The Strategic Review of Charges 2006-10: The draft determination

Our approach to setting charge caps

volume 3

WATER INDUSTRY COMMISSIONER FOR SCOTLAND

Contents

Executive summary

Introduction

Over the period July to December 2004 we published five consultation documents which set out our proposed methodology for the Strategic Review of Charges 2006-10. These volumes covered the following key areas:

- our work plan;
- the regulatory framework in Scotland and the lessons learned from the Strategic Review of Charges 2002-06;
- the calculation of prices;
- the scope for efficiency – operating cost; and
- the scope for efficiency – capital expenditure.

Regulatory information

Information is vital to effective regulation. We require Scottish Water to submit a number of regular regulatory returns, covering all aspects of customer service, costs, capital expenditure and customer billing.

We have recently appointed a Reporter for the water industry in Scotland. This appointment brings the regulatory framework in Scotland more into line with the practice of the Office of Water Services (Ofwat) in England and Wales.

Ensuring transparency and accountability

In preparing the Strategic Review of Charges we undertook a number of initiatives designed to improve the transparency and accountability of regulation. We introduced 'stakeholder information days', which were held approximately every six weeks. These provided a forum for us to outline our progress and for stakeholders to have their say. We have made our analytical tools available to stakeholders.

This draft determination is the culmination of more than a year's work. The main milestones leading up to this draft determination were as follows:

- Minister's commissioning letter for the 2006-10 Strategic Review of Charges;
- Scottish Water submits its Annual Return for 2003-04;
- Quality and Standards III consultation;
- Principles of Charges consultation;
- Scottish Water's first draft business plan;
- Ministerial Guidance; and
- Scottish Water's second draft business plan.

The next steps will be as follows:

- WICS' draft determination of charges;
- Scottish Water submits its Annual Return for 2004-05;
- opportunity for representations by stakeholders; and
- new Water Industry Commission makes final determination of charges 2006-10.

External advice

Where appropriate we have taken specialist advice from a number of companies with appropriate financial, economic and engineering expertise.

In addition, we have benefited from the advice of three senior advisors: John Banyard OBE, Sir Ian Byatt and Professor David Simpson. We believe that in preparing this Strategic Review of Charges much has been gained from the fresh perspective that these respected experts provide. We also sought detailed comments on this draft determination from Thomas Sharpe QC and his legal team. These comments have been incorporated into each of the volumes.

Framework for the Strategic Review of Charges 2006-10

The Water Industry Commissioner for Scotland (WICS) has the general function of promoting the interests of

customers. We promote the interests of customers primarily by encouraging Scottish Water to become more efficient. Cost cutting is not efficiency. Efficiency is about reducing costs and maintaining or improving the levels of service to customers.

In the Strategic Review of Charges 2006-10 we have sought to minimise the exposure of Scottish Water's customers to operational and financial risks. We commissioned a report from ING Barings on the privatised English and Welsh companies' access to debt. We were keen to ensure that there are similar effective controls on access to borrowing. If there are no such controls, the incentives to achieve efficiency targets on time are significantly reduced.

Establishing effective controls on access to debt is an important part of establishing a tight budgetary constraint on the regulated body. A properly tight budgetary constraint will focus management attention on delivering ongoing improvements in value for money to customers.

Some stakeholders have suggested that the industry should borrow more and reduce charges to customers. This is not consistent with a goal of maintaining stable charges in the medium to long term. Such an approach would also reduce the industry's flexibility to withstand an operational shock.

From a customer perspective, it is important that the industry is managed on a sustainable basis. The owner must ensure that management face a tight budgetary constraint and must monitor performance clearly. The owner will also need to take difficult decisions in the event that performance (within the control of management) lags behind what is expected.

The calculation of prices

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 2004 regulatory return, it would cost some £27 billion to replace all of the water industry's assets in Scotland. This is more than £5,000 for every person in Scotland.

The effectiveness and value of assets decline over time and customers should bear these costs as they receive the benefit from use of the assets. 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 for each type of asset to be recovered from customers' charges.

Non-infrastructure assets are 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 role of a regulator is to set charges that are sufficiently high – but no higher – to ensure the sustainable delivery of the desired level of service. We have therefore scrutinised costs carefully.

We have moved towards the regulatory capital value (RCV) method of setting prices in this draft determination. This will facilitate comparisons between Scottish Water and the industry south of the border. Scottish Water receives a rate of return on its RCV. Efficient investment in new assets is added to the RCV. Depreciation (reflecting the costs of using existing assets) reduces the RCV.

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 product of the RCV and the allowed rate of return gives 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 revenue that we allowed Scottish Water was calculated as follows:

Figure 1: How we calculated Scottish Water's revenue

Return allowed on the regulatory capital value +

allowable operating costs +

depreciation on non-infrastructure assets +

the infrastructure renewals charge (IRC) +

the costs of Public Private Partnership (PPP) contracts.

We have set revenue such that Scottish Water will comply with all the cash-based financial ratios (used by Ofwat in its 2004 final price determinations) if it meets the terms of its regulatory contract in full.

The allowed level of revenue includes an appropriate allowance for operating costs. Our assessment of operating costs takes 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.

Monitoring the RCV and the ratio of total debt to the RCV should provide stakeholders with a useful indicator over the long term of the financial performance of the water industry in Scotland.

Charge caps and tariff baskets

In this Strategic Review and in line with the new regulatory framework, we have determined a series of charge caps rather than a general cap on revenue. A charge cap largely insulates customers from the impact of changes in the customer base or volumes of consumption during a regulatory control period.

We established tariff baskets to cover the core services provided by Scottish Water. The use of tariff baskets also helps to ensure that the principles of charging determined by Scottish Ministers are applied in a transparent way.

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-household 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 tariffs. The balance of tariffs within the basket will be determined by the number and type of connections, the amount consumed and any 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.

Table 1: 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 will scrutinise carefully any material divergence in tariff changes within a basket. For the purposes of calculating the effect of this draft determination on our standard customers, we have assumed that each tariff in each basket has been increased by the same amount.

Our approach to tariff baskets

In England and Wales tariff baskets are defined in condition B of the companies' operating licences. There are no such defined tariff baskets in Scottish Water's case.

We have defined ten tariff baskets:

- household unmeasured water;

- household unmeasured waste water;
- non-household unmeasured water;
- non-household unmeasured waste water;
- measured water (20mm connection);
- measured water (25mm connection and above);
- measured waste water (20mm connection);
- measured waste water (25mm connection and above);
- surface water drainage (excluding unmeasured household); and
- trade effluent.

The tariff baskets are described in further detail in Volume 7 of this Strategic Review of Charges 2006-10.

Treatment of large customers

Large 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 large 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. We have therefore included large customers in the tariff basket.[1]

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 have developed our use of standard customers so that customers can better understand the likely impact of the review on the bill that they pay.

Scottish Water has more than 120,000 non-household customers. These customers will each require a different mix of services from the water and sewerage undertaker, and in due course the new retail undertaking to be established by Scottish Water, 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.

Tables 2 and 3 show the standard customer descriptions that we use in this draft determination.

Table 2: Standard measured customers used in draft determination

Strategic Review of Charges 2006-10	Water		Sewerage		
	Meters (no x size (mm))	Volume (m^3)	Meters (no x size (mm))	Volume (m^3)	Rateable value
Convenience store	1 x 20	30	1 x 20	28.5	£5,000
Garage	1 x 20	100	1 x 20	95	£10,000
Large restaurant	1 x 20	500	1 x 20	475	£100,000
Large office	1 x 25	900	1 x 25	855	£750,000
Retail group	2 x 20 20 x 25 1 x 35	4,500	2 x 20 20 x 25 1 x 35	4,275	£1,700,000
Food manufacturer 1	2 x 25 1 x 80	50,000	2 x 25 1 x 80	47,500	£100,000
Food manufacturer 2	2 x 25 1 x 50 1 x 100	100,000	2 x 25 1 x 50 1 x 100	95,000	£260,000
Large manufacturer	1 x 150	175,000	1 x 150	166,250	£1,225,000
Brewers	2 x 25 1 x 100 1 x 150	600,000	2 x 25 1 x 100 1 x 150	150,000	£500,000
Warehouse	1 x 20	10	1 x 20	9	£500
Large house	1 x 20	110	1 x 20	104	Band H
High School	1 x 25	2,000	1 x 25	1,900	£18,000
Hotel	1 x 50	15,000	1 x 50	14,250	£75,000

[1] It should be borne in mind that, under new section 29 of the 2002 Act (inserted by the 2005 Act), Scottish Water will not be entitled to depart from the prices set out in its charges scheme unless it obtains the consent of the Water Industry Commission under new section 29E (as so inserted). That consent may be granted only in relation to charges to be paid for services provided to a licensed water or sewerage services provider and then only if the Commission is satisfied that a customer of the provider has done, or has agreed to, something which reduces or increases the costs incurred by Scottish Water in providing the services to the provider and the departure is otherwise justified in the circumstances of the case.

Table 3: Standard unmeasured non-household customers used in draft determination

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

Financial modelling

We built a financial model to allow us to calculate the revenue that Scottish Water requires to carry out its core functions.

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

The model also contains financial assumptions, including information on interest rates and inflation expectations. In the Strategic Review we have used three indexes to measure inflation, namely:

- the Retail Price Index (RPI) for setting charge caps and the calculation of the nominal cost of capital;
- the Consumer Price Index (CPI) for all other non-asset costs; and
- the Construction Output Price Index (COPI), to assess the impact of increases in prices on investments.

Table 4 outlines the other assumptions that we made in the financial model.

Table 4: Other assumptions in the financial model

Title	Assumption	Value
Trade debtors	Number of days	27
Stocks	Percentage of operating expenditure excluding PPP	1.5%
Prepayments and accrued income	Percentage of revenue	5.5%
Other debtors	Percentage of revenue	2.5%
Trade and capital creditors	Percentage of capital expenditure	25%
Accruals and deferred income	Percentage of operating expenditure including PPP	28%
Other creditors	Percentage of operating expenditure including PPP	8%

One of the key considerations of our modelling was the financial sustainability of Scottish Water. The model automatically calculated key financial ratios. Our move towards the RCV method of charge setting has allowed us to make direct comparisons of Scottish Water's financial sustainability with that of the companies south of the border. We have compared Scottish Water's financial ratios with those used by Ofwat in its last two price reviews.

