executive indicates that it is inappropriate for owners of second homes to pay "half of what a couple on benefits in a neighbouring property will pay for the service".

The Executive is aware that the 25% discount offered to single person households provides assistance to many vulnerable households (eg pensioners living alone and single parents). It is concerned, however, that the application of this discount may not be particularly well targeted. The sole criterion to qualify for the single person discount is single adult occupancy of the property. This means that well-off individuals living alone will receive the 25% discount, whereas a couple who are receiving benefits will not. The Scottish Executive therefore proposes that the 25% discount for single occupancy is abolished.

The Executive believes that the current cost of these discounts is approximately £75 million a year. It suggests that abolishing these discounts would allow these

resources to be used to provide better targeted discounts for low-income households.

Non-household charging

Non-domestic customers may be metered or unmetered. Non-domestic customers who are not metered pay for their water and sewerage service according to the rateable value of their property. Non-domestic customers who are metered still pay for property and roads drainage according to their rateable value.

The Scottish Executive suggests that charging on this basis is likely to mean that the charges paid by customers may not reflect their costs of supply. It makes the following proposals.

- Property drainage: The Executive proposes that the costs associated with collecting and treating water that drains from properties would be better reflected if charges were based on the surface area of each property. It proposes to ensure that this is manageable by establishing a restricted number of area 'bands' (perhaps eight to ten bands). Each property would be allocated to one of these bands, and charged on that basis;
- Roads drainage: The Executive also proposes that the costs associated with collecting and treating water that drains from public roads and footpaths, etc should be collected on the basis of the property drainage area band to which each property has been allocated; and
- Unmeasured water/waste water supplies: The Executive invites comments on whether non-domestic customers without water meters should continue to be charged on the basis of rateable value. It also seeks views on the following alternatives:
 - Metering all non-domestic properties: The consultation points out that this would be an

expensive option as meters are costly to install and maintain; and

- Charging on the basis of assumed consumption: The consultation proposes to ensure that implementing such a proposal is transparent by allocating customers to one of three consumption bands.

The balance between charging and borrowing

The consultation discusses the appropriate balance between costs recovered from customer charges and those met by borrowing. It makes it clear that any such new borrowing counts as public expenditure and may impact on other policy priorities of the Scottish Executive. The Executive makes two proposals on the balance between borrowing and charges:

- Scottish Water should not borrow to meet current costs; and
- Scottish Water should fund only a proportion of its new capital investment through debt. The Executive argues that to fund all enhancements to the asset base from debt may result in lower price increases in the short term but that this would cause prices to have to rise continually above the rate of inflation in the medium to longer term. This is because there is likely to be a need for substantial enhancements to the asset base for many years to come.

Funding expansion of the public networks

The last issue dealt with in *Paying for Water Services 2006-10* is how to meet the costs of increasing network capacity. Local authorities and developers have recently become increasingly concerned about the lack of capacity on public water and sewerage networks in particular areas. They believe that this is constraining development in those areas.

One option would be to set customer charges at a level to cover all of the costs of providing new capacity on the network. This means that existing customers would meet the costs of connecting new customers to the network. The Scottish Executive believes that this would be at odds with the principle that customers as a whole should meet the costs of the service provided to them.

The Executive proposes that the costs of network expansion should be shared between new and existing customers. The consultation proposes that existing customers should meet the costs of maintaining the networks at existing capacity and meeting the quality standards set at the conclusion of the *Quality and Standards III* process.

The Executive further proposes that existing customers should pay for the expansion of Scottish Water's strategic capacity. Development of new reservoirs and treatment works would fall into this category, as these long-term assets are needed to secure future services for existing customers. It would also be both difficult and undesirable to attribute the need for such expansion to any single development proposal.

The Executive proposes that where expenditure is required to provide additional capacity for a specific development, the developer should meet these costs. This might mean that the developer is required to provide improved local distribution networks, service reservoirs or pumping stations.

The Executive suggests that this proposal strikes an appropriate balance between the interests of new and existing customers.

2.5 Our response to the consultation

Our response to *Paying for Water Services 2006-10* follows the same structure as the consultation document.

2.5.1 The Scottish Executive's proposed principles of charging

We agree with the principles of charging proposed by the Scottish Executive. It is encouraging that the first three of these principles are fully consistent with the principles that we applied at the time of the last Strategic Review of Charges.

Charging for services

We are pleased that the Scottish Executive shares our view that recovering Scottish Water's costs through charges is likely to lead to a better value for money service. We believe that there are two reasons for this.

Our view is that charging customers directly for water services is the best way to ensure that they understand the costs involved in delivering those services to them. Customers who pay for services directly and are aware of the cost will be more inclined to apply pressure on Scottish Water to reduce costs. We consider that ongoing pressure from customers provides an additional incentive for the industry to achieve cost reductions. Customers are also likely to be more realistic about the improvements in service they want to see if the costs of proposed improvements impact directly on their bills.

Collecting the costs of a water service through taxation may have the benefit of protecting vulnerable customers and reducing the number of connected properties that do not make any contribution towards these costs. However, we believe that it is possible to target assistance within a charging regime and that this may actually improve the efficiency of collection.

Harmonised charges

We agree that it is appropriate for similar customers to pay similar charges, regardless of where they are located in Scotland. This is consistent with the pricing policies of the privatised utilities in their local areas.

Cost reflectivity

We explained the importance of cost-reflective charging earlier in this chapter.

There are, of course, limits on the potential for strict cost reflectivity. Full cost reflectivity would mean that literally every connection to the water and sewerage system would require a different price to be set. Even if this were manageable (which is highly doubtful), it would significantly increase the costs of collection and would therefore not be in the interests of customers.

It is common in most countries for water charges to reflect the social priorities of governments. Scotland (and even England, where the industry is privatised) is no different. An appropriate degree of cost reflectivity simply means that account is taken of the economic costs of supply in assessing the level of prices.

Making changes to charging structures

There is no easy way to make changes to charging structures. It is understandable that customers who face higher bills might object, while customers who benefit are likely to regard the changes as being long overdue. It is important to recognise that unwinding cross subsidies over time or phasing the removal of discounts can only be achieved if other customers can be persuaded that they should pay more in the interim. The costs of phasing have to be met by other customers.

We believe that it is desirable to avoid sudden increases in bills. One possible alternative to phasing could be to provide significant advance warning that a change in the structure of tariffs will be implemented.

Our remit is to promote the interests of all customers and it is difficult to reconcile this duty with our having to make decisions about whether or not to phase changes in the structure of tariffs. We would very much welcome guidance from Scottish Ministers on how to handle such changes in the structure of tariffs. This seems to us to be essentially a political question.

2.5.2 The Scottish Executive's proposed application of the principles of charging

The proposed application of the principles of charging would appear to be economically sound. It will be vital that we receive clear guidance from Ministers on the outcome of the consultation in this regard in January 2005, so that this guidance can be taken into account when we set prices.

Cross subsidies

It is appropriate that the Scottish Executive should be responsible for taking the decisions about which, if any, customers should benefit from cross subsidies.

We would, however, highlight our analysis of the problem of the affordability of water charges for many households. It would seem likely that a properly targeted scheme could not only help some households to contribute towards the cost of the service they receive, but could also allow those who choose not to pay to be pursued more rigorously. This may reduce the burden of non-payment on other customers.

Household charging

Our analysis of water and sewerage undertakers' costs shows that a significant proportion of these costs are fixed and do not change in line with the volume of water used. There is therefore no obvious economic rationale for the discounts that are currently given to single person households and second homes. It is highly unlikely that single adult occupancy would reduce costs by 25% and the part-time use of a property will certainly not reduce the cost of supply by 50%. We recognise that the existence of such discounts is a matter for the Government, but from an economic perspective we would agree that there is likely to be a better way to target support to vulnerable households than the current system of discounts.

It will, of course, be important to ensure that any alternative mechanism to support vulnerable customers is introduced in parallel with the removal of the single person discount.

Non-household charging

Property drainage: Our analysis would suggest that charging for property drainage relative to its surface area is likely to be more cost reflective. We also agree that the use of 'area bands' would simplify implementation.

The implementation of the area bands may be costly and there may be a risk that customers could seek to position themselves in a lower band in order to try to reduce their bill. Scottish Water should have some form of power to recover unpaid charges (and interest) in the event that a customer does not accurately report their area band.

Roads drainage: There are clear advantages from linking charges associated with roads drainage to property drainage charges. It is not clear, however, that this would be more cost reflective. It will be important that all customers contribute towards the cost of roads drainage, even if their property does not drain to the sewer. Scottish Water would therefore need to collect information about the surface areas of properties that do not drain to sewer.

Unmeasured consumption: It will be important that the level of a small user tariff reflects the full cost of providing a connection (irrespective of the extent of usage). We agree that the system should be as straightforward as possible and would therefore support the proposal to establish only three charging bands. Analysis of the customer base would suggest that there are a number of unmetered customers who are likely to consume significant amounts of water (eg food processing businesses). It is therefore useful that the Scottish Executive proposes to introduce this change only in 2010, as this will ensure that Scottish Water has sufficient time to identify all of the customers that it is appropriate to meter.

Balance between charging and borrowing

We agree with the principles that the Scottish Executive outlined in the consultation. It is clearly not appropriate to borrow to fund current costs.

It is more difficult to establish an appropriate level of borrowing. We agree that borrowing 100% of enhancements to the asset base could lead to significant increases in future prices. We would also have concerns about the financial sustainability of the water industry if it were to borrow 100% of the value of enhancements to the asset base. There would be a risk that the industry could only respond to an operational or legislative shock by an immediate increase in prices. It would also be inappropriate to borrow 100% of the cost of enhancements if the enhancements were not delivered at benchmark efficiency. There is no reason why future customers should contribute towards current inefficiency.

In an asset-intensive utility business, it is important that sufficient resources are allocated to maintaining the assets. It is therefore appropriate that the infrastructure renewals charge should increase in line with inflation to reflect the increased replacement value of the assets. Allowing debt to increase in line with inflation appears to be a sensible option.

We believe that our proposed use of the regulatory capital value method of price setting is fully consistent with the proposals outlined in the consultation. The method is described in Chapter 5.

Funding expansion of public networks

It is important that new customers who join the network make an appropriate contribution to the costs of the service they are to receive. They should not expect existing customers to meet the costs of growth in the network. The charge for joining the network should provide a signal to potential customers about where the costs of joining are high and where they are low. This should ensure that developers will take connection costs into account in prioritising their choice of projects.

2.6 Impact of the consultation on the Strategic Review of Charges 2006-10

The Scottish Executive's consultation *Paying for Water Services* is an important step forward. It raises a number of issues that relate to social and economic policy and seeks views from stakeholders. These are not questions for economic regulation – even if they do have consequences for the level of prices. Non-payment of water charges is an example of such issues. It is clear that issues of affordability of water charges for some customers is leading to non-payment. It would also appear that some customers are able to avoid paying because it can be difficult to make a distinction between those who can and those who cannot afford to pay for their water service. Non-payment increases bills to all other customers.

We welcome the clarity that will come from the Scottish Executive's comments on the responses to the consultation. These will be included in the guidance that we expect to receive from Scottish Ministers in January 2005. We will seek to take full account of this guidance in completing the *Strategic Review of Charges 2006-10*.

In particular, we will use the guidance to finalise our work on tariff baskets. This will ensure that calculating prices to customers is as transparent as possible.

Section 1: Chapter 3

An introduction to depreciation

3.1 Introduction

In Chapter 1, we noted the size and scale of the Scottish water industry. According to Scottish Water's regulatory return in 2003, the replacement cost of our water and sewerage assets is some £32 billion. Clearly, these assets will not all need to be replaced at the same time. Effective asset management can ensure that investment in replacing assets is well targeted.

We must, however, recognise that the effectiveness and value of assets does decline over time, and that this is a cost that should be borne by customers as they receive the benefit from use of the assets. We seek to ensure that the full cost of this benefit is recognised and paid for in charges. The mechanism through which this happens is the depreciation charge.

The water and sewerage industry has two broad types of asset. These are termed infrastructure (essentially the water mains and sewers) and non-infrastructure (treatment plants, offices, vans, computers etc).

3.2 The importance of depreciation

It is important that Scottish Water's depreciation policy reflects the diminishing value of the assets as they wear out. This allows the actual cost of asset use during the year to be reported in Scottish Water's statutory and regulatory accounts. This enables Scottish Water to measure and report its operational performance correctly. An accurate understanding of the cost of asset use is therefore vital to effective price setting.

If an asset costs £10 million and is expected to last for ten years, the annual cost could be said to be £1 million per year. It would be appropriate for customers to contribute £1 million per year through their charges. However, if the asset lasts eight years, the cost will not have been fully recovered from those who received the benefit. Future customers will face both the cost of a new asset and the £2 million of unrecovered cost from the now obsolete asset.

In contrast, if the asset were to last 15 years, future customers (after Year 10) would benefit from the use of an asset that had already been fully paid for.

From a regulatory point of view, therefore, the depreciation policy of the water and sewerage business has to strike a balance between current and future customers. Theoretically the method used to assess depreciation could influence this balance. For example, in determining an appropriate depreciation charge, a company has to assess:

- how long an asset will last (its useful life);
- how depreciation of the asset is calculated; and
- the economic value of the asset.

For the same asset value and same estimated useful life, the annual depreciation costs derived by different depreciation methods can also vary significantly.

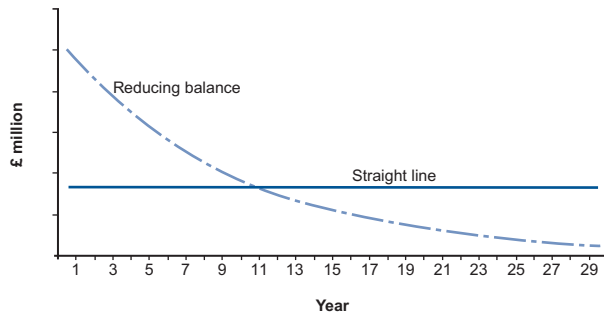
By way of illustration, we can assess the impact on annual costs using two different depreciation methods for an asset that is valued at £100 million and is expected to have a useful life of 30 years.

In the example we use:

- the 'straight line' depreciation method, which spreads the costs of using the asset evenly throughout its life; and
- the 'reducing balance' depreciation method, which assumes that the cost of use is higher in the initial years of the asset life.

The impact on the annual cost of use is illustrated in Figure 3.1. The dotted curve represents the annual depreciation charge of the asset using the reducing balance depreciation method, while the solid line represents the annual depreciation charge using the straight-line depreciation method.

Figure 3.1: Example illustrating the straight line and reducing balance depreciation methods



There is clearly a significant difference in the annual cost of use for this single asset using the two different methods. The cost of use in the first year is regarded as more than three times higher in the reducing balance method of depreciation than in the straight line method.

The water and sewerage industry has very many assets, and new assets are being built each year. The range of asset types and ages will tend to smooth out the impact of the choice of depreciation method. This is known as the portfolio effect. For example, if the water services provider had 30 of the treatment works in the example and one had been built each year, the annual cost of use (or depreciation charge) would have been the same whether the company had chosen to use the straight line or the declining balance depreciation methods.

Since Scottish Water has nearly 400 water treatment works and 1,900 waste water treatment works, the portfolio effect should minimise the risk that the method of depreciation chosen for an individual asset might have a significant impact on the total depreciation charge for Scottish Water. As this is the case, regulators can concern themselves principally about estimates of useful life and the value of assets.

3.3 Infrastructure renewals accounting

Assessing the annual cost of use of the infrastructure is more problematic. This is because infrastructure assets such as sewers and water mains usually have very long lives and these lives are particularly difficult to assess accurately. Moreover, there are plastic, cast iron and

asbestos water pipes and the type of construction determines the useful life of the water main. The position is further complicated by the fact that these different types of construction are interconnected throughout the network. The result is that even in a single area there will be a range of newer and older pipes, a range of construction materials and a range of ground conditions. It is therefore not realistic or meaningful to assess an average life. For that reason we rely on the portfolio effect and treat the whole infrastructure network as a single system. The complete asset will never become obsolete or require replacement at any one time; instead, it is replaced in parts as different elements come to the end of their useful lives.

Traditional methods of depreciation, therefore, do not work. This issue has been recognised by the water and sewerage industry for some time. To overcome the problem, the industry has introduced infrastructure renewals accounting.

Under infrastructure renewals accounting, an infrastructure renewal charge is charged to a company's revenue each year. The infrastructure renewal charge is calculated as the average of the forecast capital expenditure on the infrastructure assets required to maintain the infrastructure assets in perpetuity without any loss of value over the coming 15 to 20 years.

When setting the price limit for Scottish Water, we will include the infrastructure renewal charge. The annual infrastructure renewal charge eliminates the need for prices to vary in line with the actual spending on infrastructure in any particular year.

3.4 Assessing the depreciation charge

Establishing the appropriate depreciation charge for an asset involves three critical elements:

1. **Estimating the asset's useful life.** This is the expected number of years that an asset will last. The estimated useful life of an asset in the water industry can range from a few years to several decades.

Determining the estimated useful life of an asset is not an exact science and is often based on an engineering judgement. Most organisations are able to draw on benchmarks from within their own industries and this provides a degree of consistency.

Scottish Water's assets are classified into five categories for the purposes of depreciation:

- very short (assets having a life of up to five years);
 - short (assets having a life of six to 15 years);
 - medium (assets having a life of 16 to 30 years);
 - medium/long (assets having a life of 31 to 50 years); and
 - long (assets having a life exceeding 50 years).
A similar classification is used by Ofwat and the companies in England and Wales.
2. **Depreciation method.** The most commonly used depreciation methods, straight line and reducing balance, have been outlined above. The depreciation method chosen should be able to simulate the pattern of 'economic consumption' of the asset. This pattern is not always obvious. In the example of a typical car, it is generally understood that depreciation is very high in the initial years, levels off in the middle years then falls again as it nears the end of its life. The pattern of depreciation is more difficult to assess if the extent of use of the asset can materially affect its lifespan in years.

The actual economic value consumed in each year of an asset's life in the water industry is, as we have discussed, difficult to determine. However, the UK's Accounting Standards Board notes that the straight line depreciation method should be used when the pattern of consumption of the economic benefit of an asset is uncertain¹.

We understand that all water companies in Britain, including Scottish Water, are currently using straight line depreciation.

3. **Asset valuation.** There are two principal ways to value a fixed asset – current cost valuation and historical cost valuation. Current cost keeps revaluing the asset to take account of the current price of replacing the asset. Historical cost simply considers the acquisition cost of the asset to be its value throughout its life. The method chosen has a significant impact when assessing depreciation. A number of important factors should be considered when choosing between the two methods, and we discuss them in detail next.

3.5 Current cost accounting

In 1986, the Byatt Report² suggested that current cost accounting should be used to measure the economic costs of nationalised industries. The economic value to customers of a service provided by assets in the utility sector (with their extended lives) would be more accurately captured using current cost accounting. The fixed assets of the privatised utilities are generally reported on a current cost accounting basis in their regulatory accounts.

Although historic cost accounting is the most widely used approach in business, we do not consider that it is appropriate to price setting in the water industry. We agree with the Byatt Report that it would tend to understate, possibly significantly, the cost of replacing assets. This could mean that future customers are unduly penalised.

There is no single definition of the term 'current cost accounting'. However, it principally involves establishing the current value of the asset to the business. The current value of the asset to the business can be obtained through one of the following three ways:

- the modern equivalent asset value ('MEA value');

¹ Financial Reporting Standard 15.

² Byatt Report: *Accounting for Economic Costs and Charging prices* - Report published by HMSO in 1986

- the net realisable value of the fixed asset ('NRV'); or
- indexation.

Usually, the MEA value and NRV of an asset are compared and the higher value is taken to be the current value of the asset.

3.5.1 MEA valuation

Ofwat defines the gross MEA value as representing the cost to replace an old asset with a technically up-to-date new asset with the same service capability, allowing for any difference both in the quality of the output and in operating costs. Net MEA value is the gross MEA value net of accumulated depreciation³.

MEA valuation is most suited for industries that use long-lived assets where the technology behind these assets is steadily evolving. In such industries, using the acquisition cost of the asset could inflate its value as, through time, technology advancements will provide lower cost and higher quality solutions.

3.5.2 Net realisable value (NRV)

If the proceeds obtained through disposing of the asset is higher than the MEA value, the NRV should be used to value the asset. This is because disposing of the asset could realise a higher value than retaining it. In the vast majority of cases, the MEA value will be higher than the NRV for operational assets.

3.5.3 Indexation

Indexation is another way to align the value of the asset to its current value. Under an indexation approach, a price index which is believed to simulate the price trend of the asset is used to obtain a current value. This approach differs from MEA valuation as it is linked to the historical cost of the asset.

In practice, it can be difficult to determine a suitable index. As the assets of a water company, such as reservoirs, pipes and treatment plant are very specific to

the industry, the price trend may be very different to global indexes such as the retail price index (RPI). More specific indexes, such as the cost of construction goods, may more accurately reflect the trend in industry prices but can be heavily influenced by price trends in other sectors such as the housing market.

More importantly, indexation cannot take the impact of innovation into account. This is likely to result in an inflated asset value. The result would be an inflated depreciation charge and increased prices for customers.

3.6 Valuing Scottish Water's assets for the purposes of depreciation

We have discussed two alternative approaches to asset valuation:

- current cost accounting using MEA valuation, and
- current cost accounting using indexation.

We believe that current cost accounting using the MEA valuation for a fixed asset (or NRV in the case that the asset's NRV is higher than its MEA value) is the most appropriate for regulatory purposes. This approach ensures that:

- customers bear reasonable costs for the assets,
- Scottish Water is fairly remunerated for its capital expenditure; and
- Scottish Water is provided with the incentive to invest in new technology and more cost-effective assets.

We recognise that MEA valuation involves a higher degree of subjectivity than either historical cost accounting or indexation. Nevertheless, the MEA approach appears to provide a far more realistic, and forward-looking estimate of asset value.

³ Ofwat, RAG 1.03, published January 2003.

We also consider that the current methodology for assessing the useful life of assets, involving classifying them into one of five different categories, remains appropriate.

With regard to the method of depreciation, our proposed methodology for the forthcoming Strategic Review of Charges is to retain the existing straight line depreciation approach. This approach is:

- consistent with Ofwat's approach in England and Wales;
- appropriate for long life assets; and
- consistent with Accounting Standard FRS15, which states that, when the pattern of consumption of economic benefits is uncertain, the straight line method should be adopted.

3.7 Alternative methods of depreciation

We have reviewed other potential methods of depreciation. In a consultation paper in March 2002⁴, Ofwat outlined three alternative approaches to depreciation, namely:

- the renewals accounting approach;
- the economic depreciation approach; and
- basing the depreciation charge on the regulatory capital value (RCV).

3.7.1 Renewals accounting approach

It would be possible to introduce a renewal charge, similar to the infrastructure renewal charge for non-infrastructure assets. The Office of the Rail Regulator (ORR) adopts such an approach. The rail regulator adopted a pay-as-you-go approach to renewal expenditure when it reviewed Railtrack's access charges. This means that Railtrack does not need to assess the value of its asset base for the purpose of calculating depreciation.

Instead, it makes an accounting charge based (as with the water industry's infrastructure) on projected future capital expenditure. This is included in the track access charge calculation. In this way, the capital expenditure projected by ORR forms part of the revenue requirement and customers pay for actual expenditure. Under this approach, the RCV remains constant unless the rail network is enhanced or reduced.

Ofwat considered that such an approach would be undesirable for the water industry for the following reasons:

- It deviates from the practice in statutory accounting. As a result, the water companies' regulatory accounts would diverge further from their statutory accounts; and
- The network maintenance expenditure in the water industry fluctuates significantly. By applying a pay-as-you-go approach, customers' bills could be subject to greater volatility. In order to rectify the volatility caused by the pay-as-you-go approach, it would be possible to use a periodic average, although it could be difficult to choose an appropriate period.

We agree with Ofwat's concerns. We would also add that a renewals accounting approach might encourage Scottish Water to be less pro-active in managing its assets.

3.7.2 Economic depreciation approach

Economic depreciation is the present value of the change in economic value (cash flow generated) of an asset from one period to the next. This change provides a measure of asset consumption.

Economic depreciation is similar to the methodology used in some production industries. In these industries, the total number of units that a machine can produce over its lifetime is estimated. The machine is then depreciated according to the number of units produced in each accounting period. Both economic depreciation

⁴ Ofwat (March 2002), 'The approach to depreciation for the periodic review 2004 – A consultation paper'.

and production unit depreciation assume that the decline in value of an asset is proportional to its output or cash flow generated. However, unlike production unit depreciation, economic depreciation is very difficult to calculate accurately. While it would be theoretically desirable, the difficulty of measuring economic depreciation has to count heavily against its use in practice.

We do, however, need to ensure that the depreciation charge is not wholly at variance with the economic depreciation. The 'broad equivalence' test that we describe in Chapter 10 is useful in this regard.

3.7.3 Using the RCV as the basis of the depreciation charge

OFGEM bases the depreciation of the electricity distribution and transmission networks on its respective RCV. Using the RCV as the value to be depreciated has the advantage that the methodology is transparent and well understood. This avoids some of the subjectivity in valuing assets.

In its 2002 consultation paper, Ofwat commented that it could not use the RCV as the basis for depreciation for the water industry in England and Wales because of the huge gap between the RCV and the market value of assets at privatisation. At that time, the net MEA value of the assets was around 15 times greater than the RCV. Although the gap has subsequently narrowed down to around six times, it is still significant. In these circumstances, depreciation based on the RCV may significantly underestimate the economic depletion of the assets.

Another concern raised by Ofwat is that the depreciation charges based on an RCV approach may not correctly reflect the replacement cost of the assets and hence the value consumed in delivering water supply and sewerage services.

Although the issue of the privatised value of the assets does not arise in Scotland, the huge gap between the RCV and the assessed asset value in England and

Wales does indicate that the two measures differ significantly in the water industry. This suggests that an RCV approach to depreciation is not appropriate in the water industry.

3.8 Summary

Apart from freehold land, any asset has a limited life and over time loses value. The depreciation charge is a way to account for this loss of value in the company's accounts. The method chosen determines the impact of Scottish Water's capital investment programme on customers' bills. It is therefore important that careful consideration is given to the choice of depreciation policy.

Our proposal for the *Strategic Review of Charges 2006-10* is to:

- use a five step classification of asset life, ranging from very short to long;
- assume straight line depreciation over the life of the asset; and
- establish the economic value of the asset on the basis of an MEA valuation.

This methodology is consistent with that used for the water industry in England and Wales and in most other utilities. We also believe that this approach provides customers with the most reliable method of assessing the value of the asset base and an equitable balance between costs incurred by current and future generations.

3.9 Questions for consultation

1. Is the proposed approach to depreciation for the *Strategic Review of Charges 2006-10* appropriate? In particular:
2. Is the proposed method of determining asset life, through a five stage classification from 'very short' to 'long', adequate?

3. Is straight line depreciation the most appropriate mechanism for assessing the annual reduction in value of Scottish Water's assets?
4. Does the proposed use of MEA valuation provide a suitable method for estimating the economic value of Scottish Water's assets or would other methods give a better estimation?

Section 1: Chapter 4

Managing risk in the public sector

4.1 Introduction

Risk management is the process of identifying risks, evaluating their potential consequences and determining the most effective methods of controlling them or responding to them. Although water and sewerage businesses are in large part natural monopolies, they are still exposed to risk in several areas. There are the risks that operational, legal or asset issues could affect their compliance with public health or environmental standards, and there is the risk that they are unable to access capital on a sustainable basis.

There is the potential for customers of utility businesses to be exposed to these risks. The price they pay, and the level of service they receive, depend on factors that cannot always be predicted with accuracy, and therefore cannot always be fully taken into account in a regulatory settlement.

In carrying out our *Strategic Review of Charges 2006-10*, we need to understand both the potential financial risks and customers' exposure to them. We can then ensure that the price caps we set for Scottish Water are appropriate and that they minimise the potential financial risks for customers.

This chapter begins by looking at the ways in which customers' exposure to risk depends on the framework within which the water and sewerage service is provided. We describe how we dealt with risk in the last Strategic Review and discuss the issues that have arisen since then. We conclude with our proposals for managing and analysing risk in the forthcoming Strategic Review.

4.2 Customers' exposure to financial risk

4.2.1 Managing financial risk in the private and public sectors

The purpose of regulation is to seek to ensure that monopoly businesses act in the customer interest. In the

private sector, the regulator seeks to establish a balance between the interests of customers and those of finance providers. In doing so, it is the regulator's duty to ensure that an efficient business can fund its operations. Nonetheless, it is left to owners of the privatised business to ensure that management meets or exceeds the targets set by the regulator. Such outperformance is the only way to ensure that the owners of the business will receive a higher return on their investment.

In the public sector, the regulator focuses on ensuring that customers receive a value for money service, and on the delivery of environmental, public health and government policy objectives. These objectives apply over the short, medium and long term.

In both the public and private sectors, economic regulators seek to establish a tight budgetary constraint on the regulated body. In other words, clear statements are made about the outcomes for customers that the body must deliver and about the amount of money that can be spent. This can be achieved by fixing the maximum return available (unless targets are beaten) or by limiting the total cash funds that may be consumed.

The tight budgetary constraint should help to focus management attention on delivering ongoing improvements in value for money to customers. This also explains why regulators publish periodic assessments of the financial performance of the companies or organisations they regulate. Of course, regulators also monitor the outcomes for customers very carefully. It is not in customers' interests if budgetary pressures result in corners being cut either in customer service or in the way the asset base is maintained. As with financial performance, regulators publish information on performance in customer service and delivering investment.

4.2.2 The cost of capital in the public sector

If a public sector organisation can match the level of efficiency of investment and service delivery that is

achieved by the private sector, customers of that public sector supplier could expect sustainably lower prices than would ever be offered by the private sector. This is because the public sector is consistently able to access a lower cost of capital.

There can be no doubt that Scottish Water's customers benefit significantly from access to attractive terms for public government loans. These government loans attract interest rates that are lower than the cost of commercial debt of similar term length for a water and sewerage company in England and Wales. Moreover, such relatively expensive private debt is considerably cheaper than equity.

Although direct comparisons with private water companies can be difficult because of differences between private and public sector financing, a comparison with Ofwat's allowed cost of capital is illustrative.

Ofwat's allowed cost of capital for the period 2000-05 (which assumed a 50-50 split between debt and equity) is 4.75% real¹ post-tax for the water and sewerage companies. Ofwat's proposed cost of capital for the 2006-10 period is 5.1% real post-tax. Government loans to Scottish Water since April 2002 attracted interest rates of between 3.3% and 4.9%. The weighted average interest rate for new loans taken out by Scottish Water in 2002-03 was 4.08%. This would be equivalent to 2.86% post-tax, or approximately 1.5% real, post-tax.

We estimate that Scottish Water's customers probably benefit by around £44 million per year, because of an approximate 2% saving on the annual cost of capital. We have calculated this on the basis of current total borrowing of approximately £2.2 billion.

However, it is important to note that this cost benefit will only be truly realised by customers if they are not exposed to operational risks and if the service is delivered efficiently.

4.2.3 Other differences in financial risk

Private sector companies have private equity shareholders, who want a return on their investment. They can maximise their return by performing better than the targets set by the regulator. This creates an important incentive to outperform efficiency targets. The regulator will ensure that customers will benefit from this improved efficiency in the next regulatory period. Additionally, hard budgetary constraints apply a degree of financial discipline to the business.

External shocks can have a significant impact on a company's operations and finances. A good example of this is the drought in summer 1995, and its impact on Yorkshire Water. Reservoir levels dropped to such an extent that the company was forced to transport water by road tankers to areas of need over a period of four months, at a cost of £50 million. A further £100 million was spent on improving the pipeline network to allow better transfer of water around the county and to improve security of supplies. In addition, a price rebate was also imposed by Ofwat to compensate customers for the deterioration in service they had experienced. All of these unexpected costs had to be absorbed by shareholders of Yorkshire Water.

The windfall tax is another example of a shock. This was a specific, one-off tax, introduced in the Government's Budget of July 1997. The tax was applied on the profits made by the privatised utility companies, such as British Gas and British Telecom, in their first four years in the private sector. The tax was based on the notion that owners of the privatised utility companies had received an unexpectedly high return, or windfall return, on their investment.

In the event of such a shock or underperformance by the business (whether caused by management or external operational factors) a private utility can:

- withhold dividend payments to shareholders;
- seek a rights issue; and

¹ 'Real' means after account is taken of inflation.

- obtain debt in the private markets.

Private utilities do not have the easy option of increasing charges to customers. The presence of private equity acts as a significant shock absorber, which protects customers of the water companies in England and Wales. Furthermore, prices set by Ofwat will not normally be influenced by a change in borrowing by an individual company.

The private sector benefits from a further level of risk management that benefits customers. Strong incentives to management and employees help to reduce customers' exposure to financial risk. The commercial interests of the company are served by ensuring that management are provided with appropriate incentives to take action to minimise the impact of external shocks on the business.

4.2.4 The Glas Cymru model

It is not necessary to adopt a private sector model in order to manage financial risk. Welsh Water, for example, has established a structure that protects customers from financial risk, without a traditional shareholder acting as a 'shock absorber'.

Glas Cymru is a not-for-profit company limited by guarantee which is wholly debt financed. It purchased the assets of Welsh Water for 95% of its Regulatory Capital Value. Glas Cymru has no shareholders.

The reduced purchase price, the clear ring-fence on activities, and transparent incentives which are published in advance have all contributed to a lower cost of capital. Glas Cymru is believed to have one of the lowest costs of capital in the water industry south of the border. It has no equity finance and its average cost of debt is approximately 6.8%. This is equivalent to 4.76% post-tax. The actual real post-tax cost of capital for Glas Cymru is therefore under 3%.

Budgetary constraints are still tight and debt provided by private banks is at risk if there is an unforeseen shock. However, customers are protected because the banks are committed in advance to making additional funds available if there is such a shock (although there are likely to be governance implications for the organisation). If there is an unforeseen shock, which could have been avoided or limited through proper management, customers will not suffer because Ofwat is under no obligation to increase the cash value of the return on capital allowed to Welsh Water.

4.2.5 Managing financial risk for Scottish Water

Scottish Water's customers are potentially more directly and immediately exposed to the financial risks of the water and sewerage business than customers in England and Wales because it has no private equity shareholders to cushion shocks.

In the event of an external shock or underperformance, Scottish Water must either:

- seek unplanned public expenditure in the form of a loan; or
- increase charges to customers immediately.

If Scottish Water is required to make additional expenditure as a result of an external shock, this would mean either that public expenditure is immediately redirected, or that there is an immediate increase in customer charges.

Customers are particularly exposed to any shortfall in Scottish Water's performance against targets. This is because there are no transparent incentives to perform and its budgetary constraints are not truly tight, given that Scottish Water can seek to use contingency margins within public expenditure limits.

Although the ease with which borrowing can be accessed may reduce exposure in the short term, customers would have to pay higher prices in the longer term. Borrowing more can only delay the impact of underperformance on customers. Moreover, easier access to debt may increase the likelihood of underperformance. And in the end, underperformance against efficiency targets will inevitably lead to higher than necessary bills for customers. This is because customers will have to pay the interest costs of extra borrowing.

We believe that Scottish Water's customers are entitled to a similar level of protection from shocks as customers south of the border. We therefore propose to set prices on the assumption that Scottish Water has achieved both its operating and capital efficiency targets and has delivered the capital programme in full. We propose to make adjustments to reflect any shortfall in performance in order to ensure that customers are not disadvantaged.

The risk to customers could also be mitigated if greater access to debt required financial discipline. We have commissioned advice from the investment bank ING Barings to examine how the disciplines and controls on access to debt operate in the private sector, and what aspects could be applied in the public sector. Its report will be published with Volume 4 of our series of methodology publications.

Clearly, Scottish Water should be able to recover any legitimate, unexpected costs in order to ensure its financial sustainability, and this is discussed in further detail in Chapters 6-10.

4.3 Strategic Review of Charges 2002-06

4.3.1 Our risk analysis

In the commissioning letter for the *Strategic Review of Charges 2002-06*, Scottish Ministers recognised that the

water industry in Scotland faced uncertainties and challenges during the regulatory period. Ministers were concerned that these uncertainties could lead to a call on public expenditure that would be higher than had been budgeted for. Consequently, they asked us to carry out a formal risk analysis to show how agreed outputs could be met within both the proposed revenue cap and the absolute public expenditure limits.

Our analysis focused on the likelihood of Scottish Water failing to comply with the resource accounting budget (the public expenditure constraint) allowed by the Scottish Executive. (Wider issues relating to resource accounting were discussed in Chapter 4 of Volume 2 of our methodology.)

The risk analysis was important because it provided a higher level of confidence in the financial projections contained in the Review than a simple sensitivity analysis. This analysis allowed us to take account of all of the major risk factors at the same time, including their interdependencies.

In particular, we quantified the chances that underperformance or outperformance of our efficiency targets for operating and capital expenditure might cause Scottish Water to exceed the public expenditure constraint set in the commissioning letter.

We could have quantified the risk to customers' bills or delays to the investment programme in the same way, but these were effectively different manifestations of the same risk – the risk that the public expenditure constraint would be breached. Our analysis, therefore, attempted to determine, as objectively as possible, the degree of this risk.

To complete the risk analysis we used a technique known as Monte Carlo simulation². Using proprietary risk analysis software, we examined all possible outcomes arising from a given set of uncertainties and assigned probabilities to those outcomes. The analysis

² <http://decisioneering.com/monte-carlo-simulation.html>

went beyond normal scenario analysis, where interdependencies cannot be explicitly modelled, and therefore gave us greater confidence in our financial projections.

We carried out the risk analysis separately for each of the former three water authorities and for the then proposed Scottish Water. Our analysis for the three authorities was based on a single scenario for progress towards meeting our efficiency targets. This scenario covered the potential range of outcomes that we regarded as plausible.

We defined three mutually exclusive scenarios to cover Scottish Water's progress towards our efficiency targets for operating expenditure and capital expenditure.

Scenario A

In this scenario, we assumed that the degree of efficiency achieved was unpredictable, and that a wide range of outcomes could occur. This would happen because key success factors were not fully addressed. We believed that under this scenario it was unlikely that the proposed targets would be approached, and that there was a slight possibility that the recent decline in performance of the three authorities would continue. Broadly, we expected Scottish Water to make more progress against the capital efficiency target than the operating efficiency target. We believed that the target for operating cost was more dependent on successfully transforming the organisation.

Scenario B

In this scenario we assumed that Scottish Water addressed its key management issues. We also assumed that this was done quickly and that it was a direct result of the creation of Scottish Water from the three existing authorities.

Under this scenario, we believed that the likely closure of the efficiency gap was much more predictable. We

considered that, given the conservative assessment of the targets, management should have been able to achieve the targets with a margin to spare and that significant underperformance or outperformance of the targets was unlikely. Our analysis had shown that the water and sewerage companies in England and Wales had a very consistent record of performance. We could not see any reason why this should not be repeated in Scotland.

The worst case in this scenario was broadly similar to the level of efficiency of the underperforming Welsh Water at the 1999 periodic review. The best case was broadly equivalent to the achievement of the leading company in England and Wales by 1998-99. We noted that the management of Scottish Water had a significant advantage in that it could learn from the experience of the privatised companies.

Scenario C

In this scenario, we considered a range of outcomes where Scottish Water had addressed its key management issues. We also assumed that this was done quickly.

Scenario C differed from Scenario B in that Scottish Water would show a commitment to market testing each major area of cost, either on a local or a more global basis. This did not mean that the organisation inevitably opted to contract out its activities. It simply meant that it could be confident on an ongoing basis that it was delivering each activity as cost effectively as possible.

As an example, Wessex Water has successfully achieved a very high degree of efficiency by encouraging a partnership approach between management and workers. Welsh Water has latterly achieved a similar effect by contracting out its operations. The successful solution for Scottish Water would take into full account the expectations of customers, workers, managers and the unions.

In our view, this scenario was capable of providing efficiencies that were at the leading edge for the UK. We believed that the attractiveness of the Scottish market to potential contractors would encourage very competitive pricing of any contracts. Even in the worst case, this scenario was very unlikely to fail to deliver the proposed efficiency target, because this would have implied that market prices for activities would have been well above the norm in England and Wales. There was no empirical evidence to support this.

We regarded Scenarios A, B and C as being mutually exclusive, because we believed that the creation of Scottish Water would be a catalyst for change. The extent of that change could be marginal (Scenario A), significant (Scenario B) or leading edge (Scenario C). We did not believe that it was realistic to assume that the organisational change required to deliver the capital efficiency target would be achieved, while that required to achieve the operating cost target would not. It also did not seem likely that, beyond the variations of the range of outcomes, these organisational issues would be only partially addressed. This meant that each scenario produced results that were distinct and different from one another.

In each of these scenarios, we found no compelling reason to suppose that the risk profiles should be skewed either way. We believed, therefore, that a 'normal' distribution was most appropriate. We quantified the risk profiles for each of these scenarios, as shown in Table 4.1:

Table 4.1: Assumed mean and standard deviation of risk profiles for operating and capital efficiencies

	Profile A	Profile B	Profile C
Distribution	Normal	Normal	Normal
Mean closure of operating expenditure efficiency gap	20%	85%	105%
Mean closure of capital expenditure efficiency gap	40%	85%	105%
Standard deviation	20	7.5	5

These profiles are illustrated in figures 4.1 and 4.2.