Charges have been set to ensure that Scottish Water is placed on a sound financial footing. This should minimise the financial risks to customers.

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 5.

Table 5: 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)[2]	Min 3x	Min 3.4x	Min 3.75x
Cash interest cover (EBIDA Basis)[3]	Min 2x	Min 2.25x	Min 2.5x
Debt payback period (EBITDA Basis)	Max 5 years	Max 5 years	Max 5 years
Debt payback period (EBDA[4] Basis)	Max 7 years	Max 7 years	Max 7 years
Cashflow to capital expenditure ratio (EBDA Basis)	Min 40%	Min 40%	Min 40%

2 EBITDA – Earnings before interest, tax, depreciation and amortisation.
3 EBIDA – Earnings before interest, depreciation and amortisation.
4 EBDA – Earnings before depreciation and amortisation.

In 'Future water and sewerage charges 2005-10: Final determinations', Ofwat outlined the financial indicators that it had used to set prices for the next regulatory period. Table 6 shows these ratios.

These financial ratios were adopted by Ofwat after detailed consultation with both the Credit Rating Agencies and the financial markets. The target value of the ratios was set at a level that was consistent with a company maintaining 'investment grade' for its debt.

Table 6: Ofwat's 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 have used these ratios in the Strategic Review of Charges 2006-10

Where Ofwat has stated that a target is 'around' a certain level, we have assumed that the ratio for Scottish Water should be within 25% of the target. We have adjusted charge limits to ensure that Scottish Water remains compliant in 2009-10 with all of the cash-based ratios.

We are also publishing the two debt payback period ratios and the cash flow to capital expenditure ratio that Ofwat used for the 2000-05 regulatory control period. In order to measure the financial strength of Scottish Water on a consistent basis, we believe that it is desirable that Scottish Water should broadly comply with these guidelines. However, we have not changed charge 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 the initial RCV

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

We have set an initial RCV that is consistent with the revenue that Scottish Water needs to finance its functions on a sustainable basis. This value for the RCV is broadly in the middle of the range of potential answers that were calculated using the comparator approach. The comparator method is consistent with the approach used by Ofwat to assign initial RCVs to the water only companies.

Setting the allowed rate of return for Scottish Water

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 (a weighted average cost of capital) such that an efficient company can properly finance its functions. A company may choose a mix of debt and equity funding, but its cash return on its regulatory capital is capped (unless it out-performs efficiency targets).

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. The debt supply curve is perfectly inelastic up to the public expenditure limit set by Ministers.

It is therefore not possible to estimate a market-based weighted average cost of capital (WACC) for Scottish Water. As a public sector organisation it has no contributed equity capital, although it does generate and reinvest trading surpluses. Scottish Water 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.

We decided to apply a modified version of the private sector WACC approach. We combined the observed real cost of public sector 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.

We set the pre-tax allowed rate of return on the customer retained earnings at the post-tax allowed rate of return for debt. In real terms this rate is low. An advantage of this approach is that there is 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 had been greater than the return on debt, Scottish Water would have had an incentive to pay down debt. In contrast, if the return on the customer retained earnings had been lower than the return on debt, Scottish Water would have had an incentive to take on more debt.

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 will be central to future determinations of Scottish Water's revenue requirement, it was important that the initial RCV that we established was adjusted appropriately to reflect asset use and additions.

Treatment of additions to the asset base

The key role of the RCV in charge 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 this is 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 that have increased its value (net of depreciation), then the return component of the revenue requirement will be higher and charges will also be higher. As long as 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 have therefore added only appropriate and efficiently procured capital investment to the RCV.

Treatment of depreciation

The role of depreciation is a little more complicated. It affects charges in two ways.

- It was 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 reduces the amount of return allowed in Scottish Water's revenue requirement.

- The expected depreciation charge was added to the cash return and operating costs to determine the revenue requirement.

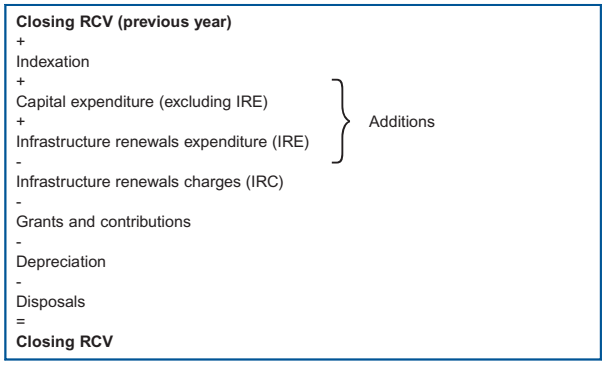
Depreciation therefore influences Scottish Water's revenue requirement both directly and indirectly (by affecting the level of return).

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 2006-10 we have set the level of efficient new investment and the appropriate depreciation charge. We would adjust the RCV before the next regulatory control period to reflect any extra or inefficient investment.

Figure 2 outlines how the change in the RCV is calculated for each year of the regulatory control period.

Figure 2: Rolling forward the RCV



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

Method for setting retail and wholesale charges

The changes to the competition framework contained in the Water Services etc. (Scotland) Act 2005 allow new entrants to obtain a licence to provide retail services to non-household customers. These new entrants would be retail specialists who would buy water and sewerage services wholesale from Scottish Water. To determine the appropriate overall level of wholesale charges we first needed to define the wholesale and retail activities. This separation of activities was set out in the regulatory accounting guidelines.

We decided to use an accounting approach to setting overall wholesale charges. We also considered alternatives such as the efficient component pricing rule and long run marginal cost, but concluded that they were less robust and increased the risk that our determination of overall wholesale charges could unduly favour either the wholesaler or the new entrant.

The accounting approach

We have therefore used our regulatory accounts to define the accounting costs of the wholesale and retail businesses. These accounting costs 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.

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 equitably 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) 2003 Act.

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. In this draft determination we have assumed that these regulations will bring the situation in Scotland broadly in line with that which applies south of the border.

Setting the allowed level of operating costs

Operating expenditure comprises day-to-day running costs such as employment costs, electricity, materials, hired and contracted costs, local authority rates, insurance, software licences and vehicle running costs. Bad debt is also regarded as an operating cost.

We do not include the following in operating costs:

- pro-active maintenance of the asset base;
- depreciation;
- infrastructure renewals charge; and
- costs of PPP schemes.

Operating expenditure accounts for some 30% of revenue. We collected information about the operating costs incurred by the water and sewerage service undertakers in the UK using a consistent breakdown of operating expenditure.

We exclude one-off items of expenditure that can affect reported operating expenditure. Examples would include:

- the costs of abnormal pension contributions;
- redundancy payments;

- rates rebates; and
- unusual weather conditions.

The baseline level of operating expenditure is the expenditure incurred in the base year. We apply future efficiency targets to this baseline. We have used the following process to set the baseline level of operating costs for the draft determination:

- We used the 2003-04 statutory accounts and June Return information to establish the total level of Scottish Water's operating expenditure in that year.
- We identified exceptional and atypical costs and subtracted them from total operating expenditure. This allowed us to establish the normal ongoing costs of running the business.
- Finally, we assessed whether there was anything unusual about Scottish Water's cost allocation in 2003-04. We compared Scottish Water with the companies in England and Wales to ensure that its cost allocation practices were consistent with those in England and Wales. Where necessary, we made appropriate adjustments to Scottish Water's operating expenditure.

The new Water Industry Commission will publish the final determination in November 2005. It will have information for 2004-05 at that stage, and is likely to revise its assessment of the baseline using that information.

New operating expenditure

Scottish Water incurs 'new' operating expenditure to deliver improvements in water quality, environmental compliance or levels of service to customers. Such new operating costs are added to the baseline that we described above.

We used the same criteria to assess the level of new operating costs as we used in the Strategic Review of Charges 2002-06. These are as follows:

- Does the expenditure result in a level of service that exceeds the reported norms for England and Wales, or enable significant additional sewage treatment?
- Is Scottish Water required to provide this additional level of service, and for what reason?
- Has Scottish Water carried out a proper assessment of the proposed new operating expenditure, rather than relying on estimates from contractors/ manufacturers or on an arbitrary percentage of the capital cost?
- Has Scottish Water demonstrated management challenge and control over the proposed costs?
- Has Scottish Water compared alternative options on a whole life cost basis, within a project appraisal?
- Have full net present value calculations been provided?
- Do the alternative options include different mixes of operating expenditure and capital investment?
- Has Scottish Water quantified the potential savings to baseline operating expenditure which arise from upgrading works or systems, and offset increases in new operating expenditure accordingly?

Like-for-like comparisons

In order to make reliable like-for-like comparisons we need to understand the factors that can influence the level of costs incurred by the water and sewerage companies in the UK. These can typically be divided into those that are broadly controllable by management and those that are outside the control of management. We term these factors 'internal' and 'external' respectively.

It is possible to identify a number of external factors that affect the costs of the water and sewerage industry. They include the following:

- difficulty of operating environment (eg population density, topography, types of water source, etc);
- customer mix;
- customer requirements (resolving complaints, etc);

- environmental requirements (eg leakage levels, sewage effluent standards, etc);
- volumes (water consumption, peak use, sewage loads);
- nature of the assets operated and maintained in the short to medium term (size, mix, performance);
- regional variations in charges for local authority rates, water abstraction and sewage discharges;
- regional variations in services such as mains diversions and sewer diversions ('third party' services); and
- regional variations in market rates for salaries, electricity or other costs.