Figure 4.1: Risk profiles for operating expenditure

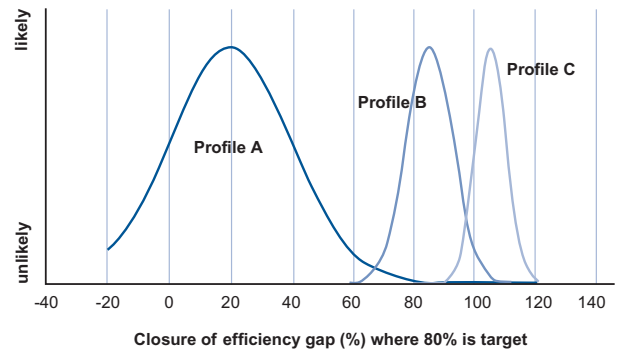
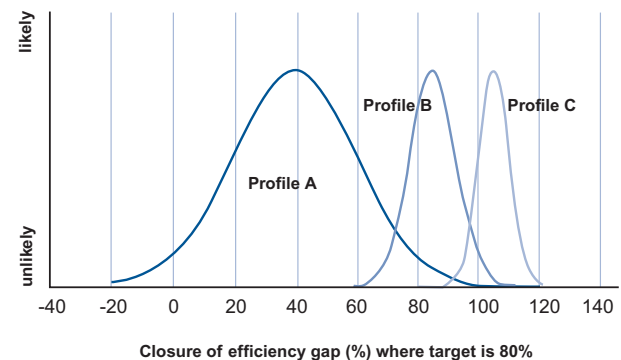


Figure 4.2: Risk profiles for capital expenditure



Our assumptions about the scenarios, and their risk profiles, covered a very wide range of possible outcomes. This is clearly demonstrated in the above figures. Furthermore, the risk analysis considered several profile combinations, considering first each efficiency target separately and second both targets together, assuming they were dependent and then independent. We were therefore confident that we had covered the plausible scope for uncertainty in the *Strategic Review of Charges 2002-06*.

Apart from the risks concerning the extent to which Scottish Water would meet its efficiency targets, we also needed to consider the risks in relation to the speed with which targets were addressed. Thus, we examined the potential impact on compliance with public expenditure budgets of a delay in achieving the targets.

In carrying out our analysis we made many assumptions. These are documented in full in the *Strategic Review of Charges 2002-06*.

- The most material of these, in terms of their impact on the financial results, were the efficiency targets;
- Our assumptions on depreciation, inflation and potential merger savings were also material, but of a lower order, and were therefore not analysed in such detail; and
- Our assumption on depreciation had a potential impact on the performance of Scottish Water in relation to its resource budget. However, we considered this to be a risk that the management and board of Scottish Water could control.

Our assumption of capital expenditure inflation was lower than the Retail Price Index (RPI). The impact of capital expenditure inflation increasing to RPI was approximately £25 million by the final year of the regulatory period. This is significant, but was not material relative to the other risks. We believed that the inflation rate for capital expenditure in Scotland was likely to continue to run below the UK average and that our estimate would be broadly correct. We also considered that the conservative assumptions made in assessing the efficiency targets were likely to lead to a far more variable outcome. The total inflation rate risk was broadly equivalent to a 5% improvement/shortfall in efficiency.

- We noted clearly that the success of Scottish Water would depend upon considerable cultural changes within the organisation. The organisation needed to understand that it would operate in a commercial and competitive world and should identify and influence those factors that would determine its ultimate success. This included issues of governance and incentives.

We also recommended that Scottish Water's management should identify key performance indicators to reflect the principal drivers of the business. We made it clear that Scottish Water would have to be fully accountable to its customers and to set tariffs that were broadly reflective of the costs incurred.

4.3.2 Outcome of risk analysis

Our risk analysis allowed us to quantify both the likely use of public expenditure and the risk of exceeding the public expenditure limits. The results showed clearly the importance of a concerted effort by the management of Scottish Water to develop a more commercial organisation.

In Scenario A there was a very high chance that the public expenditure constraint would be breached. Even in the first year, there was a 90% chance that the limit would be breached. This likelihood was greater than 99% in 2004-05. There was a 5% chance that the shortfall could exceed £330 million in 2005-06. Obviously this risk could have been reduced if either the revenue required from customers had been raised or more debt had been made available.

In Scenario B the range of possible outcomes was considerably more encouraging. In 2004-05 there was only a 2% chance that the public expenditure limit would be breached. This risk was negligible for the other years. We believed that this was a manageable risk if Scottish Water delivered on its potential. Given the catalyst for better performance that Scottish Water's creation presented, we believed that Scenario B represented a more likely range of outcomes.

The Scenario C results were excellent. The chances of exceeding the public expenditure constraint in each year were negligible, at less than 0.1% for all cases.

Under the former three water authority model our risk analysis showed that there existed a real possibility that

public expenditure constraints would be breached. The chances of the public expenditure constraint being exceeded were 31% for East of Scotland Water Authority (2003-04), 35% for North of Scotland Water Authority (2002-03) and 37% for West of Scotland Water Authority (2004-05).

We analysed the impact of delays in achieving efficiency targets. The results of the analysis showed that it was imperative for Scottish Water to give utmost priority to achieving the targets. A delay of one year would have resulted in a budget shortfall of almost £90 million in 2002-03. In the event of a two-year delay, the budget shortfall would have been more than £150 million in 2003-04.

The main findings of the risk analysis are summarised in Table 4.2. For simplicity we only consider operating cost efficiencies and capital cost efficiencies combined, either dependently or independently.

Table 4.2: Summary of risk analysis on public expenditure budget

	Most likely margin	Period	% chance of exceeding public expenditure constraint	Period
Profile A				
Best case	(£45m)	2002-03	90%	2002-03
Worst case	(£185m)	2005-06	>99.9%	2004-05
Profile B				
Best case	£96m	2005-06	<0.1%	Many
Worst case	£55m	2004-05	2%	2004-05
Profile C				
Best case	£213m	2005-06	<0.1%	Every
Worst case	£97m	2002-03	<0.1%	Every
Three authorities model – East of Scotland Water Authority				
Best case	£29m	2004-05	0.8%	2002-03
Worst case	£9m	2003-04	31%	2003-04
Three authorities model – North of Scotland Water Authority				
Best case	£22m	2005-06	14%	2005-06
Worst case	£8m	2002-03	35%	2002-03
Three authorities model – West of Scotland Water Authority				
Best case	£34m	2002-03	5%	2002-03
Worst case	£12m	2003-04	37%	2004-05

4.4 The appropriate balance between revenue and debt

It is in the interests of customers that the water industry is financially sustainable over the medium and long term. When assessing the revenue cap and completing risk analysis, we wanted to be sure that our proposed revenue caps did not simply delay current problems for another day. We were concerned to protect the interests of both present and future customers.

Any business could, at least in theory, borrow more cash in order to cover any or all of its costs. However, any borrowings will need to be repaid, with interest, from future revenues. In other words, continuing to borrow to cover current costs will mean that revenues have to increase to meet the interest charges on the borrowing. If the underlying revenue is not sufficient to cover the ongoing operational and maintenance expenditure faced by Scottish Water, borrowing is only delaying and worsening the charge levels that future generations face.

It is difficult to make direct comparisons of financial ratios with the privatised companies in England and Wales. There are several reasons for this.

- The existence of equity makes calculation of total financing costs more difficult and it tends to mitigate the risks faced by customers;
- A clear distinction is made in England and Wales between core and non-core activities (which at present is not made in the Scottish water industry);
- There are public/private partnership contracts in Scotland (which do not exist for the industry south of the border); and
- The industry in England and Wales had made more progress towards meeting improved environmental and public health standards.

In its assessment of the impact of its 1999 price determinations on the financeability of the water industry for the period 2000-05, Ofwat used the following ratios³:

1. Historical cost interest cover	Min 2x
2. Average gearing 2000-05 (D/D+E)	45-55%
3. Cash interest cover (EBITDA basis)	Min 3x
4. Cash interest cover (EBIDA basis)	Min 2x
5. Debt payback period (EBITDA basis)	Max 5 years
6. Debt payback period (EBDA) basis	Max 7 years
7. Cashflow to capex ratio (EBDA basis)	Min 40%

We believed that it was appropriate to use the two debt payback ratios in the public sector industry in Scotland. It was clear that the level of outstanding debt in Scotland (relative to revenue) was higher than was desirable. We could not allow the financial position of the Scottish water industry to worsen further without this posing additional risks for customers.

For monitoring purposes we considered that the ratio of free cash flow (defined as operating cash flow less maintenance investment expenditure) to interest payable was appropriate. We thought that this would be more immediately comprehensible than earnings before depreciation and amortisation.

In the *Strategic Review of Charges 2002-06* we set a long-term goal of a ratio of free cash flow to interest of 1.5. We regarded this as an ideal ratio, as at this level a business with a highly predictable cash flow (such as a utility) should be able to withstand any operational or legislative shocks. However, in the short term our target was to deliver a ratio of 1.0 by 2005-06. This would mean that, were Scottish Water to meet all of its

efficiency targets in full and deliver its investment programme on time, then by 2005-06 it would have had just sufficient cash to cover its interest payments. It would also have broadly complied with the two relevant Ofwat ratios.

It is important to understand that the purpose of a long-term move towards interest cover ratios above 1.0 would be to provide Scottish Water with financial resources in the event of an unexpected additional cost. In the case of Scottish Water, the only alternative to the financial protection offered by high interest cover ratios would be for there to be sufficient flexibility in public spending to cover unexpected costs as and when they arise. However, the Minister's commissioning letter pointed out that the public expenditure figures represented "absolute limits, and not targets".

4.5 Proposed approach to managing risk for the Strategic Review of Charges 2006-10

We are proposing to adopt the following approaches to managing risk at the 2006-10 Review. They appear to offer significant benefits for customers, while allowing Scottish Water to manage its business.

4.5.1 Adopt the regulatory capital value approach to price setting

We begin a detailed discussion of this approach in the next chapter. Adopting the Regulatory Capital Value approach to price setting will have four major benefits:

- It will give customers greater protection against external shocks and underperformance;
- It will protect customers from long-term price increases in the event that Scottish Water decides to undertake more borrowing than is assumed in price limits;

³ D/D+E – Debt/Debt + Equity, EBITDA – Earnings before interest, tax, depreciation and amortisation, EBDA – Earnings before depreciation and amortisation.

- It could provide a basis for incentives to management that would be transparent, published in advance and objectively measurable. These incentives should encourage management to deliver the efficiency targets, thus protecting customers; and
- It would allow us to compare financial ratios on a like-for-like basis with other regulated utilities, and so provide a better indication of financial sustainability. This method of price setting protects customers from paying for underperformance.

4.5.2 Introduce effective controls on access to borrowing

Ease of access to debt may increase the likelihood of underperformance and reduce incentives to achieve efficiency targets on time.

It must be remembered that the higher the debt relative to revenue, the greater the risk for future customers. This includes a risk of higher prices. A strengthened regulatory regime and improved transparency in the way that public expenditure is made available to Scottish Water would help to ensure that customers receive better value for money on a sustainable basis.

ING Baring's report, referred to above, will inform our proposals for more effective controls on access to borrowing. We will publish this report in Volume 4 of our methodology consultation.

4.5.3 Extend our risk analysis to include financial indicators

We propose to extend the risk analysis that we published in the *Strategic Review of Charges 2002-06*, to include not only public expenditure limits but also the financial ratios that we target in our financial model. We provide more information on these ratios and the financial model in Chapter 7. We propose to use Monte Carlo analysis techniques to examine all of the possible outcomes arising from a given set of uncertainties.

We will begin our assessment of risk by considering the range of possible outcomes on the performance against the efficiency targets. We will seek to adopt appropriate evidence based on profiles of risk. For each profile we will determine a most likely outcome, in terms of present closure of the efficiency gap, and a likely range of uncertainty around that figure. We will express these in the form of a mean and standard deviation of a normal statistical distribution.

Our analysis will allow us to answer questions such as the following:

- How might the debt to RCV ratio change if Scottish Water fails to meet efficiency targets?
- By how much does the debt payback ratio decrease if Scottish Water beats its operating expenditure targets?
- What is the chance of exceeding the public expenditure limits made available by Ministers?
- To what extent could inefficiency impact on delivery of the capital programme?

4.5.4 Fund maintenance appropriately, with depreciation recognised accordingly

As discussed earlier, there is no sensible alternative other than for customers to pay annually for an appropriate level of expenditure to maintain and renew assets as they wear out. Our Strategic Review will examine wide-ranging evidence in order to assess what an appropriate long-term level of expenditure is, given Scottish Water's asset base. We will need to review Scottish Water's assumptions on depreciation to ensure that long-term needs are properly reflected in prices.

4.6 Questions for consultation

1. Do respondents agree that we should extend risk analysis to cover the financial ratio comparisons?

2. Do respondents agree that access to borrowing should require Scottish Water to conform to the same disciplines and control that apply in the private sector?
3. Do respondents agree that customers should not pay for a failure to meet agreed targets?
4. Are there other factors that we should take into account in minimising the risks to customers both now and in the future?

Section 2: Chapter 5

How we propose to determine charges for the 2006-10 period

5.1 Introduction

For most customers, the most important outputs of a Strategic Review of Charges are the level and profile of prices they will have to pay. The role of a regulator is to set prices that are sufficiently high to ensure the sustainable delivery of the desired level of service, but no higher than they need to be. In order to ensure that customers pay no more than is necessary, we will review the costs that Scottish Water expects to incur and identify opportunities for efficiency. It is important that customers are only asked to pay for the efficient delivery of the service or, at worst, for an agreed profile of costs consistent with a move towards benchmark efficiency.

The costs faced by customers can be categorised into three main areas:

- running costs;
- costs associated with the use of existing and new assets; and
- costs of public private partnership (PPP) contracts.

We use a financial model to establish an appropriate level of revenue that is consistent with meeting these costs and ensuring that Scottish Water should be able to deliver the level of service to customers that will be defined by the Quality and Standards process¹. This model allows us to ensure that an appropriate balance is struck between current and future customers. We will also look to ensure that customers in general are protected from unnecessary fluctuations in their charges.

In calculating prices for customers, we use a tariff basket to divide the identified revenue between customer groups. The detail of how much each customer group will pay will depend on the result of the Scottish Executive's current consultation, '*Paying for Water Services 2006-10*'.

At this review we are proposing to make some changes to our approach to price setting. These changes are limited to the approach to meeting the costs of new and existing assets. We do not believe that this revised approach has any immediate material impact on the prices faced by customers, on the resources available to Scottish Water, or on the implications for public expenditure. The changes are designed principally to allow greater transparency. They bring the approach to price setting for Scottish Water into line with that for the English and Welsh water and UK energy sectors. As such, we will be able to make more direct comparisons in financial ratios and risk to customers than was previously possible.

We propose to introduce a Regulatory Capital Value (RCV) for Scottish Water. Scottish Water will receive an appropriate rate of return on this RCV. Efficient investment in new assets will be added to the RCV. Depreciation (reflecting the costs of using existing assets) will reduce the RCV.

5.2 The approach we used in 2001

At the *Strategic Review of Charges 2002-06* we prepared our advice to Scottish Ministers on the appropriate level of charges both for the then proposed Scottish Water and the three (now former) water authorities. At that Review we were not able to use the RCV approach to price setting for two main reasons:

- It would have been difficult to ensure that we set a RCV for each of the three authorities and for the proposed Scottish Water on a consistent basis. We believed that it was important to achieve consistency given that the Parliament had not approved the creation of Scottish Water; and
- We were also concerned that the regulatory information available to us (particularly on the modern equivalent value of the industry's assets) would have made using the RCV more problematic.

¹ See the Scottish Executive's Consultation document, '*Investing in Water Services 2006-10*'.

We therefore decided that it would be desirable to delay the introduction of this method of price setting to the 2006-10 regulatory period.

As a result, we developed an approach that would allow us to ensure that all of the cash costs faced by Scottish Water could be met. These cash costs were:

- interest costs;
- operating costs;
- PPP costs; and
- investment.

5.2.1 Assessing costs and revenues in 2001

We developed a financial model that allowed us to model the implications for revenue of different cost, investment and financing scenarios. This allowed us to assess what would be appropriate revenue caps for both Scottish Water and the three authorities.

Each of these elements of cost was scrutinised in detail, and we set appropriate efficiency targets for both operating costs and the cost of investment delivery. Our view was that the costs of the PPP projects were, at that time, lower than the expected costs of similar projects delivered by the three authorities. Consequently, we did not set an efficiency target for the expected costs of the PPP contracts. The expected level of interest depended largely on the profiling of the capital programme and the extent of new debt incurred by Scottish Water. These estimates of cost were added together to determine the expenditure that should be allowed to Scottish Water.

We worked with the quality regulators and the three authorities to agree appropriate phasing of the capital programme. This phasing took account of the need to improve efficiency, to deliver the environmental and public health improvements on time and to ensure that there were no undue fluctuations in customers' bills.

5.2.2 How Scottish Water funds expenditure

Scottish Water can fund its expenditure from two sources, namely revenue from charging customers and new borrowing. Any new borrowing is subject to a maximum level that is set by the Scottish Executive. This new borrowing counts as public expenditure. In the commissioning letter for the *Strategic Review of Charges 2002-06*, the Minister asked us to present a risk analysis to demonstrate that our advice did not carry a material risk that the public expenditure limits set in the commissioning letter would be breached.

We had concerns that the level of debt of the three Scottish water authorities had increased rapidly since 1996. The impact of this increase in debt on customers' bills had been reduced through refinancing of maturing debt at lower interest rates. However, it was clear that continuing to borrow at the same rate was likely to lead to much higher prices in the future than could be justified. The level of debt of the Scottish water industry was also inconsistent with the prudent financial ratios upon which Ofwat bases its determination of prices. Our principal concern was the impact that any unforeseen costs (for example a water supply incident or underperformance against efficiency targets) could have on customers. We therefore advised that the industry should not seek to use the full public expenditure allowance that was available. This was also consistent with the risk analysis requested by Ministers.

The objective of the Strategic Review was to identify the amount of revenue that should be recovered from customers. Our advice set the revenue cap at the level of allowed expenditure minus the amount that could prudently and sustainably be funded from public expenditure. Thus, for the period 2002-06, the maximum level of revenue that Scottish Water was permitted to collect from its customers was calculated as follows:

$\text{Advised revenue cap} = \text{allowed cash costs} - \text{advised public expenditure}$
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5.3 Why we have changed the method that we used in 2001

There have been a number of significant improvements in the information that is available about the water industry in Scotland. This allows us to strengthen the regulatory regime and improve our comparisons of the relative performance of the industry in Scotland with that south of the border. We believe that such comparisons are in customers' interests.

In 2001 we were able to make robust assessments of the relative efficiency of Scottish Water's level of operating cost and capital expenditure efficiency. However, the information available about the modern equivalent asset value of the water industry in Scotland was not sufficiently robust to establish an appropriate level for an RCV. We made a number of comments about improvements that we would like to see in asset information in the *Strategic Review of Charges 2002-06*². The modern equivalent asset value is the cost of replacing the assets that provide the service to customers with their modern equivalents. It therefore takes account of inflation and innovation (including changes in technology). This asset value is important to the use of the RCV method of price setting as this method seeks to ensure that sufficient resources are provided, not only to operate assets but also to refurbish, replace and finance them. As such, an improved understanding of the modern equivalent asset value is important.

We are pleased to report that Scottish Water has made progress in its understanding of its asset base. As a result, we now consider that it is appropriate to introduce an RCV for Scottish Water. This will bring the method for calculating prices for Scottish Water into line with that used by other utility regulators in the UK. The RCV method is also used internationally, including in the regulation of public sector corporations.

Introducing the RCV method of price setting will bring three main benefits:

- It will improve the transparency of comparisons of

financial ratios between the industry in Scotland and that in England and Wales;

- It will demonstrate the cost of capital benefit to customers from the industry remaining in the public sector; and
- Finally, the RCV method of price setting does not require the regulator to determine how much Scottish Water should seek to borrow or how much the Scottish Executive should seek to lend. Prices could only be impacted in relatively extreme circumstances, and we would be able to highlight the risk of such occurrences in our performance reports. This is discussed in further detail below.

We explained above our approach to improving the financial sustainability of the water industry in Scotland at the 2002-06 Review. Since our approach to price setting in 2001 was necessarily different from that used in England and Wales, it was not possible to make straightforward calculations of financial ratios.

In its report on the water industry in Scotland, the Finance Committee criticised our use of financial ratios. We remain confident that the information that we provided to the Finance Committee was both accurate and consistent with an accurate picture of the risks faced by customers. However, we do accept that we should have explained the basis of our comparisons in our oral evidence more clearly. The introduction of the regulatory capital method of price setting will ensure that comparisons of financial ratios will be much more transparent.

The market cost of capital for a private sector water and sewerage company is higher than the cost of capital charged by the Scottish Executive to Scottish Water. This will allow us to set a lower rate of return on Scottish Water's RCV than the cost of capital that is allowed by Ofwat. This difference in the financing costs of the industries in the public and private sectors will become more transparent as a result of our introduction of the regulatory capital method of price setting. We discuss

² See, for example, pages 52 and 53 of the *Strategic Review of Charges 2002-06*.

the setting of an appropriate rate of return for the industry in Scotland in Chapter 9.

5.4 The introduction of an RCV

5.4.1 Defining the RCV and allowed rate of return

The RCV is a proxy for the current value of the above-ground asset base of Scottish Water. This value will change over time to reflect the use (ageing) of assets [the cost of which is recognised by the depreciation charge] and investment in new assets.

The current below-ground assets (infrastructure) are considered to be assets that are required in perpetuity and are therefore not included in the RCV. The cost of maintaining and replacing these assets is met through the annual infrastructure renewals charge. If Scottish Water spends more or less in practice, the RCV is amended to take proper account of this and to ensure that the industry is financed on a sustainable basis.

The rate of return is the cost associated with managing and financing the above-ground asset base. The cash cost of replacement is covered by the depreciation charge.

5.4.2 The calculation of revenue

The revenue that Scottish Water should be allowed is calculated as follows:

**Return allowed on the regulatory capital value +
allowable operating costs +
depreciation on non-infrastructure assets +
the infrastructure renewals charge (IRC) +
the costs of PPP contracts**

Return allowed on the Regulatory Capital Value

We explained above that principally owing to the uncertainty surrounding the modern equivalent value of the assets of the Scottish water industry, we had to look at the cash implications of the *Quality and Standards II* investment programme. We also explained that, in this

review, we propose to set an RCV and allow a rate of return on the RCV. This is discussed in detail in Chapter 9. The product of the RCV and the allowed rate of return will give the total return allowed on the RCV. This ensures that customers only contribute towards those assets that have been created.

The level of the RCV does not, by itself, impact on the prices that customers pay. It is the cash return allowed on the RCV that will determine the level of prices that is paid by customers. We discuss the calculation of an initial value for an RCV for Scottish Water in Chapter 8.

When Scottish Water invests in new assets, the efficient value of that asset is added to the RCV and begins to earn a return. This increases prices to customers. At the same time, the annual depreciation charge will reduce the RCV. A return is paid only for the value of the non-depreciated portion of an asset included in the RCV. The value of the RCV is adjusted to take account of inflation.

The second element of the calculation of the allowed return on the RCV is the rate of return. In the private sector model this is referred to either as the cost of capital or the weighted average cost of capital. We explain the factors that we have taken into account in setting an appropriate rate of return for Scottish Water in Chapter 9. This chapter also outlines the difference between the rate of return that we allow to Scottish Water and the cost of capital set by Ofwat for the water and sewerage industry south of the border.

As explained above, we will multiply the proposed rate of return by the RCV (adjusted in future years to reflect investment and depreciation) to establish the cash return allowed on the RCV.

Allowable operating costs

The allowed level of revenue includes an appropriate allowance for operating costs. Our assessment of operating costs will take into account inflation, the scope for efficiency and an allowance for efficient new operating costs. Operating costs comprise a significant proportion of a customer's bill and we propose to pay

particular attention to ensuring that these costs are no higher than they need to be. The calculation of the appropriate level of operating costs will be discussed in Volume 4 of our proposed approach, which is due to be published shortly.

Depreciation and the Infrastructure Renewals Charge

As noted above, under our proposed RCV approach we will allow for asset costs in two ways, that is the allowed cash return on the RCV and an allowance for depreciation. The allowance for depreciation and the Infrastructure Renewal Charge (IRC) ensures that sufficient funds are available to replace assets that are at the end of their useful lives.

Depreciation charges, however, may be considered as a specific type of operating cost, as they will be treated as operating costs in the company's accounts. Depreciation is an accounting charge, rather than a cash cost. The cash cost is incurred when the asset (the use of which is recognised in the depreciation charge) is purchased.

Scottish Water's depreciation charges are included as allowed costs in order to smooth the cost of replacing assets when their useful lives are over. The costs of replacing Scottish Water's assets are reflected in the IRC and as a separate depreciation charge.

- **Infrastructure Renewals Charge.** The IRC covers the cost of maintaining, refurbishing and replacing underground assets. It does not reduce either the asset value of the company or the RCV. Like the water industry in England and Wales, Scottish Water has adopted the accounting convention of infrastructure renewals. This means that the infrastructure network (mainly comprising underground pipes, sewers, etc) is treated as a single asset to be maintained in perpetuity, rather than a collection of assets each with its own life and maintenance requirements. It is reasonable to include the IRC in the price paid by customers as it reflects the cost of the current use of the underground infrastructure. We will discuss in Volume 5 our proposals for how to determine the appropriate level of the IRC.

- **Current Cost Depreciation (CCD).** Depreciation of non-infrastructure assets (mainly those assets found above the ground) is known as CCD. For assets in existence in 2005-06, allowed depreciation charges will be based on Scottish Water's own forecasts of depreciation during the new review period. New assets installed during the period will be depreciated on the basis of a standard set of expected asset lives.

The costs of PPP contracts

Scottish Water will provide us with detailed information on the PPP costs it expects to incur during the next regulatory period. The PPP contracts effectively swapped initial capital costs, financing and maintenance costs and operating costs over the life of an asset for a series of annual payments. We propose to scrutinise these costs carefully. Our proposed approach will be described in detail in Volume 4. Our analysis of the appropriate level of these PPP costs will be allowed in our calculation of revenue.

5.4.3 Access to debt finance

In 2001, our advice to Scottish Ministers on the appropriate level of revenue caps for the three authorities and for Scottish Water also required us to provide advice on how much borrowing should be used. This advice on borrowing had an impact on both current and future prices.

The regulatory capital method of price setting does not require us to take decisions about how much extra borrowing Scottish Water should seek. Our calculation of prices will rather reflect the costs of providing the service, maintaining and replacing assets and financing new assets. The method of financing (whether from retained surplus or from new debt) will not have an impact on the price paid by customers, provided that debt remains at broadly the same proportion of the RCV.

If debt increases as a proportion of the RCV, future customers will face either higher prices or a service that is less able to absorb operational or legislative shocks.

If debt decreases as a proportion of the RCV, customers in subsequent years will benefit. Scottish Water could opt to set tariffs at a lower level than that allowed by the price cap or customers could enjoy a service that is more able to absorb operational or legislative shocks.

If Scottish Water is allowed to borrow more money, this will increase interest costs. The extra cash resources available may cause efficiency targets to be missed, but this will not impact on prices because prices will take into account only an efficient allowance for costs. If the extra money is efficiently invested in new assets, then customers would start to pay for these improvements at the start of the next regulatory period. There would be an onus on Scottish Water to demonstrate that the extra spending was necessary, appropriately timed and efficient before customers would have to pay.

If Scottish Water is allowed to borrow less money, interest costs would fall but it would also be difficult to deliver all of the benefits of the investment programme. This would result in a lower RCV in future years and hence a lower allowed cash return. This would reduce the prices paid by customers in the future, but is also likely to mean a reduction in the level of service and environmental/public health compliance that customers currently enjoy.

Monitoring of the RCV and the ratio of total debt to the RCV will provide stakeholders with a useful indicator of the financial performance of the water industry in Scotland. Stakeholders should expect the RCV to increase in line with the profile that is established at the start of the regulatory period. Smaller increases would suggest that the capital programme is making less progress than was expected at the start of the regulatory period, larger increases would suggest that better progress had been made.

The ratio of debt to RCV should indicate whether Scottish Water is making sufficient progress towards the efficiency targets that we set in the *Strategic Review of Charges 2006-10*. We propose to use our performance reports to monitor these financial indicators.

5.4.4 Advantages of the RCV approach

The RCV approach to price setting will create an incentive to deliver capital projects in a timely and efficient way. This is because Scottish Water will only earn a return once a project has been delivered and the efficient cost of that project is added to the RCV. The timing of project delivery will be agreed after we have received both Scottish Water's first and second draft business plans and the guidance from Ministers on priorities for the capital programme for the next regulatory period.

If Scottish Water delivers projects more or less quickly than expected, then the allowed return would be adjusted in the next regulatory period. This should ensure that customers are able to be more confident that the benefits promised in the investment programme will be delivered on time.

There is also a clear incentive to deliver the capital programme efficiently because only the agreed efficient cost is added to the RCV. This ensures that customers are not asked to meet the costs of inefficiency. Inefficiency in the delivery of any project will have to be matched by outperformance of the efficiency target in another area. If there is no corresponding outperformance, Scottish Water would have to increase its debt and increase the proportion of debt to RCV. In subsequent years, either there is a matching outperformance of the earlier inefficiency (and the additional borrowing costs) or there would have to be a further increase in debt equivalent to the borrowing costs.

Such inefficiency should not impact on customers. The price paid by customers will still be determined by the allowed cash return on the RCV, the depreciation and IRC allowances and the operating costs (including PPP). This calculation is not changed by a failure to meet efficiency targets either for capital investment or operating costs.

The onus is on the management of Scottish Water and its owner, the Scottish Executive, to ensure that the agreed levels of service and investment programme are

delivered. We will be able to monitor progress through a comparison of the debt to RCV ratio that was expected at the start of the regulatory period relative to that which is reported at the end of each year. This should make assessing performance much more transparent.

5.5 The introduction of price caps

5.5.1 Introduction

We also propose to determine a series of price caps rather than a revenue cap. The use of a price cap should provide customers with a clearer idea of how their charges are likely to change during the period covered by a Strategic Review of Charges.

5.5.2 How the price cap differs from the revenue cap

Revenue is a function of price and quantity supplied. The quantity supplied can vary depending on the nature of the customer base and their consumption of potable water and discharge of waste water. If the number of customers were to increase faster than had been expected (or existing customers were to increase their use of water or discharge of waste water), customers would benefit. This increase in the quantity of service provided would result in lower average tariffs to ensure that the revenue cap is not breached. Conversely, if the number of customers grows less quickly than forecast or consumption/discharge falls, then tariffs would need to increase at a faster rate than the revenue cap in order to ensure that the industry accesses the resources it needs.

A price cap insulates customers from the impact of changes in the customer base or volumes of consumption during a regulatory period. A customer should still be able to calculate the maximum price that they will have to pay by looking at their use of the water and sewerage service and the maximum applicable tariffs. We believe that the introduction of a price cap is in the general interest of customers.

5.5.3 Calculating price caps

We have described how we propose to calculate the revenue that Scottish Water will be allowed to raise from

customers. We will then translate this allowed revenue into a series of price caps. We discuss the use of tariff baskets and our proposals in more detail in Chapter 12.

The first step will be to establish a base year. We will have to have a full record of customers and the service that they received for this year. These customers will be divided into several tariff baskets depending on the type of service they require. These tariff baskets will also take full account of the results of the Scottish Executive's consultation *Paying for water services 2006-10*.

Once we have established appropriate tariff baskets we calculate the average bill for customers in each basket. We calculate this average by dividing the total revenue from customers in that basket for the base year by the total number of customers.

The next step is to establish the current relative weighting of each of the baskets. These weightings take account of the importance of each basket to Scottish Water's overall revenue. This allows us to calculate an average bill.

Future weightings of these tariff baskets will take full account of the Ministerial Guidance that we expect to receive in January 2005. This Guidance will be informed by the principles of charging consultation. We also expect that this guidance will cover issues relating to the structure of charges (eg the balance between fixed and variable components). The weightings will also take account of the expected changes in the composition of the tariff baskets. Such changes may include increases in the number of connected households or businesses, amendments to the rateable value of connected properties and reductions in the amount of potable water consumed.

We will then calculate price caps that are consistent with the changes in the average bill required.

5.5.4 Advantages of price caps

There are two principal reasons why we believe that it is in the customer interest for us to set a series of price caps rather than an overall revenue cap.

First, the introduction of price caps will provide greater transparency on the prospect for prices and will improve customers' understanding of the likely profile of prices. Customers will be able to understand what the maximum prices for the various services they use will be in each year of the regulatory period. This should allow them to plan accordingly.

Secondly, customers will be protected from changes in the customer base or levels of consumption. This will remove uncertainty about how changes in the overall customer base each year might impact on bills for individual customers.

At the current time, if Scottish Water decides to enter into a special agreement with, or provide some form of rebate to, a customer, it can make up any shortfall by increasing tariffs to other customers. The cap on revenue means that Scottish Water has only a limited incentive to maximise the revenue received from each customer. This is because increases in tariffs can be used to offset the impact of any reduction in the 'quantity' of service provided to customers.

The introduction of price caps will ensure that Scottish Water has an incentive to maximise revenue from each customer. It will no longer be able to increase prices to compensate for any shortfalls in revenue. This ensures that the impact of any such shortfall cannot impact on customers immediately. As a result, we will be able to scrutinise the reasons for any shortfall in revenue and determine whether it is appropriate to increase tariffs to compensate. Such increases are typically appropriate only when an effective management could not have avoided the shortfall in revenue.

5.6 Conclusions

Chapters 8 and 9 discuss how we propose to set a Regulatory Capital Value and an appropriate rate of return for Scottish Water. We believe that these proposed changes will improve the transparency of the price setting process and that this will bring benefits to customers. However, it is important to note that the switch to using the Regulatory Capital Value method of price setting will not immediately or materially impact on

the prices paid by customers, the resources available to Scottish Water or the amount of public expenditure required.

We believe that replacing the current revenue cap with a series of price caps will bring real benefits for customers. Establishing price caps will remove the annual uncertainty about the impact that changes in the customer base may have on prices. We discuss the detail of our proposed approach to tariff baskets in Chapter 12.

Adjustments to the initial Regulatory Capital Value established for Scottish Water are outlined in Chapter 10. The mechanism which ensures that Scottish Water is able to meet unavoidable changes in circumstance and protects customers from the impact of a failure to meet efficiency targets is discussed in Chapter 11.

5.7 Questions for consultation

1. Do customers agree that the regulatory capital method of price setting will help to facilitate comparisons between the water industry in Scotland and south of the border? If not, what are the alternative methods they would suggest?
2. Do customers agree that it would be better to set a series of price caps rather than the current system of setting a single revenue cap?
3. Are there other actions we should consider to improve the transparency of the price setting process?

Section 2: Chapter 6

Regulatory accounts and accounting separation

6.1 Introduction

Information plays a critical role in our work of regulating Scottish Water on behalf of customers. It allows us to form a view of how well Scottish Water is performing.

In the last Strategic Review of Charges, we commented on the advantages to be gained from proper accounting separation between Scottish Water's core and non-core activities. We were therefore pleased when the Water Industry (Scotland) Act 2002 limited the remit of this Office to promoting the interest of customers of the core business.

This legislative change has altered the scope of the information we require to carry out our work from that which was used at the last Strategic Review of Charges. Specifically, when we form a view of Scottish Water's financial performance we must now be able to distinguish between its core and non-core functions and, potentially, between its wholesale and retail functions.

All companies prepare statutory financial accounts, which are submitted to Companies House. As a public corporation, Scottish Water does not have to prepare or submit such accounts. However, in line with a Direction from Scottish Ministers, it is required to prepare similar financial accounts.

These statutory accounts alone are not sufficient to provide the information that we now require. In particular, they only detail the financial performance of Scottish Water as a whole and, as such, are unable to provide a specific breakdown of costs by activity.

Other regulators have overcome these limitations by introducing a set of parallel, regulatory accounts. These accounts are tailored to provide the specific information required for effective regulation. We propose to adopt the practice of other regulators by asking Scottish Water to complete regulatory accounts.

We believe that the additional requirement to prepare regulatory accounts would allow us to understand better the costs of the various activities of Scottish Water, and

thus help ensure that charges broadly reflect costs. This will strengthen our role in ensuring that customers only pay for the service that they receive. Regulatory accounts will also provide a number of additional advantages in terms of detail and clarity of the information we receive from Scottish Water. This information will play a fundamental role in the draft and final determinations of the next Review period.

This chapter discusses our proposed changes to the accounting framework for Scottish Water. We begin by explaining the development of regulatory accounts in the UK and the accounting standards that have been developed to go with them. We describe the current situation in Scotland, then summarise the case for improving the accounting framework. The chapter closes with a discussion of our proposals to implement regulatory accounts.

6.2 The development of regulatory accounting in the UK

The regulated utilities produce both statutory financial accounts under UKGAAP¹ and regulated accounts. UKGAAP accounts are not materially affected by the existence of a parallel system of regulatory accounts. They are valuable to owners and shareholders, but are not used for most aspects of regulation. It has been recognised by Government and investors that an independent, separately audited and precisely defined set of accounts is important to effective and transparent regulation.

In the water industry, Ofwat implemented comprehensive regulatory accounts in 1992-93, in order to carry out its first price review. Full legal and accounting separation of non-core from core activities had already been introduced at the time of privatisation in 1989. Over time, regulatory accounts have been introduced in a number of other regulated industries, including:

- civil aviation;
- electricity;

¹ UKGAAP – United Kingdom Generally Accepted Accounting Practice.

- gas;
- postal services;
- rail; and
- telecommunications.

In 1998, the Government published a Green Paper recommending that regulators should require monopoly utility businesses to publish regulatory accounts and to do so in more standard formats². The Government suggested that this would facilitate wider understanding of regulatory issues.

Following the Green Paper, the offices responsible for economic regulation in the UK established a regulatory accounts working group. The group comprised representatives from the gas, electricity, water, telecommunications, rail, aviation and postal services industries³. The group's aim was to develop areas of consistency within published regulatory accounts. The group's conclusions were published in April 2001⁴. We propose to follow the principles set out in that paper in our work on introducing regulatory accounts to the Scottish water and sewerage industry.

The following extracts set out the purpose of regulatory accounts:

"In essence, the main purpose of regulatory accounts should be to provide financial information about regulated businesses for use by the regulator, industry, investors, consumers and other stakeholders. This would enhance the information available within the industry and aid in the assessment of the stewardship of management and informing economic and financial decisions."⁵

In addition, it was stated that regulatory accounts could be useful in:

- *"monitoring performance against the assumptions underlying current price controls;*
- *informing future price control reviews and other regulatory decisions that require financial information such as setting determined prices;*
- *assisting in the detection of certain anti-competitive behaviour in the relevant markets, such as unfair cross-subsidisation and undue discrimination at the appropriate level within the business concerned;*
- *assisting in comparative competition;*
- *assisting in monitoring financial health; and*
- *improving transparency in the regulatory process as regulatory accounts are the main source of regular, published and audited financial information about regulated companies."*⁶

We propose to use regulatory accounts for similar purposes in our regulation of the water and sewerage industry in Scotland.

6.3 Accounting standards for regulatory accounts

The economic regulators establish and define the guidelines for regulatory accounts. Regulatory accounts do not necessarily follow the standard accounting guidelines (FRS⁷, UKGAAP, etc) used for statutory financial accounts. Indeed, in their common principles the regulators agreed that in the event of a conflict between regulatory accounting guidelines and UKGAAP, the regulatory accounting guidelines would take precedence⁸.

² *A fair deal for consumers – Modernising the framework for utility regulation*, Department of Trade and Industry, proposal 7.7.

³ The Water Industry Commissioner for Scotland was not represented on this working group.

⁴ The role of regulatory accounts in regulated industries. A final proposals paper by the: Chief Executive of Ofgem; Director General of telecommunications; Director General of water services; Director General of electricity and gas supply (Northern Ireland); Rail Regulator; Civil Aviation Authority; and Postal Services Commission. April 2001.

⁵ Ibid page 3.

⁶ Ibid page 3.

⁷ Financial Reporting Standards

⁸ Ibid paragraph 2.4, page 32.

It is essential that the regulatory accounting guidelines are detailed and comprehensive. Regulated companies will use regulatory accounts for both historical reporting and future projections. Likewise, regulators will use the regulatory accounts to inform their decisions on prices.

Regulatory accounts are designed to provide a representative picture of performance in the context of the economics of the particular regulated sector. Each regulator therefore sets out their own guidance. The specialist nature of regulatory accounts allows much tighter definitions of reporting requirements to be specified. In contrast, UKGAAP has to be sufficiently flexible to deal with a full range of types and size of business. The tighter definition allowed by regulatory accounts allows comparisons of performance both over time and between companies.

6.4 Scope of Ofwat's regulatory accounting guidelines

We propose to adopt Ofwat's regulatory accounting guidelines (RAGs) as a basis for the regulatory accounting guidelines in Scotland. The Ofwat guidelines are published in five volumes, covering the following:

RAG1 Accounting for current costs and regulatory capital values

RAG2 Classification of expenditure

RAG3 The contents of regulatory accounts

RAG4 The analysis of operating costs and assets

RAG5 Transfer pricing in the water industry

Where we amend or develop these guidelines for application in Scotland we will do so simply to ensure that they are fully consistent with Scottish Water's statutory duties. However, in so doing, we will endeavour to ensure that they remain as consistent as possible with the original Ofwat guidelines. This will be important for detailed comparison of the financial performance of the industry in Scotland.

The Ofwat guidelines explain the objectives and principles behind each set of detailed requirements and relate them to the legal framework. The guidelines

contain definitions of terms as well as very detailed guidance on each component of the financial information to be reported. Proformas for each set of information are included.

The individual volumes deal with the following areas:

RAG1 Accounting for current costs and regulatory capital values

- Current cost balance sheet (infrastructure assets, operational assets, other tangible assets, third party contributions and reserves)
- Current cost profit and loss account (adjustments to historic cost operating profit, financing adjustment, exceptional items and extraordinary items)
- Content of accounts (proformas)
- Regulatory capital value

RAG2 Classification of expenditure

- Asset categories
- Expenditure categories
- Proportional allocation

RAG3 The contents of regulatory accounts

- Definition of historical cost accounts and current cost accounts.
- Guidelines on:
 - accounting statements;
 - appointed (core) business;
 - profit analysis;
 - associated companies;
 - publication of statements; and
 - audit

RAG4 Analysis of operating costs and assets

- Analysis of individual activities
- Allocation of costs to categories within activities
- Tangible fixed assets

- Other cost allocations and apportionments

RAG5 Transfer pricing in the water industry

- Principles of transfer pricing
- Principles of market testing
- Partnering
- Principles of cost allocation
- Appointee structure

6.5. Current situation in Scotland

6.5.1 Developments since the 2001 Strategic Review of Charges

Our *Strategic Review of Charges 2002-06* used statutory accounts for the three former water authorities. At that time, our legal remit covered the whole of the authorities' businesses, both core and non-core.

However, before we carried out the *Strategic Review of Charges 2002-06* we established a format for reporting financial information that was similar to the regulatory accounts used by Ofwat. This took the form of detailed breakdowns of costs, incomes, loans, cash flows and other relevant financial information.

The format we used provided us with the necessary detailed information to carry out the Review. Equally, it provided information in a form that was consistent with that used in the water industry in England and Wales. This was important in allowing us to compare financial performance with the companies.

In the *Strategic Review of Charges 2002-06*, we recommended the introduction of accounting separation of key discrete activities. There were three main reasons for this recommendation:

- It was important that customers of the core business pay only for the core service they receive;
- Accounting separation would allow Scottish Water's management to have a better understanding of its costs and, as a result, should facilitate greater efficiency; and

- Accounting separation should lead to a more robust allocation of costs and prices would consequently be less vulnerable to challenge under competition law.

We were therefore pleased when our remit was changed by the *Water Industry (Scotland) Act 2002*. This Act gave us the duty to promote the interests of the customers of Scottish Water's core business. In order to set prices for the core business we will require clear, discrete financial information about the core activities. Our proposed introduction of regulatory accounts will provide this information.

The *Water Services etc (Scotland) Bill* proposes the introduction of competition into part of Scottish Water's current core activities, namely non-domestic retail. (It also proposes that all retail activities currently undertaken by Scottish Water become defined as non-core).

Full details of the proposals will only become clear as the Bill progresses. However, it is already apparent that some form of separate regulation of the retail and wholesale activities is likely to be required. This would mean that our regulatory accounts will have to take account of our need for information on both aspects of the business.

6.5.2 Accounting standards currently in force

Under direction from Scottish Ministers, Scottish Water is required to prepare statutory accounts that are broadly consistent with the various UK accounting standards. These accounting standards are common to businesses across the UK. They have the effect of imposing a common framework and code for reporting financial information.

A common code means that managers, shareholders, owners, customers, analysts and other stakeholders have well-defined and consistent information. This helps them to understand the financial health of businesses, both year-on-year and in the context of other businesses' performance.

The accounting standards include:

- SSAP – Statement of Standard Accounting Practices;
- FRS – Financial Reporting Standards; and

- UKGAAP – United Kingdom Generally Accepted Accounting Practice.

Scottish Water's annual statutory accounts are audited. Broadly, the audit establishes whether the accounts reflect the financial state of the business. Auditors provide an opinion to this effect⁹:

“Financial statements

In our opinion the financial statements give a true and fair view of the state of affairs of Scottish Water as at 31 March 2003 and of its surplus and cash flows for the year then ended; and the financial statements and the part of the Remuneration Report to be audited have been properly prepared in accordance with the Water Industry (Scotland) Act 2002 and directions made thereunder.

Regularity

In our opinion, in all material respects, the expenditure and income shown in the financial statements were incurred or applied in accordance with any applicable enactments and guidance issued by the Scottish Ministers.”

The audit therefore provides a degree of reassurance to the business and its stakeholders.

6.5.3 Limitations of using statutory accounts for regulatory purposes

The statutory accounts, by themselves, are of very limited use for regulation. There are several drawbacks to relying on statutory accounts for regulation. The principal issue is the lack of detail and clarity of statutory accounts.

We can illustrate this problem by comparing the content and layout of statutory accounting tables with those of regulatory accounts for the same business. The examples below are taken from the annual accounts of one of the water and sewerage companies in England and Wales.

Table 6.1 summarises the main elements of statutory and regulatory accounts for water and sewerage companies. From this simple summary alone, it is evident that regulatory accounts provide fuller information.

Table 6.1: A comparison of the main elements of statutory and regulatory accounts

Statutory accounts	Regulatory accounts
Historical cost profit and loss account	Regulatory historical cost profit and loss account ¹⁰
-	Regulatory current cost profit and loss account ¹¹
Historical cost balance sheet	Regulatory historical cost balance sheet
-	Regulatory current cost balance sheet
-	Current cost cash flow
-	Analysis of current cost operating costs by service
-	Five-year rolling current cost profit and loss account
-	Five-year rolling current cost balance sheet

As well as providing more information, regulatory accounts reveal more about the costs of the business. This is very important for effective regulation, because such information allows us to make detailed comparisons of performance. The example below illustrates this. In Tables 6.2, 6.3 and 6.4 we compare the layout of reported cost information in statutory accounts and regulatory accounts.

Table 6.2: Breakdown of operating cost information reported in Scottish Water's statutory accounts (income and expenditure)

Cost of sales
Administrative expenses
Exceptional items

Table 6.3: Breakdown of operating cost information reported in Scottish Water's statutory accounts (note number 5 – staff costs)

Wages and salaries
Social security costs
Pension costs
Less: charged as capital expenditure
Less: seconded staff

⁹ Scottish Water Annual Report and Accounts, 2002-03, page 42.

¹⁰ Historical cost is a method of valuing company assets according to how much they were initially purchased for.

¹¹ Current cost accounting values assets according to how much they would cost to replace at today's prices. Typically, due to the effect of inflation, current cost accounting values assets at a higher level than historical cost accounting.

Table 6.4: Example layout of operating cost information reported in regulatory accounts of the water and sewerage companies in England and Wales

	Service analysis							Business activities			
	Water supply			Sewerage							
	Resources and treatment	Distribution	Water supply sub-total	Sewerage	Sewage treatment	Sludge treatment and disposal	Sewage treatment and disposal	Sewerage service sub-total	Customer services	Scientific services	Cost of regulation
Direct costs											
Employment costs											
Power											
Hired and contracted services											
Materials and consumables											
Service charges											
Other direct costs											
Total direct costs											
General and support expenditure											
Functional expenditure											
Total business activities											
Rates											
Doubtful debts											
Total opex less third party services											
Third party services - opex											
Total operating expenditure											
Capital costs											
Infrastructure renewal expenditure											
Movement in infrastructure renewal prepayment											
Current cost depreciation (allocated)											
Amortisation of deferred credits											
Capital maintenance (excluding third party services)											
Third party services - capital maintenance											
Total capital maintenance											
Total operating costs											
Total operating expenditure above includes reactive and planned maintenance of:											
infrastructure											
non-infrastructure											
CCA (MEA) values:											
Service activities											
Business activities											
Service totals											
Services for third parties											
Total CCA (MEA) values											

These examples clearly demonstrate the differences in the detail and clarity of statutory and regulatory accounts. Differences also extend to the audit process.

Like statutory accounts, regulatory accounts are audited. However, the auditor's opinion contains greater detail and clarity. The following extract is taken from the regulatory accounts of one of the water and sewerage companies.

"In our opinion the Regulatory Accounts for the Company contain the information for the year ended 31 March 2003 to comply with Condition F of the Instrument of Appointment granted by the Secretary of State for the Environment to the company as a water and sewerage undertaker under the Water Industry Act 1991.

In respect of this information we report that in our opinion:

- (a) *proper accounting records have been kept by the appointee as required by paragraph 3 of Condition F of the instrument;*
- (b) *the information is in agreement with the appointee's accounting records and has been properly prepared in accordance with the requirements of Condition F and, as appropriate, Regulatory Accounting Guideline 1.03, Regulatory Accounting Guideline 2.03, Regulatory Accounting Guideline 3.05 and Regulatory Accounting Guideline 4.02 issued by the Regulator;*
- (c) *the regulatory historical cost accounting statements on pages – to – present fairly, under the historical cost convention, the revenues of and costs, assets and liabilities of the appointee and its appointed business in accordance with the company's Instrument of Appointment and Regulatory Accounting Guideline 2.03, Regulatory Accounting Guideline 3.05 and Regulatory Accounting Guideline 4.02 issued by the Regulator;*
- (d) *the regulatory current cost accounting statements on pages – to – have been properly prepared in accordance with Regulatory Accounting Guideline 1.03, Regulatory Accounting Guideline 3.05 and Regulatory Accounting Guideline 4.02 issued by the Regulator."*

Clearly, this auditor's opinion is much more detailed and precise than the audit opinion on the statutory accounts quoted above.

We consider that the lower level of definition and detail in statutory accounts could reduce the effectiveness of regulation. It is for this reason that we are proposing an additional requirement upon Scottish Water to prepare regulatory accounts.

There are other areas where our analysis could be improved by the preparation of regulatory accounts by Scottish Water, including the following:

- **Separation of core activities:** statutory accounts cover the whole Scottish Water business, not just the core water and sewerage business (which is the part of the business that we are required to regulate);
- **Comparability:** statutory accounts use different conventions from those that apply in other regulated utilities, weakening the comparative analysis that underpins target setting;
- **Competition:** costs of different activities are not distinguished in the statutory accounts, so the basis for deriving prices of services is vulnerable to legal challenge; and
- **Monitoring:** significant and complex adjustments have to be made to reported costs to align them with regulatory targets and to track annual progress.

We discuss these issues below.

6.5.4. Separation of core activities

Under the *Water Industry (Scotland) Act 2002 Part 1(2)*, our remit is defined as follows:

The Commissioner has the general function of promoting the interests of customers of Scottish Water in relation to the provision of services by it in the exercise of its core functions.

Core activities need to be separated and appropriately ring fenced, so that we can properly promote the interests of customers of the core business. The introduction of regulatory accounts will maximise clarity around definition of the separated activities.

Currently, only a limited and approximate measure of separation is possible, through unaudited reporting of non-core costs and revenues by Scottish Water in annual regulatory returns. This arrangement is problematic as:

- a) although core activities are defined by legislation in general terms, there are as yet no agreed definitions of exactly what constitutes core activities;
- b) the *Strategic Review of Charges 2002-06* dealt with all areas of business, both core and non-core, and was published before the 2002 Act;
- c) we therefore have to adjust reported numbers to accommodate ongoing changes in the scope of non-core activities since the *Strategic Review of Charges 2002-06*.

6.5.5 Comparability

Our ability to maximise value for money to customers depends in large part on setting challenging but achievable targets on financial performance. In setting targets, it is very useful to assess the progress and level of performance achieved by the water and sewerage companies in England and Wales, and by other regulated utilities.

Regulatory accounts cover all aspects of the water and sewerage companies' finances in England and Wales. This comprehensive information allows Ofwat to compare financial performance fully and objectively, and to set appropriate targets for efficiency, capital investment and sustainable financial indicators. Regulatory accounts will allow us to assess appropriate targets for Scottish Water, but only if we understand in detail Scottish Water's starting position.

In contrast to Ofwat, our performance comparisons between Scottish Water and companies currently require judgements to be applied to the information reported by Scottish Water. The need for judgement may weaken the perceived robustness of the comparisons and so limit the extent of targets that can reasonably be set.

Adjusting statutory accounts in order to bring Scottish Water's information into line with England and Wales may make regulation less transparent. It can also be difficult for Scottish Water to reproduce our adjustments and resulting analysis, which makes it harder for Scottish Water to understand performance from a regulatory perspective. This could reduce the likelihood of regulatory targets being achieved.

6.5.6 Competition

Core activities

Current competition legislation may require Scottish Water to be able to quote and justify wholesale prices for the supply of services. The absence of an audited accounting regime that differentiates wholesale and retail costs, revenues, assets and liabilities could mean that Scottish Water is more vulnerable to legal challenge.

Any future extension to the competitive framework would increase the need for a transparent basis for pricing, particularly if a licensing regime for new retail entrants is envisaged. This would require Scottish Water to declare and justify wholesale prices.

Non-core activities

Scottish Water carries out non-core functions in a competitive market, where it could be open to legal

challenge (again under existing legislation) if it cannot show that those functions are free from cross subsidy. The absence of separate audited accounts may make a challenge more likely to occur and to succeed.

6.5.7 Monitoring

As explained above, our assessments of Scottish Water's progress year-on-year and against targets require us to make adjustments. Such adjustments may also be necessary because of changes in accounting policy and practice. These changes may be perfectly in line with statutory accounting rules but nevertheless we have to unwind any such adjustments in order to be able to make like-for-like comparisons over time.

Regulatory accounts minimise the need for, and extent of, adjustments by predefining the basis on which numbers are reported.

6.6 Implementing accounting separation and regulatory accounts in the Scottish water industry

We are proposing to implement accounting separation and regulatory accounts to inform the *Strategic Review of Charges 2006-10*. We have therefore started initial work on defining the boundary between core and non-core activities and between wholesale and retail activities.

The introduction of robust accounting separation and regulatory accounts will require significant cooperation from Scottish Water. We are grateful for its assistance. As we need to collect cost information that is allocated by Scottish Water to each activity, it is important that the definitions and proformas that we use reduce the possibility of gaps or overlaps in reported information.

Scottish Water's financial systems will also need to be capable of generating reliable information that complies with requirements. We are encouraged that Scottish Water now believes that it will be able to provide most of the required information.

To date, our preparatory work to develop regulatory accounts has consisted of:

- An initial review of the Ofwat Regulatory Accounting Guidelines, designed to test how applicable they are to the Scottish water industry;
- Preliminary discussions with Scottish Water to identify core and non-core functions, based on the legal definition provided by the Water Industry (Scotland) Act 2002¹³
- Development of two draft regulatory accounting tables to capture operating costs for core functions, separated into wholesale and retail activities; and
- Issue of draft tables for operating costs to Scottish Water for comment and completion with information for 2003-04.

In August 2004, we awarded a contract to Ernst and Young LLP and Black and Veatch Consulting Limited to build upon our preparatory work, and to develop the regulatory accounts project further. Specifically, they have been appointed to use their respective accounting and reporting expertise to deliver the following key objectives:

- To identify and formally define the core and non-core businesses carried out by Scottish Water;
- To identify and formally define the retail and wholesale segments of the core business and to provide separate reporting frameworks for these activities;
- To design a series of reporting submissions capable of capturing the information required to analyse and regulate the retail and wholesale segments of the core water industry; and
- To develop a set of regulatory accounting guidelines which clearly explain the objectives and principles behind each submission, and define the nature of the information that each submission should contain.

¹³ Our provisional interpretation of core/non-core activities was outlined in Volume 2 *Our Work in regulating the Scottish Water Industry: Background to and framework for the Strategic Review of Charges 2006-10*, p.122.

Upon completion, the key outputs of this project are as follows:

- A complete set of regulatory accounting guidelines designed specifically for Scottish Water, but consistent where appropriate with those developed by Ofwat;
- A set of regulatory returns (both definitions and tables) capable of detailing all required information of the core business separated into wholesale and retail activities. These returns will be fully internally consistent and reconcilable in principle to statutory accounts;
- A set of detailed guidance to auditors and reporters to enable them to effectively audit regulatory account submissions; and
- A series of draft versions of the above, enabling Scottish Water to provide feedback which, where possible, will be taken into account in developing final versions.

Once completed, the project outputs will be used to inform the current Strategic Review of Charges. Specifically:

- 2003-04 regulatory accounts will be used to inform our draft determinations; and
- 2004-05 regulatory accounts will inform our final determinations.

As such, completed regulatory account submissions will play a crucial role in informing the determination of future prices in the Scottish water industry.

6.7 Question for consultation

1. Do respondents agree with our proposal to require Scottish Water to submit regulatory accounts?

Section 2: Chapter 7

Financial modelling

7.1 Introduction

In this chapter we describe how we will use a financial model to calculate the revenue that Scottish Water needs to raise from customers. The chapter also details our proposed assumptions and the ratios that we will use to determine whether the proposed price caps are consistent with financial sustainability for Scottish Water.

7.2 Background

We have a statutory duty to promote the interests of customers of Scottish Water's core business. One of the ways in which we do this is by ensuring that Scottish Water has sufficient funding to carry out its core functions as a water and sewerage service undertaker in an efficient manner.

Scottish Water's funding comes from two sources:

- revenue raised through charges to customers, and
- borrowing (usually from government).

The revenue that is raised from customers is determined by the price limits that we set for Scottish Water. We use a financial model to calculate the price limits. The model therefore plays a key role in the *Strategic Review of Charges 2006-10*, having an impact on:

- customers – because it determines the limits on charges for water and sewerage services; and
- Scottish Water – because it determines the level of funding available for the business to carry out its core functions.

The financial model has two principal elements:

- calculation of the revenue that Scottish Water requires to carry out its core functions; and
- the tariff basket model, which translates the

revenue collected from customers to the tariffs they will pay.

We will set a price limit for each of the four years covered by the *Strategic Review of Charges 2006-10*. Price limits are forward looking and therefore in setting price limits we have to make a number of assumptions. These assumptions concern both macroeconomic factors and factors that are specific to Scottish Water.

One of the key considerations of our modelling is the financial sustainability of Scottish Water. We use a set of ratios to assess financial sustainability. These ratios are the same as those used by other regulators to assess the financial sustainability of other utilities.

7.3 The financial model

The model calculates the required price limits having taken account of the costs that Scottish Water is likely to incur. Constructed in Microsoft Excel®, the model consists of a series of linked spreadsheets. The model goes forward to March 2025.

At the end of September 2004 we intend to publish on our website both the model itself and a user manual, which will contain more detailed information about the model.

7.3.1 Development of the model

We developed the model using internal resources. It takes account of the proposals outlined in our methodology consultation and has been subject to rigorous internal analysis. This has ensured that all of the formulae perform as we would have expected and that the results are consistent with our expectations when inputting test information.

We asked Ernst & Young LLP to audit the financial model, and will publish the results of this audit later this year.

In June 2004 we provided a draft version of the model to Scottish Water. We also gave Scottish Water an opportunity to comment on the model at a workshop in July 2004.

We believe that our own internal challenge and the detailed scrutiny provided by Ernst & Young LLP's audit should reassure stakeholders that the output of the financial model is reliable. We would welcome stakeholders' views on the model.

7.3.2 Best practice guidelines

The Institute of Chartered Accountants for England and Wales publishes a useful guide on building financial models, *'Spreadsheet modelling best practice'*¹. It provides guidelines on scoping, specifying, designing, building, testing and using spreadsheet models. It recommends that spreadsheet models should make distinct the following processes:

- inputs;
- calculations; and
- results.

Further, it recommends that there should be a title sheet explaining the model; that where possible the spreadsheet should read from left to right and top to bottom; that several worksheets are used rather than one complicated worksheet; and that each row contains only one formula.

We believe that our model is fully consistent with these guidelines and that it complies with best practice.

7.3.3 Structure of the model

The structure of our model follows the guidelines for best practice outlined above. The spreadsheets within the model can be divided into six categories:

- Key – this explains the use of colours within the model;

- Input – these are the sheets into which we will input the information;
- Process – these sheets use input information in calculations that feed into the output sheets;
- Accounting outputs – these spreadsheets show the projected financial statements for Scottish Water. They allow us to understand the minimum amount of revenue required by Scottish Water;
- Main outputs – these worksheets contain financial ratios analysis. These sheets are critical to an understanding of whether the level of revenue is consistent with the financial sustainability of Scottish Water; and
- Variation sheet – this allows the user to understand whether the level of revenue is at the minimum level but also consistent with financial sustainability for Scottish Water.

7.3.4 Information in the model

We provided Scottish Water with the input tables for the financial model as a part of the business plan guidance which we issued in June 2004. The information provided in Scottish Water's business plan will be useful. For example, we will be interested in its assessment of the scope for efficiency. We will rigorously review the information provided by Scottish Water before finalising the information to be input to the financial model.

The model also contains financial assumptions (detailed in a later section of this chapter). These assumptions include information on interest rates and inflation expectations.

All of the input information will influence the final answer that is calculated by the model. We will produce a full audit trail for each input into the model. When we publish our draft and final price limits we will publish our final version of the model with the input information.

¹ Nick and Johnathan Batson, *'Spreadsheet modelling best practice'*, April 1999, available at <http://www.eusprig.org/#DOWNLOADS>.

7.3.5 Changes to the model

We intend to use the audited version of the model when we assess Scottish Water's revenue requirement. However, the model may change after publication, for example as a result of changes following the current methodology consultation.

Given that our proposed approach closely resembles that used by Ofwat for its recent price review, we do not anticipate material changes to the model. However, we would inform Scottish Water about any changes as soon as possible and would offer it the chance to comment on changes.

Any changes that we make would be fully documented and subject to full version control. We would publish any changes, with the reasons for making them, so that all stakeholders have an opportunity to understand how the model has evolved. If necessary we would consult with Ernst & Young LLP on the need to update the audit.

7.4 Calculating the revenue requirement

In Chapter 5 we explained our proposal to adopt a Regulatory Capital Value (RCV) approach to price setting. Under this approach, the revenue requirement is calculated by:

$$\text{Revenue required}^2 = \text{allowable operating costs} + \text{allowable PFI costs} + \text{depreciation} + \text{infrastructure renewal charge} + \text{tax} + \text{cash return on the RCV}$$

Each of these items is discussed below. It should be noted that interest on debt, new debt and capital expenditure are not an explicit part of the calculation of revenue.

7.4.1 Allowable operating costs

Operating costs are day-to-day running costs, including items such as employment costs, electricity, materials, contracted costs, local authority rates, insurance, software licences and vehicle running costs. Bad debt is also regarded as a running cost.

Total operating expenditure includes the costs of providing the base service and net additional running costs associated with improvements. Base service expenditure comprises the cost that is incurred to maintain a constant level of service during the regulatory control period. New operating expenditure includes the efficient increased operating costs resulting from improvements to customer service, higher treatment standards etc. Such new operating expenditure would tend to increase customers' charges.

Efficiency savings in operating expenditure would tend to decrease customers' charges.

Operating expenditure and the associated assessment of efficiency will be discussed in Volume 4 of our methodology. Our financial model takes account of each of the following factors:

- base service operating expenditure and associated efficiencies;
- new operating expenditure and associated efficiencies; and
- the impact of inflation on operating expenditure.

7.4.2 Allowable PFI costs

The revenue requirement takes into account the costs of PFI contracts. Between 1999 and 2001 the former water authorities (now Scottish Water) signed nine PFI contracts for the provision of wastewater assets and services. Scottish Water now pays a single annual fee for the service provided rather than interest, maintenance and operating costs. In 2003-04, Scottish Water paid around £120 million in charges for these contracts.

PFI charges are treated separately from operating expenditure on sewerage because they contain elements of capital and financing costs.

² Cash received from the disposal of assets is deducted from the revenue requirement.

7.4.3 Depreciation

Each year Scottish Water invests to both maintain and improve its asset base. Capital expenditure relating to the replacement of worn-out assets is termed capital maintenance. Investment in improving or increasing the asset base is termed 'quality' and 'growth' investment.

As we discussed in Chapter 3, water and sewerage assets can be divided into infrastructure and non-infrastructure. This distinction is important because we treat them differently when setting price limits.

The level and type of capital expenditure that Scottish Water must make in each regulatory period is determined by Scottish Ministers following public consultation (the Quality and Standards process). The current investment programme – *Quality and Standards II* – is scheduled to run from April 2002 until March 2006.

The next investment period (*Quality and Standards III*) will run from April 2006 until March 2014. *The Strategic Review of Charges 2006-10* will therefore cover the first half of the *Quality and Standards III* period. Ministers will determine the levels of investment required and we will assess the scope for efficiency before inputting information on capital expenditure into the financial model.

We include information on:

- delayed investment from the previous regulatory period;
- claims for efficiency that are unsubstantiated; and
- forecast investment for the current regulatory period, divided between investment in infrastructure and non-infrastructure assets in the financial model.

7.4.4 Delayed investment

Some *Quality and Standards II* investment may not have been delivered before the start of the *Quality and Standards III* period. We propose to assume that any delayed investment will be delivered evenly across the 2006-10 period.

We propose to subtract the post-efficiency value of undelivered investment from the initial RCV. We will then add this back to the RCV as it is delivered. *Quality and Standards II* additions will be depreciated once they are added. This ensures that customers do not pay twice for the same investment outputs.

We do not propose to apply any efficiency targets to undelivered investment. However, we also intend not to make any additional allowance for inflation. Effectively, we are assuming that any undelivered investment has been contracted at a fixed price.

7.4.5 Unsubstantiated efficiencies claimed by East of Scotland Water Authority

In the *Strategic Review of Charges 2002-06*, the capital efficiency targets set for each of the three authorities were the same. However, we explained that the actual percentage targets that were set for the former East of Scotland Water Authority were lower. This reflected efficiencies that were claimed by the authority in defining its investment needs during the second Quality and Standards process. Since the Strategic Review we have attempted to confirm the efficiencies claimed by the authority, but been unable to do so. We can only assume that these efficiencies were not made. It is therefore in customers' interests that Scottish Water is required to improve its future capital efficiency by an amount equivalent to the extra cash made available to Scottish Water in the current regulatory period. The additional savings that will be required amount to £74 million.

In order to allow Scottish Water to plan and deliver the current capital programme more effectively, we have agreed with Scottish Water that we will not reduce the funds available for investment in this regulatory period. Instead, we will increase the capital efficiency targets that are assessed for the next Strategic Review period by £14.8 million a year for the first five years of the review period (that is, £74 million spread over the five-year period).

7.4.6 Investment in infrastructure and non-infrastructure

It is assumed that non-infrastructure assets (generally

those that are above ground) depreciate, ie it is assumed that they have a finite life and that they lose value equally throughout their life. It is important that detailed information is available about the age of the assets in order to forecast the appropriate depreciation. When setting prices, we consider both depreciation of existing assets at the start of the regulatory period and assets that are added during the period.

The method that we propose to use to calculate depreciation for above ground assets is different from that which Scottish Water uses to calculate depreciation in its statutory accounts. The base value for depreciating the assets is not the book value of assets. Instead, the base value of assets that we propose to use for depreciation is the Modern Equivalent Asset Value (MEAV)³.

The gross MEAV is the estimated cost of constructing an equivalent system at current prices, while the net MEAV is the depreciated value to match the remaining life of the current assets. The net MEAV is the starting point for calculating depreciation.

The estimated asset value is then divided into five categories according to its remaining life. We propose to use the same asset life categories and assumed asset life as those that Ofwat uses. These are shown in Table 7.1.

Table 7.1: Asset life categories used in the financial model

Category	Assumed life (years)	Description
Very short	5	Assets having a life of up to five years, eg vehicles and computer equipment.
Short	10	Assets having a life of 6 to 15 years, eg some ICA plant, telemetry, heavy vehicles and plant.
Medium	20	Generally, mechanical assets having a life of 16 to 30 years, eg pumping units and associated electrical plant, process plant, filter bed media, glass coated steel storage tanks.
Medium/long	40	Generally mechanical assets having a life of 31 to 50 years, eg filter bed structures, site fencing.
Long	60	Generally operational structures including service reservoirs, treatment work structures, inter-process pipe work and filter bed structures. Such assets will have a life exceeding 50 years.

³ We are currently consulting on this methodology (please refer to Chapter 3).

We propose to categorise assets that are added during the regulatory control period in the same way and to depreciate them over their assumed life. In any one year, if Scottish Water's capital expenditure on non-infrastructure assets is greater than depreciation it is adding to its non-infrastructure assets.

Assumptions about depreciation affect revenue – and therefore prices – in several ways:

- Scottish Water is allowed to collect annual depreciation from customers, so the higher the depreciation charge the higher the revenue that is required from customers;
- Depreciation is deducted from the RCV each year. This reduces the return on capital that Scottish Water is allowed to collect from customers;
- New non-infrastructure assets are added to the RCV. This increases the return on capital that Scottish Water is allowed to collect from customers; and
- Scottish Water will benefit from the depreciation on new asset additions in additional revenue from customers.

7.4.7 Infrastructure renewals charge

We discussed in Chapter 3 that infrastructure assets need to be treated in a different way from non-infrastructure assets.

In common with the water and sewerage companies south of the border, we will include an Infrastructure Renewals Charge (IRC) in our calculation of prices. The IRC is the notional level of investment required to maintain infrastructure assets.

In any one year the actual level of investment in infrastructure assets is termed the infrastructure renewals expenditure. When we input our assumptions into the financial model, we propose to assume that Scottish Water's projected figures for the IRC will be the same as infrastructure renewals expenditure. We are

assuming that Scottish Water will spend the theoretical level required to maintain the infrastructure assets during each year of the regulatory control period.

7.4.8 Taxation

We do not expect Scottish Water to pay Corporation Tax in the 2006-10 period. We will therefore not include Corporation Tax in the financial model.

7.4.9 Cash return on the regulatory capital value

In Chapter 5 we discussed our proposal to change our approach to price setting and to use the RCV approach. This is consistent with the approach of other utility regulators.

Scottish Water would earn a return for holding its assets. To calculate the cash return on the RCV we would need to set:

- an initial RCV for Scottish Water; and
- the rate of return that Scottish Water should be allowed to earn.

7.4.10 Regulatory capital value

Chapter 8 outlines our approach to establishing an initial RCV. The RCV would change over time; it would be increased by annual investments in water and sewerage assets made by Scottish Water and would be decreased by the level of depreciation of those assets. The effects of inflation, and the efficiency with which new assets are delivered, are also taken into account. This is explained in Chapter 10.

We propose to take an average⁴ of the opening and closing RCVs for each year. The average RCV is the first input to the cash return on the RCV.

7.4.11 Rate of return

We will input an appropriate rate of return to the financial model. In Chapter 9 we discuss how we intend to set this rate of return.

7.5 Financial assumptions

In building our model, we need to make a number of financial assumptions. These are briefly described below.

7.5.1 Inflation

Inflation measures increases in the prices of goods and services. Our assumptions concerning inflation are important because the model projects costs forward over a number of years.

Indexes are used to calculate inflation. In the Strategic Review we propose to use two indexes to measure inflation, namely:

- the Consumer Price Index (CPI) for all non-asset costs; and
- the Construction Output Price Index (COPI), to assess the impact of increases in prices on investments.

7.5.2 CPI

We believe that the CPI is an appropriate measure of inflation for non-capital goods costs. The CPI is now the measure of inflation targeted by Government and the Bank of England. Ofwat currently uses the Retail Price Index (RPI) in its price setting.

We also propose to assume that CPI will be 2% for each year of the regulatory control period. This is in line with the Bank of England's target.

7.5.3 COPI

We propose to use COPI for analysing the effect of inflation on capital expenditure. COPI measures the movement in prices of construction work that is carried out. There are five different indexes that are calculated: public housing, private housing, public non-housing, private industrial and private commercial. Finally there is

⁴ Average RCV = (Opening RCV + Closing RCV) ÷ 2.

an output index called the 'all new construction output index', which is a weighted average of all five previous indexes. We propose to use the latter definition in our Strategic Review.

The Department of Trade and Industry (DTI) publishes these indices on a quarterly basis. We will forecast COPI in the financial model. When we forecast COPI in the Strategic Review we intend to examine by how far and in what direction COPI has diverged from RPI (and latterly CPI). We believe that COPI should track CPI in the long term. We will therefore assess whether future COPI should track downwards or upwards in order to reverse any divergence. If we consider that there has been no material divergence we propose to set COPI at 2% per year.

7.5.4 Dividends

As the owner of Scottish Water, the Scottish Executive could theoretically ask for a dividend to compensate for the ownership risk. We do not expect this to happen, but need to allow for the possibility in our model. Rather than assume a given percentage of revenue paid out in dividends, we have asked Scottish Water to indicate any dividend they would expect to pay.

7.5.5 Cash

We propose to assume that Scottish Water has zero cash balances. Cash was around 0.1% of revenue in 2002-03 and around 1.0% in 2003-04. This assumption is likely to benefit Scottish Water as it would earn interest on any cash balance. Our model would not include any such benefit. We believe that this is a valid assumption that simplifies the model and would not have any material impact on the outcome.

7.5.6 Working capital and other balance sheet assumptions

The most common definition for working capital is current assets minus current liabilities. Current assets are defined as those assets that would be turned into cash in less than one year. Current assets can be cash, debtors, stocks or prepayments. Current liabilities refer

to those liabilities that will mature within one year. These include items such as trade and capital creditors, and short-term debt.

Differences in working capital have a direct impact on Scottish Water's cash flow. These will be forecast in the financial model.

In the model we use different assumptions for each of the accounts mentioned. The cash account assumption has already been explained. Our other assumptions are outlined in Table 7.2

Table 7.2: Balance sheet assumptions

Title	Assumption	Value
Trade debtors	Number of days	35
Stocks	Percentage of operating expenditure excluding PPP	2%
Prepayments and accrued income	Percentage of revenue	5%
Other debtors	Percentage of revenue	2%
Trade & capital creditors	Percentage of capital expenditure	17%
Accruals and deferred income	Percentage of operating expenditure including PPP	30%
Other creditors	Percentage of operating expenditure including PPP	7%

Changes in non-current accounts will also affect the cash needs of the company. On the assets side we have the fixed assets account, which we assume will vary in proportion to the investment programme. On the liability side, there are accounts such as creditors (amounts that have been due for more than one year) and provisions for liabilities. These will be inputs in the model.

7.5.7 Exceptional/extraordinary costs

By definition, extraordinary items are related to transactions that are unusual in nature, infrequent in occurrence and material in amount. For instance, in the last Strategic Review most of the spend-to-save expenses were projected as extraordinary items, as these were considered to be one-off expenses related to reorganisation.

When we assess prices we propose to assume that there are no exceptional items. We will reconsider this assumption if evidence from Scottish Water suggests

that exceptional items may be a material expense.

7.6 Financial sustainability

In this section we explain the financial ratios we propose to use in the *Strategic Review of Charges 2006-10*. The model will automatically calculate these financial ratios. We can compare the outcome of these calculations with the ratios used by Ofwat. Ratios are important tools that allow us to assess the financial sustainability of Scottish Water.

There is no single financial ratio that can fully describe the financial performance of a company. Usually, financial ratios measure the profitability, liquidity and solvency of a company. Ratios can be compared to benchmarks to assess the company's relative financial position. A commercial bank, for example, will use financial ratios to decide whether to approve a loan.

7.6.1 Financial ratios in our Strategic Review of Charges 2002-06

In the last Review, we highlighted several ratios that we believed were important in understanding the relative financial sustainability of Scottish Water. The ratios contained within the Review are shown in Table 7.3.

Table 7.3: Financial ratios calculated in the Strategic Review of Charges 2002-06

	2001-02	2002-03	2003-04	2004-05	2005-06
Free cash flow cover of interest	-0.7	0.0	0.3	0.7	1.0
% total base operating cost to revenue	47.3%	36.5%	31.6%	29.5%	29.2%
Return on current cost assets (after exceptional items)	7.0%	7.3%	7.6%	8.5%	8.4%
Average depreciation life (years)	25	23	21	21	22

In addition, we specified that the ideal cash flow cover of interest should be around 1.5 and that we would encourage Scottish Water to achieve this target in the long term. We discussed our use of this ratio in more detail in Chapter 4.

7.6.2 Ofwat's use of financial ratios

Ofwat has a duty to ensure that an efficient company can finance its functions. Ofwat therefore uses financial indicators to assess the financial sustainability of water and sewerage companies. Ofwat does not prescribe an optimal capital structure or preferred rating for company debt, but it does use financial ratio comparisons to ensure that a company will be able to access the capital markets.

Ofwat consults with the capital markets on the appropriate financial ratios for the regulatory capital period. We propose to compare Scottish Water's financial ratios with those used in Ofwat's last two price determinations:

- 1999 price review – covering the period 2000-05; and
- 2004 price review – covering the period 2005-10.

Ofwat set out a list of the financial ratios that it had taken into account in setting price limits at the 1999 review in its report, *'Final determination: Future water and sewerage charges 2000-05'*. These ratios are shown in Table 7.4.

Table 7.4: Ofwat's target ratios for 2000-05

	Water and sewerage companies	Large water only companies	Small water only companies
Historic cost interest cover	Min 2x	Min 2.25x	Min 2.5x
Average gearing (D/D+E)	45-55%	45-55%	45-55%
Cash interest cover (EBITDA Basis)	Min 3x	Min 3.4x	Min 3.75x
Cash interest cover (EBIDA Basis)	Min 2x	Min 2.25x	Min 2.5x
Debt payback period (EBITDA Basis)	Max 5 yrs	Max 5 yrs	Max 5 yrs
Debt payback period (EBDA Basis)	Max 7 yrs	Max 7 yrs	Max 7 yrs
Cashflow to capex ratio (EBIDA Basis)	Min 40%	Min 40%	Min 40%

In *'Future water and sewerage charges 2005-10: Draft limits'*, Ofwat outlined the financial indicators that it has used to set prices for the next regulatory period. Table 7.5 shows these ratios.

Table 7.5: Ofwat's draft target ratios for 2005-10

	Target
Cash interest cover (funds from operations/gross interest)	Around 3 times
Adjusted cash interest cover (funds from operations less capital charges/gross interest)	Around 1.6 times
Adjusted cash interest cover (funds from operations less capital maintenance expenditure/gross interest)	Around 2 times
Funds from operations/debt	Greater than 13%
Retained cash flow/debt	Greater than 7%
Gearing (net debt/regulatory capital value)	Below 65%

Ofwat outlined its reasons for changing the financial ratios in its MD190 letter⁵. Its reasoning was based on a publication by Moody's, *'The UK water sector: financial parameters and structural enhancements for leveraged financings – rating methodology'*⁶. The ratios have changed because the rating agencies have become more concerned about cash based ratios and gearing measured as a percentage of RCV. The post-maintenance cash interest cover ratios are also now considered to be more significant.

7.6.3 Our proposals for the Strategic Review 2006-10

We propose to adopt the ratios used by Ofwat in its price determinations for 2005-10. We would therefore intend to target the same levels that Ofwat has targeted. Where Ofwat has stated that a target is "around" a certain level, we assume that the ratio for Scottish Water should be within 25% of the target. We would change price limits to ensure that Scottish Water remains compliant with each of these ratios, except debt/RCV (leverage). This is because Scottish Water has no equity finance.

We also propose to publish the two debt payback period ratios and the cashflow to capital expenditure ratio that Ofwat used for the 2000-05 regulatory period. It would be desirable for Scottish Water to remain within these targets. However, we will not change price limits to ensure compliance with the targets for these ratios. This reflects the capital market's view that these ratios are now outdated. We believe that it is useful to continue to

monitor these ratios to ensure consistency in our approach to financial sustainability.

The following paragraphs explain how each of these ratios will be calculated⁷ and their significance. The financial model manual explains in detail how each of the inputs for these ratios is calculated.

7.6.4 Cash interest cover (2004 price review)

This formula calculates the number of times the profits of one year (generated from operations and after paying any taxes) can cover interest expenses of the same year. A number of 1 would mean that the company generated enough cash to cover interest expenses. This ratio does not take into account any expense on capital. Ofwat expects this financial ratio to outturn at around 3 times for companies south of the border.

Cash interest cover will be calculated as follows:

$$\frac{\text{Net cash flow from operations} - \text{taxes}}{\text{Interest paid}}$$

7.6.5 Adjusted cash interest cover (2004 price review)

This ratio calculates the number of times that interest can be paid out of the profits in one year, adding back maintenance. Ofwat differentiates between maintenance charges and maintenance expenditure and calculates two separate ratios. Throughout the financial model we have assumed that the maintenance charge (infrastructure renewals charge) is the same as infrastructure renewals expenditure. We will correct for any material differences from this assumption at the next Strategic Review through a process of logging up and down⁸. We therefore only calculate one ratio.

Ofwat expects companies to achieve a ratio of around 1.6 times for the maintenance expenditure ratio and around 2 times for the maintenance charge ratio. We

⁵ MD 190, 'Further guidance to companies for final business plans'. March 2004.

⁶ Moody's Investors Service. July 2002.

⁷ Unlike Ofwat, we do not include interest received as income, as the projected amounts are not expected to be material.

⁸ This process is explained in Chapter 11.

propose to use 1.6 times as the appropriate target for Scottish Water.

The adjusted cash interest cover ratio will be calculated as follows:

$$\frac{\text{Net cash flow} - \text{depreciation} - \text{infrastructure renewals expenditure} - \text{tax}}{\text{Interest paid}}$$

7.6.6 Funds from operations to debt (2004 price review)

This ratio measures the percentage of outstanding debt that can be covered by the funds from operations generated over the year. Ofwat expects this ratio to be greater than 13%.

The funds from operations to debt ratio is calculated as follows:

$$\frac{\text{Net cash flow from operations} - \text{taxes} - \text{interest paid}}{\text{Net debt}}$$

7.6.7 Retained cash flow to debt (2004 price review)

This ratio measures the ability of a company to pay its debt back from cash retained within the business. The output is a percentage; Ofwat expects the companies to achieve a ratio of no less than 7%.

The ratio is calculated as follows:

$$\frac{\text{Net cash flow from operations} - \text{taxes} - \text{dividends}}{\text{Net debt}}$$

7.6.8 Gearing (2004 price review)

This is a measure of Scottish Water's level of indebtedness. It is the total debt divided by the RCV. Ofwat expects companies to maintain a ratio of below 65%.

We will monitor this ratio, but we do not expect Scottish Water to decrease its leverage levels significantly.