We can also identify a number of factors that are within the control of management. They include the following:

- the organisation's remuneration policy;
- the organisation's policy regarding the use of permanent or temporary employees;
- the organisation's policy regarding purchasing and stocks of materials and consumables;
- the organisation's policy regarding hired and contracted services, for example the use of lawyers and consultants; and
- in the long term, the nature of the assets operated and maintained (size, mix, performance) – over time, water and sewerage service providers can change the assets they own and operate, either by building new ones, decommissioning old ones or making changes to existing assets to modify the way in which they operate.

Calculating relative efficiency

In order to make objective comparisons we need to take proper account of the external factors that influence the level of costs of each company. We use two separate benchmarking models to allow us to assess the relative efficiency of the water and sewerage companies.

The models allow us to compare the actual costs incurred by a water and sewerage company with a predicted level of costs from our benchmarking models. The difference between the predicted and the actual level of costs is an indicator of the relative efficiency of the company. We adjust these results so that the average level of predicted costs is 100. The results for other companies have been adjusted in a similar way. Companies with results that are lower than 100 are relatively efficient, while those with scores higher than 100 are relatively inefficient.

Ofwat's methods of benchmarking

Ofwat uses econometric models to establish a relationship between the costs incurred by the companies and a number of cost drivers. These cost drivers take account of both engineering and economics. There are nine models for operating expenditure:

- water resources and treatment;
- water distribution;
- water power;
- water business activities;
- sewer network;
- large sewage treatment works;
- small sewage treatment works;
- sludge treatment and disposal; and
- sewerage business activities.

The purpose of each model is to establish a relationship between the costs reported by the companies and external cost drivers. The models themselves take different forms. These are summarised in Table 7.

Table 7: Summary of econometric models and explanatory factors

Model	Model type	Explanatory factors
Water resources and treatment	Linear model for unit cost	Population, number of sources, distribution input, proportion of supplies from rivers.
Water distribution	Log unit cost	Population, proportion of total mains length with diameter >300mm.
Water power	Log linear	Distribution input, average pumping head.
Water business activities	Log linear	Number of billed properties.
Sewer network	Log linear	Sewer length, area, resident population, holiday population.
Large sewage treatment works	Log linear	Total load, use of activated sludge treatment, tight effluent consent for both suspended solids and BOD5.
Small sewage treatment works	Unit cost	Works size, works type, load.
Sludge treatment and disposal	Unit cost	Weights of dry solids, disposal route.
Sewerage business activities	Unit cost	Number of billed properties.

We adapted the Ofwat models to reflect the number of small sewage treatment works in Scotland.

We developed two new unit costs for Scotland, both of which were high relative to those in the other size bands. This reflects the fact that it tends to cost more to treat loads at very small works. We also reworked the Ofwat econometric models using information from Scottish Water.

The WICS alternative model

We developed an alternative model to assess the efficiency of the water industry in Scotland. In developing an alternative model we took particular care to use a different approach to Ofwat's econometric models so that the alternative model would provide an independent check on the results given by Ofwat's models.

The alternative model splits the water and sewerage business into ten different activities:

- water abstraction and treatment;
- water distribution;
- business activities (water);
- bad debt (water);
- sewage collection;
- simple sewage treatment;
- complex sewage treatment;
- processing sludge;
- business activities (sewerage); and
- bad debt (sewerage).

For each of these activities, we determine the principal factors that would affect comparisons of operating costs between Scottish Water and the water and sewerage companies in England and Wales.

We used information from Scottish Water and the water and sewerage companies about each of these cost drivers. The model also takes account of economies of scale.

The purpose of making adjustments to reported costs

It was important for us to consider the results of the Ofwat, modified Ofwat, and the alternative modelling approaches very carefully. Our models cannot take account of all of the external factors that influence cost. These factors may either increase or decrease the level of cost.

We believe that the fact that the Ofwat models have been successfully applied to companies as different as Thames Water[5] and South West Water[6], and to both large water and sewerage companies and small water only companies, confirms that the models can reasonably be applied in Scotland.

We asked Scottish Water to draw to our attention any factors (those not included in the models) that would either increase or decrease cost. We believe that we have made appropriate adjustments to the results of the models. To justify an adjustment, Scottish Water has had to provide evidence in the following areas[7]:

5 Thames Water covers much of the south east of England, including London.
6 South West Water covers Devon and Cornwall.
7 These questions are adapted from Ofwat's letter to Regulatory Directors, RD35/98, 1998.

- What is the justification for the special circumstances which demonstrates a material difference from industry norms? Scottish Water was required to set out whether the factors are the result of special obligations, the character of all or part of its customer base, or the result of historical development of the water and sewerage systems in its area of supply.

- What is the quantification of the impact of the special factors that demonstrate a net additional effect on Scottish Water's costs, over and above that which would be incurred without these factors?

- What has Scottish Water done to manage the additional costs arising from the special factors and to limit their impact?

- Are there other special factors that reduce costs relative to industry norms? If so, have these been quantified and offset against upward cost pressures?

Assessing the future efficiency gap

The efficiency of the comparator companies in England and Wales continues to improve. We have taken account of the way in which the performance of the companies south of the border is likely to change over the next regulatory control period. Otherwise customers in Scotland may have to pay more than is necessary.

Ofwat published the results of its final determinations of price limits for the companies in December 2004. This has informed our assessment of the scope for improvement by Scottish Water over the period 2006 to 2010. We have set an allowed level of operating costs that takes account of the improvements that Ofwat has required the companies south of the border to achieve.

Calculating total allowable operating expenditure

We have set targets in terms of total allowable operating expenditure (not including depreciation). We have set total allowable operating expenditure at a level that we believe is sufficient for Scottish Water to carry out its operations for each year of the regulatory control period. This is the amount that will be funded through customer charges. Figure 3 sets out the calculation of total allowable operating expenditure.

Figure 3: Calculation of total allowable operating expenditure

Total allowable operating expenditure
=
Baseline operating expenditure
±
Assessed changes in baseline operating expenditure
-
Efficiencies in baseline operating expenditure
+
New operating expenditure
-
Efficiencies in new operating expenditure
+
PPP operating expenditure
+
New PPP operating expenditure
+
The impact of annual inflation on all of these components

Public Private Partnerships

The three former authorities decided to let a total of nine concessions for building and operating waste water treatment plants. These concessions were for a period of 25-30 years.

The concessions were let to joint venture companies which usually consisted of a consultant engineering and design firm, a construction contractor and an operations company. The companies had to accept responsibility for maintenance over the contract period and for the inherent risks of project delays, cost over-runs and volume changes caused by shifts in demand. They were also required to deliver the service within tightly specified parameters. An essential element of PPP is the transfer of risk from the public to the private sector.

We have no doubt that the contracts for the nine projects represented good value for money at the time they were concluded. However, we consider that improvements in Scottish Water's performance have made it less certain that the PPP contracts represent value for money to customers today. We therefore considered setting an efficiency target for PPP. Respondents to our methodology consultation did not consider that this was appropriate. However, one respondent did suggest that we should monitor costs carefully to ensure that the contractors were delivering the required level of service. Increases in PPP costs have had to be justified in detail.

Another respondent remined us that PPP may represent the most practical or best value method of delivering the required outputs. We have taken this view into account in this draft determination.

Levels of service

We have developed our use of the benchmarking approach for quality of service regulation.

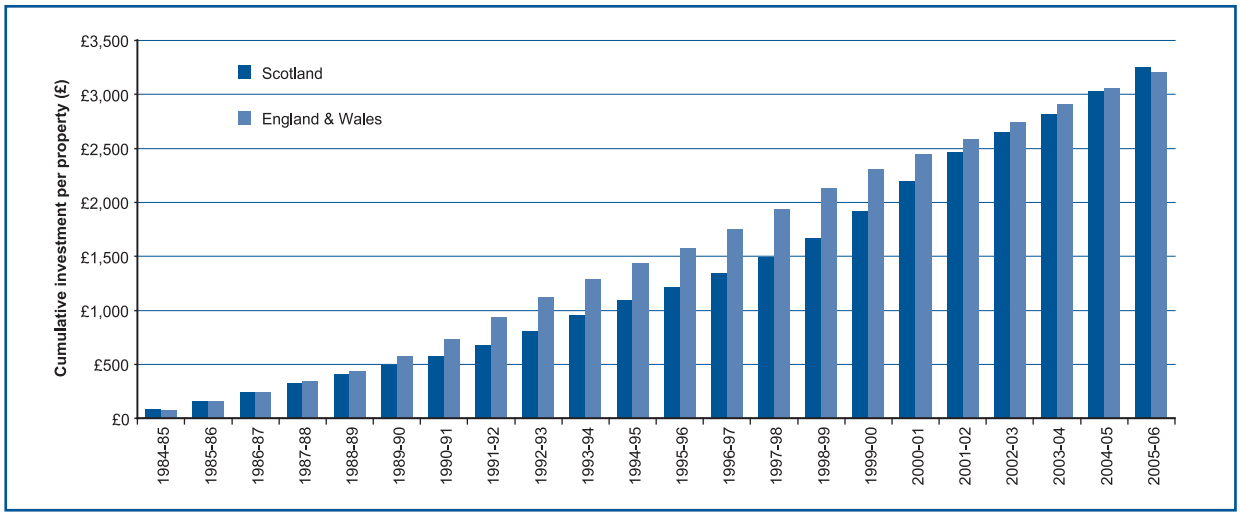
Our analysis of the score for efficiency has not been adjusted to take account of differences in the level of service. We have set clear milestones for the customer service performance of Scottish Water. If Scottish Water does not meet these standards we would be minded to adjust the allowed level of operating costs at the next charge determination downwards to reflect the lower level of service provided.

Historic investment in Scotland

It is important to put the current and past levels of investment in Scotland's water industry into a proper context. If we compare the level of investment in Scotland with that in England and Wales using the measure of investment per property, we see that investment will have matched that in England and Wales over the period 1985-2006, as Figure 4 shows.