The ratio is calculated as follows:

$$\frac{\text{Net debt}}{\text{RCV}}$$

7.6.9 Debt payback period (EBITDA basis) (1999 price review)

This is a measure of how many years it would take a company to pay back its debt from earnings before interest, tax, depreciation and amortisation:

$$\frac{\text{Net debt}}{\text{Net cash flow from operating activities}}$$

7.6.10 Debt payback period (EBDA basis) (1999 price review)

This is a measure of how many years it would take a company to pay back its debt from earnings before depreciation and amortisation but after interest and tax:

$$\frac{\text{Net debt}}{\text{Net cash flow from operating activities less interest less tax}}$$

7.6.11 Cash flow to capital expenditure 1999 price review

The cash flow to capital expenditure ratio measures how much of the capital programme is being paid out of current cash flows:

$$\frac{\text{Net operating cash flow from operating activities less tax less interest}}{\text{IRE plus other asset additions less asset disposals}}$$

7.7 Calculating customers' charges

We have described the financial model that we will use to calculate the amount of revenue Scottish Water needs to raise from customers.

After we have established the revenue required, we need to translate this revenue into customers' charges. To do this we use the tariff baskets. The tariff baskets require us to take account of any underlying changes in the customer base that would either increase or decrease the change in prices necessary to match the

change in revenue required. For example, the number of Council Tax Band D equivalent households is increasing at around 1% a year. This means prices for household customers have to increase by less in order to match the revenue required.

Price limits will be applied to primary income only⁹. We propose to subtract the costs associated with providing secondary services from the revenue requirement before matching required revenue to expected revenue. We will ask Scottish Water to forecast its expected costs of providing secondary services. We will also require Scottish Water to justify its assumptions and assess whether or not they are appropriate.

7.7.1 Changes in customer base affecting revenue

We begin by forecasting what the revenue would be if tariffs were kept constant each year. We multiply the tariffs by the relevant tariff multiplier¹⁰.

We will ask Scottish Water for a projection of the relevant tariff multiplier for each tariff. We expect these projections to be based on sensible assumptions and to be justified by reference to historical trends. We would propose to modify any tariff multipliers that we do not consider to have been appropriately justified. If we do modify a multiplier, we will outline our reasons in the *Strategic Review of Charges 2006-10*.

The following example covers charges for unmeasured customers, who pay a fixed charge for connection and a charge based on their rateable value.

Table 7.6: Example of calculation of expected revenue

	Year 0	Year 1	Year 2
Fixed rate	£100	£100	£100
Rateable value rate	£0.1/£1 of RV	£0.1/£1 of RV	£0.1/£1 of RV
Number of customers	1,000	1,100	1,120
Total rateable value	£5,000,000	£6,000,000	£6,050,000
Fixed revenue	£100,000	£110,000	£112,000
Rateable value based revenue	£500,000	£600,000	£605,000
Total revenue	£600,000	£710,000	£717,000
Percentage increase	-	18.3%	1.0%

In this example the revenue from unmeasured customers would increase by 18.3% then 1% if Scottish Water did not change its tariffs. We would repeat this calculation for all tariff baskets¹¹. The result is the expected revenue of Scottish Water for the regulatory control period.

The expected revenue with no tariff change has to be compared with the required revenue that was forecast in the financial model. We then need to calculate the percentage increase in expected revenue required to match the revenue requirement. Table 7.7 shows a worked example.

Table 7.7: Changes in expected revenue (with no tariff change) to match required revenue

	Year 1	Year 2
Previous year revenue	620,000	760,000
Percentage increase in revenue from customer base	18.30%	1.00%
Revenue without tariff change	733,460	767,600
Required revenue (from financial model)	760,000	780,000
Total price increase required	3.62%	1.62%
Inflation	2.00%	2.00%
Weighted average increase (the k factor)	1.62%	-0.38%

⁹ Primary income refers to tariff charges for the provision of water and waste water services. Secondary income is income collected for all services not defined as primary services. For instance, secondary income refers to charges for water for building work, caravans, field troughs, outside taps, septic tank services and sewerage connections. In the year 2003-04 the percentages of primary and secondary income to total income were 96% and 4% respectively.

¹⁰ A tariff multiplier is the appropriate unit that a tariff is multiplied by to calculate a bill. For example, this may be the rateable value, the number of connections or the volume of water consumed.

¹¹ Tariff baskets are explained in Chapter 12.

7.7.2 Understanding the effects of increases on charges for individual customers

Scottish Ministers have asked us to prepare the *Strategic Review of Charges 2006-10*. As part of this Review, we have been asked to set charge limits for various customer groups. We will therefore need to define these groups and to model the effects of increases. Broadly, we will follow the process we have outlined for setting the weighted average price increase for the whole customer base, but do so for individual customer groups. Our aim will be to meet the objectives set by Ministers in their statements on the Principles of Charging in January 2005.

7.8 Summary

Our financial model will provide a reliable, transparent and auditable basis for price setting. We believe that our assumptions are prudent and appropriate but welcome views from respondents on the proposals in this chapter.

7.9 Questions for consultation

1. Do respondents agree with the financial assumptions that we propose to make?
2. Do respondents agree with our proposal to use the Ofwat ratios as the primary indicator of financial sustainability? If not, which ratios should we use?

Section 2: Chapter 8

Establishing an initial RCV

8.1 Introduction

In Chapter 5, we outlined our proposed approach to setting prices. We believe that the price setting process will be more transparent if we establish a Regulatory Capital Value (RCV) for Scottish Water. The cash return allowed on this RCV will form a core element of the price setting approach. This will be consistent with the use of an RCV by other utility regulators in the UK, and with the views of the Competition Commission (formerly the Monopolies and Mergers Commission).

As yet, no RCV has been determined for Scottish Water; in this chapter we discuss the potential approaches we might take in establishing an initial RCV. Chapter 10 examines how the value of the RCV will change over time as a result of additions to the asset base and depreciation of the assets that make up the asset base.

There are four broad approaches that can be used to establish the initial RCV for a regulated utility in the private sector:

- **The accounting approach.** The RCV can be constructed by considering the accounting value of a company's individual assets. By adding up the values of individual assets we can build up a picture of the overall asset value of the company. This approach is also referred to as the 'asset based' approach;
- **The market value approach.** A second way to value the RCV is to consider the value that financial markets place on the firm. The value placed on the company by the stock market is known as the equity value. The total value of a firm is the market value of its debt added to its equity value;
- **The comparator approach.** It is possible to set an RCV by comparing Scottish Water with other similar organisations. The comparator company should carry out the same activities and provide the same services as the utility in question. Ideally, the comparator should be a similar size as the utility, although the observed RCV can be scaled to take account of any difference; and
- **The discounted cash flow approach.** The fourth approach to setting an initial RCV considers the discounted value of the cash flows generated by the assets. This method of asset valuation is based on developing a financial model of the company over a given period, typically 20 years. An assessment is then made of revenues minus costs over the period. The estimated RCV is the net present value of the revenues and costs.

Most UK regulators used the second approach to estimate the initial RCV of their regulated businesses. In the electricity, gas, telecommunications and rail industries, and in most of the water industry outside Scotland, the initial RCV was determined as the value of equity plus the value of debt. There were, however, some differences in the way that the approach was applied. For example, in most cases the equity price was taken at the close of the market on the day of the sale, whereas for the water industry in England and Wales an average price over the first 200 days of trading was used.

Although the market-based approach is the one that is most commonly used, it is obviously not possible to apply this method for a public corporation such as Scottish Water. There is no market value of equity to form the basis of an estimate of RCV. We therefore need to use an alternative method to set an initial RCV for Scottish Water.

In the remainder of the chapter we consider the approaches used by Ofwat for determining initial values for the water and sewerage companies and the water only companies. We then set out the options for estimating Scottish Water's initial RCV which we believe could work. We would welcome the views of stakeholders.

8.2 The water industry in England and Wales

8.2.1 Ofwat's approach

At the time of privatisation in 1989, the Secretary of State for Environment and the Secretary of State for

Wales assessed an asset value for each water and sewerage authority. In advance of flotation there was no market evidence to value the authorities, and the book value of assets was not considered to provide a reliable guide to the current market value. The Secretaries of State therefore valued the authorities on the basis of the cash flows that would have been generated had they remained in the public sector. The resulting values were known as the 'indicative values'.

This approach, however, appeared to undervalue the companies when compared with subsequent market evidence. Ofwat therefore consulted on the appropriate way to set an initial capital value in the run-up to its 1994 price review. In November 1992, Ofwat issued a consultation document, *'Assessing capital values at the periodic review: a consultation paper on the framework for reflecting reasonable returns on capital in price limits'*, which considered the following key issues:

- The use of market evidence on company values, both at the time of initial price setting and at the time of the periodic review;
- Accounting treatment of possible advancement of price limits to achieve satisfactory financial profiles. This concerns the need to make an adjustment to the allowed price limits so that the companies' financial ratios are viewed as acceptable by financial markets, given the regulator's duty to ensure that properly managed companies can access the capital markets; and
- How differences between expectations and outturn should be handled. In other words, how price limits should reflect changes in the planned level of outputs and differences in costs (either because of changes in efficiency or because general price movements were different from those expected).

It is the first issue which is relevant to establishing an initial RCV for Scottish Water. With respect to the water and sewerage companies in England and Wales, the consultation stated:

"At initial price setting, the Secretaries of State had to make an assessment of the value of existing assets in establishing the overall return required by water companies. At the Periodic Review, the Director has some market evidence which can be used more directly, at least in the case of the water and sewerage companies. There are, nonetheless, a variety of ways in which these company values might be measured.

Market evidence relates principally to the equity component of a company's capital. But the reasonable return on capital needs to remunerate both investors and creditors. To determine the total value, the value of debt therefore has to be added (or any cash balances deducted). In principle, the market value of debt should also be used; in practice, only book values are readily available.

The proceeds from the sale of the water and sewerage companies were around £5.2 billion. In establishing the appropriate initial value for equity it is appropriate to make some allowance for the expected premium on flotation. One approach would be, as suggested by the NAO report¹, to consider the market capitalisation at the end of the first day's trading. This was £6.1 billion². The handling of the cash injection of £1.5 billion is more problematic. On one view, it resulted in a permanent reduction in price limits, and should be regarded as a source of finance for new capital expenditure on which the company should not expect a return; on another, it merely changed the profile of charges, without affecting company value."

With respect to the water only companies in England and Wales, the consultation stated:

"The comparable assessment of the values of water only companies is less obvious, since these companies were not floated and, in many cases, are not currently quoted or widely traded. There are therefore problems in interpreting available share price information, and alternative approaches may be required. The Director is considering this matter further in conjunction with those companies."

¹ *Sale of the water authorities in England and Wales*, February 1992.

² The NOA report indicates that the average premium, after adjustments for general movements in share prices, was 8.7%, within the 10% target set by the Department of Environment and the Welsh Office.

The periodic review document, *'Setting price limits for water and sewerage services: the framework and approach to the 1994 periodic review'* set out Ofwat's conclusions following the consultation. This formalised Ofwat's use of the RCV to determine capital costs for the purposes of price regulation. This approach was used at the 1999 periodic review and again at the 2004 review.

At the 1994 price review, Ofwat discussed two approaches that could be used for estimating the initial value of the RCV. The first approach was the accounting approach, which used the asset values reported in historic cost or current cost accounts. The second approach was the market valuation approach.

Ofwat's 'initial market value' approach in setting the initial RCV for water and sewerage companies is summarised as follows:

- The initial market value is the initial capitalisation, based on share prices adjusted for the part-paid nature of the shares, plus any debt and deduction of the cash injection;
- In considering what needs to be remunerated, the value of debt in the company's balance sheet is included. Borrowing cost, as well as dividends, is part of the financing costs that must be met from the overall return on capital;
- Cash balances are deducted in determining the initial value. Until used to purchase fixed assets, these cash balances were remunerated by interest receipts;
- For the value of equity, a number of measures of initial capitalisation could be taken. For water and sewerage companies, Ofwat adopted the market value based on share prices averaged over the first 200 days of trading as offering the most reasonable measure of initial share value to be remunerated; and
- For the value of debts, Ofwat would have used the market value in principle, but in practice only book values were readily available.

It was practical to carry out this exercise on the water and sewerage companies. However, as noted above, dealing with the water only companies was more problematic because reliable market data was not available.

Ofwat therefore established the RCV for water only companies using water and sewerage companies as comparators. They argued that this approach was consistent with the general approach to estimating the RCV for privatised industries and was relatively straightforward to apply. To apply the comparator approach, Ofwat assumed that the ratio of 'market value' to 'current cost accounting (CCA) asset value' was the same for the water only companies as the average for the water and sewerage companies.

Ofwat recognised, however, that such an approach presented practical difficulties. As it explained:

- the ratios for individual water and sewerage companies vary significantly;
- the approach could give only a broad indication of the comparable initial RCV; and
- at the initial price setting, the Secretary of State identified alternative measures of the indicative value for the water only companies, which in some cases were significantly different from each other.

8.2.2 The Monopolies and Mergers Commission (MMC) view of Ofwat's approach

The Monopolies and Mergers Commission (now the Competition Commission) is the body to which the water companies can appeal if they disagree with Ofwat's price determinations. The MMC has the authority to redetermine an appellant company's price limits after examining Ofwat's review in detail. After an investigation it comments, in a published report, on the suitability or otherwise of each element of Ofwat's methodology.

Following the 1994 periodic review the MMC reported on the determinations of South West Water and Portsmouth Water. In its reports, the MMC broadly endorsed Ofwat's approach to the RCV.

With respect to the initial value of the RCV the MMC stated³:

“At least as important as the issue of the cost of capital is that of the capital base to which it should be applied. The former water and sewerage authorities were privatised at some 15 per cent of their then current cost book value. There is clearly no justification for applying the cost of capital to the full current cost value of the asset, which would result in significant redistribution of income from consumers to shareholders; nor, given the long life of assets and the sufficiency of funds to cover depreciation of existing assets and renewal of infrastructure assets, is there any economic reason to do so. On the other hand, it is clearly necessary to apply a capital base which allows existing shareholders a reasonable return; uncertainty over returns to shareholders would itself jeopardise the attraction of new capital to the company.”

As part of the appeals to the MMC in 1995, the water industry trade associations objected to Ofwat’s calculation of capital value and suggested that full indicative values should be adopted. They argued that the average market value of equity over the first 200 days of trading in company shares (less any net cash position) was not a fair reflection of the true value of the companies for the purposes of setting future price limits. As we have seen, the MMC rejected any valuation that does not reflect how much investors paid for the companies.

The trade associations also complained that Ofwat’s approach had been materially different from the approach taken by the Director General of Electricity Supply in determining price controls for the electricity distribution businesses and from the approach taken by the MMC in its report on British Gas. The water trade associations were concerned that they could be disadvantaged in the long term relative to other regulated utilities by unjustified variations in approaches towards common issues taken by the various regulatory bodies. However, the MMC also rejected this complaint, explaining that the different circumstances of the water industry justified the different approach.

“The treatment adopted by the Director differs from that put forward by the MMC in the context of the Gas inquiries. In the Gas reports, we acknowledged that the appropriate value for the ratio of stock market valuation to CCA values (referred to as the market to asset ratio – MAR) could not be precisely calculated. In the context of that inquiry (including other financial factors), we suggested adoption of a ratio similar to that prevailing some six months prior to the start of the inquiry and we also proposed a somewhat different approach to treatment of investment, allowing for all investment rather than net investment in calculating subsequent additions to the asset base. The circumstances of the water industry are different, in particular the extent of the Director’s involvement in the investment programme of the companies, both in requiring that particular investment programmes are undertaken, and in disallowing investment in certain cases over and above the statutory requirements in setting prices.”

8.3 Potential options for setting Scottish Water’s initial RCV

8.3.1 Introduction

At the last Strategic Review of Charges we used a cash-based approach to assess the industry’s revenue requirement. At this Review we propose to adopt the RCV approach.

As we have seen above, there are a number of approaches that could be used to set Scottish Water’s initial RCV. The most common approach, which uses the market value of the firm’s equity plus the value of debt, cannot be applied. The three remaining approaches to establishing an initial RCV are:

- asset based approaches;
- comparator approaches; and
- discounted cash flow approaches.

³ *South West Water Services Ltd: A report on determination of adjustment factors and infrastructure charges for South West Water Services*, MMC, 1995.

8.3.2 Asset based approaches

In Australia regulators have tended to use asset based approaches. There are several different asset based approaches. Four common approaches are:

- depreciated actual cost;
- depreciated indexed historical cost;
- depreciated optimised replacement cost; and
- modern equivalent asset value.

Depreciated actual cost (DAC)

The depreciated actual cost approach is the simplest of the asset based approaches. The DAC is the value that would result from taking the historic cost value of the fixed assets and subtracting the accumulated depreciation for those assets.

In accounting terms, the historical cost value of an asset is the original cost of the purchase, delivery and installation of an asset. In contrast, the current cost value of an asset is the original cost in current price terms. Supporters of depreciated actual cost argue that if regulation is to act as a surrogate for competition, the asset valuation methodology should be the same as that used by the private sector. In Australia, most listed companies use depreciated actual cost as a basis for recording asset value.

The simplicity of the DAC approach makes it attractive. However, the use of a simple historic cost measure for the RCV raises a number of issues:

- The DAC approach does not allow for the impact of inflation on asset values. Over time the money value of all assets tends to increase, in just the same way that the prices of the goods and services that we buy in the shops tends to increase. If the prices of all goods and the values of all assets tend to increase in line with inflation, we might expect the same to be true for the RCV as well. This is important because, for a given rate of return, the

total return will be lower if the asset base has not been adjusted for inflation;

- The DAC approach does not allow for the impact of innovation asset values. Innovation means that a modern asset can deliver the same output more cheaply and more efficiently than an old asset. For a given rate of return, the total return will be higher if innovation is not taken into account when valuing the asset base; and
- The DAC approach does not take account of efficiency.

It is also argued that DAC generally bears little resemblance to the economic value of the assets, in the sense that it bears no direct relationship to future cash flows that the assets will generate in their normal use.

Depreciated indexed historical cost (DIHC)

Some regulators consider DIHC as a useful reference point for setting the initial capital base. The DIHC approach adjusts historical asset values to take account of inflation by applying an appropriate inflation index. The inflation index takes account of the increase in capital prices experienced by the economy as a whole. One index that could be used for making this adjustment is the Capital Output Price Index.

The DIHC approach is one form of current cost valuation. As a result of applying the inflation adjustment the asset valuation will be higher than it otherwise would be. It is, however, more likely to reflect the actual current value of the assets.

Depreciated optimised replacement cost (DORC)

The DORC methodology focuses on the physical attributes of the assets. The DORC is the net current cost of replacing an existing asset with an asset that has similar service potential. The valuation has two important characteristics:

- The potential replacement assets take account of innovation; and
- The new asset base incorporates opportunities to optimise the configuration of the network. An optimised system is a reconfigured system designed to serve current demand plus the expected growth in demand as efficiently as possible over a specified period. This method excludes any unused or under utilised assets beyond the specified planning horizon.

Calculating the degree of optimisation is a contentious issue. On the one hand utilities are faced with the possibility that they will recover insufficient depreciation if the potential for optimisation is overestimated. On the other hand, customers will be concerned that charges are higher than they need to be if the potential for optimisation is underestimated.

The DORC approach is difficult to calculate. It is appropriate in a mature industry with well-developed asset registers and well-defined analytical processes for evaluating over-design, capacity and redundant assets. This may rule this method out for setting the initial RCV of Scottish Water.

Modern equivalent asset valuation (MEAV)

Similar to the DORC approach, the MEAV methodology values the assets on the basis of replacing the existing assets with a technically up-to-date new asset with the same service capability. It further allows for any difference in the quality of output and in operating costs. Net MEA value is the gross MEA value net of accumulated depreciation.

MEAV is most suited for industries that use long-lived assets, such as the water industry, where the technology behind these assets is steadily (but not rapidly) evolving. It is used by Ofwat and other utility regulators in the UK as it provides an up-to-date valuation of the asset base; some of which will have been purchased and installed many years ago, making the original acquisition cost a poor indicator of current value.

We ask Scottish Water to provide a gross and net MEA value as part of its regulatory return to us. One concern would be that the reported MEAV has been rather volatile in the last few years. However, using the net MEAV as an indicator of the initial RCV may be relatively straightforward.

8.3.3 Comparator approaches

We could use the comparator approach, which is consistent with the approach Ofwat used to set the initial RCV of the water only companies. To do so, we would need to identify companies that are broadly comparable to Scottish Water. Ideally, the comparator should have comparable business risk exposure, should have similar core and non-core business lines, and should be of a similar size. Two sets of information would need to be available for the comparator company:

- First, a financial measure that is also available for the utility (ie Scottish Water) should be available for the comparator. This financial measure could be the book value of debt, the book value of fixed assets or the current cost accounting value of fixed assets; and
- Second, a financial measure that is relevant to estimation of the RCV should be available for the comparator. If the comparator were regulated and had an RCV this could be the RCV itself. If the comparator had no RCV it could be an equity value for the firm.

We would then consider the relationship between various financial measures for the comparator firm. For example, if we had information on the value of fixed assets and on the market value of equity we could calculate the ratio of market value to fixed asset value.

If the comparator company is similar to Scottish Water we could assume that the same relationship would hold for Scottish Water. We can then use our knowledge of the value of Scottish Water's fixed assets to establish the initial RCV.

The water and sewerage companies in England and Wales would provide the most obvious comparators for Scottish Water. We believe that there are a number of ways that we could look to set an initial RCV for Scottish Water based on comparison with the companies south of the border.

The options would include setting the initial RCV for Scottish Water by making comparisons with:

- asset bases (in terms of both value and structure);
- non-infrastructure capital investment;
- Welsh Water's debt to RCV ratio;
- companies' funding costs of RCV ratio (ie debt and dividends); and
- assets relative to the type and number of customers served.

The options would also include comparing the factors outlined above historically with those for Scottish Water today, in order to reflect the opportunities that Scottish Water has had to transform its operations.

Each of these comparisons is likely to yield different answers. If we use this method, we are likely to consider using average, median or mode calculations in order to finalise an initial RCV for Scottish Water.

8.3.4 Discounted cash flow approaches

The final option that we propose to consider is the discounted cash flow method of asset valuation. We would use our financial model to calculate the current value of Scottish Water.

In order to calculate a value we would have to consider the value of Scottish Water today. We can calculate this by keeping prices consistent in real terms, assuming that operating and PPP costs increased in line with inflation, and that capital expenditure is equal to depreciation. The cash flow of Scottish Water would then equal:

$$\text{Revenue} - \text{operating costs} - \text{PPP} - \text{capital expenditure} \\ = \text{cash flow for valuation purposes}$$

We would then use an appropriate discount rate to assess a value for these cash flows in current money.

Discounting future cash flows at an appropriate rate takes account of profits that will occur in the future. This discount rate recognises that £1 of profit in the hand today is worth more than the promise of £1 of profit in one year's time. Likewise, the promise of £1 of profit in one year's time is worth more than the promise of £1 of profit in two year's time. The discount factor works by scaling down the value of the profit by a small amount more for each year that it will occur in the future. The value today is retained by totalling the discounted future profit for each year.

There are a number of difficulties in using the discounted cash flow method to establish an initial RCV. There are the obvious assumptions that have to be made to assess future cash flows. For example: Are the assumptions on revenues and costs realistic? Should capital expenditure take account of innovation?

Perhaps even more problematic is the choice of an appropriate discount rate. The higher the discount rate, the lower the initial RCV. As the RCV is a factor in calculating the resources that are required to finance current and future assets, it follows that a lower RCV would require a higher rate of return for the industry to be funded on a sustainable basis. It would be difficult to justify using a different rate of return and discount rate for establishing the RCV, because that would introduce a degree of circularity into the calculation that is not desirable.

8.4 Summary

As we explained in Chapter 5, our proposal to use the RCV approach to price setting will require us to set an initial RCV for Scottish Water. We are unable to use the market based approach of other regulators because Scottish Water is in the public sector.

We believe, however, that other methods are available which will allow us to set a robust initial RCV for Scottish Water, namely an asset value approach, a comparator approach and a discounted cash flow approach.

We are encouraged that Ofwat has used the comparator approach successfully in setting the initial RCV of the water only companies. It could also be useful to draw on experiences in Australia in setting RCVs for public sector companies.

8.5 Questions for consultation

1. Do stakeholders agree that there are broadly three ways to establish an initial RCV for Scottish Water?
2. Which method would stakeholders see as the most reliable, and why?

Section 2: Chapter 9

The allowed rate of return

9.1 Introduction

In Chapter 5, we outlined our proposals to switch to a Regulatory Capital Value (RCV) approach in setting prices at the Strategic Review of Charges 2006-10. The RCV approach separates the cash cost of replacing assets (depreciation) from the financing and management costs. These financing costs and management costs are the cash return on the regulatory capital value. We explained that we would estimate the cash return on the RCV using the formula:

$$\text{Cash return on the RCV} = \text{RCV} \times \text{Allowed rate of return}$$

In Chapter 8 we explained how we intend to set an initial RCV. In the private sector, a regulator sets an allowed rate of return. This is often referred to as the cost of capital. The regulator will set this rate of return to reflect current and expected market conditions. The regulator has a duty to set an appropriate rate of return that allows an efficient company to properly finance its functions. The company is free to choose a mix of debt and equity funding, but its rate of return is capped (unless it outperforms efficiency targets).

In the public sector, the regulator is not able to set the rate of return based on his observation of the cost of capital in the market. Scottish Water's cost of debt is set by Government. As a public sector organisation, Scottish Water has no contributed equity capital, although it generates trading surpluses and reinvests these proceeds.

This chapter outlines our proposals for how we might arrive at the appropriate rate of return in the Strategic Review. It begins by explaining the rate of return; it then reviews how regulators have set the allowed rate of return for companies in the private sector. The chapter concludes by outlining how we propose to set the allowed rate of return in the Review. We welcome views from all stakeholders on our proposed methodology.

9.2 The allowed rate of return

9.2.1 What is a rate of return?

A simple example of what the rate of return means would be to consider the interest that is earned on savings in a bank account. Say, for example, that we deposited £200 in a bank at the start of the year and at the end of the year the bank statement says there is £210 in the account. We can calculate the rate of return as follows:

$$\begin{aligned} \text{Rate of return} &= \frac{210 - 200}{200} \times 100\% \\ &= \frac{10}{200} \times 100\% \\ &= 0.05 \times 100\% \\ &= 5\% \end{aligned}$$

In the above example, calculating the rate of return in the year is a relatively straightforward exercise since we know the values at the start and at the end of the period. The bank sets a rate of return that it believes will allow it to attract funds. The bank will make use of these funds to generate a profit.

In a similar way, we need to set a rate of return that will allow Scottish Water to cover its costs, invest for the future and remain financially sustainable.

9.2.2 What is an allowed rate of return?

The allowed rate of return is the rate of return that we believe Scottish Water requires in order to meet the objectives that have been set by Scottish Ministers.

If we set the allowed rate of return at too low a level, there is a risk that Scottish Water would not have sufficient funds to meet its obligations. This could result in debt increasing to unsustainable levels. This would benefit current customers, but would penalise future customers. Alternatively, it could result in a failure to

deliver environmental, public health or customer service benefits. Customers would pay lower charges if the rate of return was set too low, but they would also receive a poorer service.

If we set the allowed rate of return at too high a level, customers will pay more than they need to. This could act as a disincentive on management to achieve efficiency targets. This would mean that customers pay more than is necessary in the medium term. Alternatively, the level of outstanding debt could decline significantly relative to the asset value of the company. This would penalise current customers to the benefit of future customers.

Our objective therefore has to be to ensure that we set an allowed rate of return for Scottish Water so that it can finance its efficient operation.

9.2.3 What is a weighted average cost of capital?

The Weighted Average Cost of Capital (WACC) is the overall cost of capital for a firm. It takes account of the capital structure of the firm (ie the market value of its debt and equity) and the rates of return it pays on both its debt and equity.

Retained earnings and share issues are examples of equity. Investors normally hold equity because they expect that they will earn dividends or because they expect that the shares will increase in value.

A private firm can also borrow, by issuing bonds or commercial paper or by seeking a loan from bankers. The firm will have to repay the initial amount of money borrowed at the end of the loan term, and meet interest costs as they become due.

Investors will seek a higher return if they consider that the investment carries a higher level of risk. By risk, we mean the possibility that the investor will not get back some or all of the money invested.

Debt is usually viewed as being less risky than equity. This is because debt normally carries a defined annual

rate of interest and in the event of bankruptcy debt holders get paid before shareholders. Equity also pays a less certain amount each year (dividends are at the discretion of the firm). Investors therefore typically require a greater return from equity of a firm than from its debt.

However, as the amount of debt a firm has increases, so does the risk that a firm will not be able to meet its interest payments or repay all of its debt on time. Firms with high levels of debt may have to provide investors with a higher rate of return for new debt than other similar but less indebted firms.

The weighted average cost of capital combines the rate of return from debt and from equity relative to the share of each in the market value of the firm. The formula for assessing the weighted average cost of capital is shown in Figure 9.1¹.

Figure 9.1: Pre-tax weighted average cost of capital

$$\text{WACC} = \left[r^D \times \left(\frac{D}{D + E} \right) \right] + \left[r^E \times \left(\frac{E}{D + E} \right) \right]$$

Where:
 r = return
 D = debt
 E = equity

As a worked example, assume that the market value of a firm's debt is £25 million and a firm's equity is £75 million. It pays an annual interest rate of 10% and dividends at 15% of the market value of the equity. The weighted average cost of capital is calculated as follows:

$$\begin{aligned} \text{WACC} &= 10\% \times \frac{25}{25 + 75} + 15\% \times \frac{75}{25 + 75} \\ &= 10\% \times 25\% + 15\% \times 75\% \\ &= 2.5\% + 11.25\% \\ &= \mathbf{13.75\%} \end{aligned}$$

In order to calculate a weighted average cost of capital, a regulator has to decide an appropriate rate of return for both debt and equity. He has also to assign an

¹ Assuming no tax advantage to debt or equity.

appropriate market value to the debt and equity of the firm. His calculation of the rate of return is further complicated by both taxation and inflation.

9.2.4 Taxation

Debt and equity are treated differently for tax purposes. Interest charges are an allowable expense for the purpose of corporation tax. Interest charges therefore reduce a company's tax bill. Dividends are paid from the profit that a company makes after paying tax.

The corporation tax advantages of debt are recognised in the post-tax weighted average cost of capital calculation. This is shown in Figure 9.2.

Figure 9.2: Post-tax weighted average cost of capital

$$WACC = \left[r^D \times \left(\frac{D \times (1-t)}{D + E} \right) \right] + \left[r^E \times \left(\frac{E}{D + E} \right) \right]$$

Where:
 r = return
 D = debt
 E = equity
 t = corporation tax rate

9.2.5 Inflation

Inflation is the measure of the general rise in the prices of goods and services. Inflation causes the purchasing power of money to be eroded. The investor is therefore concerned with the real rate of return – that is the return after having adjusted for the effect of inflation.

The formula for calculating the real rate is shown in Figure 9.3.

Figure 9.3: Formula for calculating the real rate of return

$$\text{Real rate of return} = \text{nominal rate of return} - \text{inflation rate}$$

It is important to differentiate between the real rate of return (when inflation has been taken off) and the nominal rate of return (when it has not).

9.2.6 WACC and public corporations

There are difficulties in assessing the WACC for a public corporation. This is because the regulator cannot easily observe the costs of debt or equity and, moreover, it is also difficult to estimate the market value of the organisation. We will return to these issues later in this chapter. First we consider how regulators of private companies assess the costs of debt and equity and address issues relating to market value.

9.3 How regulators set WACC for private sector companies

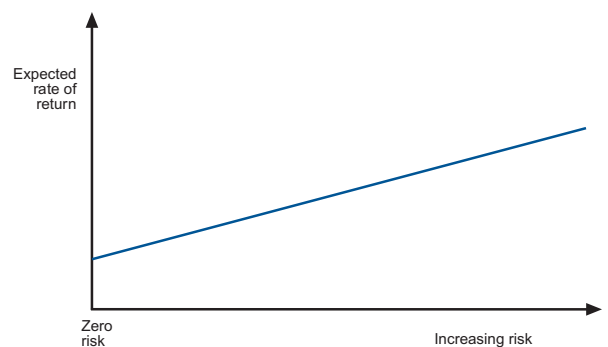
9.3.1 The rates of return for debt and equity

An investor decides where to invest his money by considering the rates of return offered to him by the options open to him, and taking account of the rate of return relative to its risk.

The ratio of the rate of return to the level of risk should be constant. The lowest rate of return is paid on an investment has no risk.

The investor makes his choice based on the rate of return and the level of risk. Figure 9.4 illustrates that an investor would expect a greater return if the investment was considered to be more risky.

Figure 9.4: Comparison of expected rate of return and risk



9.3.2 Risk-free rate of return

Figure 9.4 shows the 'risk-free' rate of return. Even if there is no risk an investor would still require a return because of the opportunity cost in choosing not to spend on goods and services immediately.

Government bonds² are generally considered to have no default risk. The Government will always meet its financial obligations. The return on a bond is set by the interest rate and the principal to be repaid. Over time inflation will erode the value of this return. There is therefore a residual inflation risk for the investor.

The Treasury also issues index-linked bonds. These bonds pay an annual interest rate of inflation³ plus a real rate of return. These bonds have no default or inflation risk.

Regulators can establish the risk-free rate of return by analysing the rate of return on index-linked treasury bonds. If we consider as an example an index-linked Treasury bond that costs £98 today which matures in one year's time, paying £100 plus £3 in interest and £2.50 in inflation. Inflation is expected to be 2.5%. The real risk-free rate of return would be calculated as follows:

$$\begin{aligned} \text{Real rate of return}^4 &= \frac{105 - [98 \times 1.025]}{98 \times 1.025} \times 100\% \\ &= \frac{105.5 - 100.45}{100.45} \times 100\% \\ &= \frac{5.05}{100.45} \times \frac{100\%}{1} = 5.03\% \end{aligned}$$

The real risk-free rate of return for the forthcoming year is 5.0%.

The risk-free rate will change according to market conditions.

² Also known as Gilt-edged bonds or Gilts.

³ Measured using, for example, the retail price index.

⁴ This is the real rate of return since it includes the effects of inflation.

⁵ Wright, Mason and Miles: *A study into certain aspects of the cost of capital for regulated utilities in the UK*; February 2003 report on behalf of Smithers & Company Limited, published by Ofgem and commissioned by the UK economic regulators and the Office of Fair Trading.

9.3.3 Estimates of the risk-free rate

The risk-free rate of return is an important input to the calculation of the WACC. Table 9.2 shows a comparison of some recent estimates of the risk-free rate. Each of the studies uses index-linked Treasury Bonds as the basis for their estimate. However, each estimate uses a different time-horizon to judge the appropriate risk-free rate.

Table 9.2: How other regulators estimate the risk-free rate

Regulator	Year of review	Basis	Time period	Rate
Ofwat	2004	Index-linked Treasury bonds	Medium-term historical average	2.5%-3%
Oxera (for Ofgem)	2004	Index-linked Treasury bonds	Considered both historical averages and future rates	2.25-2.75%
Civil Aviation Authority	2001	Index-linked Treasury bonds	Medium-term historical average	2.75%-3.25%
Joint Regulator study ⁵	2003	Index-linked Treasury bonds	Medium-term historical average	2.5%

A regulator also has to make an assessment of the extra risk (beyond the risk-free rate) that an investor in the regulated company must assume. The extra risk and therefore extra return required by an investor will be lower in the case of debt than in the case of equity.

9.3.4 Additional rate of return on debt

The debt of a regulated company has a risk of default. Investors will therefore demand a higher rate of return than the risk-free rate.

If a company's debt is traded on a market then the regulator can observe the additional rate of return that investors demand. The additional rate of return is calculated by subtracting the risk-free rate from the observed return on the company's debt.

Alternatively, regulators can seek to establish an appropriate return by using information from ratings

agencies. Firms with traded debt are rated by agencies such as Moody's, Fitch Ratings and Standard and Poor's.

One potential issue in setting an appropriate rate of return on debt is whether or not to include the cost of 'embedded' debt. A company borrows at prevailing market rates. The market rate will fall if inflation falls. A company has to accept the inflation risk when it borrows unless it borrows on an index-linked basis. Such borrowing (termed embedded debt) may appear expensive (or cheap) in the future.

In theory, if a regulator correctly assesses both the long-term risk-free rate and the long-term debt premium, companies should develop a portfolio of debt that is broadly equivalent to the long-term rate of return. At times of low interest rates a company will be able to borrow at below the assessed rate of return on debt; at times of high interest rates a company will be forced to borrow above the assessed rate of return.

It is not certain that the risk-free rate and debt premium can be determined with sufficient confidence or that a company is likely to issue debt sufficiently often to benefit from this portfolio effect.

Many commentators argue that embedded debt should, at least in part, be included in the cost of capital. However, allowing for the costs of embedded debt could reduce the incentive to manage debt efficiently. If companies know that the regulator will set prices that fund them for all debt that is taken out at above-market rates, then this could encourage firms not to take a prudent long-term approach to their finances.

In practice, the regulator has to make a judgement about whether or not to fund embedded debt.

Ofwat looks at market-based evidence, the companies' credit ratings and evidence from investors. In its 2004 draft price determinations⁶, Ofwat explained that it had analysed the premium to the risk-free rate paid by water companies and considered that it was historically low.

Ofwat considered that such a low premium to the risk-free rate was unlikely to be continued over the regulatory period. Its advisors supported this view and consequently Ofwat decided to allow a higher premium.

At its 1999 price review, Ofwat allowed an embedded debt premium. It accepted evidence from the regulated companies about the effects of embedded debt.

However, in its draft determinations for 2004, Ofwat has decided not to allow for any impact of embedded debt. It reasons that the arguments for an embedded debt premium are not as strong as they were in 1999, because Ofwat has allowed a higher premium to the risk-free rate in the draft determination than was necessary in the current market.

9.3.5 Estimating the rate of return on equity

The cost of equity cannot easily be observed in the market. Regulators therefore typically use the capital asset pricing model and the dividend growth model to estimate an appropriate cost of equity.

9.3.6 The capital asset pricing model

The capital asset pricing model estimates the return on a particular equity using three variables: the risk-free rate (discussed above), the market risk premium and the beta of the stock. The market risk premium is the expected return on the market minus the risk-free rate. This cannot be calculated with certainty but can be estimated using historical returns. The beta of a stock measures its volatility relative to the volatility of the market. A stock with a beta of 1 is no more or less volatile than the market, whereas a stock with a beta of 0.5 will be only half as volatile (ie it will typically move 0.5% if the market moves 1%).

The formula for the capital asset pricing model is shown in Figure 9.5.

⁶ "Future water and sewerage charges 2005-10 – Draft determinations"

Figure 9.5: The capital asset pricing model

$$r = r_f + \beta (r_m - r_f)$$

Where:

r = return on the equity of the firm
 r_f = risk-free rate
 β = beta
 r_m = return on the market

9.3.7 Dividend growth model

The dividend growth model measures the return on a share by forecasting future dividend growth. The model assumes that expectations on future dividends are correctly incorporated into the current share price. The formula for the dividend growth model is shown in Figure 9.6.

Figure 9.6: The dividend growth model

$$r = \frac{DIV_1}{P_0} + g$$

Where:

r = rate of return
 DIV_1 = projected dividend for next year
 P_0 = current market price
 g = expected rate of growth in dividends

The present share price can be observed in the market. Expected dividends and the likely growth rate of dividends have to be estimated based on company guidance or analysts' reports.

9.3.8 How regulators have calculated the rate of return on equity

Ofgem, Ofwat and the CAA all use the capital asset pricing model to estimate the return on equity. Ofwat and Ofgem have also used the dividend growth model to confirm their analysis.

Regulators generally comment on the difficulty of estimating the market return. However, regulators have arrived at similar views of the equity risk premium. This is shown in Table 9.3.

Table 9.3: Comparison of calculation of market rate of return

Regulator	Year of review	Basis	Rate
Ofwat	2004	Forward looking, based on market evidence	4%-4.5%
Oxera (for Ofgem)	2004	Forward looking, based on market evidence	3.5%-4.5%
CAA	2001	Actual market returns on equity	3.5%-4.5%

Ofwat and Ofgem have used a beta of 1 in their 2004 draft determinations. They believe that recent declines in the beta are the result of increased market volatility and do not reflect a reduction in the risk of water companies or electricity distribution companies. Ofwat has suggested that it is prudent to use a beta of 1 in volatile markets.

9.3.9 The mix of debt and equity

As discussed above, regulators have to determine an appropriate capital structure in order to set an allowed weighted average cost of capital.

There is no consensus on the optimum mix of debt and equity. Regulators can set the allowed rate of return with reference either to:

- projected proportions of debt and equity in the market value of the company; or
- an assessed efficient level of debt and equity.

There are two ways that a regulator can measure the level of debt and equity in a company:

- By using the market value of debt and equity; and
- By using the RCV as a proxy for the market value of the company. The level of debt is the debt issued by the company; the difference between the RCV and the level of debt is therefore the level of equity.

Ofwat has used the RCV as a proxy for the market value of the regulated entity. This approach avoids the difficulty of assessing the market value of the regulated

firm's equity. This is difficult because the regulated firm will usually be a subsidiary of a holding company. It will be the shares of the holding company that are traded on the Stock Exchange.

If weights are set using the projected proportions of debt and equity in the market value of the company, then the allowed rate of return will probably better match the demands for interest payments and dividends that a company faces. However, companies are likely to have chosen different mixes of debt and equity. It would not be appropriate for a regulator to set a different allowed rate of return for each company. Moreover, it is important that the onus is placed on the company to maintain the balance between debt and equity that allows it to access the capital markets on a sustainable basis.

If weights are set on the basis of an assessed efficient capital structure then this creates the incentive for the company to manage the costs associated with debt and equity efficiently.

In 2004 Ofwat and Ofgem estimated WACC based on their view of an efficient capital structure. Their view on the efficient capital structure was based on discussions with experts, market observations, academic evidence and advice from the ratings agencies.

9.3.10 Summary of approaches to setting WACC by regulators of private sector companies

Regulators generally follow a broadly similar procedure in setting the allowed rate of return. This is summarised in the flow diagram in Figure 9.7.

Figure 9.7: Setting an allowed rate of return

1) Assess the appropriate risk-free rate using long-term return on index-linked Treasury bonds

2) Assess the appropriate debt premium. If the company's debt is not traded, find an appropriate comparator.

3) The sum of 1) and 2) gives the return on debt.

4) Calculate the market risk premium using long-term returns.

5) Calculate the Company's beta. If the company is not traded then we use the beta of a comparator.

6) Using information from 1), 4), and 5), calculate the return on equity using the capital asset pricing model.

7) Calculate the proportion of the company's RCV that is debt, use this to weight the information from 2) and 6) to calculate the company's weighted average cost of capital – this is the allowed rate of return.

The formula for calculating the allowed rate of return is shown in Figure 9.8.

Figure 9.8: Calculation of the allowed rate of return

$$\text{WACC} = \frac{D}{\text{RCV}} \times (r_f + r_i) + \left[\frac{1 - D}{\text{RCV}} \right] \times \left[r_f + \beta (r_m - r_f) \right]$$

Where:	=	
D	=	level of debt
RCV	=	regulatory capital value
r_f	=	risk-free rate
r_i	=	interest rate premium
β	=	beta
r_m	=	return on the market

9.4 Setting an allowed rate of return for Scottish Water

We have described the process that is used by the regulators of the private sector utilities to set an allowed rate of return. The chapter continues by looking at how we might set an appropriate rate of return for Scottish Water. Our aim is to allow Scottish Water to earn a return that is sufficient for it to fund its activities in a sustainable way. We propose to seek a balance between current and future customers by ensuring that the allowed rate of return is only just high enough to cover the costs of the benefits provided to current customers.

9.4.1 Financing of Scottish Water

As a public corporation, Scottish Water has only two sources of funds: revenue from customers and new debt. Scottish Water does not borrow directly from the capital markets, nor does it borrow at commercial rates. Scottish Water borrows from the Scottish Consolidated Fund at public-sector borrowing rates.

Scottish Water does generate surpluses and therefore has retained earnings, which it can invest to achieve the outputs set by Scottish Ministers. It does not currently pay dividends and therefore all of the surplus generated can be reinvested for the benefit of current and future customers. These retained earnings have essentially the same properties as retained earnings (a form of equity) in the private sector, except that they are reinvested for the benefit of customers, rather than with the specific aim of generating increased future profits.

In considering this source of funds for Scottish Water we will refer to 'customer retained earnings'. The use of customer retained earnings to fund investment will result in a higher RCV and an unchanged level of debt. The ratio of debt to RCV will therefore decline. As a direct consequence, borrowing more would still be consistent with the financial sustainability of Scottish Water.

To set an allowed rate of return for Scottish Water by adopting the same principles as the regulators of private sector utilities, we would need to estimate an allowed rate of return on debt and an allowed rate of return on customer retained earnings. Scottish Water should be allowed to earn a return when it uses customer retained earnings as a source of funds.

Although it may seem feasible to estimate a weighted average cost of capital for Scottish Water, there are issues associated with applying the conventional approach to assessing an appropriate WACC for a public corporation. The conventional WACC approach assumes that we can identify market rates of return for debt and equity. Scottish Water does not have debt or equity that is publicly traded. We are not therefore able to establish a market-based measure of equity or debt returns for Scottish Water in the way that we would for a private sector company. Neither have we been able to identify another public corporation for which an allowed rate of return has been set independently of the management or Government.

The WACC approach is further complicated because regulators have tended to regard the RCV as a proxy for

the enterprise value (market values of the debt plus the equity) of the regulated business. The market value of the equity is therefore equal to the RCV minus the outstanding net debt. As we described in Chapter 10, the RCV will increase over time to reflect the efficient net new investment in the assets of the company. It is therefore reasonable to regard these investments as increasing the value of the company. The respective RCVs reflected the market's view of the value of the companies in the period after privatisation. The RCV would therefore seem to be a reasonable approximation of the value of the companies in England and Wales.

However, we believe that it would be difficult to justify an assertion that the RCV would be a reasonable estimate of the enterprise value of Scottish Water. Chapter 8 outlines some of the difficulties that arise when attempting to establish the initial RCV for a firm in the public sector.

The value of an enterprise can be estimated in a variety of different ways. One common market-based approach is to use the dividend growth model, which combines the dividend yield⁷ and the expected growth in dividends to establish an equity value. However, Scottish Water does not pay dividends so this approach cannot be used. An alternative approach would be to calculate the Net Present Value (NPV) of Scottish Water's future cash flows. The NPV approach requires an appropriate discount rate to be established in order to discount cash flows that will occur in the future. However, it would be difficult to justify the use of a discount rate that is different from the allowed rate of return. The NPV approach cannot therefore be used since we need a market value to establish the allowed rate of return, but need an allowed rate of return to use the NPV method of establishing a market value.

For these reasons we consider that it is impractical to apply the conventional WACC calculation to Scottish Water. If a WACC is to be calculated, the approach would need to be modified to take account of Scottish Water's particular circumstances.

⁷ Dividend yield is calculated as the annual dividends per share divided by the price of the share.

9.4.2 Possible approaches

There are four possible approaches to setting an appropriate rate of return for Scottish Water:

- adopt the Ofwat allowed cost of capital;
- use long-term average real borrowing rates;
- use the discount rate suggested in HM Treasury's Green Book; and
- use a hybrid approach.

We will examine each in turn and summarise the advantages and disadvantages of each approach.

Ofwat's assessment of the allowed cost of capital

One possible approach would be to use Ofwat's allowed rate of return. This could be justified on the grounds that the companies in England and Wales are good comparators for Scottish Water. However, we believe that such an approach would not be in customers' interests.

At each periodic review, Ofwat establishes an allowed weighted average cost of capital for the water companies south of the border. Ofwat describes the estimate of the WACC as a 'highly significant element within the determination of price limits'⁸. In the private sector, if the allowed rate of return is set below the level that investors will accept, the companies will experience difficulties in financing their mandatory investment programmes. If the allowed rate of return is set too high, customers' bills will be too high and shareholders will earn windfall returns.

Ofwat's current proposed allowed rate of return for the water and sewerage companies is 5.1%. This estimate may be modified when the final determination is published in December 2004. The cost of Scottish Water's debt (both the current overall cost and the cost of new debt) is lower than Ofwat's estimate of the cost of debt for the companies south of the border. This

would suggest that Ofwat's WACC would significantly overestimate the appropriate rate of return for the water industry in Scotland. If we were to set an allowed rate of return that was significantly in excess of the cost of new debt, Scottish Water would not face a tight budgetary constraint and consequently would be under less pressure to improve its efficiency. This is because Scottish Water would be able to afford the extra interest payments and a higher level of operating cost than was justified.

Moreover, the allowed rate of return south of the border has to be sufficient to attract debt and/or equity investment. As we outlined above, investors will consider the opportunity cost of providing new capital to the water industry: in other words, they will compare the return that is available with their view of the risks that they face. The water and sewerage companies have to compete for capital with many other investment choices that are available to providers of capital. Ofwat has a duty to ensure that an efficient company is able to access the capital markets and attract sufficient capital to finance its functions.

In contrast, Scottish Water does not have to compete for capital in the same way. It would therefore not be realistic to set an allowed rate of return at or close to the same level as in England and Wales.

The risk profile of Scottish Water could also reasonably be considered to be lower than that of the companies south of the border. This is because competition is more extensive in England and Wales, where inset appointments, special deals outside the tariff baskets (which are at the risk of the shareholder) and common carriage are possible. The companies have also improved their operating cost efficiency and thereby reduced the opportunity for significant outperformance of the regulatory settlement.

Long-term average borrowing rates

Scottish Water currently relies on debt provided by government and retained earnings to finance an increase in its asset base. A second possible approach

⁸ 'Setting price limits for 2005-10: Framework and approach', Ofwat, 15 October 2002.

for establishing an allowed rate of return for Scottish Water would be to apply an average of observed historic real borrowing costs.

This would be relatively straightforward to apply, although there would be decisions to be made concerning the choice of maturities and the period of the comparison.

The approach could also overestimate the required rate of return in the medium term, as the premium on longer-term debt is at historic lows. If we were to use this method, we believe that it would not be appropriate to allow extra costs associated with embedded debt to be recovered from customers.

There would still potentially be an issue about the rate of return that should be allowed on customer retained earnings, which represent an important source of funds for Scottish Water.

*The Treasury Green Book*⁹

'The Green Book', which is published by HM Treasury, is a guide to appraisal and evaluation in the public sector. 'Appraisal' relates to the decision to commit funds to the achievement of objectives and 'evaluation' relates to the assessment of past and present activities. The preface to the 2003 edition of the Green Book states that the guidance "is relevant to all appraisals and evaluations":

"Some central government bodies sell goods or services commercially, including to the government itself. These activities may be controlled by requiring prices to be set to provide a required rate of return (RRR) on the capital employed by the activity as a whole. Government policy is generally to set charges for goods and services sold commercially at market prices, and normally to recover full costs for monopoly services, (including the cost of capital as defined in the Treasury Fees and Charges Guide)."

The 2003 edition of the Green Book reduced the Treasury estimate of the discount rate to 3.5% real but did not update the 6% real estimate for the cost of

capital included in the 1997 edition:

"The discount rate is used to convert all costs and benefits to 'present values', so that they can be compared. The recommended discount rate is 3.5%."

The 'discount rate' measures 'the rate of social time preference'. The Green Book defines social time preference as "the value society attaches to present, as opposed to future, consumption".

A third possible approach to setting the allowed rate of return for Scottish Water would be to take the discount rate of 3.5% real as the allowed rate of return. There are two advantages of this approach. It uses a rate of return that is established by Government and it should therefore be sufficient for Scottish Water to fund its efficient operation. Secondly, this approach would cover both the debt and customer retained earnings portions of the regulatory capital value.

However, setting an allowed rate of return at 3.5% real may be quite significantly higher than the observed cost of new debt to Scottish Water. This could have the effect of encouraging Scottish Water to increase its borrowing and may delay the necessary improvements in efficiency. The effect of this could be reduced if we regarded the 3.5% real rate as the pre-tax return rather than the post-tax return.

Hybrid approach

A fourth potential approach would be to apply a modified version of the WACC approach. We would combine an observed real cost of debt with an estimate of an appropriate rate of return on the customer retained earnings (the equity portion of Scottish Water's RCV) in order to produce an allowed rate of return.

The future real rate of interest on debt for Scottish Water could be estimated in two ways. The first option would be to take the average of observed historic real borrowing rates, as discussed above. The alternative would be to take an average of current borrowing rates faced by Scottish Water.

⁹ 'The Green Book' Appraisal and Evaluation in Central Government, HMSO, 2003.

We would propose to make no allowance for embedded debt if we applied the observed real historic cost of debt. However, if we used the average of the real rates that have been available to Scottish Water over the current regulatory period, we would propose to make an allowance for the full cost of embedded debt.

For the current regulatory period we would propose to use whichever of these two options is more favourable to Scottish Water. However, we would also want to make it clear that we would not intend to make an adjustment for embedded debt in future regulatory periods, unless there was a very material change in the rate of inflation.

We propose that the pre-tax allowed rate of return on the customer retained earnings should be set at the post-tax allowed rate of return for debt. In real terms this rate is likely to be low. We believe that customers should be willing to finance a relatively low return on the customer retained earnings because this will replicate within a public sector capital structure the equity buffer that protects customers south of the border from operational or legislative shocks¹⁰. There will be no incentive for Scottish Water to seek to change its current ratio of debt to its regulatory capital value. If the return on the customer retained earnings is greater than the return on debt, Scottish Water would have an incentive to repay debt. In contrast, if the return on the customer retained earnings is lower than the return on debt, Scottish Water would have an incentive to take on more debt.

This approach should also help stakeholders to monitor Scottish Water's performance. The level of its outstanding debt relative to its RCV should be in line with the forecasts that are included in the Strategic Review of Charges. If the level of debt to RCV declines, either Scottish Water has outperformed its efficiency targets or it has not delivered its capital programme as planned. Conversely, if the level of debt relative to its RCV increases, Scottish Water is either ahead of schedule in delivering the capital programme or has underperformed relative to its efficiency targets.

¹⁰ This issue is discussed in detail in Chapter 4.

9.5 Our proposed approach to setting an allowed rate of return for Scottish Water

The four possible methods each have advantages and disadvantages. These are outlined in Table 9.4

Table 9.4 :

Method	Advantage	Disadvantage
Owat's Allowed Cost of Capital	<ul style="list-style-type: none"> Recognised cost of capital Underpinned by analysis of capital markets 	<ul style="list-style-type: none"> Relevant to public sector Top high relative to observed cost of capital
Long Term Average Real Borrowing Rates	<ul style="list-style-type: none"> Straightforward to calculate 	<ul style="list-style-type: none"> Issue of embedded debt Relevant to "customer retained earnings"
Green Book	<ul style="list-style-type: none"> Applies to whole RCV Official Government discount rate for public sector projects 	<ul style="list-style-type: none"> Higher than observed cost of debt
Hybrid Σ	<ul style="list-style-type: none"> Facilitates monitoring No incentives to change capital structure 	<ul style="list-style-type: none"> No obvious disadvantages

We propose to adopt the hybrid WACC approach outlined above. This approach has a number of potential benefits for customers:

- The information that we would need to establish an appropriate rate of return for Scottish Water using this approach is readily available.
- The estimated cost of capital will be consistent with Scottish Water's observed cost of capital. Customers will not be required to fund an allowed rate of return that exceeds Scottish Water's observed cost of capital.
- The approach facilitates performance monitoring.
- Scottish Water has no incentive to change its debt to RCV ratio. Increasing or reducing borrowing will not have any impact on customers' bills.

9.6 Questions for consultation

1. Do respondents agree that it would not be appropriate to adopt the rate of return allowed for the private sector water industry south of the border by Ofwat?

2. Do respondents agree that the hybrid approach described above should be used to set the allowed rate of return for Scottish Water? If not, which other method would respondents suggest? In particular how could the suggested method facilitate monitoring and avoid any incentive for any stakeholder to seek to change the ratio of debt to RCV?

3. Do respondents agree that we should make an allowance for embedded debt for this regulatory control period, but only make such allowances in the future if there has been a material change in the rate of inflation?

Section 2: Chapter 10

Regulatory capital value – treatment of depreciation and additions

10.1 Introduction

In previous chapters we introduced the concept of using the Regulatory Capital Value (RCV) in price setting, and examined the options that are available to us when calculating the initial RCV. We also discussed the significance of the rate of return allowed on the RCV and how this can influence prices.

In this chapter we discuss how the value of the RCV changes over time, and how the method we use to take account of these changes can influence the prices that customers pay. This Chapter is principally further background to the use of the RCV method of price setting. There are therefore no specific questions for consultation. However, the views of stakeholders would, of course, be welcome.

The RCV is a value placed on a company's asset base and on which it should earn a return. Obviously this value will change over time. As the assets represented by the RCV grow older, their physical usefulness declines. As a result, the financial value of the assets also declines. As explained in the previous chapter, we refer to this reduction in value over time as depreciation.

A company may choose to add to its asset base by buying entirely new assets (enhancement), replacing existing assets (renewals) or repairing existing assets (maintenance). All of these activities increase the usefulness and value of the asset base. We refer to increases in the asset base as additions.

In order to ensure that the RCV continues to be representative of the value of Scottish Water's asset base, we need to take account of additions and depreciation. It is important for customers that we do so, as the value of the RCV influences the price that customers pay. By adjusting the RCV for additions and depreciation, we ensure that customers only remunerate an RCV that represents the value of the assets which serve them.

10.1.1 How additions and depreciation affect prices

As we have noted in previous chapters, the RCV plays a role in determining Scottish Water's revenue requirement.

Revenue requirement = operating costs + public/private partnerships (PPP) + infrastructure renewals charge (IRC) + depreciation + return on capital

Depreciation and additions play a role in this calculation through the impact they have on the RCV, and in the case of depreciation, as a separate component of the revenue requirement.

Additions affect the price cap by increasing the RCV. As the rate of return remains constant (it is a percentage of the RCV), any increase in the RCV increases the amount of return allowed in Scottish Water's revenue requirement, and hence increases prices.

The role of depreciation is a little more complicated. It can affect prices in two ways:

- It is deducted from the RCV and hence represents the amount by which the value of the assets has fallen. Again, assuming a constant rate of return, any reduction of the RCV would reduce the amount of return allowed in Scottish Water's revenue requirement. In this instance, a high level of depreciation would reduce the revenue requirement; or
- The expected depreciation charge is added to the cash return and operating costs to determine the revenue requirement.

Depreciation can therefore influence Scottish Water's revenue requirement either directly, or indirectly (by affecting the level of return).

10.2 Rolling forward the RCV

As explained above, both additions and depreciation have a significant effect on Scottish Water's revenue

requirement. It is important that we take both additions to, and depreciation of, the RCV into account throughout the regulatory period. In order to do this, we will calculate the RCV on an annual basis. This process of adjusting the RCV from its starting value to reflect changes in its value is known as ‘rolling forward’.

We explained the use of the RCV for price setting in Chapter 5. Here we look at the process in more detail. We begin by considering the adjustments that are necessary in order to roll forward the RCV. We then examine in more depth how we treat additions and depreciation, and how we account for differences in projected and actual changes in the RCV.

Scottish Water’s revenue requirement for each year of the next regulatory period will be established before the period has begun. Only in exceptional circumstances will it change¹. This means that, rather than taking account of how the revenue requirement changes each year as it happens, we have to project how we expect it to change at the outset. In the context of the RCV, it means that we have to anticipate both the additions we expect will be made to the RCV and how it will depreciate for each year of the regulatory period. It also means that at the end of the regulatory period, when we know what actually happened, a process needs to be in place to adjust the RCV for any difference.

Figure 10.1 outlines how the change in the RCV is calculated for each year of the regulatory control period.

Figure 10.1: Rolling forward the RCV

Closing RCV (previous year)	
+	
Indexation	
+	
Capital expenditure (excluding IRE)	} Additions
+ Infrastructure renewals expenditure (IRE)	
-	
Infrastructure renewals charges (IRC)	
-	
Grants and contributions	
-	
Depreciation	
-	
Disposals	
=	
Closing RCV	

In order to roll forward the RCV, there are a number of adjustments that need to be made. We deal with each of these below.

10.2.1 Indexation

In order to ensure that the RCV does not decrease in real terms as a result of general price rises in the industry itself, we will adjust the RCV each year to take account of inflation. This is calculated according to anticipated changes in the construction output price index (COPI). Where the actual COPI has differed from the expected COPI, this can be taken into account at the next price determination.

10.2.2 Capital expenditure and IRE (additions)

Any capital expenditure on non-infrastructure assets and expenditure on infrastructure assets (IRE) are regarded as additions to the RCV as they are expected to enhance or maintain Scottish Water’s asset base.

When Scottish Water spends money on its non-infrastructure assets, it can be allocated to:

- maintenance to preserve base service levels (maintenance non-infrastructure or MNI expenditure);
- enhancement to improve the existing asset base.

Projected capital expenditure and IRE are added to the RCV each year. One of the critical issues is that only the efficient value of the capital expenditure is added to the RCV. This protects customers from paying for inefficiency. We will discuss this in more detail later. The application of depreciation is shown schematically in Appendix 1.

10.2.3 Infrastructure renewals charge

The infrastructure renewals charge (IRC) is an explicit component of the regulated company’s revenue

¹ Chapter 11 explains the instances in which an interim determination can be triggered.

requirement. As explained in chapter 3, it is intended to allow the company to fund investment in infrastructure assets. Because an allowance for funding infrastructure assets has been made directly, we must ensure that customers do not pay for the same investment again through the RCV. For this reason we cannot simply allow the RCV to grow by the amount of the infrastructure renewals expenditure. The IRC is therefore subtracted from the RCV each year, reflecting the cost of use for the year that should be met by customers.

The net expenditure on infrastructure assets may have an impact on the value of the RCV. In order to explain how this happens, we must consider the effects of the IRC and the IRE together. Whereas the IRC is an allowance made by the regulator, the IRE is the actual amount of expenditure on infrastructure assets.

Suppose that the regulator has allowed £10 million in the revenue requirement for infrastructure expenditure. If the company actually spends £12 million there may be a case for allowing the company to recover a further £2 million. The regulator can do this by adding £2 million to the RCV. The company will then recover £12 million, £10 million through the IRC and £2 million through the RCV.

Suppose that the regulator has allowed £10 million, but the company has actually spent only £8 million. The regulator must claw back £2 million to ensure that customers are not paying for investment that has not been made. The regulator can do this by deducting £2 million from the RCV.

When we project IRE and IRC across the regulatory period, however, we assume they are both equal. We explain the reasons for this later in the chapter.

10.2.4 Grants and contributions

Any grants and contributions made towards capital expenditure by a third party are deducted from the RCV. Although they represent an addition to the asset base, they are in reality a gift. They are therefore not added to the RCV as they should not be remunerated by customers.

10.2.5 Depreciation

Businesses expect to use fixed assets such as buildings, plant and machinery for several years. However, these assets will eventually wear out and become obsolete. Depreciation is a monetary measure of the cost of use of an asset for each year of its life.

10.2.6 Disposals

When an asset reaches the end of its useful life, or is sold, it is a disposal from the asset base. As it is no longer used to the benefit of customers, its net book value (the value of the asset less any depreciation) is also deducted from the RCV.

10.3 Treatment of additions to the asset base

10.3.1 Capital expenditure (excluding IRE)

The key role of the RCV in price setting is to reflect the value of the physical assets used to provide a service to customers. When Scottish Water makes an investment in its assets – be it simply to replace or maintain assets that have worn out, or to actually enhance the asset base – this should be reflected in an increase in the RCV. In increasing the RCV, we are ensuring that the return earned on total assets will increase in recognition of the investment made.

If Scottish Water has made additions to the RCV which have increased its value (net of depreciation), then the return component of the revenue requirement will be higher and prices will also be higher. Providing capital expenditure has been justifiably incurred in order to provide service to customers, then it is reasonable that customers should remunerate this investment in the RCV.

It is very important, however, that customers are only required to remunerate justifiable expenditure. We therefore need to ensure that only appropriate and efficiently procured capital investment is added to the RCV.

The *Quality and Standards III* process will define the investment needs of the industry over the next regulatory period. The process should provide more detail than its two predecessors about the outputs that capital expenditure is expected to deliver. We will apply efficiency targets to this expenditure². We will then be able to make projections of how much capital investment is expected to take place each year over the duration of the regulatory period, and how it will affect the RCV.

We will use these projections to calculate the cash return on the RCV. An important assumption that we will make in so doing is that Scottish Water will deliver the expected outputs at the expected cost, ie they will meet the efficiency target.

We recognise that the reality of what will actually occur over the ensuing regulatory period could differ from these projections. Therefore, at the end of each regulatory period, if necessary, the closing RCV will be adjusted to reflect the actual value of investment delivered. We will do this by comparing the actual RCV at the end of the regulatory control period with the projected RCV.

There are a number of potential outcomes from making this comparison. We describe these outcomes below, along with the action that would normally be taken for each³:

Scenario:	Total actual expenditure exceeds that assumed in the price caps.
Cause (1):	Over the period, additional obligations (such as changes in water quality standards) have been placed on Scottish Water which have required greater expenditure than anticipated.
Action:	In this circumstance, the additional expenditure would be justified as additional benefit had been brought to customers. The RCV would be increased at the close of the regulatory period to reflect this extra investment.
Cause (2):	Greater than expected inefficiency.
Action:	To the extent that actual capital expenditure exceeds anticipated capital expenditure, but only delivers anticipated outputs, the difference is not added to the RCV at the close of the regulatory period.

Scenario:	Anticipated outputs are not delivered by the end of the regulatory period.
Cause:	Possible causes could be poor management or inefficiency.
Action:	Where expected outputs have not been delivered, the RCV would be decreased to reflect these shortfalls in delivery. Therefore, in the next regulatory period, customers would not be paying for inefficient investment.

Scenario:	Capital expenditure is lower than expected, but anticipated outputs have been delivered – 'outperformance'.
Cause:	Due to greater than anticipated capital expenditure efficiency, anticipated outputs have been delivered, but at a lower than expected cost.
Action:	The RCV would be reduced to reflect the lower actual expenditure. This passes the benefit of the efficiency on to customers. Until that time, Scottish Water would retain the financial benefit of the outperformance. This should act as an incentive for management. In England and Wales, Ofwat allows the regulated companies to retain this benefit for a full five years in order to enhance the incentive for efficiency.

10.3.2 Infrastructure renewals expenditure

We explained above that expenditure on infrastructure assets is remunerated in two ways. First, the IRC is a component of the revenue requirement. Second, the difference between the IRC and the IRE may have an impact on the value of the RCV, and hence the cash return on the regulatory capital value.

The IRC is calculated as an average of historical infrastructure renewals expenditure over a typical timescale of 15-20 years. As with non-infrastructure capital expenditure, we estimate the IRC for each year of the regulatory period.

We explained above that the IRE is added to the RCV and the IRC is deducted from the RCV. However, the actual IRE each year may differ from the IRC. IRE will often fluctuate on a year-to-year basis due to a high or low rate of system failures, extreme weather or the actions of a third party which require Scottish Water to undertake maintenance.

Where differences in IRE and IRC occur, they are termed:

- **Accruals** – Where IRC exceeds IRE, it is added to Scottish Water's accounts as a liability. That is, Scottish Water has received funding for

² The basis for these targets is discussed in Volume 5 of our methodology consultation documents.

³ This will be discussed in more detail in the next chapter.

infrastructure renewals that have not yet been carried out.

- **Prepayments** – Where IRE exceeds IRC, Scottish Water has already carried out infrastructure renewals for which it has not yet received funding.

Over the course of the regulatory period, accruals and prepayments should tend to balance each other out. When we set price limits, we assume that the IRC will equal IRE in each year of the regulatory period. As such, we are assuming that at the end of the regulatory period, total IRE should equal IRC, and the effect on the RCV should be neutral.

10.4 Treatment of depreciation

Depreciation can have an impact on the revenue requirement in two ways:

- It is deducted from the RCV and hence reduces the return on capital.
- It is an item in the revenue requirement as it contributes to the level of funding for capital expenditure.

As we have explained, depreciation measures the annual cost of using an asset during its life. It is deducted from the RCV to reflect benefit that customers have received from these assets. All other factors remaining the same, if depreciation exceeds new expenditure, then the RCV will be reduced, and the return on capital earned will be lower. Similarly, if depreciation is lower than new investment, the RCV will increase and the return on capital earned will be higher.

Depreciation is also a component of Scottish Water's revenue requirement in its own right. Customers should pay for the use that they get from existing assets and Scottish Water needs revenue to continue to replace assets as they wear out. By including depreciation in the revenue requirement, we are taking account of the cost of non-infrastructure assets wearing out, and providing

revenue to replace them. Depreciation is not applied to infrastructure assets, as their maintenance is funded out of the IRC.

At present, we are consulting on how we should establish an initial RCV for Scottish Water. However, like Ofwat, we intend to calculate depreciation separately from the RCV, and to deduct it each year from the RCV.

10.5 Depreciating non-infrastructure assets

We explained in the previous chapter that we propose to use the modern equivalent asset method to value Scottish Water's assets. We also propose to use the same standard asset lives as Ofwat uses.

10.6 Depreciating infrastructure assets

We explained the nature of the infrastructure renewals charge in the previous chapter. In *Setting price limits for 2005-10 : Framework and approach*⁴ Ofwat summarises:

“Infrastructure assets are not depreciated. The industry adopted infrastructure renewals accounting in 1989. Under this method, the infrastructure network is treated as a single asset system to be maintained in perpetuity rather than a collection of individual assets each with its own life and maintenance requirements. An annual charge, the IRC, is made against profits for the annualised cost of maintaining the system at its current level of operations. We call expenditure to maintain and replace the network infrastructure renewals expenditure (IRE). The level of IRC should be broadly constant, in real terms, over the medium term, assuming that the network systems are in a steady state as regards operational capacity.”

10.7 Ensuring that calculated depreciation is appropriate

In England and Wales, before (or after) a depreciation charge is included in price caps and later deducted from the RCV, Ofwat carries out a check to ensure that the

⁴ Page 52

depreciation charge is at an appropriate level. This check is known as ‘broad equivalence’. The broad equivalence test applies to depreciation on existing assets and additions. Where projections of depreciation fail this check, they can be adjusted accordingly.

The rationale behind the principle of broad equivalence is relatively straightforward⁴. As existing assets reach the end of their useful lives and are removed from the asset base, they are no longer liable for depreciation. As such, the depreciation charge falls. However, as new expenditure enters the depreciation calculation, it should rise again by a compensating amount, that is, depreciation should remain constant. Providing there is no enhancement of the asset base (it is in a constant state, neither improving nor declining), the overall level of depreciation should equal the new expenditure on non-infrastructure maintenance, or at least be broadly equivalent in the long run⁶.

The practical effect of broad equivalence is to use projected non-infrastructure maintenance expenditure as a ‘cap’ on future depreciation. It is used to ensure that customers do not pay a level of depreciation that funds more than is necessary. This helps the regulator to ensure that prices are as high as they need to be but no higher.

The process of assessing whether or not there is broad equivalence, and calculating adjustments where necessary, can be very complicated. In order to carry out the test, a number of practical difficulties must be overcome.

10.7.1 Issues with broad equivalence

Ofwat’s broad equivalence principle is complicated by the fact that future non-infrastructure maintenance needs are assessed on the basis of past non-infrastructure maintenance requirements to preserve base service. This presents the possibility that if past

non-infrastructure maintenance has been understated, future non-infrastructure maintenance and hence depreciation may also be understated. The reverse could also be true, and depreciation could be higher than necessary. As prices are sensitive to the depreciation charge, this could mean that customers pay too much or too little for the base level of service they receive.

The approach also depends on being able to test reliably if broad equivalence holds. If such a comparison is to be made between Scottish Water’s non-infrastructure maintenance expenditure and depreciation, we will have to consider a number of other factors :

- **Which base year should be used?** Ofwat uses 1992-93 as a base year for its calculations as this was the first year for which both MNI and depreciation figures were robust and the asset base was in a steady state⁷. A similar base year would need to be determined for Scottish Water.
- **What is an appropriate period for broad equivalence to hold?** In order for non-infrastructure maintenance to exactly equal depreciation, then the comparison must be made over the lifetime of the oldest asset in the asset base. For instance, if the oldest asset life is 60 years, the total MNI spent on replacing it should only equal depreciation once the asset is fully depreciated and has reached the end of its useful life.

However, in practice this is difficult to calculate as the reliability of non-infrastructure maintenance projections decreases with time. It would be very difficult for a water company to produce non-infrastructure maintenance projections of the required level of accuracy to test broad equivalence for 60 years⁸. It is for this reason that Ofwat uses 28 years – it is a compromise between the long length of time required to test broad equivalence

⁵ Ofwat first set out the rationale in its consultation for the 1999 periodic review of charges, *Setting price limits for water and sewerage services. The framework and business planning process for the 1999 Periodic Review* (February 1998).

⁶ Ofwat, *The approach to depreciation for the periodic review 2004: A consultation paper* (March 2002), p.21.

⁷ *Setting water and sewerage price limits for 2005-10*, p.64.

⁸ *Ibid.*

and the declining accuracy of non-infrastructure maintenance expenditure projections with time.

- **What is an appropriate tolerance limit?** In recognition of the difficulties associated with calculating broad equivalence, Ofwat assumes that it will not hold exactly and allows a tolerance limit of 5% of total turnover. That is, if the difference between MNI and depreciation is greater than 5% of turnover, Ofwat will consider adjusting depreciation to ensure that this 5% limit is not exceeded⁹. However, depending on the degree of accuracy of information provided by Scottish Water, a higher or lower tolerance level may be more appropriate.
- **Under what circumstances is it reasonable to expect the tolerance level to be exceeded?** There are a number of factors that could justifiably distort the balance between depreciation and MNI. For instance, although assets are depreciated, they may not be replaced within the period that broad equivalence is expected to hold. As such, a protocol is needed to assess the validity of these factors.
- **Can broad equivalence be made to work if the asset base is undergoing strong growth?** If the asset base is undergoing strong growth, then it is crucial that expenditure on capital enhancement is deducted from the calculation. However, this must be carried out accurately otherwise broad equivalence will not hold.
- **How should technical progress be allowed for?** Companies in England and Wales have argued that rapid technical progress is resulting in assets having shorter lives. This requires them to be depreciated more quickly. As a result, the profile of depreciation of the overall asset base is changing, tending towards being more akin to the reducing balance method¹⁰.

- **Accuracy of the information available.** Broad equivalence relies on accurate information, particularly the allocation of expenditure between asset categories. In order to calculate broad equivalence effectively, the regulated company and the regulator must be able to distinguish clearly between MNI and capital enhancement¹¹. They must also be able to distinguish between maintenance on assets in existence in the base year, and maintenance on those added since the base year.

At present, the historical non-infrastructure maintenance information required to test broad equivalence is not available in Scotland. This essentially precludes any possibility of implementing broad equivalence for the next Strategic Review of Charges. However, it is an issue that we would like to revisit should sufficient information become available.

10.8 Summary

However it is first calculated, Scottish Water's RCV will not remain static over time, as the value of the assets that the initial RCV represents will decline both financially and operationally. Conversely, as additional investment is made in these assets, the RCV will increase. We need to take account of these changes in order to ensure that the RCV remains representative of the value of the assets that serve customers.

As customers pay for additions to the RCV through higher prices, we need to ensure that the additions are justified and efficient. The expected capital expenditure must have delivered the agreed outputs.

Similarly, the way in which depreciation is charged can affect the prices that customers pay both through the return on the RCV and as an explicit component of the revenue requirement. Customers should pay for the cost of using existing assets each year. To do otherwise would impact future generations unduly.

⁹ Ofwat., *The approach to depreciation for the periodic review 2004: A consultation paper* (March 2002), p.23.

¹⁰ *Ibid.*, p.25

¹¹ *Ibid.*

Section 2: Chapter 11

Interim determinations and logging up and down

11.1 Introduction

Regulatory reviews occur at fixed intervals. In Scotland, a Strategic Review of Charges is carried out every four years, while in England & Wales a price review is carried out every five years. The period of time between regulatory reviews is referred to as the regulatory control period. At a regulatory review, the regulator sets price caps or revenue caps for the next regulatory control period.

In order to set price caps or revenue caps, the regulator forecasts the costs that the regulated company will incur over the next regulatory control period, if it carries out its functions efficiently. The revenues recovered by the company must be sufficient to cover these costs.

The regulator forecasts costs based on the information that is available to him at the time of the review. This information comes from many sources: company business plans, research, representations from stakeholders, etc. In some cases the regulator can be confident that the assumptions underpinning the price determinations are reliable. During the regulatory control period things may turn out to be a little different from the way that was assumed, but generally the assumptions will prove to be broadly correct. However, in other cases the regulator knows that there is a good chance that the assumptions that underpinned the review may prove to have been incorrect.

This chapter considers what can be done in order to take account of the fact that some things are uncertain, and therefore difficult to take into account, when a determination is made. We need to achieve a balance between having a flexible enough process to allow for significant changes and a process that is not too uncertain. Customers generally seek predictability in the level of charges.

We consider two mechanisms that have been used by Ofwat in England and Wales. The first is the mechanism for carrying out 'interim determinations of price limits' between regulatory reviews. The second is the approach of 'logging up and down' at a regulatory review.

In the current regulatory framework in Scotland, the Water Industry Commissioner for Scotland provides advice to Scottish Ministers on charges. Ministers can commission advice whenever they consider it necessary. In this framework, there is no need for a specific process for interim determinations since it would be for Ministers to judge when advice needs to be revisited.

The *Strategic Review of Charges 2002-06* was the first full analysis of the revenue needs of the Scottish water industry. Logging up and down can only apply at the end of a regulatory control period. It is only now appropriate to consider whether we should introduce such a process.

The proposed change in the regulatory framework to create a Water Industry Commission with a power to determine prices will, we believe, make it necessary to introduce both the possibility of an interim determination and the logging up and down process. This will ensure that Scottish Water is able properly to finance its functions and can recover the costs of any unexpected expenditure that results from uncertainty rather than underperformance.

The chapter addresses the following questions:

- What are interim determinations and logging up and down?
- What is their rationale?
- How has Ofwat applied them in England & Wales?
- What issues does their application in the Scottish water industry raise?

In general, we would propose to replicate as much of the Ofwat process as is consistent with the structure of the industry in Scotland. Clearly, we would not be able to rely on licence conditions¹ but we believe that it should be possible to use the business plans and the price determination to highlight issues that may cause an interim determination to be appropriate.

¹ Each of the companies south of the border operates under a licence. The licence details their responsibilities and how prices will be set. It also sets out the mechanism for price changes during a regulatory control period.

11.2 What are ‘interim determinations’?

An interim determination is a reconsideration of a firm’s price limits that is undertaken between formal price reviews. The reconsideration is carried out in the light of a particular set of circumstances or factors that were not taken into account at the last review. Either the firm or the regulator may initiate an interim determination.

An interim determination is not a ‘mini periodic review’. The full range of factors that are considered by the regulator at a price review are not considered at an interim determination. Only those circumstances that have triggered the review will be taken into account.

The factors that can trigger an interim determination fall into two categories:

- First, relevant changes of circumstance (RCCs), which are factors that are recognised in the company licences, ie the Instruments of Appointment; and
- Secondly, notified items (NIs), which are factors that were identified and noted at the last price review, but were not allowed for in the determination of prices.

In addition, some water and sewerage company licences refer to any other circumstance (other than a relevant change of circumstance) that has a material impact on the firm. The impact on the firm is described in the company licences as:

“(a) a substantial adverse effect on the Appointed Business or on its assets, liabilities, financial position, or profits or losses, not being one which would have been avoided by prudent management action taken since the transfer date; or

(b) a substantial favorable effect on the Appointed Business, or on its assets, liabilities, financial position, or profits or losses, being one which is fortuitous and not attributable to prudent management action.”

11.2.1 Relevant changes in circumstance (RCCs)

RCCs refer to the variations in circumstances, as laid down in Condition B of the company licences, in respect of which Ofwat may make adjustments to price limits.

There are four principal relevant changes in circumstance:

RCC 1 – new legal requirements: a new or changed ‘legal requirement’ affecting companies in their capacity as water or sewerage undertakers. The change could be a legal requirement ceasing to apply, being withdrawn or not being renewed. New or changed legal requirements include the impact of:

- national legislation;
- regulations made by the Council or Commission of the European Communities;
- undertakings given to the Secretary of State by the Appointed business, and accepted by the Secretary of State; and
- legal judgements (ie decisions made in courts of law).

RCC 2 – proceeds from the disposal of land: a difference in the proceeds of land disposals from that assumed when price limits were last set.

RCC 3 – failure to take steps: the Appointee has failed to take steps that the determination assumed it would take in order to comply with a legal requirement. As a result the amount allowed by the determination is substantially greater than the costs incurred, and the purpose has not been otherwise achieved.

RCC 4 – relative price effects (RPE): the cost of an allowed capital investment is different from what was assumed at the last price review due to an increase or decrease in capital prices relative to the Retail Price Index (RPI). The indicator of the relevant prices is the Notified Index, which is the change in ‘Construction Output Price Index’ (COPI) relative to RPI. This relevant change in circumstance applies only to Anglian Water Services Ltd, United Utilities Water plc and Yorkshire Water Services Ltd.

11.2.2 Notified items

At a price review, Ofwat may identify items that could have an impact on the companies' turnover. There may be uncertainty about whether the items will materialise, or about the size of any impact if they do. Ofwat can formally acknowledge that these items have not been allowed for, either in full or at all, by recording them as notified items in the determination.

If, as a result of a factor identified in a notified item, actual costs or revenues differ from the levels assumed in the determination, these differences can trigger an interim determination.

There are currently three notified items:

- A variation (increase or shortfall) in the number of customers requesting meters, free of installation charge, compared to the numbers assumed when the price limits were set;
- The effects of the prohibition of disconnection of household supplies for non-payment of charges. This includes changes in the level of customers' debt and the costs of managing customers' debt, as a result of the fact that companies are no longer able to disconnect domestic customers for non-payment of bills; and
- Companies' increased administrative costs resulting from operating the statutory scheme to abate metered charges for domestic customers who are members of vulnerable groups.

11.3 What is logging up and down?

Whereas an interim determination occurs between reviews, logging up and logging down is an adjustment that takes place at the end of the regulatory control period to reflect differences in cost from the original determination. Such differences will have an impact on prices only in the next regulatory period.

In June 2002, Ofwat issued a consultation paper on logging up and down². This paper provides a description of the logging up and down process:

“Between periodic reviews there may be changes to the outputs that a company is required to deliver. Where a change, either in terms of additional obligations or the removal of obligations, is material this can trigger an interim determination of price limits. If the change is not sufficient to trigger an interim determination (or if a company or we choose not to seek one), we provide a mechanism for the company to ‘log up’ any reasonable net additional costs to be taken into account at the next periodic review. Similarly reductions in outputs required are ‘logged down’.

This consultation paper goes on to explain:

“The logging up and down process deals primarily with smaller changes to the items specified in the licence. If the change is not sufficient to trigger an interim determination (or if the company or we choose not to seek one), we provide a mechanism for the company to ‘log up’ any reasonable net additional costs to be taken into account at the next periodic review. Similarly reductions in outputs required are ‘logged down’. The logging up mechanism is not specifically included in companies’ licences although such a mechanism is implied by the need to reflect in the periodic review the actual circumstances faced by companies.

The net amount of logged up capital expenditure taken into account at the 1999 periodic review was around £600m. A similar amount was logged up at the 1994 periodic review. Additional operating costs arising from changes to the quality enhancement programme which arose in the period 1995-96 to 1999-2000 were £21m.

There are differences in the way the logging up and interim determination processes deal with changes in revenues and costs. The interim determination mechanism treats the changes as if they had been known when we originally set price limits. The logging up mechanism takes into account the financial impacts of the changes from the start of the next price setting period only.