The conclusion from this analysis, therefore, is that if there is a significant backlog of investment in Scotland relative to that in England and Wales, it can only be a result of historical and current inefficiency, not a lack of investment funds. We are not persuaded by Scottish Water's argument that the percentage of the total asset base that has been replaced in England and Wales over the same period is much greater than in Scotland. To be useful, such a comparison would rely on both a robust asset inventory and asset valuation. Scottish Water has accepted that more work is required in this area. Customers in Scotland have paid for, and so deserve, an equivalent standard of service to that which customers in England and Wales receive.

Figure 4: Cumulative investment per property in Scotland and in England and Wales 1984-2006[8]



[8] Adjusted for inflation and for the effect of PFI investment. Efficiency adjustment is not included. The forecast expenditure in Scotland for 2004-05 and 2005-06 is based on figures supplied by Scottish Water.

Potential overhang from Quality and Standards II

In its second draft business plan, Scottish Water states that it expects to invest a total of £1,941 million by the end of March 2006. The plan also states that some £283 million will have to be invested after March 2006 in order to deliver the Quality and Standards II objectives.

We have accepted Scottish Water's estimate of the overhang from Quality and Standards II, although we have removed the claim for extra capital inflation beyond the current regulatory control period. Our analysis has shown that Scottish Water will deliver £274 million of the Quality and Standards II investment programme after March 2006. Accordingly, we have adjusted the initial RCV down to reflect the remaining outputs.

We will continue to monitor all of the projects in the WIC18 baseline[9] until we are satisfied that Quality and Standards II has been delivered. The Reporter will have an important role in confirming that the full investment programme has been delivered.

Lessons learnt from establishing the baseline investment programme for Quality and Standards II

One of the disappointments of Quality and Standards II has been the difficulties faced by stakeholders and customers in monitoring Scottish Water's delivery of the investment programme. This has resulted from the lack of clearly defined projects and associated outputs that comprised the baseline programme. We have addressed this by publishing the agreed list of projects for this regulatory control period. This list contains a fair degree of definition and detail but we will requuire further definition to allow us to monitor the delivery of the investment programme that has been funded in this draft determination. We will ensure that customers are not asked to pay twice for the same output.

Investment programme deliverability

We have funded a large capital programme that should deliver both the Ministers' 'essential' and 'desirable' objectives. Our views on deliverability have taken account both of experience south of the border and of Scottish Water's comments in its business plan.

How Ofwat assesses capital expenditure efficiency

Capital maintenance econometrics

Ofwat's econometric modelling of capital maintenance uses statistical regression analysis to establish a relationship between the costs incurred by companies and a defined set of cost drivers. These cost drivers have a significant impact on costs but are outside the control of the management of the company. By controlling the principal external cost drivers in the models, Ofwat can determine relative efficiency with a degree of accuracy.

The cost drivers that are included within the econometric models are known as 'explanatory factors'. There are nine models and they take different forms. These are summarised in Table 8.

Table 8: Summary of econometric models and explanatory factors

Model	Model type	Explanatory factors
Water resources and treatment	Unit cost	Total connected properties
Water distribution infrastructure	Log linear	Length of main; total connected properties
Water distribution non-infrastructure	Log linear	Pumping station capacity; water service reservoir and storage tower capacity
Water management and general	Log linear	Billed properties; proportion of billed properties that are non-household
Sewerage infrastructure	Log linear	Length of sewer; number of combined sewer overflows; proportion of critical sewers
Sewerage non-infrastructure	Unit cost	Number of pumping stations
Sewage treatment	Log linear	Total load; total number of works
Sludge treatment and disposal	Unit cost	Total weight of dry solids
Sewerage management and general	Unit cost	Billed properties

9 The WIC 18 baseline attempted to define all of the projects that comprised Quality and Standards II. It took some three years to define all of the projects satisfactorily.

We have used these models to assess the level of capital maintenance for Scottish Water. Using these models allows us to ensure that we have allowed an appropriate level of capital maintenance which should ensure that customers receive value for money both in the short and in the longer term.

Capital works unit costs

We have used the Ofwat capital works unit costs, or 'cost base', approach to assess the relative efficiency of Scottish Water in procuring and implementing capital projects. Ofwat uses this technique to inform its assessment of relative efficiency for both capital maintenance and capital enhancement expenditure.

The cost base is a database of costs, termed 'standard costs', for a wide range of standardised projects, or units of work. We have compared the standard costs submitted by Scottish Water with those of the companies south of the border to assess relative procurement efficiency. We adjusted the results of our capital cost modelling using the same approach as we adopted for making adjustments to the level of operating cost.

Conclusion

Our approach to the Strategic Review of Charges 2006-10 has drawn on the tried and tested methods of Ofwat. We have also sought to learn from our work in completing the Strategic Review of Charges 2002-06 and the representations that were made to us. We believe that our approach is proportionate and transparent and is fully consistent with the Ministerial Guidance.

Chapter 1
Our approach to the Strategic Review of Charges 2006-10

Introduction

Regulation seeks to ensure that customers enjoy a value for money service. Customers should be able to count on a supply of high-quality, wholesome drinking water, continuing improvement in our beaches and water environment to meet the requirements of EU legislation, and a service that is provided at a reasonable cost. It is the job of the regulators to ensure that customers enjoy a 'silent' service.

Customers rightly expect us to have built on progress since the last Strategic Review of Charges, and to have monitored Scottish Water's performance effectively during the current regulatory control period. They also expect us to ensure that charges are sufficient, but no more than sufficient, to fund the levels of service and investment that were outlined in the Ministers' objectives.

This second full Strategic Review of Charges was commissioned in good time. We have been able to take advantage of the time we have had to make sure that the current Strategic Review is as transparent as possible. All of these efforts are designed to ensure that customers can be confident that they are getting value for money.

Our proposed methodology for the Strategic Review of Charges 2006-10 was set out in five documents that were published during 2004.

The proposed methodology covered the following key areas:

- our work plan;
- the regulatory framework in Scotland and lessons learned;
- the calculation of prices;
- the scope for efficiency – operating cost; and
- the scope for efficiency – capital expenditure.

This volume summarises the methodology that we have followed in completing this draft determination of Scottish Water's charges.

Regulatory information

Information is vital to effective regulation. We ask Scottish Water for a wide range of information, covering all aspects of its water and waste water businesses. This information allows us to monitor and report on Scottish Water's performance. We continually re-assess these information requirements.

The information we request is set out in Figure 1.1.

Figure 1.1: Regulatory Information

	Submission	Frequency of submission	Team that receives the submission
WIC 1/9/14/22	Non-domestic customer revenue information	Twice yearly	Revenue and Tariffs
WIC 4	Domestic customer revenue information	Twice yearly	Revenue and Tariffs
WIC 5	Customer service performance return	Quarterly	Competition and Customer Services
WIC 6	Quality performance assessments (written)	Quarterly	Competition and Customer Services
WIC 18	Quality and Standards final output	Ad hoc	Investment and Asset Management
WIC 19	Investment appraisal audits	Annually	Investment and Asset Management
WIC 24	Leakage strategy	Annually	Investment and Asset Management
WIC 25	Resource accounting and budgeting (RAB)	Monthly	Costs and Performance
WIC 43	Annual Return 2003-04	Annually	Office-wide
CIR	Capital Investment Return	Quarterly	Investment and Asset Management
WIC 55	Strategic Review of Charges – regulatory accounts	Ad hoc	Costs and Performance

In England and Wales it is water industry practice for Ofwat to use a consultant engineer, known as a Reporter, to help verify information submissions. The Reporter audits the information provided to the regulator by the companies and highlights any issues or inaccuracies.

Following discussions involving the Scottish Executive, this Office and Scottish Water, we appointed a Reporter for the water industry in Scotland in December 2003. This has improved the regulatory process and the reliability of regulatory submissions in Scotland.

The Reporter is Mr David Arnell of Black and Veatch Consulting. He is required to review all aspects of Scottish Water's information submissions, as directed by this Office. This includes auditing both the annual regulatory return submitted by Scottish Water and its business plan submissions, and scrutinising the costing scope and content of the proposed investment programme. Such scrutiny has played an important role in improving the quality and reliability of information provided to Ofwat by the companies in England and Wales. The Reporter is independent of Scottish Water.

As well as this Office, the Scottish Executive, the Drinking Water Quality Regulator (DWQR) and the Scottish Environment Protection Agency (SEPA) can ask the Reporter to examine Scottish Water's performance in areas relevant to their statutory duties.

This audited information has informed our work in assessing the scope for efficiency and the sustainable level of charges. It has led us to commission further work to understand the appropriate scope of Scottish Water's proposed investment plan.

Final decisions about the charges that will be paid by customers from April 2006 will still not be made for some five months. Volume 1 of this Strategic Review of Charges 2006-10 sets out our draft determination. The new Commission will listen to all representations from stakeholders on the draft determinations until 23 September.

Ensuring transparency and accountability

We have provided stakeholders with a number of opportunities to make their views known to us.

In preparing the Strategic Review of Charges we undertook a number of initiatives designed to improve the transparency and accountability of regulation. We introduced 'stakeholder information days', which were held approximately 'every six weeks. These provided a forum for us to outline our progress and for stakeholders to have their say. A summary of the meetings is available on our website. Similarly, we offered a separate briefing to members of the Scottish Parliament.

A staged approach

We included a number of interim announcements in our work plan. For example, we commented on the likely prospects for charges after Scottish Water's first draft business plan. We also provided information to Scottish Water on the cost of capital that we proposed to use and a range for its initial regulatory capital value. Where possible, we have made our analytical tools available to stakeholders.

The financial model is one of the key tools. In common with other regulators, we have used a financial model to calculate the revenue that will be required from customers. The financial model allowed us to assess different cost, investment and timing scenarios so that we can be sure that we have chosen the option that represents best value for money for customers. The financial model was subjected to an extensive external audit. This audit reviewed both the workings of the model and internal processes, such as version control, in preparing the Strategic Review of Charges.

The financial model, which is available on our website, is constructed using Microsoft Excel©[10].

The work plan that we adopted in preparing the Strategic Review contains the following key events:

- Minister's commissioning letter for the 2006-10 Strategic Review of Charges;
- Scottish Water submits its Annual Return for 2003-04;
- Quality and Standards III consultation;
- Principles of Charges consultation;
- Scottish Water's first draft business plan;

[10] Stakeholders who wish to download the model will require a licensed copy of Microsoft Excel©.

- Ministerial Guidance;
- Scottish Water's second draft business plan;
- Scottish Water submits its Annual Return for 2004-05;
- WICS' draft determination of charges;
- opportunity for representations by stakeholders; and
- New Water Industry Commission final determination of charges 2006-10.

The full workplan is reproduced in Appendix 3.

Minister's commissioning letter for the 2006-10 Strategic Review of Charges

Ross Finnie, Minister for the Environment and Rural Affairs, asked us to begin work on the Strategic Review of Charges. This letter set out initial policy considerations and detailed proposed changes to the regulatory framework.

Scottish Water submits its Annual Return for 2003-04

The Annual Return is the principal information submission that Scottish Water makes to us. The return includes information about customers, assets and financial performance. It also covers progress on the agreed investment programme. The Annual Return informed the draft determination of charges.

Quality and Standards III consultation

The Scottish Executive coordinated a multi-stakeholder process to determine the objectives of the investment programme for the period 2006-14. This consultation provided one of the main opportunities for stakeholders to express their views to the Scottish Executive.

Principles of Charges consultation

This important Scottish Executive consultation discussed how customers should pay for water services.

Scottish Water's first draft business plan

Scottish Water provided its first draft business plan to us on 29 October 2004. We had provided Scottish Water with detailed guidance on the requirements for the business plan in June 2004. The first draft business plan was an important opportunity for Scottish Water to set out its strategy in some detail and to highlight any factors it wanted us to take into account in setting efficiency targets or charges.

This plan also contained Scottish Water's view of an appropriate investment plan for the 2006-10 regulatory period. This took account of Scottish Water's knowledge of the Quality and Standards III process, any likely backlog from Quality and Standards II, and its views on the size of a programme that could be efficiently managed.

Ministerial Guidance

Detailed guidance was provided by Ministers in February 2005. This guidance outlined the priorities for investment in the next regulatory control period and the principles that should be applied in setting tariffs for customers. The guidance also set the amount of public expenditure that would be available.

Scottish Water's second draft business plan

The second draft business plan was Scottish Water's opportunity to communicate its strategy, objectives and resource requirements to this Office in light of the Ministerial Guidance on investment priorities. This plan reflected their interpretation of the Ministerial Guidance that was provided at the end of February 2005. The plan also contained a detailed investment programme that, in the opinion of Scottish Water, meets the priorities that were set out in the guidance. We have published this investment plan in full.

WICS' draft determination of charges

Our draft determination outlines our initial proposals for Scottish Water's charge limits for the 2006-10 regulatory period.

Scottish Water submits its Annual Return for 2004-05

This Annual Return is particularly important as it will inform the final charge limits in the Strategic Review of Charges.

Opportunity for representations by stakeholders

Following publication of this draft determination, customers and stakeholders can make representations on the initial proposals until 23 September. During this period, there may be further guidance from Ministers.

New Water Industry Commission's final determination of charges 2006-10

The final determination will be published on 30 November 2005 following consideration of representations by the new Water Industry Commission. This will be the final determination of the revenue requirements and charging levels for Scottish Water for the period 2006-10. It will explain in detail the processes the new Commission has gone through in establishing charge caps.

Summary work plan for May 2004–May 2006

There were three major changes to our proposed work plan that we published in July 2004. These related to the publication of our proposed approach to assessing the scope for efficiency in capital expenditure, our plans to publish draft efficiency targets for capital expenditure and operating costs, and the timing of the Ministerial Guidance.

The Ministerial Guidance was published on 10 February 2005. This was slightly later than expected but did not impact our work plan.

We had originally intended to publish our proposed approach to setting efficiency targets in a single volume. Unfortunately, we had to delay the publication of our approach to setting capital expenditure efficiency targets because Scottish Water was not able to provide us with reliable information on the extent of the Quality and Standards II investment programme that will not have been delivered by April 2006. We published our approach to setting targets for capital expenditure efficiency in December 2004.

In its first draft business plan, Scottish Water included a number of representations about our approach to setting targets. It also suggested a significant number of special factors that it believed we should take into account. We therefore decided to review both our approach and Scottish Water's submission on special factors in some detail. This precluded the early publication of our views on the scope for operating cost and capital expenditure efficiency targets.

External advice

We have delivered most of the work plan outlined above using in-house office resources. In certain areas, we have taken specialist advice from a number of companies with appropriate financial, asset management and audit expertise. This was cost-effective for our Office and ensured that the Strategic Review of Charges benefited from the perspective of external experts.

In addition, we have been fortunate in being able to seek advice and comment from three senior advisors: John Banyard OBE, Sir Ian Byatt and Professor David Simpson. John Banyard was an Executive Director of Severn Trent plc and is widely regarded as one of the leading experts in asset management in the water and sewerage industry. Sir Ian was the former Director General of the Office of Water Services and Chief Economics Advisor to HM Treasury. Professor Simpson was former Economic Adviser to Standard Life, and his previous post was Professor of Economics at the University of Strathclyde.

We also sought detailed comments on this draft determination from Thomas Sharpe QC and his legal team. This team comprised junior counsel Meredith Pickford and Shepherd and Wedderburn. These comments have been incorporated into each of the volumes.

Chapter 2
Background

Introduction

The principal statutory duty of the Water Industry Commissioner for Scotland (WICS) is to promote the interests of customers. We promote the interests of customers primarily by encouraging Scottish Water to become more efficient. Cost cutting is not efficiency. Efficiency is about reducing costs and maintaining or improving the levels of service to customers. Scottish Water can therefore become more efficient by reducing its cost to deliver an acceptable level of service or by improving its service to customers without increasing its costs.

The last Strategic Review of Charges covered the period 2002-06. In November 2005 the new Water Industry Commission will publish its final determination of charges for the Scottish water industry. The final determination will outline the charge implications for customers of Scottish Water for the period 2006-10.

Our intention throughout this Review has been to provide an open and transparent process. This is in accordance with our commitment to the Better Regulation Task Force principles of proportionality, accountability, consistency, transparency, and targeting[11].

In this chapter we outline the background to our work in assessing the appropriate level of charges. We set out and explain the background of the Review and the current regulatory framework.

Economic regulation

Before we set out the framework for the next Strategic Review of Charges, it is important to explain the role of regulation within the water industry in Scotland.

The purpose of regulation is to seek to ensure that monopoly businesses act in the customer interest. Customers should not have to pay higher charges or accept lower levels of service because they are unable to choose their supplier.

Network utility industries tend to be monopolies because the cost of replicating the network is excessive. Economists describe them as involving a significant 'natural monopoly' element. A natural monopoly refers to the situation where there is only one firm supplying a product in the market, but this is not the result of the behaviour of the firm. Instead, it arises because it is the sensible way to organise the industry and it is in the best interests of customers.

However, the behaviour even of natural monopolies may work against the customer interest if unchecked. There are two ways in which this might happen. First, if the customer has no choice about where to purchase a service, the monopoly has an incentive to charge an excessive price and to make excessive profits. Second, in the absence of competition the monopoly faces no incentive to innovate and improve its efficiency over time.

Economic regulators[12] 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 focus the attention of management on delivering ongoing improvements in value for money to customers. This explains why regulators publish regular assessments of the financial performance of the companies or organisations they regulate.

In a competitive market, companies face similar tight budgetary constraints in that they have to match their costs to the revenue they can win from customers. Regulation consequently provides a proxy for the discipline of competition.

[11] The Better Regulation Task Force was established in September 1997. It is an independent body that advises Government on action to ensure that regulation and its enforcement accord with the five Principles of Good Regulation. For further information see http://www.brtf.gov.uk.

[12] Regulation of a public sector corporation is not unique. Postcomm fulfils a similar role to WICS in its regulation of the Royal Mail. The Civil Aviation Authority (CAA) also has economic regulation responsibilities for the locally owned Manchester Airport.

The creation of Scottish Water

The Strategic Review of Charges 2006-10, unlike its predecessor, has focused solely on the activities of Scottish Water. In the last Strategic Review of Charges (2002-06), the creation of Scottish Water from the three previous water authorities was still subject to parliamentary approval.

The three separate authorities remained in existence until the formation of Scottish Water on 1 April 2002 under the Water Industry (Scotland) Act 2002. Under sections 21-23 of the Act the functions, property, liabilities, and staff of the water and sewerage authorities were transferred to Scottish Water.

Scottish Water remains in the public sector, and is owned by and accountable to the Scottish Parliament through the Scottish Ministers.

Scottish Water has completed three years in its new form and has made solid progress in reducing its operating costs. To date, progress in delivering the capital programme has accelerated but is still less encouraging than the improvements made in reducing operating costs.

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 charges than could ever be achieved 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 customers of Scottish Water benefit significantly from access to attractive terms for public government loans which are much cheaper than the private sector's cost of capital[13].

It is important to note that this cost benefit will only truly be realised by customers if they are not exposed to operational risks and if the service is delivered efficiently. However, as the regulator we must take into account that customers of Scottish Water are more immediately exposed than customers in England and Wales to the financial risks of the business. This is because there are no private equity shareholders.

The Strategic Review of Charges 2002-06

Our analysis at the last review showed that a sustainable water industry in the public sector would require action to be taken in the following areas:

- increased revenue to the minimum level consistent with meeting ongoing maintenance and environmental/ public health compliance;
- challenging but achievable efficiency targets;
- harmonised and broadly cost-reflective tariffs;
- improved regulation and financial control;
- improved performance monitoring; and

The level of revenue

We showed that the Scottish industry had spent considerably more, in the past several years before that review, than it received in customer charges. We explained that this was a problem because there was a likelihood that sustained investment at current levels will be required for the foreseeable future.