² MD179 *Logging up and down - dealing with shortfalls in outputs and new requirements between Periodic Reviews*, 28 June 2002.

The shortfalls process deals with delays in delivering outputs compared to the assumptions we made when we set price limits. There are differences in the way in which we treat logging down of outputs and shortfalls in outputs.”

11.4 What is the rationale for interim determinations and logging up and down?

Regulation is forward looking. Carrying out a regulatory review involves setting price caps, or revenue caps, to cover a period of four or five years that will occur in the future. The regulatory review process typically begins two years before the end of the current regulatory control period. In England and Wales, this means that Ofwat has to make judgements about the appropriate level of costs seven years hence.

As the regulatory control period unfolds, circumstances may turn out to be different from those that were assumed in the determination. If circumstances are very different this could have a significant financial impact on the firm, either to the firm's benefit or to its detriment. When the regulator is deciding what to do about this difference between actual circumstances and the circumstances that were assumed at the determination, he must take account of the actions that were and are open to the managers of the firm. Companies should not be rewarded (or punished) for ineffective (or effective) management.

The regulatory framework in England and Wales ensures that improvements in efficiency by the water and sewerage companies (beyond the regulatory targets) ultimately benefit customers. Companies are allowed to keep the benefit of outperformance for five years, after which it is transferred to customers. This is seen as an important incentive to companies to deliver a more effective service.

However, managers cannot control all of the firm's costs and they cannot influence all of the firm's revenues. Customers will benefit if managers are encouraged to improve those things that they can control, either to reduce the firm's costs or to secure revenues. In contrast, there is no benefit to customers if managers

are punished or rewarded for things that are outside their control.

There are two situations in which regulators might consider taking action between reviews if their assumptions turn out to be inaccurate. On the one hand it is possible that:

- costs are significantly higher, or revenues are significantly lower, than was assumed at the review; and
- managers had no control over the causes of the higher costs or lower revenues and they had no way of addressing the issue once it had arisen.

In this case the incentives placed on managers are not improved by forcing the company to operate within the price caps or revenue caps decided upon at the determination. Instead, there is a case for the regulator to make an adjustment to increase the price cap or revenue cap.

On the other hand, it is possible that:

- costs are significantly lower, or revenues are significantly higher, than was assumed at the review; and
- managers had no responsibility for the causes of the lower costs or higher revenues.

In this case there is no justification for allowing the price caps or revenue caps that were decided upon at the determination. Instead, there is a case for the regulator making an adjustment to reduce the company's price cap or revenue cap and to pass the benefit to customers.

If costs are materially different from those forecast in a price review or as a result of management action, no change is made to the determination.

The interim determination process is important in ensuring that prices reflect costs that have been reasonably incurred. By bringing prices into line with costs in cases where this does not damage the incentives of managers, and where failure to bring

prices into to line with costs would have a serious financial impact on the firm, the regulator ultimately reduces the firm's cost of capital. As a result, finance providers would consider the investment to be less risky.

At the same time, the regulator must recognise that many customers value stability in prices. There is a balance to be struck between ensuring that prices reflect costs and ensuring that prices are stable. For this reason, adjustments should be made between reviews only when this is absolutely necessary. In the case of an interim determination³ in England & Wales, Ofwat requires the impact on the firm from a change in circumstances to pass a materiality threshold. This ensures that customers do not see continuous small changes in prices relative to those that were agreed at the determination.

Smaller changes in costs and revenues which do not pass the materiality threshold, but which may nevertheless have a significant impact on the firm, are dealt with at the next review through logging up and down. This ensures that customers pay prices that reflect costs.

The logging up and down mechanism also has important incentive properties in the Regulatory Capital Value (RCV) approach to price setting. Managers know that if they fail to make the investments that they have promised, and fail to deliver the outputs that customers expect, this will affect the RCV of the company at the next regulatory review. If a company does not deliver the agreed capital programme, the RCV would be adjusted downwards to reflect both the non-delivered items and any timing difference in the delivery. A lower RCV will result in Ofwat setting lower prices. Managers therefore have an incentive to deliver the agreed programme of investment and to ensure that the investment provides customers with the outputs that are expected.

11.5 The mechanics of interim determinations

The interim determination process consists of a number of well-defined steps. An important feature of these

steps is that they are transparent. All company requests, or Ofwat proposals, for a change in the price cap between regulatory reviews are published. Similarly, Ofwat's assessments of the cost and revenue impacts of RCCs or NIs are published. In addition, before any price cap is changed Ofwat consults with industry stakeholders and the general public.

This transparency is an important part of the regulatory framework. Regulation provides customers with certainty by setting price caps or revenue caps for a period of time. If the regulator changes price caps or revenue caps before the next regulatory review he risks causing uncertainty and inconvenience to customers. He also risks undermining the credibility of the price caps or revenue caps that are set at future reviews.

In order to avoid these problems it must be clear to customers that any changes to price caps or revenue caps that are made between reviews are not arbitrary. Instead, customers must understand that changes are justified and that they are made according to a well-defined process that is based on a clear set of rules. The steps in Ofwat's approach to an interim determination are as follows:

Step 1: The interim determination must be initiated.

Either the company or the Director General of Water Services can submit a notice for an interim determination. If either does, the other can submit a counter claim within a limited period. Companies must request an interim determination by 1 October of the year before the charging year for which they are seeking revised price limits. The charging year begins on 1 April each year. It follows that, for example, if a company had wished to have its charges revised for April 2003, it would have had to apply for an interim determination before October 2002.

Step 2: Ofwat confirms that the factors forming the basis of the claim are within the current RCCs or NIs.

Following a request for an interim determination, Ofwat will confirm that the factors declared fall within the

³ A short-hand acronym 'IDOK' is sometimes used by commentators (interim determination of 'K', the price limit).

current definitions of RCCs or NIs. Changes that affect the economy in general, for example the April 2003 change in National Insurance contributions, are picked up in the RPI element of the price cap. A company could not, therefore, use this factor to request an interim determination. If such general factors were included in the interim determination, their effect would be double counted.

Step 3: For each individual factor, Ofwat applies a triviality test.

When Ofwat considers whether a change is a relevant item, it only takes account of non-trivial changes. If the net present value (NPV) of a specific change is less than 1% of a company's turnover for the last reporting year, then it would be considered to be trivial and it would not be included as part of the materiality test. However, when assessing triviality, Ofwat groups together all schemes that are carried out in response to a single RCC. For example, all of the work necessary to comply with a cryptosporidium notice will be considered together (both monitoring and additional treatment costs).

Step 4: For all factors taken together Ofwat applies a materiality test.

The combined NPV of all of the factors must be more than 10% of the appointed business' turnover. For example, if one factor is worth 3% of turnover, another is worth 5%, and yet another is worth 4%, the total effect is 12%. This is sufficient to trigger an interim determination despite the fact that no single factor is worth 10% of turnover.

If the costs incurred do not relate to a relevant change in circumstance the materiality threshold is doubled.

The test is applied by calculating the NPV of the change in cash flows resulting from the factors. If costs are higher than forecast, the difference between forecast costs and actual costs is estimated. In the case of operating costs the difference is estimated for the period from when the additional costs began until the next price review. In the case of capital costs the difference is estimated for a period of 15 years from when the

investment was made. If revenues are lower than forecast, the difference between forecast revenues and actual revenues is estimated. The difference is estimated for a period of 15 years from when revenues fell below the forecast level.

Step 5: Revised price limits are calculated.

If the materiality threshold is passed, Ofwat calculates what change should be made to prices to recover the additional costs or allow for the reduction in costs. Ofwat's decisions on changes to price limits must be made within three months of a request.

Step 6: The company may appeal to the Competition Commission.

If the company does not accept Ofwat's assessment it may refer the issue to the Competition Commission.

11.6 The mechanics of logging up and down

A standard process is used to evaluate each item in a logging up claim or a logging down proposal. Ofwat set out the mechanics of the process in its publication, *'Setting water and sewerage price limits for 2005-10'*:

“Logging up

Logging up is an established policy used at the 1994 and 1999 reviews. The policy provides a means by which each company can seek to have the reasonable continuing net additional costs of meeting changes in obligations, standards or demands not previously recognised in price limits, reflected in the periodic review determinations. The policy aims to reflect forward costs from the start of the new price limit period (ie from April 2005 for this review). Logging up is not an alternative to an interim determination.

The policy deals primarily with capital costs. The policy does not seek to remunerate the in-period costs (ie in years 2000-01 to 2004-05 for this review). Without a logging up procedure a company would risk losing excess capital costs incurred to meet the

changes above the assumed investment profile. The policy can also be used where the impact of the changes has been managed within the assumed investment profile to avoid damaging the capital expenditure rolling incentive mechanism.

Our general policies on the base year starting position for operating expenditure and revenue deal with most of the operating expenditure and revenue issues associated with recognised changes. The exception is the adjustment to the opening position for the operating expenditure rolling incentive mechanism to avoid the loss of outperformance benefits caused by new quality obligations, notified items and service enhancements. If no such adjustment was made then outperformance benefits could be reduced or eliminated by costs arising from new obligations.

A standard process is used to evaluate each item in a logging up claim. This is set down in outline below. The information needed to inform the process is set down in section C5, table C15 of the PR04 business plan information requirements manual. The main submission on logging up should be in the draft business plan in August 2003 with an update in the business plan in April 2004.

Step 1. First triviality test. Are the submitted costs associated with the claimed change above the triviality threshold? The triviality threshold for a single change is 1% of service turnover in year 3 or when aggregated with other small changes is 3% of total service turnover in year 3. If yes proceed to step 2, if no disallow item.

Step 2. Recognised change. Is the item a recognised change not previously provided for in price limits? Is there a definitive output and due date for delivery or compliance? Recognised changes are normally in the following categories. The list is not exhaustive but the burden of proof lies with the applicant.

- **A new quality obligation** that results in a change in regulations or consents affecting the company and not previously included in price

limits. The item needs to be confirmed as a necessary change that is being enforced by either the Drinking Water Inspectorate or Environment Agency.

- An obligation covered by a **notified item** at a previous review in that it was not or only partially included in price limits.
- A **service enhancement** that has resulted in a permanent improvement in recorded service level over and above that required as part of the previous review package. Recognition of the change requires the prior endorsement of the need for the enhancement by WaterVoice and, prior notification to us of the intention to make the enhancement together with reasons and anticipated costs. If we have commented adversely on the proposal at the notification stage then it would not be accepted as a recognised change.
- Increases in **demand for water** above those assumed in price limits that have resulted in the need to commission new resources. The new resources must be shown to be necessary to maintain adequate security of supplies for the foreseeable future. Recognition of the change requires clear evidence of the increase in customer demand rather than increase in leakage. These items are not carried forward into the rolling incentive calculations since the objectives are not to protect from these in period risks and to encourage robust forward planning in the company.

If the item meets the requirements of any of this list then proceed to step 3, if not then disallow the item.

Step 3. Reporter's confirmation. Has the company's reporter confirmed that both the solution chosen and the submitted costs are reasonable and properly set down as relevant to the change? If confirmation satisfactory then proceed to step 4, if not then refer item back to company and reporter for resolution of the concerns. If this is not forthcoming then the item will be disallowed.

Step 4. Reasonable net additional costs. Adjustments to the submitted costs to reflect both concerns arising from the reporter's scrutiny and catch-up factors identified through the relative efficiency analyses. No adjustments will be made for a company at the efficiency frontier. These adjustments are to ensure that customers only finance reasonably efficient costs and to provide strong incentives for efficient delivery.

Step 5. Second triviality test. Are the reasonable net additional costs associated with the recognised change above the triviality thresholds (Step 1). If yes proceed to Step 6, if no disallow item.

Step 6. Financial adjustments. The reasonable net additional capital costs related to all the recognised items are carried forward into the opening Regulatory Capital Value and so reflected in the return on capital assumptions in price limits.

For recognised items associated with new obligations, most notified items and service enhancements, the reasonable net additional costs are also used to revise the in period regulatory expenditure profile (operating expenditure) or total (capital expenditure). The revised profile or total is used in the rolling incentive mechanism.

Logging down and shortfalls

Logging down is the mirror image process, normally triggered by Ofwat, where changes in obligations, standards or demands not previously recognised in price limits reduce costs or where outputs already financed in price limits are no longer required. The process then ensures the reasonable continuing net reduced costs are reflected in periodic review judgements. Again the policy aims to reflect forward costs from the start of the new price limit period.

Shortfalls are associated with a failure to deliver on time assumed outputs already financed in price limits. In addition to the standard logging down there is also an adjustment to reflect in full the net present value of the 'benefit' accruing to the company from the

delayed delivery or failure to deliver the output in the current period. This represents a cost neutral adjustment not a penalty since the relevant quality regulator could seek through the court penalties for shortfalls in meeting quality requirements.

We use the costing assumptions and phasing from the previous review of prices for the calculations for both logging down and shortfalls."

11.7 Consistency between logging up and down and interim determinations

In MD179 '*Logging up and down – dealing with shortfalls in outputs and new requirements between periodic reviews*', 28 June 2002, Ofwat consulted on the issue of consistency between logging up and down and interim determinations. Ofwat stated:

“3.1.1 Companies believe that there should be a clear link between the logging up process and interim determinations. Items which are normally logged up are those that result from RCCs or NIs that were not material enough to trigger an interim determination, particularly new legal obligations.

3.1.2 Companies have suggested that the logging up process should aim to put companies in the same financial position as if the item at issue had been included in price limits (either at the previous periodic review or an interim determination).

3.1.3 Differences between the logging up process and interim determinations arise in two ways:

- the treatment of financing costs for capital investment, and
- the treatment of operating costs and revenue losses.

3.1.4 [...] When we log up capital expenditure, we do not make any allowance in price limits for the cost of financing the investment from the date it was incurred until the start of the next price review. Shareholders bear the cost of this for up to five years. (Similarly where an item is logged down, shareholders benefit

from the financing costs allowed in price limits for up to five years.) For an interim determination, the financing costs are allowed (or recovered) from the date the investment is incurred (or was expected to be incurred).

3.1.5 However, our current approach allows us to challenge the companies' assumptions, proposals and performance rather than directly manage the delivery of the outputs required. The current processes provide incentives to the companies to identify changes to outputs which entail additional costs. There are much weaker incentives for companies to identify changes where outputs are less onerous than we originally assumed. Because there is an information imbalance between the companies and the regulator, it is difficult for us to identify such changes. The trade-off in changing the logging up process to one which puts companies in the same financial position as if the item had been included in price limits, would be for us to try to counter or remove this imbalance. We would have to devote significant time and effort and a higher degree of scrutiny to identify changes lessening the obligations on companies to the same extent as the companies identify ones requiring more work. This would involve additional monitoring and data gathering, more risk of managing rather than challenging companies and hence a weakening of the incentives provided by the RPI-X regime.

3.1.6 For operating costs and revenue losses we allow, through the logging up (or logging down) process, any increase (or decrease) arising from those items identified as an RCC or a NI from the first year of the next price review period only, not from when the change in costs first arises. For an interim determination, all past operating costs and revenue losses relating to an RCC or NI are accumulated and recovered through the new price limits. As the NIs introduced at the 1999 periodic review are mainly operating cost and revenue based, this has highlighted the differences in treatment.

3.1.7 In the past the costs which have been logged up have related to changes in the quality enhancement programme. The vast majority of these costs have

been capital costs. The treatment of operating costs and revenues for logging up purposes has not been an issue. However, we took specific account of the increased likelihood of changes involving operating costs and revenues at the 1999 periodic review when we amended the materiality calculation for interim determinations.

3.1.8 As with changes in capital costs, the trade-off for aligning the interim determination and logging up processes for changes in revenue and operating costs would be increased scrutiny and challenge to identify items to be logged down. It would be a major exercise for us to put in place processes to do this. Companies would have to clearly separate out shortfalls in outputs from efficiencies. Our efficiency assessment would have to exclude the effect of any shortfalls and other calculations, such as the rolling incentive mechanism for operating costs, would also have to be adjusted.

3.1.9 We believe that the current balance between interim determinations and logging up is about right. While we do not believe that companies should retain unneeded funds, neither do we believe that companies should be required to fund all material changes in requirements between reviews. Although there have been more interim determinations since the 1999 periodic review, this is a direct result of the NIs we introduced and the change in materiality calculations for the impact of revenue losses and increased operating expenditure."

In *'Setting price limits for 2005-10: Framework and approach'*, Ofwat explains why it does not intend to amend the logging up process:

"9.23 In the consultation we set out our concerns that amending the logging up process would remove incentives for companies to challenge or seek to reduce the financial impact of new legal obligations placed upon them as costs would be fully reimbursed by customers. The companies argued that they would continue to do this regardless of a change in the logging up process. Some other respondents argued for changing the logging up process to encourage companies to carry out more environmental improvements.

9.24 Our concerns set out in MD179 remain. There is an asymmetry of information which exists between the companies and the regulator. Companies have incentives to identify items to be logged up but not those to be logged down. If we amended the logging up process we would have to subject companies to much more scrutiny and challenge to identify items to be logged down. In their responses companies argued that they believe we have all the necessary information to identify items for logging down. While we are able to identify the most significant of these items we continue to believe that we would have to take steps to address the information imbalance. Even if we did this it would still be less easy for us to identify items for logging down than it is for the companies to identify those for logging up.”

We would agree with Ofwat that the regulated company tends to benefit from the information asymmetry between the regulator and the regulated entity. While we understand the potential advantages in bringing the rules for interim determination and logging up/down more into line, we do not believe that this would be practical. Ofwat has explained the increase in the regulatory information requirement that would be required. We do not believe that this would be consistent with the Better Regulation Task Force’s requirement that regulation be better targeted.

11.8 Interim determinations and logging up and down in Scotland

11.8.1 Are interim determinations or logging up/down required in Scotland?

We explained earlier that in preparing either advice or a determination, a regulator has to form a view on the costs that are likely to be incurred several years into the future. This requires him to forecast inflation (both for retail prices and capital expenditure), costs of capital and as the timing and efficiency of investment. Some of these assumptions are likely to favour the regulated company, others are likely to favour customers. An adjustment to the price settlement is required when either the customer or the company benefits by a significant amount.

A good example from the last Strategic Review of Charges is our forecasts of retail price and capital goods inflation. We overestimated retail price inflation and, to date, have underestimated capital inflation. At the current time, Scottish Water has been disadvantaged by a total of £31 million. We believe that this is not material and that an adjustment to prices would not have been appropriate.

However, there have been two circumstances where, if there had been a mechanism for adjusting prices, it may have been appropriate to consider an interim determination:

- the unsubstantiated claim for efficiency made by the former East of Scotland Water Authority prior the last Strategic Review; and
- the current slow progress in the delivery of the *Quality and Standards II* programme.

In our *Costs and Performance Report 2002-03*, we noted: “In the Strategic Review of Charges, the capital efficiency targets set for each of the three authorities were the same. However, we explained that the actual percentage targets that were set for the former East of Scotland Water Authority were lower. This reflected efficiencies claimed by the authority in the definition of its investment needs during the second Quality and Standards process.

Since the Strategic Review we have attempted but been unable to confirm the efficiencies claimed by the authority. We can only assume that these efficiencies were not made. It is therefore in customers’ interests that Scottish Water be required to improve its future capital efficiency by an amount equivalent to the extra cash made available to Scottish Water in the current regulatory period. The additional savings that will be required amount to £74 million.”

Similarly, slower delivery of the capital programme results in Scottish Water having received more money from customers relative to the outputs delivered than was intended. In such circumstances we believe that it could be appropriate to seek an interim determination.

11.8.2 Proposed approach

In Chapter 4, we discussed the importance of ensuring that the regulatory regime establishes a robust framework. It is vital that a regulated company faces a tight budgetary constraint; in the absence of such a constraint there will be little pressure on the company to improve its efficiency. This would clearly not be in customers' interests.

We also differentiated between a 'shock' that was the result of ineffective management, and circumstances where the outputs required from a company changed. It is important that customers do not pay twice for the same output, but also that they benefit from a financially sustainable industry. This requires the regulator to distinguish between such shocks. A company should be able to be confident that unscheduled pro-active investment, which will benefit customers, is taken into account in setting prices. Similarly, the company should know that a delay in delivering benefits to customers will also be taken into account.

Our proposal to use the Regulatory Capital Value method of price setting will make any future adjustments to Scottish Water's price caps more transparent. Ofwat's approach to interim determinations and logging up and down has been in place for more than ten years. The mechanisms used are well documented and well understood. For this reason we propose to adopt Ofwat's approach as far as is consistent with the framework of the industry in Scotland.

We propose to adopt the same timetable as Ofwat for interim determinations. This would require either this Office or Scottish Water to give notice by 1 October in the year before the interim determination should take effect.

We propose to set out clearly the timetable, rules and consultation process for interim determinations in our draft determination of prices.

11.9 Conclusion

Interim determinations and logging up and down are an

important safeguard (for customers and for companies) in Ofwat's regulation of the privatised water and sewerage industry. They help to reduce the operating risk for companies and consequently their cost of capital. They also provide a clear incentive for companies to deliver the outputs included in the regulatory price settlement.

We believe that both Scottish Water and its customers would benefit from the introduction of interim determinations and logging up and down in Scotland. The views of stakeholders would be very welcome.

11.10 Questions for consultation

1. Do stakeholders believe that there should be a process to adjust prices during a regulatory control period? If so, should we seek to introduce a process for interim determinations?
2. Do stakeholders believe that it is appropriate to adjust prices in the next regulatory control period to reflect actual outcomes in the previous period? If so, should we seek to introduce a similar process to Ofwat's logging up and down?
3. What factors should trigger an interim determination? At what level of materiality should an interim determination be triggered?
4. Are there other relevant changes in circumstance that we should consider introducing?
5. What is the most effective method for consulting with customers about a potential price change?
6. Would customers prefer the regulator to revise prices downwards during a regulatory period (eg in the event of slow delivery of outputs) even if prices are likely to increase by a greater percentage in the future as a consequence?

Section 3: Chapter 12

Setting price caps: the role of the tariff basket

12.1 Introduction

We are committed to improving the transparency of the regulatory regime. As part of this commitment, we believe that it is vital that customers can more readily understand the likely impact of the *Strategic Review of Charges 2006-10* on their bills.

In earlier chapters we discussed how we intend to assess the level of revenue that Scottish Water should be allowed to raise from customers. This chapter sets out our proposals for translating the allowed revenue into the tariffs that impact on customers' bills.

In January 2005, we expect to receive guidance from Scottish Ministers on the principles of charging that should be applied in the *Strategic Review of Charges 2006-10*. This guidance will identify any cross subsidies between customer groups that need to be unwound.

We propose to establish tariff baskets to cover the principal [core] services provided by Scottish Water. The use of tariff baskets will also help to ensure that the process of unwinding cross subsidies is as transparent as possible. In addition, we consider that tariff baskets will allow customers to see more clearly the likely impact of the Strategic Review on their bills. In this regard, our proposals to increase the number of 'standardised customers' (which we discuss in the next chapter) will further increase transparency in the price setting process. Adopting 'tariff baskets' will also bring the price setting process more into line with the other utility regulators in the UK, such as Ofgem, Ofwat and Postcomm.

The detail of the tariff baskets will be available on our website early in 2005. This will give customers better access to information about bills and will help strengthen the regulatory regime.

The chapter begins by reviewing the current annual process for the approval of charges and the structure of tariffs in Scotland. It continues by describing how tariff baskets work and our proposals to use them in Scotland.

12.2 Current regulatory framework

In 2001, the Minister for Environment and Rural Affairs commissioned a Strategic Review of Charges. He asked for the Review to cover the period 2002-06. The Review had to provide advice on the factors that should be taken into (and left out of) account in the setting of charges. The Minister could accept the advice, accept the advice with modifications, or reject the advice and substitute his own advice. The original advice and the Minister's response (including reasons if he amended or rejected the original advice) needed to be published.

Scottish Water has to provide this Office with a 'scheme of charges' each year during the regulatory control period. This scheme of charges contains its proposals for tariffs for the next financial year. Our role is to review this submission and to establish whether the scheme of charges is consistent with the advice that was accepted by Ministers. We analyse whether or not:

- the proposed tariffs are consistent with the agreed revenue caps;
- the balance between customer groups and between types of tariff are consistent with the advice.

If we are content that the scheme of charges is consistent with the advice accepted by Ministers, we approve the scheme. If not, we have to propose amendments such that the scheme of charges would be consistent with the advice. If Scottish Water accepts the amendments, we approve the scheme of charges. In the event that we cannot agree a scheme of charges with Scottish Water, we refer the proposed scheme and our suggested amendments to the Scottish Ministers. They will then set charges for the next financial year.

12.3 Limitations of the current regulatory framework

As we discussed in Chapter 2, many customers have not understood the impact of the *Strategic Review of Charges 2002-06* on their bill. We believe that this has not been helped by the annual scheme of charges approval process.

Over the period of the current Strategic Review of Charges, it has become clear that the existing arrangements for establishing charges, and communicating changes to customers, have a number of limitations. In particular:

- the link between the revenue cap and customers' bills is not clear;
- information on tariffs is not available until around two months before they take effect;
- there is only limited scope for flexibility in the approval process for the annual scheme of charges.

In Chapter 5, we discussed our proposals to introducing 'price caps' in place of revenue caps. A price cap regime would establish a clearer link between the Strategic Review of Charges and the bills that customers pay. We believe that setting price caps will allow customers to understand the likely impact of any tariff changes on their bill.

By using tariff baskets we can establish, and communicate to customers, the impact on bills of changes in charges. Tariff baskets are the collection of charges to which the annual regulatory price caps would apply. There are very many individual tariffs and it would not be practical to set a cap on each individual tariff. Instead we group tariffs into baskets and impose a price cap on each basket. There can therefore be modest differences in the changes in the levels of the individual tariffs within a single basket, but overall the impact on all customers in that basket should be very similar.

12.4 The structure of charges in Scotland

Charges to individual customers will vary according to the type of customer and the service they are receiving. In particular, customers are classified as:

- domestic (household) or non-domestic (non-household – businesses, charities or public sector organisations);

- measured (metered), un-measured (un-metered) or (for wastewater only) trade effluent;
- water or wastewater.

12.4.1 Domestic unmeasured water

Unmeasured domestic (household) customers pay for water charges based on the Council Tax band of their home. Their bill does not depend on their consumption. Discounts are currently provided to single person household and to second home owners.

12.4.2 Domestic unmeasured wastewater

Charges for unmeasured domestic wastewater customers are also based on the Council Tax band of the property. This charge includes surface water and roads drainage¹. The same discounts are available.

12.4.3 Domestic measured water

Fewer than 1% of domestic customers have a meter. These customers pay a fixed charge based on the size of their meter connection and a volumetric rate based on how much water they consume. All domestic metered water customers currently have a standard 20mm connection. This is the smallest connection available.

In April 2004, Scottish Water introduced a low user tariff discount for domestic and non-domestic metered customers with a standard 20mm connection who use less than 25m³ of water² a year. Such customers now pay a lower standing charge but a higher volumetric rate for the first 25m³ of water. Their charges then revert to the standard volumetric rate for consumption greater than 25m³.

12.4.4 Domestic measured wastewater

Domestic metered water customers do not have a meter to measure their wastewater. Instead they pay a standing charge based on the size of their water meter connection and a volumetric rate which assumes that 95% of their water consumption is returned to sewer.

¹ Surface water drainage charges cover the cost of draining surface water from a property. Roads drainage charges cover the costs of draining surface water from the public highways.

² 1m³ of water is equal to 1,000 litres.

These customers pay for surface water and roads drainage based on the Council Tax band of their property.

12.4.5 Non-domestic unmeasured water

Unmetered non-domestic customers are currently charged relative to the rateable value of their property. These customers pay two fixed charges, neither of which reflect their consumption of water: a minimum charge for access to the network and an additional charge that is a proportion of their rateable value.

12.4.6 Non-domestic unmeasured wastewater

Charges for unmeasured non-domestic wastewater are also a function of the connected property's rateable value. Customers pay three separate fixed charges: a minimum charge for accessing the network and two charges that are a proportion of their rateable value. One covers wastewater and the second covers surface water and roads drainage.

12.4.7 Non-domestic measured water

Metered non-domestic customers pay a standing charge, which depends on the size of their meter connection, and a volumetric charge based on how much water they consume.

Non-domestic measured water customers with a standard 20mm connection are charged in the same way as metered domestic customers for water.

Larger meter connection sizes range from 25mm to 600mm. Annual water consumption up to 100,000m³ is charged at the standard 20mm volumetric rate. Customers who use in excess of 100,000m³ of water during the year receive a discount from the standard volumetric tariff for any consumption above the 100,000m³ threshold. A second increased discount applies above 250,000m³. Customers who commit in

advance to using a minimum amount of water can obtain a larger discount on their consumption over 100,000m³ and 250,000m³.

12.4.8 Non-domestic measured wastewater

Non-domestic wastewater customers pay a fixed charge based on the size of their water meter connection and a volumetric rate based on an assumption that 95% of their water consumption is returned to sewer. If a customer can demonstrate that less than 95% of water returns to sewer (for example, a company that uses water in its production processes) then they can apply to have the assumption of 95% reduced.

There are no discounts for customers who discharge large volumes of wastewater.

The surface water drainage charge for non-domestic metered customers, whether metered or unmetered, is based on the rateable value of their properties.

12.4.9 Trade effluent

Charges for trade effluent are based on the Mogden formula³. This formula assesses a charge for the treatment of a particular strength and volume of effluent based on the costs of treating this wastewater.

Trade effluent customers pay an annual fixed charge on the basis of expected discharge of effluent and a variable rate based on the actual volume and strength of the effluent discharged.

12.4.10 Summary of charges

Table 12.1 presents a summary of Scottish Water's charges.

³ We discussed Scottish Water's charging for trade effluent and its use of the Mogden formula in Volume 2 of our methodology consultation documents. This is available on our website at www.watercommissioner.co.uk.

Table 12.1: Summary of charges

	Type of charge		
	Fixed £ per annum	Fixed – based on rateable value (pence per £ of RV)	Volumetric (pence per m ³)
WATER			
Unmetered domestic	✓		
Metered domestic	✓		✓
Unmetered non-domestic	✓	✓	
Metered non-domestic	✓		✓
SEWERAGE			
Unmetered domestic			
Wastewater (including foul and surface water drainage)	✓		
Metered domestic			
Sewage	✓		✓
Surface water drainage	✓		
Unmetered non-domestic			
Sewage	✓	✓	
Surface water drainage		✓	
Metered non-domestic			
Sewage	✓		✓
Surface water drainage		✓	
Trade effluent	✓		✓ ⁴

12.5 A definition of tariff baskets

In the previous section we outlined the wide range of services provided by Scottish Water. A tariff basket would include all of the tariffs that impact on customers who receive a particular service. For example, if measured non-domestic customers were considered as a group, all of the tariffs that impact them would be included. Such a tariff basket would therefore include the standing charges relating to the different sizes of connection available and the volumetric tariff.

The balance of tariffs within the basket will be determined by the number and type of connections, amount discharged and by increases or decreases in the tariffs included in the basket.

Total revenue is determined by adding together the output of each tariff basket. The revenue from an individual tariff basket is assessed by calculating the sum product of the relevant customer base and relevant tariffs.

⁴ Trade effluent is charged for using both volume and strength.

⁵ See Chapter 7, Financial Modelling.

In this example, there are just two tariff baskets:

	Number of customers Years 1 + 2	Consumption Years 1 + 2	Tariff Year 1	Tariff Year 2	Revenue Year 1	Revenue Year 2
Basket A	5	10	£1.00	£1.50	£50.00	£75.00
Basket B	5	10	£2.00	£2.50	£100.00	£125.00
Total	10	20	-	-	£150.00	£200.00

A 50% increase is allowed in Basket A and a 25% increase in Basket B. Revenue from Basket A increases from £50 to £75 and from Basket B from £100 to £125. Total revenue increases from £150 to £200.

12.6 Defining the weighted average price increase (WAPI)

WAPI is the weighted average price increase and is a measure of the overall impact of all the tariff changes in each tariff basket. It is therefore the amount by which tariffs on average have increased within the tariff basket.

At the Strategic Review of Charges we are proposing to set real caps on the weighted average price increase on each tariff basket. A real price cap is the allowed change in prices after inflation. If the real WAPI cap is zero, then prices would increase at the rate of inflation.

We will also estimate the implied nominal price cap in the *Strategic Review of Charges 2006-10*. The actual nominal price cap will be set in line with the appropriate level of the Consumer Price Index (CPI) for the setting year⁵.

We propose that the price cap regime should be applied in Scotland in the same way that it is applied in England and Wales. Scottish Water would be permitted to carry over any unused change in prices from one year to following years. We should not penalise Scottish Water for choosing to have charges below their allowed price cap in any one year. Unused price cap is denoted with the letter 'u'. The real price cap is denoted by the letter 'k'.

The maximum weighted average increase in prices is determined as follows:

$$\text{WAPI} \leq \text{CPI} + k + u$$

12.7 The use of tariff baskets; ensuring compliance with the price caps

We need to take account of the combined impact of changes in the individual tariffs that make up a customer's bill. We do this by calculating a 'weighted average' change in prices for the tariff basket. We compare this with the price cap that has been applied to the tariff basket.

The weighted average price change is calculated by multiplying the percentage of Scottish Water's total revenue that each tariff comprises by the change in the tariff. This gives a weighted percentage increase for each tariff. The total of these weighted percentage increases is then the overall weighted average.

This is illustrated using a sample tariff basket containing just three tariffs.

Table 12.2: The use of weighted average tariffs

	% increase (D)	% of total revenue (E)	Weighted % increase (D x E)
Tariff A	5%	50%	2.5% (A)
Tariff B	-5%	20%	-1% (B)
Tariff C	20%	30%	6% (C)
Weighted average (A+B+C)	-	-	7.5%

The weighted average increase provides a good indication of the impact on customers, as it takes account of the relative size of the impact from each tariff change.

The impact of a change in tariffs may be different in subsequent years. It will depend on the importance of that tariff to the total revenue contributed by that tariff basket. In Table 12.3, the importance of Tariff A to total revenue has declined, while Tariff B's has increased. The increases in tariffs remain the same.

Table 12.3: Effect of changing usage of different tariffs

	% increase	% of total revenue	Weighted % increase
Tariff A	5%	40%	2.0%
Tariff B	-5%	30%	-1.5%
Tariff C	20%	30%	6%
Weighted average (A+B+C)	-	-	6.5%

We believe that our proposed approach ensures that customers within a tariff basket are treated equitably. Introducing tariff baskets into the charging regime also would allow us to analyse carefully the impact of tariff changes on total revenue when customers each buy a different mix of services.

12.6 Timetable for setting charges

We are keen to establish a clear timetable for the annual tariff setting process. Our proposed timetable for 2006-07 is set out below. We use the following terms:

Charging year – the financial year to which the tariffs will apply (2006-07).

Setting year – the financial year in which the tariffs are set (which is one year prior to the charging year, 2005-06 in this example).

Reference year – the financial year from which customer information is taken (which is two years prior to the charging year, 2004-05 in this example).

Table 12.4: Proposed timetable for setting charges for 2006-07

End September in reference year (2004-05)	<ul style="list-style-type: none"> Customer numbers set Rateable value set
End March in reference year (2004-05)	<ul style="list-style-type: none"> Water and sewage volumes set Trade effluent volumes and loads set Revenue split set
April of setting year (2005-06)	<ul style="list-style-type: none"> Scottish Water proposes any new tariffs
June of setting year (2005-06)	<ul style="list-style-type: none"> Scottish Water submits customer numbers, rateable value information, consumption and revenue split in the annual 'June Return' for the reference year.
Beginning of September in setting year (2005-06)	<ul style="list-style-type: none"> Scottish Water submits scheme of charges, including tariff basket information.
End of November reference year (2004-05) to end of November setting year (2005-06)	<ul style="list-style-type: none"> CPI to be applied to prices is measured.
December of setting year (2005-06) set the inflation figure.	<ul style="list-style-type: none"> We write to Scottish Water to the inflation figure.
End December in setting year (2005-06)	<ul style="list-style-type: none"> We either approve the proposed scheme of charges or announce an alternative scheme with an appropriate explanation.
1 April in charging year (2006-07)	New tariffs take effect.

We recognise that tariffs will not be finalised until the end of December in the year before they would come into effect. However, the Strategic Review of Charges will have set out in detail the proposed weighting to be applied in each year to each tariff basket. This weighting will be in line with the guidance provided to us by the Scottish Ministers in January 2005. The Review will also forecast likely customer numbers.

This information, combined with the maximum revenue allowed to Scottish Water, should allow most customers to have a broad understanding of the likely level of their bill in each year of the regulatory control period.

12.8 Our proposed approach to tariff baskets

In England and Wales the process and formulae which define the tariff baskets used in setting prices are contained within condition B of the companies' operating licenses. Scottish Water's duties are set out in statute and there is no equivalent licensing regime in Scotland. We therefore propose to describe our proposed tariff baskets in detail in our *Strategic Review of Charges 2006-10*.

We propose to use the following information to determine the weighted average price increase:

- tariffs in the setting year;
- tariffs in the charging year;
- half-year customer numbers from the reference year;
- half-year rateable values in the reference year;
- water and sewage volumes for the reference year;
- trade effluent volumes and loads for the reference year;
- revenue split in the reference year; and
- the change in CPI between 1 November in the reference year and the end of October in the setting year.

We propose that there should be eight or ten separate tariff basket items:

- domestic unmeasured water;
- domestic unmeasured wastewater;
- non-domestic unmeasured water;
- non-domestic unmeasured wastewater;
- measured water [possibly split 20mm connection and other];
- measured wastewater [possibly split 20mm connection and other];
- surface water drainage (excluding unmeasured domestic); and
- trade effluent.

We believe that it may be worth considering the introduction of two separate tariff baskets to include tariffs (except surface water drainage) for customers

with a standard metered connection. There are four principal reasons why we consider that this may be worthwhile:

- metered customers with a standard connection are more like households than other metered customers;
- monitoring prices for this group separately should help to ensure that the interests of domestic customers are properly protected in the event that Parliament approves the current Water Services (Scotland) Bill;
- it should be easier to reflect the outcome of the 'Paying for water services' consultation in the tariff basket weightings; and
- the extra tariff baskets should improve the predictability of prices for a large number of smaller businesses.

There are two principal reasons why we should restrict the number of tariff baskets to eight:

- Scottish Water would have less flexibility in managing the expectations of its business customers; and
- greater complexity is introduced to price setting.

On balance we believe that the advantages outweigh the two potential disbenefits. We are, however, keen to hear the views of stakeholders on this point.

Our proposed approach uses a greater number of basket items than there are for the companies in England and Wales. Ofwat uses only five tariff basket items for water and sewerage companies, namely:

- measured water;
- unmeasured water;
- measured wastewater;
- unmeasured wastewater; and

- trade effluent.

We propose to introduce at least eight tariff baskets for three main reasons:

- Unmeasured domestic customers' bills are based on the Council Tax band of the property, whereas unmeasured non-domestic properties are currently billed on the basis of their rateable value. If we put both groups of customers in the same basket item then it is possible that the reported increase for the combined group would not be representative of either customer group.
- The Scottish Executive has asked us to determine charge limits for various customer groups. It seems appropriate that this should involve looking at smaller non-domestic, domestic, smaller and larger non-domestic customers separately. Putting domestic customers in separate tariff basket items would facilitate the determination of charges in line with guidance from Ministers.
- The Scottish Executive is currently proposing that the way Scottish Water charges for unmeasured non-domestic services should be changed in order to remove some of the anomalies created by rateable value charging. The impacts of this change will be easier to evaluate if we include unmeasured non-domestic water and wastewater as a separate item.

We also propose to separate the recovery of surface water drainage costs from the measured and unmeasured wastewater services. If surface water drainage and wastewater charges were grouped in a single basket item, tariff changes on actual bills may be quite different to changes in revenue from the tariff basket. Moreover, the Scottish Executive's proposal to change the method of charging for surface water drainage should be easier to implement and to monitor if it is kept as a separate item.

12.8 The use of the tariff basket

It is important to use a consistent method to calculate the appropriate weightings of tariffs. There are three possible ways we could weight our proposed tariff basket:

- By using the actual breakdown of revenue for each tariff in the reference year.
- By calculating a notional revenue for each tariff based on the customer numbers in the reference year and tariffs in either:
 - the setting year, or
 - the charging year.

We propose that the actual revenue in the reference year should be used to weight each of the increases in the tariff basket. This method is consistent with the approach adopted by Ofwat. It also has the advantage of being based on actual revenue from various customer groups.

Our proposed approach involves the following three stages for each tariff basket item:

- A notional revenue for the setting year is calculated. This involves multiplying the customer information in the reference year by the tariffs in the setting year.
- A notional revenue for the charging year is calculated. This involves multiplying the customer information in the reference year by the proposed tariffs for the charging year.
- We would then establish the percentage increase for the tariff basket item by dividing the notional revenue in the charging year by the notional revenue in the setting year, subtracting 1 and multiplying by 100.

An example should help to explain our approach. We have to assess the change in charges for metered water between Years 2 and 3. We would need to know the customer numbers for Year 1. We will assume that there were 10 customers and each had a 20mm meter

connection. We also assume that the total metered water consumption for the ten customers was 1,200m³.

We also need to know what the tariffs were in Years 2 and 3. Table 12.5 shows the tariffs used in this example. Table 12.6 shows how the percentage increase in measured water is calculated.

Table 12.5: Example tariffs

	Year 2	Year 3
20mm fixed charge	£150	£200
Water rate (£/m ³)	£0.75	£0.60

Table 12.6: Calculation of the percentage increase in revenue from a tariff basket

	Year 1 (units)	Year 2 (revenue)	Year 3 (revenue)
Standing charge	10	£1,500	£2,000
Volumetric	1,200	£900	£720
Total		£2,400	£2,720
Percentage increase			13.33%

We would repeat the calculation in Table 12.6 for each of the eight or ten items in Scottish Water's tariff basket. This would give us the increase for each item. We would then check that the revenue likely to be raised from each tariff basket was consistent with the weightings set out in the Strategic Review of Charges. To do this, we would weight the implied increase in revenue from the tariff basket with the weightings for the appropriate reference year.