Continuing to increase net borrowing significantly to eliminate the gap between revenue and expenditure will only make matters worse. Borrowing may delay a charge increase, but it will increase future bills by the interest payable on any additional borrowing. Net borrowing cannot increase at a faster rate than the value of the asset base. In providing our advice on the level of revenue, we took into account a clear customer concern that the industry had 'to get its house in order' and that, as a commodity business, 'it should learn to live sustainably without real increases in price'. We believe that the revenue increases that were implemented will ensure that we have a more sustainable industry in the future and that customers will benefit as a consequence.

[13] We estimate that customers of Scottish Water probably benefit by over £100 million per year. This is the product of the difference between the Ofwat allowed rate of return and that which we have set and the regulatory capital value.

Challenging but achievable efficiency targets

The charges paid by customers in the public sector model are a direct function of the efficiency of the water industry in Scotland. Unlike in the private sector, no dividends are paid to shareholders from any profit. Any surplus in Scotland can go wholly to financing investment and improving service to customers.

We set three separate efficiency targets to cover operating costs, capital expenditure, and the potential savings resulting from the merger of the three authorities. These efficiency targets were challenging but achievable. After three years, we can see real progress in reducing operating costs. Scottish Water is also confident that the creation of Scottish Water Solutions will improve both the timeliness and the efficiency of the delivery of capital investment.

The total annual value to customers if Scottish Water achieved the efficiency targets was projected to be in excess of £400 million a year by the end of the current regulatory period. These efficiencies are important because a sustainable water industry needs to be affordable both now and in the future.

Harmonised and broadly cost-reflective tariffs

When the Minister for the Environment, Sport and Culture, Sam Galbraith MSP, announced his intention to merge the three water authorities, he highlighted the harmonisation of charges as an important benefit. There were clearly significant anomalies in the charges that resulted from the three authority model. It is, for example, much cheaper to supply Dundee than north Fife, yet charges were much higher in Dundee. We considered that a harmonised charge across Scotland was equitable for all customers.

There has been some comment about our recommendation that charges for businesses should also be harmonised across Scotland. There were three reasons why we considered that this was important.

- The merger of the three authorities only made sense if cost savings, investment prioritisation and a single management structure were to be introduced. This would remove the justification for differential pricing for the three former areas. The choice therefore is between wholly cost-reflective charging (which will disadvantage the smallest and most rural) and fully harmonised charging.

- Businesses, like households, should not be asked to pay more solely because of their location.

- The distinction between some household and non-household customers was blurred, for example people who work from home, farms and crofts, owners or managers with accommodation in hotels or on school and business sites.

We still consider that it would have been difficult for Scottish Water to defend having different charging regimes in different parts of Scotland.

Regulation and financial control

We drew on the information contained in the 2000-01 Annual Return to write the Strategic Review of Charges 2002-06. This was the first time that such standardised information had been available. In the past three years we have endeavoured to improve further the overall quality of regulatory information. This is crucial to improving the financial and customer service performance of the industry.

Improved monitoring

Monitoring performance is central to regulation. This explains why we sought ministerial approval for the annual reports on the performance of the industry in Scotland and for a joint project with the quality regulators to agree how the outputs of the capital investment programme should be monitored. Increased information about performance is only valuable if, as a result, customers get a better level of service or the costs of the industry can be sustainably reduced.

Performance monitoring has developed significantly in the last three years. This monitoring takes two forms:

ongoing collection and analysis of information, and publication of annual reports on:

- Costs and Performance;
- Investment and Asset Management; and
- Customer Service.

These reports are objective analyses of the current performance of the industry in Scotland. We believe that our performance monitoring has already brought results. Scottish Water is likely to have reduced its operating costs by £145 million a year in real terms.

Resource accounting and the Strategic Review of Charges 2002-06

In reviewing the outcome of the Strategic Review of Charges 2002-06, it is important to explain the impact on customers' bills of the introduction of resource accounting. Some commentators have suggested that the introduction of resource accounting directly led to higher bills for customers. This topic was discussed in detail by the Parliament's Finance Committee. We believe that the introduction of resource accounting did not have an impact on the charges paid by customers. Indeed, the introduction of resource accounting led to increased scrutiny of the value of assets owned and the depreciation policies used by the industry. This will have contributed to the progress of the past few years towards a more sustainable public sector water industry that can continue to meet the expectations of customers.

Resource Accounting and Budgeting (RAB) was fully introduced in April 2001. The Minister's commissioning letter for the 2002-06 Strategic Review of Charges set public expenditure limits on a resource accounting basis. It also made clear that we should regard these as maximum limits and that we should demonstrate, by means of risk analysis, that our advice on charges was consistent with these maximum limits.

The introduction of resource accounting had no direct impact on the way in which either the former three authorities or Scottish Water managed their businesses or prepared their accounts. The three authorities had always prepared their accounts on an accruals basis. Resource accounting did change the financial control figure that the Scottish Executive used. Instead of monitoring the extent of new borrowing required (refinancing of existing debt at maturity does not count as public expenditure), the Scottish Executive began to measure consumption of resources and capital spending.

Clearly the way in which a company is monitored or analysed does not impact on either its accounts or its underlying business. Consequently, providing that the control total has been correctly adjusted to reflect the difference in how it is calculated, this should have had no impact on the company on the charges that it needs to charge.

Lessons learned from the Strategic Review of Charges 2002-06 and the response of stakeholders

The Strategic Review of Charges 2002-06 highlighted a number of challenges:

- the need to improve efficiency;
- the potential threat of competition;
- the need to improve understanding of the condition and performance of assets; and
- the desirability of improving the financial sustainability of the industry.

The industry has responded well to all of these challenges and customers can look forward to much improved value for money as a result. Not surprisingly, some stakeholders criticised the last Review and some of the steps that have been taken to meet the challenges highlighted in our analysis.

The areas of criticism have included:

- the process of harmonising charges;
- the increase in fixed charges;

- the industry should have been allowed to borrow more;
- the efficiency targets were unreasonable;
- a lack of clarity in roles and responsibilities; and
- a lack of explanation.

We believe that the Strategic Review of Charges 2002-06 set a framework that was appropriate and in the interests of customers of today and in the future. There has been a marked improvement in the industry's efficiency and in its understanding of its assets. We believe that the review made a significant contribution to encouraging these improvements.

In preparing the Strategic Review of Charges 2006-10, we are keen to learn lessons from the criticisms that have been made. We believe that there are a number of steps that we can take to improve the transparency, accountability and perceived proportionality of regulation.

Transparency

Improving process

In July 2004 we published 'Our work in regulating the Scottish water industry: Setting out a clear framework for the Strategic Review of Charges 2006-10'. This described our work plan in some detail and highlighted all of the information that we collect from Scottish Water. It also gave information about the opportunities for stakeholders to learn more about our work and to ask questions.

Perhaps the most important part of the process begins with the publication of this draft determination. This will be followed by a period for representations about this draft determination from stakeholders. The new Water Industry Commission will publish the final determination of charges at the end of November. These charges will take effect from the beginning of April 2006.

Better explaining our approach

We have held a large number of stakeholder information days, which provided an opportunity for us to explain where we are in completing the Strategic Review of Charges. These sessions also allowed stakeholders to raise their concerns or issues with us.

Helping stakeholders to understand the answer

There are three important ways in which we can help stakeholders to understand the answer. Publishing all of the key inputs to the Review has been an important step. However, we have also endeavoured to present the answer in a way that allows stakeholders to understand what the answer means for them and for customers as a whole. We have also outlined our reasoning and made reference to the evidence that we have relied upon to come to our answer.

We also note comments from some commentators that they found that our reasoning in the last Strategic Review of Charges was not complete. We consider that this current Strategic Review of Charges provides sufficient information for all of the major findings of the review to be replicated.

Providing opportunities for comment

There are three main ways in which stakeholders have been given an opportunity to comment. These are the stakeholder information days, the publication of our proposed methodology, and the period for representations after publication of the draft determination. Each of these plays a valuable role in allowing us to hear the views of stakeholders.

Accountability

We believe that the strengthening of the regulatory framework in Scotland will help improve both actual and perceived accountability. The establishment of a Commission should depersonalise regulation – a Commission arriving at a joint decision is always likely to be considered more accountable than an individual with a similar power.

The proposal to give the Commission the power to determine charge limits within a policy framework set by

Ministers is welcome. This will ensure that authority and responsibility are aligned.

Proportionality

There has been a concern from some quarters (principally Scottish Water and the trades unions) that our analysis lacked proportionality. The assertion was that we had adopted regulatory tools from south of the border and blindly applied these in Scotland, taking little or no account of the maturity, geography and asset base or of the public sector nature of the water industry in Scotland. Similarly, there was a concern about how quickly we asked Scottish Water to narrow the efficiency gap.

We did explain our method for assessing how quickly Scottish Water should close the efficiency gap in some detail. Looking back, it may also have been helpful to re-emphasise the importance of spend to save in making our rate of catch-up less demanding.

In the Strategic Review of Charges 2006-10, we have paid particular attention to issues around comparability of companies, costs and levels of service. We have sought to set targets which are proportionate and which take full account of factors that would both increase or reduce the targets.

Other factors

There are two further factors that have had an impact on the Strategic Review of Charges 2006-10. These are changes to the regulation of trade effluent charges and the introduction of a Reporter. We discuss each of these in turn.

Trade effluent

To date, tariffs for trade effluent have not been included in Scottish Water's scheme of charges and we have not played any role in regulating them. Instead, Scottish Water, exercising powers under section 29(3)(j) of the Sewerage (Scotland) Act 1968 has set these charges. In practice this has meant that the total amount raised from customers in trade effluent charges has been limited to the difference between the agreed revenue cap and the amount raised from the tariffs approved in the scheme of charges.

The Water Services etc. (Scotland) Act 2005 provides for the Water Industry Commission to determine charges for all of Scottish Water's core services. As trade effluent is a core activity of Scottish Water, trade effluent charges are within these provisions. Consistent with that approach, the Act provides for the repeal of section 29(3)(j) of the Sewerage (Scotland) Act 1968, thereby removing Scottish Water's power to set trade effluent charges separately.

There are three types of waste water: surface water draining to sewers, foul sewage and trade effluent.