12.8.1 Comparison with Ofwat's approach

For measured customers we are proposing to use the same approach as Ofwat. We would use one set of customer numbers and calculate the impact of the percentage increase in charges on total revenue⁶. Each year's price change would not use information from any previous year's change in price.

For unmeasured services, however, we would propose to use a different approach from that taken by Ofwat. It calculates one notional total revenue and a

⁶ Since the customer numbers are the same it does not matter whether average bill or total revenue is used.

corresponding average bill each year. This notional average bill is compared with the previous year's average bill to work out the percentage increase for this group of customers.

The notional revenue is calculated by multiplying the tariffs in the charging year by the customer numbers as at December of the prior year. The average charge is calculated by dividing this notional revenue by the number of customers in the December of the prior year.

For example, Ofwat used customer numbers from December 2003 to assess the unmeasured price increase for 2004-05. Ofwat first multiplied the tariffs for 2004-05 by customer numbers in December 2003 to create the notional revenue. Ofwat then divided this notional revenue by customer numbers in December 2003. This created the notional average charge for 2004-05. Ofwat calculated the percentage increase in charges by dividing the notional average charge for 2004-05 by the notional average charge for 2003-04⁷.

The difference between Ofwat's approach for measured and unmeasured price changes would have no impact if all unmeasured customers were identical or if there were no changes to the unmeasured customer base. However, if a customer who leaves the unmeasured basket has a higher than average bill, bills for customers that remain within the basket must rise in order to maintain the average. Conversely, if a customer who leaves the basket has a bill of lower than the average, bills for customers that remain within the basket must fall in order to maintain the average.

There are three main reasons why we propose not to adopt Ofwat's approach to unmeasured charging:

- We believe that Scottish Water should not be able to offset the effects of a customer leaving the unmeasured basket by increasing charges to other unmeasured customers. It would be difficult to justify to unmeasured customers why their charges are rising faster than those for other customers. This would not be consistent with charges being broadly cost reflective;

- One of the reasons why the current approach to unmeasured services was introduced in England and Wales was to allow water companies to collect the same level of revenue as the customer base gradually moved towards metered services. It helped to create an incentive to switch to a metered tariff; and
- Ofwat has previously proposed changing this method. In a 1997 consultation, Ofwat proposed that the arithmetic of the unmeasured basket items should be changed so that they were similar to the metered basket items. The water companies rejected this proposal. We would have reservations about introducing a system which Ofwat itself has proposed to change.

12.8.2 Treatment of large customers

Larger customers in England and Wales can benefit either from an inset appointment or negotiation on price with their existing supplier. The inset arrangement allows another licensed supplier to supply customers⁸. Ofwat considers that pricing arrangements for larger customers could significantly distort tariff baskets and put at a disadvantage those who can neither benefit from competition nor negotiate.

Excluding large customers from the tariff basket has the effect that shareholders pay for these discounts.

In the public sector model in Scotland, the cost of any discount to one customer has to be paid by all other customers. Special agreements should only be entered into when everyone gains from the agreement. We would therefore propose that special agreements remain in the tariff basket. The creation of separate tariff baskets for standard measured customers would provide additional protection to such customers from the impact of any discount to larger customers.

⁷ Calculated the same way, but when Ofwat was reviewing the companies' tariff proposals the previous year.

⁸ There are 10 inset appointments in England and Wales. These are operated by Anglian, Thames, Hartlepool, Albion, Northumbrian, Severn Trent and Three Valleys.

12.8.3 Worked example of the proposed approach

The example below shows how our proposed approach to tariff baskets would operate. Table 12.7 sets out the split of revenue by tariff basket in Year 1. It also shows the percentage increases in Year 3. The weighted average increase in Year 3 is the percentage increase in each item multiplied by that item's share of total revenue in Year 1 that the item accounted for.

Table 12.7: Worked example of the use of tariff baskets

	Year 1 revenue (%) (A)	Year 3 increase (%) (B)	Weighted increase (%) (AxB)
Domestic unmeasured water	35%	1.0%	0.350%(C)
Domestic unmeasured wastewater	25%	0.0%	0.000%(D)
Non-domestic unmeasured water	3%	4.5%	0.135%(E)
Non-domestic unmeasured sewage	2%	12.0%	0.240%(F)
Measured water	10%	13.3%	1.331%(G)
Measured sewage	5%	-2.5%	-0.125%(H)
Measured water 20mm	35%	105%	0.3%(I)
Measured sewage 20mm	2%	0%	0%(J)
Surface water drainage	10%	0.9%	0.090%(K)
Trade effluent	5%	2.0%	0.100%(L)
Weighted average increase (C+D+E+F+G+H+I+J+K+L)			2.42%

If the company had been allowed a real increase of 0.5% in revenue for Year 3 and the appropriate CPI was 2%, the increase in charges would be within the weighted average price increase allowed. The company would also be allowed to carry forward 0.08% of an unused price cap to the following year.

It is important to emphasise that changes in the current balance of tariff baskets will be made to reflect the outcome of the Scottish Executive's Consultation, 'Paying for water services 2006-10' and the Ministerial Guidance which we will receive in January 2005.

If Scottish Water wanted to change the balance of tariffs within a tariff basket, we would expect to see a clear and robust explanation of the rationale behind the change. Normally, we would approve such a proposal only if the proposed tariffs were demonstrably more cost reflective.

We summarise our proposed approach and the differences from the methodology used in England and Wales in Table 12.8.

Table 12.8: Summary of approaches in Scotland and in England and Wales

	Ofwat	Our proposals for Scottish Water
Basket items	<ul style="list-style-type: none"> Measured water Unmeasured water Measured sewage Unmeasured sewage Trade effluent 	<ul style="list-style-type: none"> Domestic unmeasured water Domestic unmeasured wastewater Non-domestic unmeasured water Non-domestic unmeasured sewage Measured water [possibly split 20mm customer and the rest] Measured sewage [possibly split 20mm customer and the rest] Surface water drainage (excluding unmeasured domestic) Trade effluent
Year used to weight charges	Reference year	Reference year
Unmeasured percentage increase	Measured using average charge from the setting year and comparing this with the average the year before. This gives companies increased certainty of revenue, but can cause large increases for unmeasured customers.	Measured using notional revenue. Customer numbers and volumes from the reference year are multiplied by tariffs in the setting year and the charging year. The percentage increase is the notional charging year revenue divided by the notional setting year revenue.
Measured percentage increase	Measured using notional revenue. Customer numbers and volumes from the reference year are multiplied by tariffs in the setting year and the charging year. The percentage increase is the notional charging year revenue divided by the notional setting year revenue.	Measured using notional revenue. Customer numbers and volumes from the reference year are multiplied by tariffs in the setting year and the charging year. The percentage increase is the notional charging year revenue divided by the notional setting year revenue.
Allowed increase	RPI + k + u	CPI + k + u
Where tariff basket is contained	In condition B of the companies' licences.	In the <i>Strategic Review of Charges 2006-10</i> .
Large customers	In England customers who consume more than 250,000m ³ are excluded. In Wales customers who consume more than 100,000m ³ are excluded. This is due to competitive supply for these customers.	All included within the tariff basket.
Special deals	Excluded from tariff basket as shareholders fund the discount for these customers.	Included within tariff basket.
When weighted average increase is assessed	February of the setting year.	September/October of the setting year.
Inflation measurement time period	November in reference year to November in setting year.	November in reference year to November in setting year.
New tariffs	To be based on sensible predictions of customer numbers.	New tariffs should be consistent with 'Paying for water services 2006-10'.

12.10 Summary

We propose to introduce the concept of tariff baskets to the water industry in Scotland. The tariff baskets and their weightings would be set out in the *Strategic Review of Charges 2006-10*. The introduction of tariff baskets should ensure that customers will be better placed to understand how their bills are likely to change during the regulatory control period.

In the next chapter, we outline our proposals to increase the number of standardised customers. This should further help customers to understand the likely impact of the Strategic Review of Charges on their bills.

12.11 Questions for consultation

1. Do you agree that the proposed approach for the tariff basket items is appropriate for Scotland?
2. Do you agree that we should introduce more tariff baskets than Ofwat?
3. Do you agree that we should establish tariff baskets for metered water and wastewater customers with a standard connection?
4. Do you agree that the proposed method for calculating the weighted average price increase is the most appropriate method to use? If not, which alternative method would be more appropriate and why?
5. Is a target date of the end of December for announcing tariffs (which will come into effect on 1 April in the following year) acceptable, given that details about tariff baskets and their weightings will be included in the *Strategic Review of Charges 2006-10*?

Section 3: Chapter 13

Standard customers

13.1 Introduction

In the *Strategic Review of Charges 2002-06*, we provided advice to Scottish Ministers on revenue caps. We also suggested that tariffs should be harmonised across Scotland for both domestic and non-domestic customers and that they should be made more broadly cost reflective. The impact of these recommendations was illustrated with reference to a number of standard customers.

We are keen to ensure that both the process and the outcome of the current Strategic Review of Charges are as transparent as possible. Consequently, we propose to develop our use of standard customers to help customers to understand better the likely impact of the Review on the bill that they pay.

This chapter starts by explaining the link between tariffs and bills. It then explains the role of standard customers and the changes that we propose to make.

13.2 The link between tariffs and bills

Sometimes the terms used to discuss bills can be confusing. When we talk about a bill, we mean the total amount a customer has to pay in a period¹. This bill will contain at least one tariff. A tariff is the amount that a customer pays for each unit of consumption of a particular service.

Consider, for example, hiring a bicycle. If a rental shop charged £2 per hour for hiring a bicycle, then £2 per hour is the tariff. If you hired the bicycle for five hours, you would pay £10. In this instance £10 is the bill.

In general when we look at Scottish Water's charges, we look at its tariffs. Scottish Water can propose amendments to tariffs to reflect more accurately their costs of providing the service.

The service that a customer receives or could receive depends on a number of factors. These include:

- type of connection (eg water/waste water, metered/unmetered);
- size of the connection;
- rateable value of the property;
- use of the service that the property makes;
- area of the property that drains to sewer;
- strength of the sewage it discharges; and
- Council Tax band for a household property.

A customer's bill will vary depending on the relative use of the services provided. For example, the bill for a domestic customer with no meter will be based on the Council Tax band of the property, whereas charges for a business customer with a meter will be based on:

- the size of the water connection;
- the amount of water consumed;
- an assumed size of the waste water connection;
- the assumed amount of waste water discharged; and
- the rateable value of their property (for draining surface water from the property).

The customer's bill will be the total sum of each of the relevant factors multiplied by the appropriate tariff.

If we want to provide visibility on how bills are going to change as tariffs change, we need a way to show how the changes will impact on bills for different customers.

For the 2.3 million domestic (household) customers this is a relatively straightforward process. These customers pay according to the Council Tax band of their property. This system is based on a defined number of ninths of a Band D charge. For example, a Band A customer pays

¹ Often this will be a year, however, some customers are billed monthly or quarterly, depending on their size.

six ninths of the Band D Charge, whereas a Band H customer pays 18 ninths. This means that charges to each unmeasured domestic customer rise or fall by the same percentage in any one year. They do not change by the same amount, as the Band H customer is paying three times as much as the Band A customer, so their bill will increase or decrease by three times the amount of the Band A customer's bill.

Scottish Water publishes the charge for each band in its annual scheme of charges. Domestic customers should therefore have sufficient information to understand how their charges will change.

Scottish Water has more than approximately 140,000 non-domestic customers. These customers will each require a quite different mix of services from the water and sewerage undertaker, so the impact of tariff changes will impact on their total bills in different ways.

This is perhaps best illustrated by a very simple example. There are three non-domestic water customers. These customers use different amounts of water as shown in Table 13.1.

Table 13.1: Sample customers' consumptions

Customer name	Water use description	Consumption (m3 per year)
Newsagent	Customer is a low water user.	10
Butcher	Customer is a moderate water user.	40
Tearoom	Customer is a high water user.	250

In this example, in Year 1 'ABC Water' levied a minimum charge of £50 on these customers and also charged them £1.00 per cubic metre of water used in year 1. In Year 2, ABC Water decided that, in order to make charges more reflective of the costs of supplying the customers, the minimum charge should rise to £100, while the rate for water usage should fall to £0.50 per unit.

Table 13.2 shows the customers' bills in Years 1 and 2. It also shows the percentage increase in each of their bills. The total figure represents the total revenue from the three customers of ABC Water in this example. The

total percentage increase refers to the increase in ABC Water's revenue.

Table 13.2: Impact on sample customers of changes in tariffs

Customer name	Bill in Year 1	Bill in Year 2	Percentage Increase
Newsagent	£60	£105	75%
Butcher	£90	£120	33.33%
Tearoom	£300	£225	-25%
Total	£450	£450	0%

In this example, ABC Water's revenue from the three customers has not changed year-on-year. However, two of the customers have faced very significant changes in their bills.

In practice, without analysing the components that make up each bill, it is impossible to predict the impact of tariff changes for every customer. We are therefore keen to establish a number of appropriate reference points in the *Strategic Review of Charges 2006-10*, so that customers can get a sense of the level of change in their bill that they are likely to experience.

13.3 Methods for assessing the impact of tariff changes

One way to assess the impact of tariff changes on bills would be to consider 'average customers'. This method is widely used in utility regulation where the impact of price changes on average bills are often quoted. There are, however, problems with this approach. The example with three customers shown above illustrate this.

The average yearly water use for all three customers is 100m3. If a customer existed that consumed this average amount, their bill would have been £150 in Year 1 and £150 in Year 2 - they would have seen no change and ABC Water could rightly claim that the tariff changes had not had an impact on the average customer. However, the bill did not stay the same for any of our three customers - in fact, two customers saw their bills rise by considerable percentages. It would be quite misleading to state that these tariff changes did not affect bills.

It is therefore necessary to develop more sophisticated reference points. The approach we adopted in the *Strategic Review of Charges 2002-06* was to use the concept of 'standard customers'. These are a set of representative 'typical customers' who are defined by aspects such as their consumption, connection size and rateable value. We can calculate the impact of tariff changes on the bills for each of these 'typical customers'. Customers can then match the service they receive with the standard customer who is most similar to them. This should allow them to understand the likely impact on their bills of changes in tariffs.

We believe that this is helpful because it allows us to explain the detailed year-on-year effects of tariff changes on a number of broadly representative standard customers. We therefore propose to continue using the standard customers approach for the *Strategic Review of Charges 2006-10*.

13.4 Impact of developments since the last Strategic Review of Charges on the standard customer model

It is clearly important that our set of standard customers is representative of the actual customer base. This ensures that all customers can find a 'match' that will illustrate the likely impact of tariff changes on their bill.

As part of the work for the *Strategic Review of Charges 2006-10*, we propose to revise our list of standard customers to help ensure that we achieve as wide a representation as possible.

In the period since the last Review was completed, our understanding of the impact of tariff changes on customers has improved. The key changes which impact on our set of standard customers are as follows:

- We receive a larger number of complaints about bills, providing us with more information;
- Scottish Water submits more detailed customer information; and

- Trade effluent has become a core function of Scottish Water.

These changes are discussed below.

13.4.1 Information from complaints

One of our statutory duties is to investigate complaints from customers that Scottish Water has been unable to resolve itself. Following the change in Scottish Water's tariffs in April 2003, we received a large number of complaints from customers, particularly from small businesses, about the impact of the changes on their bills. One of the most common complaints that we received at the time was that the impact of the changes in tariffs had not been sufficiently well signalled.

While our set of standard customers did include those with low consumption and a meter, it did not include unmetered customers who pay according to their rateable value. We therefore propose to add standard customers of this type to our set.

13.4.2 More detailed information about customers

At the time of the *Strategic Review of Charges 2002-06* we asked each of the three former water authorities to provide detailed information about the make-up of their customer base². However, because of limitations on the information that was available at that time, the authorities were unable to provide as complete a response as we would have liked. The information in the *Strategic Review of Charges 2002-06* was therefore based on a subset of customers that, to the best of our knowledge, was representative of the total customer base.

In May 2003, Scottish Water submitted detailed information about its customer base for the first time. Since then, we have been analysing the effects of tariff changes on the different types of customer represented in Scottish Water's submission. As a result, we now have a much clearer understanding of the full range of customers.

² WIC1 followed by WIC22 after the Review, see Appendix 2 of Volume 1: *Our work in regulating the Scottish water industry: Setting out a clear framework for the Strategic Review of Charges 2006-10*.

We therefore propose to add to the list of standard customers used in the last Strategic Review some additional customer types that are more representative of Scottish Water's actual customer base.

13.4.3 Trade effluent becoming a core function

The draft *Water Services. (Scotland) Bill*, which was introduced in June 2004, includes a provision that trade effluent should be made subject to regulation by our office for the first time. This is discussed in more detail in our document, *Our work in regulating the Scottish water industry: Background to and framework for the Strategic Review of Charges 2006-10*³.

We will therefore be carrying out detailed analysis of the effects of changes in trade effluent charges on customers. Trade effluent charging is particularly complicated. It is calculated using the Mogden formula, which contains a number of elements. Tariffs for each of these elements could change and could have a material impact on customers' bills.

We therefore propose to add representative trade effluent customers to our set of standard customers.

13.5 Proposed set of standard customers for the Strategic Review of Charges 2006-10

In the previous section we discussed why we are proposing to modify the list of standard customers. We do not propose to remove any of the standard customers that we used in the last Strategic Review. We believe that it is important to continue to provide information for these standard customers. This will allow more straightforward comparisons of the impact of current tariff changes with those that take place during the 2002-06 regulatory period.

However, from our analysis of the customer base information provided by Scottish Water, it has become clear that some of the descriptions applied to the standard customers in the last Review were over simplified. In one sense this is unimportant because

what matters is the change in bills that standard customers are illustrating. However, we propose to update the descriptions of the standard customers to ensure that they are not misleading.

Table 13.3 shows the standard customer descriptions that we used in the *Strategic Review of Charges 2002-06*. It also shows the proposed new name for these customers for the *Strategic Review of Charges 2006-10*.

Table 13.3: Standard customers used at the 2002-06 Review

Name in 2002-06 Review	Proposed name for 2006-10	Water		Sewerage		
		Meters	Volume (m ³)	Meters	Volume (m ³)	RV
Newsagent	High Street newsagent	1 x 20 mm	30	1 x 20 mm	28.5	£5,000
Garage	Garage	1 x 20 mm	100	1 x 20 mm	95	£10,000
Restaurant	Large restaurant	1 x 20 mm	500	1 x 20 mm	475	£100,000
Commercial	Large office	1 x 25 mm	900	1 x 25 mm	855	£750,000
Retail	Retail group	2 x 20 mm 20 x 25 mm 1 x 35 mm	4,500	2 x 20 mm 20 x 25 mm 1 x 35 mm	4,275	£1,700,000
Food manufacturer 1	Food manufacturer 1	2 x 25 mm 1 x 80 mm	50,000	2 x 25 mm 1 x 80 mm	47,500	£100,000
Food manufacturer 2	Food manufacturer 2	2 x 25 mm 1 x 50 mm 1 x 100 mm	100,000	2 x 25 mm 1 x 50 mm 1 x 100 mm	95,000	£260,000
Manufacturing	Large manufacturer /pharmaceuticals	1 x 150 mm	175,000	1 x 150 mm	166,250	£1,225,000
Brewers	Brewers	2 x 25 mm 1 x 100 mm 1 x 150 mm	600,000	2 x 25 mm 1 x 100 mm 1 x 150 mm	150,000	£500,000

We outline below the standard customers that we propose to add to our existing list of standard customers.

13.5.1 Additional metered customers

Our review of the customer information provided by Scottish Water suggests that metered customers are reasonably well represented within the existing standard customers. We therefore propose to add only four additional standard customers.

³ Section 2 Chapter 13 of the document discusses the changes to trade effluent charging in detail.

The proposed additions, which are outlined in Table 13.4, are:

- a customer who would qualify for a discount under Scottish Water's 20mm tariff;
- a medium-sized hotel;
- a High School; and
- a Band H⁴ domestic property with a meter.

Table 13.4: Proposed additional standard metered customers

Name	Water		Sewerage		
	Meters	Volume (m ³)	Meters	Volume (m ³)	Rateable value
Warehouse	1 x 20mm	10	1 x 20mm	9	£500
Large house	1 x 20mm	110	1 x 20mm	104	Band H
High School	1 x 25mm	2,000	1 x 25mm	1,900	£18,000
Hotel	1 x 50mm	15,000	1 x 50mm	14,250	£75,000

We believe that these additions should ensure that there are sufficient reference points for metered customers.

13.5.2 Standard unmeasured non-domestic customers

Approximately 55% of non-domestic customers do not have a water meter. These customers were not included in the standard customers used in the *Strategic Review of Charges 2002-06*. In general, we would expect these customers to have a lower consumption and lower bills than metered customers. This is because it is likely that Scottish Water will have ensured that customers who use a lot of water have a meter. Moreover, we would expect customers to opt for a meter if they had a high rateable value relative to their consumption.

However, it is not always practicable to install a meter, for example when customers share a supply pipe. This may mean that some customers with relatively large rateable values pay on an unmetered basis. Our analysis of the customer information provided by Scottish Water suggests that there is some evidence of this.

We therefore propose to include four unmeasured non-domestic customers in our list of standard customers, as shown in Table 13.5.

Table 13.5: Proposed additional standard unmeasured non-domestic customers

Customer name	Rateable value
Small newsagent /grocer	£200
Local hairdresser	£920
Sports club	£2,250
Supermarket	£30,000

13.5.3 Standard trade effluent customers

It is more difficult to define standard trade effluent customers than it is to define water customers or customers who discharge standard-strength sewage. There are just over 2,000 customers in Scotland who have trade effluent agreements. Scottish Water uses 31 different categories to group these customers and their size can range from a small garage to a large petrochemical firm.

Because of this, the aim in developing standard customers for trade effluent is not to represent all trade effluent customers. However, we hope to indicate the types of industries that have trade effluent agreements, and to show different varieties of strength and volume and different sizes of customer.

In developing this list of customers we have also considered whether the customers we have chosen would demonstrate the effect of changes in the components within the Mogden formula. Scottish Water's use of the Mogden formula is discussed in detail in Chapter 13 of Volume 2 of our series of methodology publications.

⁴ Around 800 household customers have meters. These customers do not pay for surface water drainage on the basis of a rateable value, but on the basis of the Council Tax band of their property.

The six additional standard customers that we propose are shown in Table 13.6.

Table 13.6: Proposed additional standard trade effluent customers

Standard customer name	Volume		Load		Average Strengths	
	Annual	Daily	Total suspended solids	Biological oxygen demand	Total suspended solids	Settled chemical oxygen demand
Bakery	200	0.55	0.5	0.75	575	1600
Clothing manufacturer	12000	32.9	1	1	20	300
Abattoir	90000	246.6	150	250	600	1500
Electronics Business	550000	1507	15	50	10	75
Printers	10000	27.4	5	40	100	2500
Distillery	150000	411.0	7	55	15	200

In summary, we hope that the changes and additions we propose to make to the set of standard customers will improve the reference points available to customers. This should ensure that the impact of tariff changes on customers' bills are more transparent.

13.6 The link between standard customers and tariff baskets

In the previous chapter we outlined our proposals to introduce 'tariff baskets' in Scotland. This proposal aims at bringing the Scottish water industry into line with other regulators in the UK. It is also part of the changes associated with the proposed use of price limits, rather than revenue caps, in the *Strategic Review of Charges 2006-10*. It provides a mechanism by which customers can see a more direct link between economic regulation of the industry and the bills they pay.

In assessing Scottish Water's charges scheme using tariff baskets, we will consider the following two questions:

- Is the weighted average price increase equal to, or less than, that allowed in the Strategic Review of Charges?
- Are the proposed charges discriminating against any individual customer, or group of customers?

If we are satisfied that the answer to the first question is "yes" and that the answer to the second question is "no" then we will be likely to approve the scheme of charges.

In our earlier three customer example we showed that there can potentially be large increases and/or decreases for certain types of customer within an average price increase. These may be a result of what is termed 'rebalancing', which is effectively reallocating costs between customer groups so that one group pays more and another less. Rebalancing can be justified where, for example, improved information about costs has shown that the new tariffs are more cost reflective than the old ones. It is, however, important that the customers affected can understand the changes and the impacts they will have on their bills.

For this reason we will continue to use standard customers to signal the effects of tariff changes to customers, alongside the proposed introduction of tariff baskets.

13.7 Key messages for customers and consultation questions

We use standard customers as a way to demonstrate the effects that tariff changes have on the bills customers pay. The technique is simple and transparent and allows customers to select a standard customer that has a similar service profile to their own.

To improve the representation of different customer groups, we propose to add an additional 14 customers and to rename existing customers for the *Strategic Review of Charges 2006-10*.

13.8 Consultation questions

1. We would like to hear your views on the proposed changes to the standard customers used in the *Strategic Review of Charges 2002-06*. Do you feel that our proposals will make it easier to identify the customer group represented? Are there any other changes you would like to see being made?

2. We would like to hear your views on the proposed additions and changes to the standard customers, as detailed above. Do you consider that we have achieved broad representation of the customer types? Are there any other customer types that we should add to the lists?

3. Are there any other customer types that are not properly represented in the revised list?

Section 3: Chapter 14

Method for setting retail and wholesale prices

14.1 Introduction

In previous chapters we described how we propose to set retail prices for customers in the *Strategic Review of Charges 2006-10*.

Proposals in the *Water Services (Scotland) Bill* that are currently under scrutiny by Parliament would establish a framework for competition in the Scottish water industry. This framework would allow new entrants to obtain a licence to provide retail services to non-domestic customers. These new entrants would be retail specialists who would buy water and sewerage services wholesale from Scottish Water. In light of the proposals set out in the *Water Services (Scotland) Bill*, we need to consider how we would determine appropriate wholesale prices for such retailers.

This chapter begins by explaining the implications of the *Water Services (Scotland) Bill* and how these changes affect our price review. We then explain what is meant by the terms wholesale and retail. We look at which pricing structures would best ensure that customers pay for the service they receive, and examine the potential advantages and disadvantages of alternative structures. We also review the approaches and views of other regulators, and conclude by setting out our proposals for consultation.

14.2 Background

14.2.1 Legislative developments

The possibility of competition in public networks has increased since 2000, when the *Competition Act 1998* came into force. Although the *Competition Act 1998* was to some extent the starting point for introducing competition into the water sector, a degree of competition did already exist, through 'off-network' deals and some small-scale brokerage (retail)¹ deals.

The *Competition Act 1998* prohibits agreements, business practices and conduct that damage competition in the UK. More specifically, the Act prohibits:

- anti-competitive agreements (known as the Chapter I prohibition); and
- abuse of a dominant market position (known as the Chapter II prohibition).

It is not clear at this stage what the impacts of the *Competition Act 1998* might be on the water industry. As a result, there is a risk that the framework for competition in the public water industry in Scotland could be determined by the Courts. The interpretation of the Act by the Courts may not be consistent with the broader policy objectives of the Scottish Executive for the water industry in Scotland. At the same time, the Scottish Executive has also recognised that, subject to safeguards which ensure broader policy objectives can be delivered, it may be beneficial to introduce some competition into the water and sewerage industry in Scotland.

The *Water Services etc (Scotland) Bill* was introduced in June 2004. It contains the following provisions:

- It prohibits common carriage²;
- Scottish Water will be required to establish a retail subsidiary – Scottish Water Retail (SWR). In other words, Scottish Water will be required to operate the two activities – wholesale and retail – as separate functions. Operating these two activities separately is likely to mean that there will be greater clarity in the allocation of costs;
- Retailers, including SWR, will be licensed. This means that they can be held accountable for their performance;

¹ Brokerage : a deal by which water is sold to customers by a third party, who is not responsible for anything other than the final supply of water to a customer's premises . Off-network : a privately owned water supply or waste water treatment and disposal system that reduces or eliminates the need for a connection to the public water and waste watersystem.

² Common carriage : common carriage enables a new entrant to abstract and treat water and arrange for this to be entered into Scottish Water's distribution system. The new entrant pays a fee for this "common-carriage", essentially the use of an "essential facility" (an asset that cannot reasonably be replicated). The new entrant's customer does not necessarily consume the new entrant's water.

- Retail competition will be restricted to non-domestic customers; and
- The market will cover both water and wastewater services.

We believe that the framework proposed in the *Water Services etc (Scotland) Bill* will benefit all customers. It will also reduce the likelihood of legal challenge under the *Competition Act 1998*. Such a challenge could, if successful, disproportionately affect vulnerable domestic customers. A successful challenge could place restrictions on:

- harmonised charges;
- cross-subsidy to assist vulnerable customers; and
- government lending to Scottish Water.

The required separation of Scottish Water's wholesale and retail activities and the improved cost allocation that is likely to result, should also benefit all customers.

14.2.2 Setting wholesale prices

In the first full Strategic Review of Charges, we advised Scottish Ministers on the revenue caps that should be applied to Scottish Water in the period 2002-06. The Review also contained estimates of the prices that customers were likely to face if the revenue caps and other recommendations were accepted. These were retail prices – i.e. prices to end users.

For this second Strategic Review of Charges, Scottish Ministers have asked that we set both wholesale and retail prices. We propose to set limits on both wholesale and retail prices in our tariff baskets (see Chapter 12).

It will be important to set an appropriate wholesale price. If it is set too low, new entrants would benefit, but the core water and sewerage treatment and network business would have insufficient revenue. This could adversely impact on the delivery of investment or could result in Scottish Water appealing to the Competition Commission to review the price determination.

If the wholesale price is set too high, there is a risk that new entrants would seek to challenge this price under the *Competition Act 1998*.

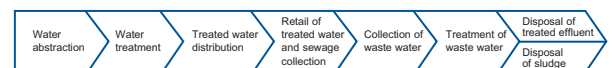
14.3 Defining the retail and wholesale activities

Retail is the selling of goods or services directly to consumers; it is usually in small quantities and the goods or services are not for resale. Wholesale is the selling of goods or services to merchants, usually in large quantities and for resale to consumers.

Retailers specialise in knowing and understanding customers: what they want to buy and how they would like it to be provided. They benefit from economies of scale by buying the product wholesale, and from economies of scope by using their capacity to sell the products and services of different suppliers to their customers.

Scottish Water currently handles all aspects of the water and sewerage service. Its activities can be represented in a value chain.

Figure 14.1: Scottish Water's value chain



Water abstraction is the collection or extraction of natural water, which can be either surface water such as lochs, streams and rivers, or groundwater, which is stored in naturally formed underground reservoirs called aquifers.

Water treatment includes all of the physical and chemical processes that make the water safe to drink. The level of treatment depends on the quality of the input water.

Treated water distribution involves transporting clean water from the treatment plant to customers, using a network of pipes and pumps called the distribution system. Distribution systems are local, or at best regional, which means that customers can normally only be served by one or two treatment plants.

Retail of treated water and sewage collection involves the direct, customer-facing activity in the supply of the service.

Collection of wastewater includes gathering all of the wastewater produced by households and non-households, together with rainwater from roads, footpaths and roofs (all known as sewage) and transporting it to a wastewater treatment works.

Treatment of wastewater includes all of the processes required to remove the non-water from wastewater and to clean the water so that it can safely be returned to the environment. Two products come out of a water treatment works: treated effluent, which is the treated wastewater, and sludge, which are the settled solids that came with the wastewater.

Disposal of treated effluent is the discharge of the treated wastewater into a river, stream or the sea. The discharge of treated effluent is regulated by law and is monitored and controlled by the Scottish Environment Protection Agency.

Sludge can be disposed into landfills or it can be used as fertilizer for agriculture or forestry.

The proposed framework would allow new entrants to undertake only a single activity in the value chain, namely the retail of treated water and sewage collection.

14.3.1 Scottish Water's wholesale activities

We need to define what the wholesale activities are in order to assess the appropriate level of costs that should be recovered from all retailers.

We believe that Scottish Water's wholesale activities include all of the operational activities that do not involve interaction with the end customer. Our initial view is that retail activities would include all matters relating to:

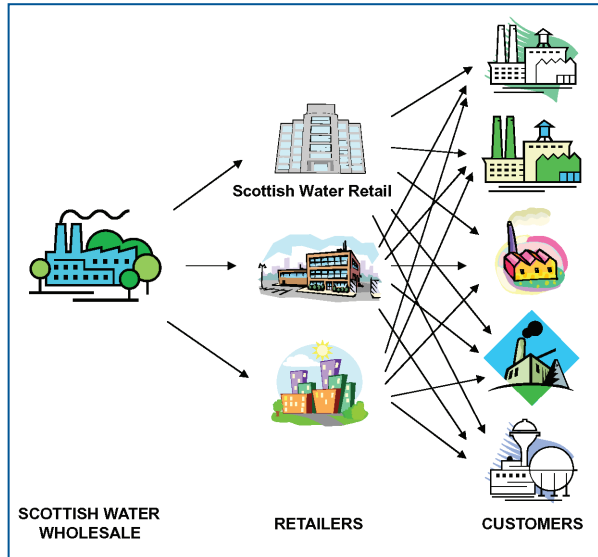
- retail pricing and tariffs;
- the billing process;

- collection of charges;
- debt follow up and debt management;
- meter reading, customer meter operations and ownership;
- call and correspondence handling;
- responses to customer enquiries, complaints or requests for information;
- key account management;
- liaison with the wholesaler to deal with customer issues; and
- marketing.

The Bill would require Scottish Water to establish a retail subsidiary. Scottish Water would be required to treat that retail subsidiary no differently to any potential new entrant.

Scottish Water would therefore become the wholesaler of water and sewerage services to its retail subsidiary and to any new entrants, with any new entrants becoming new retailers of these services to the end customers. The retailers would have to pay the wholesaler for the services provided, irrespective of whether or not they are paid by the end customers. This would mean that the costs of bad debt would therefore be transferred to the retailer.

We would expect that new entrants, as focused, specialist retailers, could improve the level of service offered to customers. For example, they could offer customers multiple payment alternatives (in method of payment and frequency), could combine the bills of various locations into one single bill (for multi-site customers), or could offer advice about how to reduce consumption. Further opportunities could exist if the retailer were already providing the customer with another utility service, as they would benefit from economies of scope, and could offer their customers a single bill that covers a number of utility services.

Figure 14.2: Retail competition

14.4 What we will consider when we set wholesale prices

In Volume 2 of our methodology, we explained that if the *Water Services (Scotland) Bill 2004* receives Royal Assent we will have responsibility for regulating wholesale charges. The way that Scottish Water's wholesale charges are set may have implications for the future of the Scottish water industry. Our choice of approach could have an impact on:

- whether competition develops if Scottish Water's wholesale and retail businesses are separated and competitors are allowed into the non-domestic retail market; and
- if competition does develop, the way in which it develops, for example, whether it focuses on a few large customers or includes more of the non-domestic customer base.

When we choose an approach, therefore, we must take account of the possible impact of that choice on customers. In order to ensure that customers' interests are best served, we propose to use the following criteria to assess different approaches.

14.4.1 Our proposed criteria are outlined below:

First, we believe that it is most important that the approach we use for setting wholesale charges must be theoretically sound. This includes the requirement that the approach should be consistent with the rules of competition law. From the point of view of customers, potential entrants and Scottish Water, this is a valuable constraint on the choices that we can make. It means that our approach to setting wholesale charges cannot be arbitrary, but instead must be defensible in principle and made through a rational process. The constraint that our approach must be defensible will be enforced through the right of retailers and Scottish Water to appeal to the Office of Fair Trading and the Competition Commission if they disagree with the level of wholesale charges. In addition, as explained in Volume 2, we can be subjected to judicial review if the process by which wholesale charges are set does not appear rational.

Second, the approach that we use must be practical. Setting wholesale charges must be based on a robust allocation of costs. Whatever approach we choose will have to be applied in practice in order to produce the wholesale charge available to potential new entrants to the retail market. An approach that is good in theory but that is also impractical will not benefit customers if it results in charges being set either too high or too low. It is important that both the wholesaler and new entrants are prepared to accept the wholesale charge.

Third, the approach that we use must be consistent with the Scottish Executive's policy objectives, as set out in its consultation *'Paying for water services 2006-10'* and the *Water Services (Scotland) Bill 2004*. The approach used for setting wholesale charges should result in prices that:

- allow Scottish Water wholesale to recover efficiently incurred costs;
- are consistent with the protection of public health and the environment; and
- are consistent with providing support to disadvantaged customers, which Ministers will determine.

Fourth, the approach that we use must be sufficiently flexible so that it can be developed to take account of changing circumstances. As competition develops, it is likely that the industry's understanding of which activities belong in the retail businesses, and what the costs of those activities are, will evolve. It should be possible to adapt the approach to take account of these changes.

14.4.2 Possible approaches to setting wholesale prices

Under the Scottish Executive's proposals, Scottish Water will still be responsible for delivering water to the customer's premises and the removal of wastewater for treatment and disposal. The assets used to do this can be referred to as 'essential facilities' because they are essential to the provision of the retail services and cannot reasonably be replicated. The wholesale charge is the charge that Scottish Water will levy for providing retailers with the essential monopoly services.

There are four approaches to setting wholesale charges that we intend to consider:

- the efficient component pricing rule;
- the long run marginal cost approach;
- accounting approaches;
- comparator approaches.

During the Review we will analyse in detail each of these approaches, and any others that might be identified. We will take account of the factors noted above and any other considerations raised by respondents to this consultation. In the section below we outline the four approaches and make some initial observations on their strengths and weaknesses.

14.4.3 The efficient component pricing rule

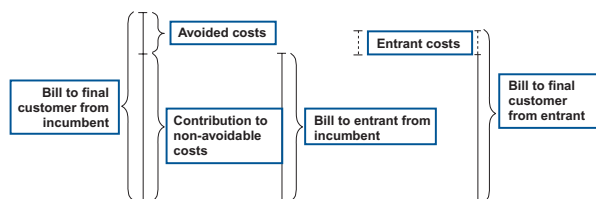
The 'efficient component pricing rule' (ECPR) was developed by economists during the 1980s as a method of setting charges for access to an essential facility. The rule was designed for situations where the incumbent

provides not only the monopolistic network elements of the service but also carries out the potentially competitive retail activities. The objective of the rule is to ensure that entry into the potentially competitive part of the market is efficient and so benefits customers.

The ECPR applies the concept of 'avoidable costs'. An avoidable cost is the cost that a company no longer has to bear if it ceases to supply a customer. For example, suppose that a business customer decided that they no longer wished to receive water and sewerage services from Scottish Water. Scottish Water would no longer have to read the meter or produce a bill for that customer. The costs of those activities (for example, the cost of the time spent reading the meter and calculating the bill, the cost of the paper that the bill was printed on, and the cost of the postage) are the avoidable costs associated with supplying that particular customer.

Under the ECPR, access prices are set at a level calculated as the incumbent's retail price minus the incumbent's avoidable costs. The price faced by the customer is this access charge plus the costs of the entrant. This is illustrated in the figure below.

Figure 14.3: New entrants and ECPR



It can be shown mathematically that under the ECPR the entrant will only enter the market if his costs are lower than those of the incumbent. As Figure 14.3 shows, this means that whenever there is entry into the market the overall level of costs will fall. Economists refer to this as an improvement in productive efficiency.

The logic of the ECPR is widely accepted and yet the approach is a highly controversial one. An important reason for this is that the ECPR does not provide the incumbent with any incentive to improve the efficiency of the network. However inefficient the network operations are, the incumbent will recover their costs through the

access charge. Moreover, there is no incentive for the incumbent to examine the structure of his costs in order to ensure that they are consistent with changes in the number of retail customers that it serves. Inefficiency in the incumbent's retail function will always be paid for by new entrants and ultimately all customers.

Critics of the ECPR approach would also argue that it does not promote 'dynamic efficiency' in the wholesale business, that is, the network operator is not encouraged to improve its efficiency over time. Supporters of the approach, however, would claim that it is the job of the regulator to ensure that the monopoly part of the industry is efficiently run. They stress the fact that the ECPR promotes efficiency in the competitive part of the market, that is, the productive efficiency referred to above.

We are not convinced by this assertion since ECPR would, as a consequence, only be duplicating a supposed benefit of competition. If an inefficient company entered any competitive market, other more efficient companies, including the incumbent company, should either force it to become more efficient or to exit the market.

Applying the ECPR in practice also presents a number of problems. In theory, under the ECPR the incumbent should be indifferent between supplying the customer himself and granting access to an entrant who then supplies the customer. This is because the incumbent recovers his 'unavoidable cost' and an element of profit happens whatever. He recovers these costs either directly from the customer or indirectly via the access charge. However, in practice incumbents do not like to lose revenue. In the short term they will tend to misrepresent the balance between their avoidable and unavoidable costs in order to ensure that the access charge is as high as possible. This will discourage entry. The incumbent may actually distort the balance of their costs in favour of fixed costs. This would mean that if an entrant were to take a customer the incumbent would see very little difference in its revenues. Setting prices on this basis would make it likely that a new entrant would challenge the wholesale price.

Even if the incumbent were committed to providing all of the information that it had available on avoidable costs, the ECPR would be difficult to apply in practice. This is because the avoidable cost for one customer could be very different from the avoidable cost for another customer. For example, when the incumbent loses the first customer this may have no impact on the scale of billing operations. However, by the time the incumbent loses the hundredth customer there may be an opportunity to scale down billing operations. Avoidable costs will therefore change over time. Similarly, they may vary depending on where a customer is located.

In principle these differences should be reflected in the access charge if it is estimated on the basis of the ECPR. In practice, it is almost impossible for the incumbent to be able to provide the detailed information required to produce such an estimate.