- Surface water refers to the rain water that drains from roofs, yards, pavements, roads and so on.
- Foul sewage refers to waste water (either household or non-household customers) from toilets and washing facilities (sinks, wash basins, showers, baths, etc).
- Trade effluent is liquid waste from industrial or other commercial activity. It can cover a wide variety of liquid waste. Trade effluent is more difficult to treat and can represent a hazard. Businesses must have the consent of the sewerage company before discharging trade effluent into public sewers.

Paying for trade effluent

Historically, trade effluent charges in the UK were based on the volume of the discharge. In 1976, the National Water Council and the Confederation of British Industry agreed the Mogden formula as a basis for trade effluent charges. This formula sought to increase the cost-reflectivity of the charges that were made for the treatment of trade effluent. The formula sets a higher charge for more concentrated effluent that will require a higher level of treatment.

As part of the Strategic Review of Charges 2006-10, we have consulted with trade effluent customers, appropriate representative bodies and Scottish Water about the appropriate way to regulate trade effluent charges. We have created a tariff basket for trade effluent services. This will increase the transparency of setting trade effluent charges.

Reporters

Successful regulation relies on high-quality information and analysis. This is especially true for the Strategic Review process where we will place high reliance on the accuracy of information provided to us by Scottish Water.

The agreement between this Office, Scottish Water and the Scottish Executive on the ten principles included the introduction of a Reporter.

There were five reasons why we wanted to appoint a Reporter.

- There was a need for an independent assessment of the quality and reliability of information provided by Scottish Water.
- We believed that a Reporter could assist in accelerating the improvement in information quality in Scotland.
- We believed that a Reporter could help Scottish Water ensure that proper processes for collecting, storing and using information were established.
- We believed that a Reporter could assist us in defining core and non-core activities and ensuring that the retail/wholesale split was robust.
- The Reporter system has been a key element in Ofwat's regulation of the water industry south of the border.

Conclusion

In the last five years we have established a strong foundation for regulation of the water industry in Scotland. Within this framework, Scottish Water has already reduced its operating costs by some 20% and, by the end of the current Review period, we expect that it will have reduced operating costs by 30% or £145 million annually in real terms. This improved efficiency will benefit customers on an ongoing basis if pressure is maintained in the longer term.

Chapter 3
The calculation of prices

Introduction

In this chapter we discuss how we have calculated the charges that customers will have to pay in the next regulatory control period.

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

- the costs that have to be recovered by Scottish Water;
- the way charges are calculated;
- how adjustments to charges 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 high-quality water and disposing of the waste water 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 2004 regulatory return, it would cost some £27 billion to replace all of the water industry's assets in Scotland. This is more than £5,000 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' were presented in two sections: 'Proposed principles of charging' and the 'Application of principles'. The consultation put forward proposals on the principles of charging in four areas:

- **Charging for services:** The Scottish Executive suggested that, subject to safeguards, customers should pay for the service they receive.
- **Harmonised charges:** The Executive suggested 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 proposed 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). This would appear to be consistent with the Water Framework Directive's requirements that charges for water should be cost reflective.
- **Making changes to charging structures:** The Executive proposed gradually to introduce changes in tariffs over a number of years.

The consultation also considered the application of the principles of charging. The following issues were addressed:

- **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 differentiated 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 also commissioned work to understand the nature and extent of any unintended cross subsidies. In the consultation, the Executive also sought views on how quickly any such cross subsidies should be unwound.

- **Household charging:** The Executive proposed 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 proposed 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 proposed to keep the total level of borrowing by Scottish Water broadly constant in real terms.

- **Funding expansion of the public networks:** The Executive set out proposals to share the cost of growth in the network between existing and future customers.

Our response to the consultation

We agreed 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 noted 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 welcome the clear guidance provided by Ministers in the Ministerial Guidance.

Depreciation

The effectiveness and value of assets decline 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: an infrastructure renewals charge and a standard depreciation charge on the non-infrastructure[14].

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 effect[15] 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

[14] It is possible that the introduction of international accounting standards would end the practice of levying an infrastructure renewals charge. In our calculation of prices we have adopted a prudent approach and not allowed the IRC to be deducted for tax purposes. We have allowed an appropriate capital allowance to be deducted. This significantly increases the tax payable.

[15] The portfolio effect is discussed in 'Principles of Corporate Finance' by Brealey and Myers, Seventh International Edition, 2003, McGraw-Hill, p.187 onwards.

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 would be difficult to implement. To overcome the problem, the industry has introduced infrastructure renewals accounting. Under infrastructure renewals accounting, an infrastructure renewals charge is charged to a company's revenue each year. The infrastructure renewals 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 used 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 fixed assets 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 have sought to minimise the exposure of Scottish Water's customers to these risks. One of the main ways in which we have reduced customers' exposure to risk in the public sector model is to move towards the regulatory capital value approach to price setting.

We are also keen to ensure that there are effective controls on access to borrowing. We 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. The Scottish Ministers agreed and made it clear in paragraph 21 of their Principles of Charging guidance that they would not increase lending to Scottish Water beyond the limits set in the final determination.

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, each utility has a licence to operate that requires it to meet standards of operation that are considered appropriate in terms of social, development, environmental, and public health policy objectives. The economic regulator takes account of all such issues that may arise from legislation or other government guidance when determining the outputs that are to be delivered, and then sets the charge limits accordingly. Thereafter, he depends on shareholder pressure to ensure that these are delivered as efficiently as management can achieve, and simply has to monitor performance to ensure that the defined standards are properly achieved.

In the public sector, the regulator has to assess the lowest reasonable overall cost of delivering the objectives set by the Scottish Ministers. He cannot rely on the presence of capital market forces to deliver efficiency. The duty of the new Water Industry Commission is to set charges such that the Ministers' objectives can be met at the lowest reasonable overall cost.

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.

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 9.8% (5.1%, real, post-tax)[16]. 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. Ofwat would only adjust prices if the 'shock' was outside the control of management

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 have therefore decided to set prices at this Strategic Review on the same basis as Ofwat, using 2003-04 as our base year. In setting the allowed level of operating costs in the early years of the next regulatory control period, we have taken account of the level of performance that Scottish Water has indicated that it will achieve in its business plans. We have made adjustments to the RCV to reflect the slower than expected delivery of the Quality and Standards II

[16] Future water and sewerage charges 2005-10: Final Determinations, p.41.

investment programme in order to ensure that customers are not disadvantaged.

Ministers have now undertaken not to increase borrowing beyond the levels set in the final determination[17].

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

The role of the new Commission is to set charges that are sufficiently high – but no higher – to ensure the sustainable delivery of the objectives for industry set by the Scottish Ministers. We have therefore scrutinised 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 used 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 objectives set out in the Ministerial Guidance[18].

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

In calculating charges for customers, we used tariff baskets to divide the identified revenue requirement between customer groups. These tariff baskets have taken account of the February Ministerial Guidance.

The RCV method of price setting

At this review we have moved towards the RCV method of price setting. We introduced a regulatory capital value 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.

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 charges.

The revenue that we allowed Scottish Water was calculated as follows:

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

We have set revenue such that Scottish Water will comply with all the cash-based financial ratios (used by Ofwat in its 2004 price determinations) if it meets the terms of its regulatory contract in full. We discuss these ratios in more detail below.

The product of the RCV and the allowed rate of return gives 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 takes 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 scope of activities delivered.

[17] Points 20 and 21 of the Minister's February Guidance on the principles of charging outline this commitment in detail.
[18] See the Scottish Executive's consultation document, 'Investing in water services 2006-10'.

We 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 renewals 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 have scrutinised these costs carefully. We have allowed PPP costs in full and have added an extra allowance to reflect the required investment identified at PPP sites.

One important feature of the regulatory capital value 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 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. The RCV will increase in line with the profile that is established at the start of the regulatory control period.

The introduction of charge caps

In this Review, we have determined a series of charge caps rather than a general cap on revenue. We believe that introducing a charge cap is in the general interest of customers and is in line with the new regulatory framework. A charge cap largely insulates customers from the impact of changes in the customer base or volumes of consumption during a regulatory period. We have translated the required revenue into a series of charge caps for our tariff baskets. The weightings of these tariff baskets reflect the guidance that we received from Ministers following their consultation on the principles of charging.

Customers will now be better placed to understand the maximum charge that they are likely to have to pay by looking at their use of the water and sewerage service and the charge 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 interests of customers of the core business. We are now required to distinguish between Scottish Water's core and non-core functions. The Water Services etc. (Scotland) Act 2005 also required 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 have adopted the practice of other regulators by asking Scottish Water to complete regulatory accounts.

In particular we have adopted Ofwat's regulatory accounting guidelines (RAGs) as the basis for our regulatory accounting guidelines. Where we have amended or developed these guidelines for application in Scotland we have done so simply to ensure that they are fully consistent with Scottish Water's statutory duties. However, in so doing, we have endeavoured to ensure that they remain as consistent as possible with the original Ofwat guidelines. This is important to our detailed comparison of the financial performance of the industry in Scotland.

Financial modelling

We built a financial model to allow us to calculate the revenue that Scottish Water requires to carry out its core functions. We have also used a tariff basket model, which translates the revenue collected from customers to the tariffs they will pay.

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

Input information

The financial model requires robust and detailed information. We provided Scottish Water with the input tables for the financial model as 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 have used three indexes to measure inflation, namely:

- the Retail Price Index for setting charge caps and the calculation of the nominal cost of capital;
- the Consumer Price Index for all other non-asset costs; and
- the Construction Output Price Index, to assess the impact of increases in prices on investments.