A more feasible approach is to ask the incumbent to estimate the avoidable costs associated with losing chunks of the retail market. For example, the incumbent could be asked what costs would be avoided if they lost 20% or 50% of the market. Even this approach imposes a considerable information requirement on the incumbent. Much of that information is not available from standard regulatory accounts but would need to be produced specifically for the purpose by the incumbent. From the point of view of the regulator this makes the task of validating the information particularly difficult.

There is one further reason why our initial analysis would suggest that the use of ECPR would not be appropriate in setting wholesale prices in Scotland. The proposed *Water Services (Scotland) Bill* will require Scottish Water to establish a retail subsidiary. Scottish Water would have to charge the same wholesale price to both its retail subsidiary and to new entrants.

ECPR was developed to set an access price when the incumbent would provide retail services itself – not to set a wholesale price for an arm's length subsidiary company. The separation of Scottish Water's retail arm is important because otherwise there would be a risk of challenge from new entrants that the retail business (with access to cheap Government borrowing) has an unfair advantage.

14.4.4 The long run marginal cost approach

A second approach to access pricing would be to set the access charge at the 'long run marginal cost' (LRMC) of providing access to the network. The concept of a long run marginal cost can be considered in two parts:

- The 'marginal cost' is the change in cost that takes place when a firm increases its output by a small amount³.
- The 'long run' is the period of time that is sufficiently long to allow a company to make a capital investment in order to increase the volume of output that it is capable of producing. If Scottish Water faced a sudden increase in demand, in the short run it would have to manage with the assets that it has in place. This might mean taking more water out of a reservoir than it would ordinarily extract or running a treatment works for longer hours than usual. In the long run, Scottish Water could respond to the change in demand by, for example, building new reservoirs or treatment works.

LRMC therefore refers to the change in a firm's cost that happens when output increases by a small amount. It takes account of the possibility that the firm can expand its productive capacity through capital investment.

The LRMC is a measure of those costs that could arise in the future if demand were to change. In other words, LRMC is a forward-looking measure of costs. If prices are set at LRMC they provide a pricing signal of the cost consequences of additional demand. Proponents of LRMC stress that this is an efficient approach to pricing. Users will only demand the product or service if the value that they place on it matches the cost of providing it. This argument applies both to the provision of network services and the provision of the final product to customers.

The importance of LRMC for pricing in the water industry has been emphasised by Ofwat in a series of publications. MD123, *'Water pricing: the importance of long run marginal cost'* (February 1997) set out the

Director's views on the importance of LRMC, particularly with respect to the pricing of bulk supplies. Following MD123, companies have been asked to provide Ofwat with estimates of LRMC on various occasions, for example, as part of their supply/demand balance submissions in 1998 and their business plans in 1999. In 1999, Ofwat announced that it would be publishing companies' estimates of LRMC in the 1999-2000 *'Report on tariff structure and charges'*.

Ofwat argued that the quality of LRMC estimates would be improved by wider access both to the methodologies adopted and to the results.

Ofwat has also provided guidance on how LRMC should be estimated. In the reporting guidance for *'Periodic Review Information Requirement E'*, published in 1998, Ofwat suggested that LRMC could be derived from the cost of a future resource scheme. In MD159 *'LRMC and the regulatory framework'* (11 February 2000) Ofwat referred to more complex approaches advocated by some economists. Then, in MD170 *'The role of long run marginal costs in the provision and regulation of water services'* Ofwat provided a comprehensive description of how to estimate LRMC. Ofwat's favoured approach in MD170 took account of all of the new costs that a company would expect to incur over a future planning period of 30 years.

There are a number of potential problems that might arise if an LRMC approach were chosen to set wholesale charges in Scotland. These are discussed below.

First, the investment planning process in Scotland focuses on the periods defined by the Quality and Standards programmes. *Quality and Standards II* covers the current regulatory control period. In contrast, *Quality and Standards III* will extend beyond the end of the next regulatory control period to 2013. This has been designed to match the timetable for completing the requirements of the Water Framework Directive. Although *Quality and Standards III* will cover a longer period than both *Quality and Standards I* and *II*, it is considerably shorter than the period recommended by

³ In theory, the change in output could be a very small increase or a very small decrease, although generally economists use the term in the case of an increase in output by 'one unit'.

Ofwat for the estimation of LRMC. It is unlikely that a reliable 30-year view of investment needs in Scotland could easily be produced. In the absence of such a 30-year view, we could not estimate the LRMC in a robust way, and there would be a significant risk of challenge.

Second, in some cases marginal cost pricing does not generate enough revenue for the incumbent to cover its costs. This could be the case if the estimated LRMC is a very low number; for example, if there is excess capacity on the network and only modest investment in capacity is planned. The incumbent could be faced with significant existing costs of financing and running the network, but the wholesale charge may not be sufficient to recover these costs. The investment that the Scottish Executive believes is required for quality, replacement and enhancement will have an impact on the LRMC but there remains a risk that setting prices on this basis could adversely impact on the wholesale operation.

Third, marginal cost pricing may fail to generate sufficient revenue because the estimate of LRMC excludes certain costs. For example, overhead costs that result from the assets and activities that provide a benefit to the entire business are not included. Typical overheads would include head office and IT systems costs. These would not be included in an LRMC estimate. We believe, therefore, that an access price based on LRMC may be excessively favourable to new entrants.

A solution to the revenue sufficiency problem would be to apply a mark-up to the LRMC-based charge. One approach to mark-ups is to apply a different mark-up to different customers according to the relative responsiveness of their demand to the price charged. This approach is known as 'Ramsey pricing'. According to Ramsey pricing, the less sensitive the customer's demand is to the price charged, the higher should be the mark-up. This raises problems of political acceptability, and practicality. In practice there is unlikely to be reliable information on the responsiveness of demand to price.

An alternative to the Ramsey approach would be to apply a uniform mark-up, designed to recover the incumbent's costs of providing network services. The

resulting price would be identical to the wholesale price calculated by the accounting approach.

14.4.5 The accounting approach

Under an accounting approach the wholesale charge would cover the accounting costs of the wholesale business. These accounting costs would cover:

- direct and indirect operating costs (indirect costs include items such as shared legal, IT, and head office functions);
- direct and indirect capital expenditure; and
- financing costs.

There are two steps required to calculate an appropriate wholesale charge on an accounting basis:

- First, we must identify wholesale and retail activities. If this approach is adopted, the initial split between wholesale and retail will be the best approximation that can be made at the time. However, the incumbent, potential entrants and customers may have different ideas about which activities belong in retail and which belong in wholesale. As further information becomes available about the activities that retailers might undertake, it may be necessary to modify the initial split; and
- Second, we must identify where the costs of Scottish Water's retail and wholesale businesses are recorded in the accounts. Wholesale costs will then be allocated to the wholesale business, while retail costs will be allocated to the retail business. Many costs will appear in the accounts under heads that are recognisable as wholesale or retail activities. However, in other cases, where assets are shared between the wholesale and retail parts of the business, an allocation rule will be required in order to share the costs between the two parts of the business. If this approach is adopted, the initial allocation in the case of these costs will be based on the best information available at the time. As the industry gains greater understanding about how

shared assets and common activities contribute to the different parts of the business, the initial allocation of costs is likely to require modification. It is noteworthy that £264 million (some 6% of electricity distribution costs) was reallocated to 'retail' after the initial separation had been implemented.

In Chapter 6 we set out our proposals to introduce a regulatory accounting framework for Scottish Water. We explained that regulatory accounts should provide greater clarity and transparency in Scottish Water's costs. There are two elements to this. The first is the separation of the core and non-core activities in the accounts. The second is the separation of retail and wholesale activities. This second separation will identify costs that are directly attributable to the retail and wholesale businesses. It will also require Scottish Water to allocate joint costs to each of the separate parts of the business. At the current time, the companies south of the border have not agreed to provide Ofwat with this level of information about their retail costs.

The regulatory accounts could provide a solid and practical basis for estimating the wholesale charge for the draft determination [of price limits in 2005]. As the industry's knowledge and understanding develops, the regulatory accounting framework should provide the flexibility that is required to incorporate this into the wholesale charge. We would expect, therefore, that any estimate produced from the regulatory accounts for the final determination would incorporate refinements to the charge reported in the draft determination.

14.4.6 The comparator approach

We also propose to consider the experiences of other network utility industries that have wholesale and retail activities. In particular, we will examine the evidence from those industries where good information is available on wholesale and retail costs.

The energy industries in England and Wales provide useful comparators. The gas and electricity industries are comparable to the water industry in that they have

network elements where it is most efficient to have a single monopoly provider. They also have elements where competition is possible, but where competing businesses rely on the services of the networks in order to be able to provide services to their customers. In both the gas and electricity industries there has been structural separation between the vertical components of the businesses. The monopoly elements of the businesses, that is, transmission and distribution, have been separated from those elements that are subject to competition. In the electricity industry the competitive elements include generation and supply (retail). In the gas industry the competitive elements include gas exploration and production, gas shipping⁴, and supply (retail).

Structural separation of the energy industries has been reinforced by legal separation between different businesses. One 'group' may own both a supply business and a distribution business, but each of those businesses must be a legal entity in its own right, with an independent board of directors and an independent Managing Director. The different businesses also have their own separate accounts. Where two or more businesses are owned within a group structure, transfer pricing is used to account for shared costs, for example, if there is a common IT system.

We propose to review the balance between wholesale and retail costs in the gas and electricity sectors. However, while the energy industries are similar to the water industry in the sense that they include network elements, they are also different in many ways. They use different assets to provide services, and the reliability and safety considerations associated with the provision of those services take a different form. We believe that the balance of costs between retail and wholesale activities in energy cannot simply be read across to the water industry. Instead, the evidence that is available from the energy industries should be used as a check on the results obtained for the water industry by other methods. The split should be taken as broadly indicative, but should be viewed in the light of industry-specific factors.

⁴ 'Shipping' involves purchasing transmission capacity and arranging for the delivery of gas.

That said, it should be possible to make comparisons between energy and water for some activities that are common to both. For example:

- What does a gas retailer do that a water retailer does not?
- What are the costs of the gas retailer?
- Why should the water retailer's costs be different?

This will allow us to check the reasonableness of some of the elements that might make up a wholesale charge for Scottish Water.

14.5 Proposals for setting retail and wholesale prices

We have explained the alternative structures for pricing wholesale and retail services. We are interested to hear the views of stakeholders before we confirm our proposed approach. However, it is already clear that whichever approach we adopt, we will need to consider how it can be implemented so that:

- it is practical;
- benchmarking comparisons can be maintained with England and Wales;
- it does not disadvantage either Scottish Water or the new entrant; and
- it can accommodate changes in the division between retail and wholesale activities.

We discuss these issues briefly below, and outline our proposals for dealing with them.

14.5.1 Practical approach

We believe that the information to support the setting of the wholesale price must be readily available and be capable of detailed audit. It will be important not to create an additional regulatory burden on Scottish Water if this can reasonably be avoided.

14.5.2 Benchmarking comparisons

In forthcoming Volumes 4 and 5 of our methodology, we will explain our detailed proposals for benchmarking the performance of Scottish Water against water companies in England and Wales and against other utilities. Our benchmarking will form the basis of the efficiency targets that we set in the Strategic Review. As there is no separation of wholesale and retail activities in the water industry in England and Wales, companies do not report these costs separately. We believe, however, that there may be good reasons to set different efficiency targets for the wholesale and retail activities of Scottish Water. We will examine the available evidence from other sectors to determine whether or not separate targets would be justified.

Although regulatory accounting information that we collect from Scottish Water will need to be more detailed than that South of the border, we will have to ensure that we can continue to make like-for-like comparisons with the water companies. We therefore propose to ensure that the framework and definitions for reporting regulatory accounting information will allow full reconciliation to Ofwat's regulatory accounts, and hence to reliable benchmarking and targeting.

14.5.3 Even-handedness

One of the principal benefits of the introduction of the proposed framework for competition is that it reduces the likelihood of Scottish Water being challenged under the *Competition Act 1998*. We believe that it is important that the wholesale price allows both Scottish Water's wholesale and its retail businesses the opportunity to recover all of their reasonable and efficient costs. This would ensure that new entrants face a level playing field and, as such, minimise the risk of challenge that the framework is biased against them.

14.5.4 Changes in the division between retail and wholesale activities

Earlier in this chapter, we set out our initial views on which activities would constitute retail activities. The present consultation process will help us to reach a considered view. Ultimately, however, the views of new

entrants to the non-domestic retail market will need to be considered. It is likely that agreement on the precise definition of retail will need to be reached between Scottish Water, the new entrant(s) and other stakeholders. The outcome of such negotiations will not be known until after the final determination of prices.

We propose, therefore, that changes in the definition of retail that are agreed after the *Strategic Review of Charges 2006-10* will be made a 'notified item', under the proposals described in Chapter 11. These arrangements allow prices to be adjusted to accommodate material factors that are expected to impact on costs or revenues in a regulatory control period but where it is not possible to quantify their impact at the time prices are set.

14.6 Questions for consultation

1. Do respondents consider that the criteria that we propose to use in assessing different approaches to setting wholesale prices (ie that the approach should be theoretically sound, practical, consistent with Scottish Executive policy and flexible) are appropriate?
2. What are respondents' views on the ECPR, LRMC, accounting cost and comparator approaches to the setting of wholesale prices?
3. Do respondents agree that the split between wholesale and retail activities should be a notified item?

Section 3: Chapter 15

Connection charging regime

15.1 Introduction

In previous chapters we examined the methodology by which customer charges will be established in the forthcoming *Strategic Review of Charges 2006-10*. We have also discussed how these charges are allocated across the range of existing customers who are connected to the network.

Each year, around 24,000 new customers are added to both the water and wastewater networks. The connection of new customers adds costs; such as the cost of extending the network to reach the new properties and the costs of supplying additional water and wastewater services. In some cases, particularly where the capacity of the network is limited, these additional costs can be very high.

Throughout the utility industry, issues have arisen in relation to allocation of costs for new connections between existing and prospective customers. At one extreme, it is clearly unreasonable for someone wishing to connect a new house to the water supply network to pay the full cost of providing a new reservoir, simply because the existing reservoir is fully committed. At the other extreme, it is equally unreasonable for someone wishing to connect a development of houses in an area where the existing wastewater capacity is known to be highly constrained to expect existing customers to pay for a complete new wastewater system.

In Scotland, the mechanism for establishing how costs should be shared between existing and prospective customers is currently being redefined by the Scottish Executive through changes set out in the *Water Environment and Water Services (Scotland) Act 2003*. The outcome of this process will impact on customer charges in the period of the next Strategic Review.

In this chapter we look at how these connection costs are allocated between existing customers and new customers connecting to the network. We explain the current connection charging arrangements and provide our assessment of the likely impact of the proposed

changes. We also compare the situation in the water industry in Scotland with other utilities throughout Great Britain. It will be important that we are able to monitor the costs of new connections and the allocation of costs between new and existing customers.

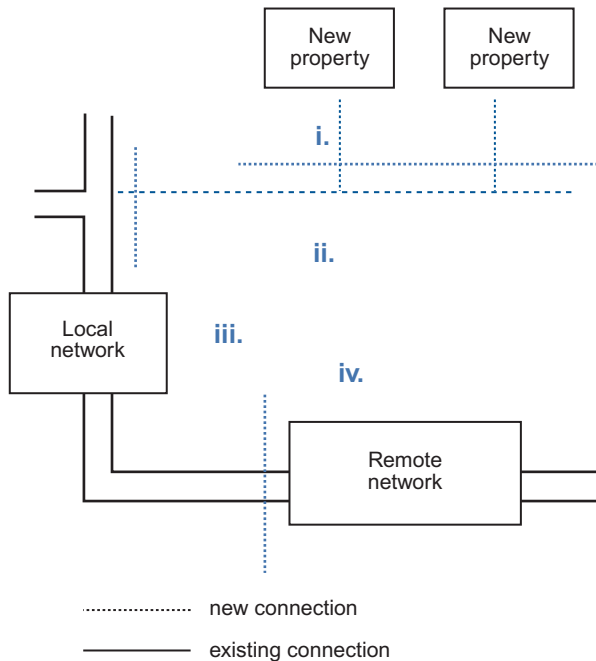
For both existing and new customers, the allocation of the costs associated with new connections needs to be both equitable and transparent. This requires a careful assessment of the impact of connection charging regimes, particularly where network capacity is limited. For the water industry in Scotland, the impact of limitations of the network capacity on new development confirms the need for robust connection charging arrangements to be in place.

15.2 The components of connection

Charging arrangements for new connections are relatively complex. To understand the allocation of costs between different parties, it is helpful to break down the process of connecting new developments to the water and wastewater network into the following four elements:

- i. laying a service pipe or drain to a property and making the connection to the water main or sewer (often termed 'service connections');
- ii. laying a section of new water main or sewer if not present nearby and connecting it to the existing network;
- iii. upgrading the existing local water/ wastewater network to accommodate the new connection, including, where necessary, upgrading local service reservoirs or local pumping stations; and
- iv. developing resources to accommodate the new connection, if water or wastewater services are already fully committed (including bulk mains, water treatment plants or sewage treatment works).

These four elements are illustrated in Figure 15.1.

Figure 15.1: Key components of a connection

The four elements of connection are common to most utilities, including water, electricity and gas. There is a degree of standardisation in the utility sector concerning the approach to funding the costs associated with each element.

The components of connection associated with parts (i) and (ii) are generally termed the 'shallow' reinforcement elements. As will be discussed in more detail later, these are almost always funded by the party seeking the connection (the 'connectee'). Part (iv) is termed the 'deep' reinforcement element. It is usually funded by all customers through the companies' capital investment programme. Part (iii), which represents the impact on the existing local water distribution/sewage connection system, falls between these two extremes. A range of approaches are used by utilities to assess the actual level of part (iii) costs.

The rules for calculating these costs will need to be clearly defined by Ministers or by the Water Industry Commission after guidance by Ministers. If the Commission is required to develop rules, we would propose to consult on our proposals.

A further consideration is that some parts of the work associated with establishing the new connection can be provided either by the utility (for example, Scottish Water) or by the connectee (for example, a developer), while other parts can only be carried out by the utility. The first is termed 'contestable' work; it usually involves work that is specific to the new connection rather than the existing network. The second is termed 'non-contestable'; it typically involves work on the existing network, particularly where there are public health or safety implications.

The extent to which connection work is 'contestable' has an impact on the process for setting charges for customers who connect to the network. The contestable elements are open to competition and, if the customer is unhappy with the price or delivery service being offered by the utility, an alternative provider can be sought. For the non-contestable elements, the utility is the sole provider of the service. Consequently, scrutiny of the charges is required to ensure costs are appropriate and properly allocated between customer groups. This will be an important function of this office.

15.3 The impact of connection charging policy

We have described how connection charging policy determines the allocation of network upgrade costs between the party seeking the connection and the existing customer base. If this allocation is not properly balanced, an inappropriate element of the cost burden of connecting new properties falls onto one party or the other, with potentially significant detrimental impacts for customers.

This is best illustrated by considering the extremes of connection charging:

- the connectee paying the full cost of the new connection (deep connection charging); and
- customers funding the entire cost of the connection through charges (shallow connection charging).

The advantages and disadvantages of these approaches are discussed over:

15.3.1 Deep connection charging

Attributing all costs associated with the connection to the party seeking the connection has the following key advantages:

- Existing customers are protected from paying towards the costs of work from which they will not benefit;
- It provides a strong financial signal to connectees to encourage them to locate in areas where capacity exists and to avoid parts of the network where capacity is limited. This encourages efficient use of assets. The nature of utility networks is such that spare capacity on the network will be greater at some points than others; and
- The costs of connection are transparent.

Deep connection charges has the following key disadvantages:

- In areas where the network is constrained, the cost of connecting new developments quickly becomes so high that it creates a barrier to new entrants. Elements of the utilities' networks, such as treatment plants and reservoirs, are high-cost items and it may not be reasonable to expect connectees to fund these in isolation;
- The costs of connection may impact directly on housing development and business expansion. This could conflict with both local and national government development plans for the area. For example, there may be impacts on social priorities such as affordable housing;
- The new connectee may end up funding indirect network improvements, such as improved security of supply, which benefit other customers;
- Deep connection charging could result in widely differing charges for new connectees depending on geographic location;

- Similarly, deep connection charging could be seen to discriminate between new customers and existing customers. The cost of connecting existing customers may have been covered by the tax-payer¹; and
- There is a potential 'free-rider' problem. The first connectee has to meet the costs of upgrading the network in an area, but subsequent connectees are likely to benefit from any new capacity released. This is a feature of utility networks where upgrades come in discrete block sizes rather than a continuum. The capacity released by an upgrade will almost always exceed the requirements of the new connectee. Allocating the 'spare' capacity, and deciding whether or not the first comer should receive a refund from subsequent connectees, is problematic.

15.3.2 Shallow connection charging

Spreading the entire connection costs across the existing customer base has the following key advantages:

- It facilitates the connection of new customers. All existing customers contribute a small amount to the work necessary to accommodate the new connection. The new connectee will, in turn, pick up a small element of the costs of connecting future customers;
- This approach promotes the network to be developed in areas that have been targeted for housing and/or business development;
- Indirect benefits from work on the network remote from the connection, such as improved water quality or better environmental performance, are funded by all customers, not just the connectee; and
- The issue of 'free-riders' is removed.

Shallow connection charging has the following key disadvantages:

¹ Existing customers pay, through their charges, for the maintenance and ultimate replacement of the network serving their properties. New customers would do the same, through time. This discussion relates to the original cost of installing the entire network serving the property.

- Locational signals are lost: customers end up paying potentially high connection costs even though there is excess network capacity in other areas; and
- There is a limit on the level of investment that can be provided for improving the network's capacity. Unlimited investment may result in significant excess capacity and much higher customer charges than would otherwise have been necessary.

Neither of these two extremes is desirable. In practice, a 'middle ground' is generally adopted. This requires those seeking a new connection to fund a reasonable proportion of the local costs. Customers generally meet the cost of network upgrades remote from the connection point. This regime has the following advantages:

- Connectees do not face barriers to entry through very high connection costs associated with remote network upgrades. These are funded through customer charges as part of the overall requirement for network investment. In particular, local housing and industrial development policies are facilitated;
- Some locational signals are retained, particularly for local reinforcement. This ensures that there is an incentive for the connectee to seek connection where local reinforcement costs are lowest; and
- The allocation of costs is more consistent with the allocation of benefits. Part (iii) and (iv) upgrades will provide some benefit to the existing customer base (for example, in security of supply).

In summary, the allocation of connection costs is critical to facilitating connections, ensuring efficient development of the network and allowing costs for both new and existing customers to be proportional to the benefits received.

In the next section we look at the current arrangements for connection charging in Scotland and illustrate how these arrangements exhibit some of the issues

associated with shallow connection charging. We then compare these arrangements with other utilities in Britain. Finally, we discuss the potential benefits for Scottish Water's customers of the current proposals to develop a connection charging regime in Scotland which is more consistent with standard utility practice.

15.4 Scottish Water's current connection charging policy

For the water and wastewater industry in Scotland, new connections to the network can be subdivided into two categories:

- New connections that are linked with the development of **new** houses, shops and industry; and
- First-time connections that arise when **existing** properties that have their own private arrangements for securing water (for example, a private water supply) or disposing of waste water (for example, a septic tank) seek connection to the public system. Such situations are found mainly in rural areas and tend to be driven by water quality and environmental concerns.

For domestic (or household) customers, current legislation² requires Scottish Water to provide a connection to the public network for either new or existing properties, where it is practical to do so at 'reasonable cost'. Clearly, the definition of reasonable cost is critical. For new household connections, Scottish Water currently interprets reasonable cost as being a maximum of £1,500 per property, split £1,000 for wastewater and £500 for water. In practice, reasonable cost contributions for new properties average around £1,000 per property.

For first-time household water connections, Scottish Water defines the reasonable cost threshold as £500. For first-time household wastewater connections, a sliding scale operates based on the Council Tax band of the property, ranging from £1,995 for a Band A house to £5,985 for a Band H.

² *The Water (Scotland) Act 1980, The Sewerage (Scotland) Act 1968, The Water (Scotland) Act 1980 and the Water Environment and Water Services (Scotland) Act 2003.*

In effect the reasonable cost contribution is funded by the existing customer base as a contribution towards the cost of connection. While the requirement for a reasonable cost provision for domestic properties is set out in statute, the process for establishing the level of the provision is not transparent and appears to have evolved through custom and practice. It could be seen as a contribution towards the cost of connection in recognition of the future income that will be derived from the new customer.

If the cost of connection exceeds reasonable cost the connectee could opt to pay the difference in order to benefit from a water and/or sewerage service. It is also possible that Scottish Water's investment programme may facilitate connection.

For non-domestic (industrial or commercial) customers there is no direct equivalent of the reasonable cost contribution. However, for waste water connections only, Scottish Water currently provides a connection allowance of £23,600 per hectare of land connected. Our understanding is that this arrangement is based on Scottish Water's legal obligation to collect sewage (as opposed to trade effluent) from land in its area. The figure assumes an equivalent house density of 23.6 houses per hectare and then ascribes the reasonable cost provision of £1,000 per 'equivalent house' to the land.

The existing arrangements can be more fully explained by looking at the allocation of costs for the various elements of the connection described in the model above (Figure 15.1).

Part (i) – Local connection

The local element of the connection is paid for by the connectee, usually via a standard charge or, for non-standard arrangements, an ad-hoc, cost-reflective charge. The standard charges varies from £180 (where the connectee carries out all excavation and reinstatement work) to £1,000 for a full installation across a road in tarmac.

For sewer connections, the connectee (or their contractor) has the option to carry out the work in full,

subject to Scottish Water's inspection and approval. This assessment carries a charge of £50. If Scottish Water performs the connection, the charge is the actual cost of the engineering work undertaken.

Part (ii) – New main or sewer required for development

It is the responsibility of the connectee to fund this part of the network upgrade work. For wastewater connections the work is typically carried out by the connectee and a reasonable cost payment is refunded by Scottish Water.

For wastewater connections, Scottish Water's reasonable cost contribution is up to £1,000. Where the actual cost of the work is less than £1,000, the actual cost is the amount refunded. For water connections, the contribution is up to £500.

For non-domestic properties, all costs for this element of the connection are generally paid by the connectee. However, in some cases a reasonable cost contribution is made by Scottish Water depending on the nature of the site being developed and how many developers are involved.

Part (iii) - Upgrading the existing local network, including service reservoirs and pumping stations

The allocation of costs for this element of work is dependent on whether or not the upgrade work is included in Scottish Water's investment plan for the current regulatory period. In effect, the connectee pays for any elements of the required upgrade work which are additional to what is already being funded (by existing customers) in the current regulatory period.

For domestic properties, an allowance of any remaining (after taking account of part (ii) costs) reasonable cost contribution is granted.

Part (iv) - Developing water resources or increasing wastewater treatment capacity

This 'deep' element of the connection is normally paid for by all customers through the funding provided for

network upgrades in Scottish Water's investment plan. However, where a particular upgrade does not appear in the current investment plan, the connectee may opt to pay for this element of the connection work to bring forward completion and thereby facilitate the connection.

Table 15.1 provides a summary of the existing connection charging arrangements.

Table 15.1: Summary of existing connection charging arrangements

Connection element	Payee				
	Domestic		Non-domestic		
			Water	Wastewater	
Local connection (i)	Connectee		Connectee	Connectee (customers pay for any 'domestic' element)	
New main/sewer required for development (ii)	Customers, up to 'reasonable cost'		Connectee (new mains)	Connectee, with a contribution from customers (£23,600 per hectare)	
Upgrading existing local distribution/sewerage network (iii)	Work required. Allowance for this growth already in investment programme:	Customers	Customers/connectee (no 'reasonable cost')	Work required. Allowance for this growth already in investment programme:	Customers
	Work required. Some allowance for this work under investment programme:	Connectee pays for any 'additionality'		Work required. Some allowance for this work under investment programme:	Connectee pays for any 'additionality'
	No allowance for work under investment programme:	Connectee, subject to any remaining 'reasonable cost' element		No allowance for work under investment programme:	Connectee, subject to any remaining contribution element
Developing resources, increasing sewage treatment works capacity (iv)	Customers (connectee may pay for 'additionality')		Customers (upgrading of water treatment works)	Customers (connectee may pay for 'additionality')	
Infrastructure charge	None		None	None	

In recent years, a number of issues have arisen in relation to Scottish Water's connection charging mechanism, including the following key concerns:

- The cost to customers of the 'reasonable cost' contribution. This element of the mechanism is a significant burden on customers: it is estimated that around £17 million is paid each year to developers through this contribution. This is equivalent to almost 2% of a customer's bill;
- The reasoning behind the reasonable cost contribution. In particular, it is not clear why customers, including the vulnerable, should fund the installation of water and wastewater services to new houses. This is not consistent with the approach taken in the electricity, gas and telephone industries; and
- The impact of the connection charging policy on new development. There has recently been significant publicity relating to the existence of 'development constraints' on the wastewater and, to a lesser extent, water networks. These are areas where insufficient network capacity exists to allow new houses or businesses to connect to the system. It is not clear that making a contribution to local connection costs is consistent with the limited investment available to increase overall capacity in the system. This contribution would appear to

increase demand that cannot realistically be met. Moreover, similar problems do not appear to exist to the same extent in other utility models where developers fund a larger proportion of the connection costs.

In response to concerns about the nature and scope of the reasonable cost contribution, the Scottish Parliament has brought forward, as part of the *Water Environment and Water Services (Scotland) Act 2003*, proposals aimed at redefining the 'reasonable cost' payment to connectees. These are discussed in more detail below.

15.5 Position in England and Wales

It is useful to review the approach to connection charging taken in the water industry south of the border. In the next section we broaden the debate further by examining the approach in other utilities.

As in Scotland, water and sewerage companies in England and Wales have a legal duty, under the *Water Industry Act 1991*, to make connections to their networks.

Generally, the *Water Industry Act 1991* allows companies to recover the costs associated with the elements of the connection defined as parts (i), (ii) and (iii) in our model (Figure 15.1). However, a number of rules apply in respect of the determination of these charges. Network upgrade costs are allocated in the same way for both domestic and non-domestic supply connections. There is no equivalent of the 'reasonable cost' contribution in Scotland for domestic customers. The costs relating to part (iv) are funded by existing customers as part of the companies' investment plans, as in Scotland.

The connectee is also required to pay an 'infrastructure charge' of approximately £245. This is regarded as a contribution towards the costs of meeting the growth in demand for the water and sewerage system. This charge is applied for both water and wastewater connections, ie a total of around £490 is charged per property for both services.

Current legislation in England and Wales provides for competition in the establishment of new connections. The companies generally allow customers, or their contractors, to make the physical connection to the existing sewer network themselves. This is termed 'self-lay'. The *Water Act 2003* gave Ofwat the power to determine disputes over water and sewerage connections.

It is useful to look at the arrangements in the water industry in England and Wales for each of the components of connection shown in Figure 15.1.

Part (i) Local connection: The connectee pays for the part (i) costs. The connectee or his contractor normally carries out this work. If the company provides the connection the arrangements are similar to Scotland, with a set of published standard charges. For large or unusual cases, the charge is based on the actual costs incurred.

Part (ii) (New main or sewer required for development) and Part (iii) (Upgrading existing local network, including service reservoirs and pumping stations): In general the connectee pays the costs reasonably incurred in carrying out this work. However, in establishing the charge, an allowance is made for the income that will be received from the water/sewerage charges that the newly connected properties will pay.

Connectees can either request the undertaker to carry out the work for the new connection (termed 'requisitioning') or, alternatively, a connectee can pay its own contractor to carry out any elements of the work which are deemed to be 'contestable' (as defined above). The water company assumes responsibility for, or 'adopts', the assets once installed.

Calculating the charge is a complex process; it is based on a calculation of the net present cost over 12 years. The annual payment from the connectee for the connections is spread over 12 years and is calculated as the difference between the annual cost of borrowing to fund the work (at a rate of interest approved by Ofwat) and the water/sewerage charges payable for the newly connected properties (which may vary year-on-year). In

practice, these payments are often commuted to a single payment, by mutual agreement between the company and the connectee. The ability to make this commuted payment has now been formalised so that connectees can opt either for a 'one-off' connection payment or for a 12-year variable charge.

Part (iv) (Developing water resources or increasing wastewater treatment capacity): As in Scotland, the water companies in England and Wales recover part (iv) costs from the customer base as a whole. The companies include any deep reinforcement required for growth in their investment plans.

15.5.1 The infrastructure charge

In England and Wales, the water companies can make an infrastructure or network charge for both domestic and non-domestic connections. This is in addition to the connection charge.

The infrastructure charge is targeted at the non-recoverable costs part (ii) and part (iii). It is expected to cover the cost of general background growth in demand that cannot be charged to a single applicant, such as 'infill'³ development. At the 2004 periodic review, the maximum infrastructure charge was set at £239 (in 2002-03 prices). This limit is index-linked. Companies can make an infrastructure charge for both the water connection and the wastewater connection.

Infrastructure charges are not, however, intended to cover part (iv) of the connection costs. Ofwat believes that these costs should be recovered from the broader customer base.

15.6. Approach in other utilities

Many of the issues associated with connection charging policy, and with the development of competition in

connections work, are very similar in the gas, electricity and water industries.

Connection charging practice in utilities is continuing to evolve, particularly in the electricity sector where connection charging regimes for lower voltage distribution networks are currently under review.

In general, regulators have tended to encourage a general move towards 'shallower' connection policies. This has been driven, in part, by the desire to introduce competition and thereby encourage new entrants. By spreading more of the connection costs onto the general customer base, funded through 'use-of-system' charges, the barrier to entry that may result from 'deeper' connection policies is avoided. However, there is a recognition in both gas and electricity connection charging regimes that fair allocation of costs between the connectee and existing customers is required.

a) Electricity distribution

For electricity distribution systems, connection charging currently differs for load and generation connections⁴.

In load connections, the connectee will generally pay for all network reinforcement associated with the voltage at which they are connecting (including the local connection)⁵.

A safeguard also exists to protect 'first-comers' who pay the up-front costs of relieving network constraints. Inevitably, network reinforcement is implemented in discrete portions and it is often the case that the network reinforcement required for one development has the capacity to service several more. Consequently, arrangements exist to reimburse the first-comer by charging an element of the connection cost to subsequent connectees. The network operator acts as the agent in this transaction.

³ Infill development is the use of small plots of land to build new houses, either around, or in the gardens of, existing houses. It has the effect of increasing the density of housing in an area and hence the load on utility services, without significantly extending the boundaries of the settlement.

⁴ Load connections take electricity off the network: for example, the electrical load of shops, businesses and houses. Generation connections put electricity onto the network from sources such as power stations.

⁵ The electrical network is split into different voltage levels. High voltages are used for transporting electricity between different load centres, low voltages provide supplies to businesses and homes. Network reinforcement costs for load connections are confined to the voltage at which the connection is being made.

Competition exists in connections within these areas. The network operator, in providing a connection quote, must clearly identify those engineering elements of the connection that are contestable (ie can be provided by others) and non-contestable (ie reserved for the network operator, mainly for reasons of safety).

b) Gas connections

A relatively shallow approach is used in gas connections. For new customers within 23 metres of the existing network, a standard charge is applied and the first ten metres of the connection (assuming it is in a public highway) are provided for free. For customers beyond 23 metres, all local connection work is chargeable. However, deeper reinforcement is not generally charged for single, or small numbers, of domestic properties.

For larger housing developments, and industrial connections, the local network is now almost always provided by the developer through competitive connection infrastructure providers (usually not Transco). A charge is then made by Transco for connection to the main gas network. This charge may include some elements of the deeper reinforcement (eg for pressure reduction valves). Transco provide a ten-year development statement which highlights to developers where gas supply is available and the timescales for network development. Developers have the option of paying themselves should they wish to accelerate network development.

15.7 Future connection charging arrangements in Scotland

In general, the arrangements for connection charging in the Scottish water industry are broadly similar to those used in England and by other utilities. There are, however, two important exceptions. These are the 'reasonable cost' contribution and the absence of an infrastructure charge.

Part 2 of the *Water Environment and Water Services (Scotland) Act 2003* provides for changes to be made to

the system for funding new connections to the water and wastewater infrastructure by amending the *Sewerage (Scotland) Act 1968* and the *Water (Scotland) Act 1980*. These changes include conferring regulation making powers on Ministers for various detailed provisions. This includes determining reasonable cost and setting construction standards and detailed conditions for connection agreements.

During the passage of the Bill through the Scottish Parliament, Ministers made it clear that the aim of the new regulations was to remove the existing reasonable cost contribution for connections. Subsequently, the Scottish Executive has released a consultation paper on the principles of charging for water and wastewater services⁶. The paper includes a section on funding expansion of the public networks. It discusses, and invites views on, the extent to which developers should fund new connections to the water and wastewater networks.

Our current understanding is that the Scottish Executive proposes to bring forward regulations under the *Water Environment and Water Services (Scotland) Act 2003* by the end of 2005. These regulations will revise the mechanism by which Scottish Water determines reasonable cost for both new development and first time provision. Consequently, these changes will have an impact on the period of the *Strategic Review of Charges 2006-10*.

The Scottish Executive is currently considering whether the introduction of an infrastructure charge is appropriate in Scotland. If set at the same level as south of the border, the infrastructure charge could raise just under £12 million. This would go some way to financing local network reinforcement work that cannot be attributed to specific development.

We believe that further work will be necessary to determine the extent of connectees' contribution to the part (iii) costs. In England and Wales, Ofwat has recently formalised the approach by which the charge for this element is off-set by an amount which reflects the future income from the connection. Under the previous

⁶ 'Paying for Water Services 2006-10', Scottish Executive consultation, July 2004.

revenue cap, there was no need to take specific account of future revenue from the connection. However, the proposed move to price cap regulation will require some account of future revenue from a new property to be taken into account.

As is currently the case, deep reinforcement work associated with part (iv) of the connection will continue to require funding from the investment programme. A key element of the work being carried out for *Quality and Standards III* is identifying the likely extent of investment requirements in this area. We also expect Scottish Water's investment plan submission for the Strategic Review of Charges properly to identify and cost investment requirements in this area. We will review Scottish Water's proposals to ensure that they provide value for money for customers.

It may be necessary to allow a mechanism, within the limits of the overall investment programme funding, for an identified level of funding in this category to be re-allocated to alternative schemes to take account of changing housing or industrial development priorities.

15.8 Assumptions for the Strategic Review of Charges 2006-10

For the *Strategic Review of Charges 2006-10*, we will seek guidance from Scottish Ministers about the assumptions we should make concerning the revenues and costs arising from new connections.

15.9 Summary

The cost of connecting new customers to the water and wastewater networks varies considerably depending on factors such as the size of the connection and the capacity of the existing network to service more demand.

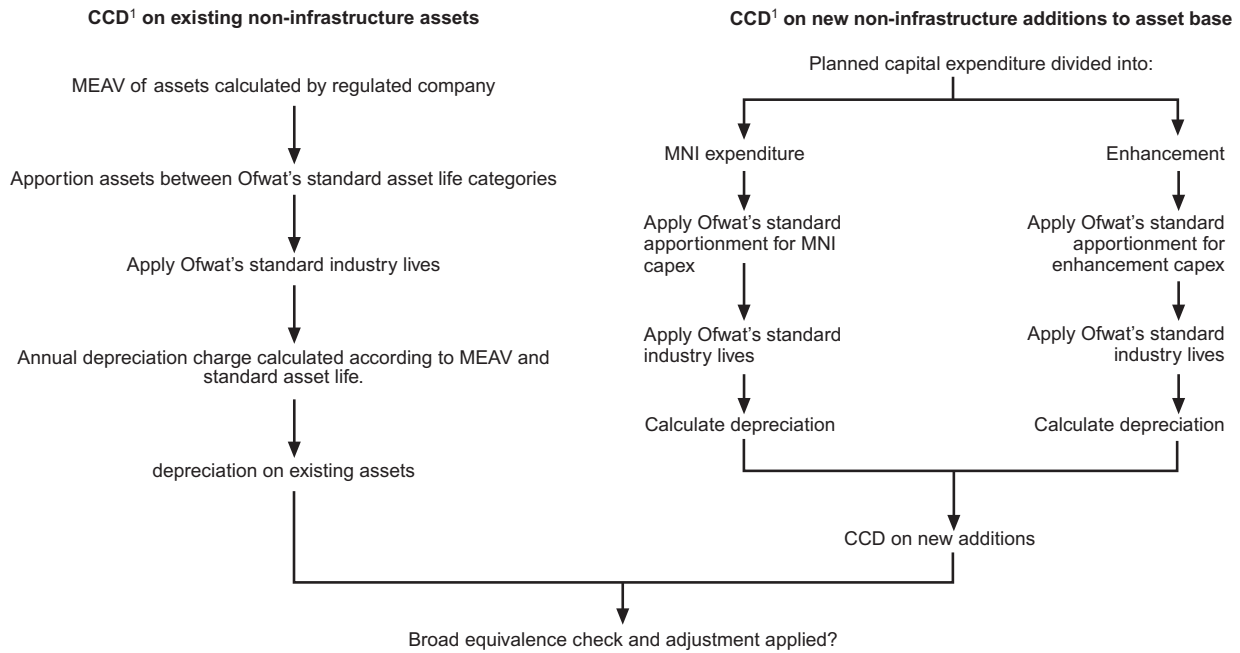
Many of the issues associated with connection charging policy, and also the development of competition in connections work, are very similar in the gas, electricity and water industries. The current arrangements in the water industry in Scotland tend to pass more of the costs through to existing customers than is typically the case in these other utility sectors.

The mechanism for establishing the way costs are shared between existing and prospective customers is currently being redefined through changes set out in the *Water Environment and Water Services (Scotland) Act*. The outcome of this process will impact on customer charges in the period of the next *Strategic Review of Charges 2006-10*.

15.10 Question for consultation

1. Are there any lessons from England and Wales that you want to propose for application in Scotland?

Appendix 1: Process for calculating CCD on non-infrastructure assets



¹ Current cost depreciation (see Chapter 3).

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