Other assumptions we made are outlined in Table 3.1 below:

Table 3.1: Other assumptions in the financial model

Title	Assumption	Value
Trade debtors	Number of days	27
Stocks	Percentage of operating expenditure excluding PPP	1.5%
Prepayments and accrued income	Percentage of revenue	5.5%
Other debtors	Percentage of revenue	2.5%
Trade and capital creditors	Percentage of capital expenditure	25.6%
Accruals and deferred income	Percentage of operating expenditure including PPP	28%
Other creditors	Percentage of operating expenditure including PPP	8%

Financial ratios

One of the key considerations of our modelling was the financial sustainability of Scottish Water. The model automatically calculated key financial ratios. Our move towards the regulatory capital value method of price setting has allowed us to make direct comparisons of Scottish Water's financial sustainability with that of the companies south of the border. We have compared Scottish Water's financial ratios with those used by Ofwat in its last two price reviews.

Charge caps have been set to ensure that Scottish Water is placed on a sound financial footing. This should minimise the financial risks to customers.

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 3.2.

Table 3.2: 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 years	Max 5 years	Max 5 years
Debt payback period (EBDA Basis)	Max 7 years	Max 7 years	Max 7 years
Cashflow to capital expenditure ratio (EBDA Basis)	Min 40%	Min 40%	Min 40%

In 'Future water and sewerage charges 2005-10: Final limits', Ofwat outlined the financial indicators that it has used to set prices for the next regulatory control period. Table 3.3 shows these ratios.

Table 3.3: Ofwat's 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 adopted these financial ratios after detailed consultation with both the Credit Rating Agencies and the financial markets. The target value of the ratios was set at a level that was consistent with a company maintaining 'investment grade' status for its debt.

How we have used these ratios in the Strategic Review of Charges 2006-10

Where Ofwat has stated that a target is 'around' a certain level, we have assumed that the ratio for Scottish Water should be within 25% of the target. We have adjusted price limits in 2009-10 to ensure that Scottish Water remains compliant with each of these cash-based ratios.

We are also publishing the two debt payback period ratios and the cash flow to capital expenditure ratio that Ofwat used for the 2000-05 regulatory period. It is desirable that Scottish Water should broadly comply with these guidelines. However, we have not changed charge 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

We consulted on our approach to establishing the initial RCV for Scottish Water as part of our methodology consultation. We explained that 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 by making a comparison with the RCV of a similar company.
- **A discounted cash flow approach** – the RCV is calculated by using financial valuation techniques.

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

We wanted the RCV to be sufficient to ensure that if Scottish Water met its obligations under its regulatory contract, then it would comply with all of the targeted financial ratios in 2009-10. The initial RCV was calculated based on the investment programme delivered, our inflation expectations and our allowances for depreciation.

The 2009-10 RCV will be rolled forward in all future regulatory control periods.

We checked this initial RCV with a range of comparisons including:

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

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

This analysis showed that the initial RCV was reasonable.

Setting the allowed rate of return

In the private sector, a regulator sets an allowed rate of return. 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 (a weighted average cost of capital) 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 out-performs 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 3.1.

Figure 3.1: Post-tax weighted average cost of capital

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

Where:

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

The investor is 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 3.2.

Figure 3.2: Formula for calculating the real rate of return

Real rate of return =
nominal rate of return – 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 the cost of 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 have needed 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 could not 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.

Our approach

We decided to apply a modified version of the WACC approach. We combined 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 was analysed over a 10 and 20 year period with reference to index-linked gilt securities. The pre-tax allowed rate of return on the customer retained earnings was set at the post-tax allowed rate of return for debt. In real terms this rate is low. Valuing customer retained earnings in this way has replicated within a public sector capital structure the equity buffer that protects customers south of the border from operational or legislative shocks[19].

An additional advantage of this approach is that there is no incentive for Scottish Water to seek to change its current ratio of debt to regulatory capital value. If the

[19] This issue is discussed in detail in Chapter 4.

return on the customer retained earnings had been greater than the return on debt, Scottish Water would have had an incentive to pay down debt. In contrast, if the return on the customer retained earnings had been lower than the return on debt, Scottish Water would have had an incentive to take on more debt.

This approach should make the monitoring of Scottish Water's performance against the financial ratios more straightforward.

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 was central to our determination of Scottish Water's revenue requirement, it was important that the initial RCV that we established was adjusted appropriately to reflect asset use and additions.

Figure 3.3: Calculation of required revenue

> **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

The key role of the RCV in charge setting is to reflect the value in use over the long term of the physical assets used to provide a service to customers. When Scottish Water makes an investment in its assets this is 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 have therefore added only appropriate and efficiently procured capital investment to the RCV.

Treatment of depreciation

The role of depreciation is a little more complicated. It affects charges in two ways:

- It was 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 reduces the amount of return allowed in Scottish Water's revenue requirement.

- The expected depreciation charge was added to the cash return and operating costs to determine the revenue requirement.

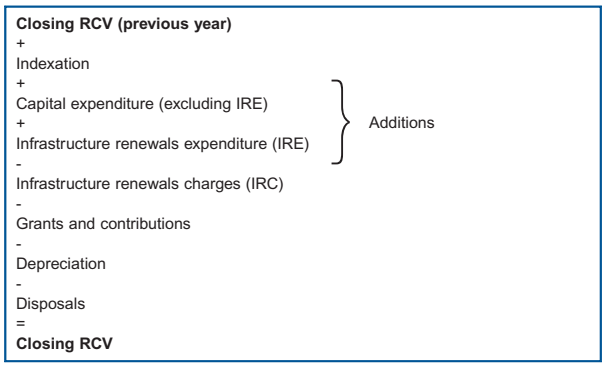
Depreciation therefore influences Scottish Water's revenue requirement both directly and indirectly (by affecting the level of return).

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 have set the level of efficient new investment and the appropriate depreciation charge. We would adjust the RCV before the next regulatory control period to reflect any extra or inefficient investment.

Figure 3.4 outlines how the change in the RCV is calculated for each year of the regulatory control period.

Figure 3.4: Rolling forward the 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 expected 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 charge caps or revenue caps for the next regulatory control period.

In order to set charge 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.

Ofwat uses two mechanisms to adjust the regulatory price settlement in the event that assumptions made at the price 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 change in the regulatory framework to create a Water Industry Commission with a power to determine charges makes it necessary to introduce both the possibility of an interim determination and the logging up and down process. This ensures 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.

What are 'interim determinations'?

An interim determination is a reconsideration of a company's charge 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 price review, it can notify the 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. We have set out our approach to interim determinations and our notified items in Volume 7.

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 charges only in the next regulatory period.

Charge caps and tariff baskets

We established tariff baskets to cover the core services provided by Scottish Water. The use of tariff baskets also helps to ensure that the principles of charging determined by Scottish Ministers are applied in a transparent way. In addition, they bring the charge setting process more into line with the other utility regulators in the UK, such as Ofgem and Ofwat.

The detail of the tariff baskets is available on our website. This gives customers better access to information about bills and will help strengthen the regulatory regime.

Table 3.4 presents a summary of Scottish Water's tariffs.

Table 3.4: 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 household	✓		
Metered household	✓		✓
Unmetered non-household	✓	✓	
Metered non-household	✓		✓
SEWERAGE			
Unmetered household			
Waste water (including foul and surface water drainage)	✓		
Metered household			
Sewage	✓		✓
Surface water drainage	✓		
Unmetered non-household			
Sewage	✓	✓	
Surface water drainage		✓	
Metered non-household			
Sewage	✓		✓
Surface water drainage		✓	
Trade effluent	✓		✓[20]

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-household 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 tariffs. 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.

[20] Trade effluent is charged for using both volume and strength.

Table 3.5: 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 scrutinise very carefully any material divergence in tariff changes within a basket.

Changes in the current balance of tariff baskets have been made to reflect the outcome of the Scottish Executive's consultation, 'Paying for water services 2006-10' and the Ministerial Guidance which we received in February 2005.

Our 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 describe our proposed tariff baskets in detail in Volume 7 of this Strategic Review of Charges 2006-10.

There are ten separate tariff basket items:

- household unmeasured water;
- household unmeasured waste water;
- non-household unmeasured water;
- non-household unmeasured waste water;
- measured water (20mm connection);
- measured water (25mm connection and above);
- measured waste water (20mm connection);
- measured waste water (25mm connection and above);

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

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. We have therefore included large customers 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 have developed our use of standard customers so that customers can better understand 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 household 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 120,000 non-household 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 3.6 shows the standard customer descriptions that we used in the Strategic Review of Charges 2002-06. It also shows the new name for these customers for the Strategic Review of Charges 2006-10.

Table 3.6: Standard measured customers used at the 2002-06 & 2006-10 Reviews

Strategic Review of Charges 2002-06	Strategic Review of Charges 2006-10	Water		Sewerage		
		Meters (no x size (mm))	Volume (m^3)	Meters (no x size (mm))	Volume (m^3)	Rateable value
Newsagent	Convenience store	1 x 20	30	1 x 20	28.5	£5,000
Garage	Garage	1 x 20	100	1 x 20	95	£10,000
Restaurant	Large restaurant	1 x 20	500	1 x 20	475	£100,000
Commercial	Large office	1 x 25	900	1 x 25	855	£750,000
Retail	Retail group	2 x 20 20 x 25 1 x 35	4,500	2 x 20 20 x 25 1 x 35	4,275	£1,700,000
Food manufacturer 1	Food manufacturer 1	2 x 25 1 x 80	50,000	2 x 25 1 x 80	47,500	£100,000
Food manufacturer 2	Food manufacturer 2	2 x 25 1 x 50 1 x 100	100,000	2 x 25 1 x 50 1 x 100	95,000	£260,000
Manufacturing	Large manufacturer	1 x 150	175,000	1 x 150	166,250	£1,225,000
Brewers	Brewers	2 x 25 1 x 100 1 x 150	600,000	2 x 25 1 x 100 1 x 150	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 have included four unmeasured non-household customers in our list of standard customers, as shown in Table 3.7.

Table 3.7: 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 suggested that metered customers were reasonably well represented within the existing standard customers. We therefore added only four additional standard customers. The additions are outlined in Table 3.8.

Table 3.8: Additional standard metered customers

Name	Water		Sewerage		
	Meters (no x size (mm))	Volume (m^3)	Meters (no x size (mm))	Volume (m^3)	Rateable value
Warehouse	1 x 20	10	1 x 20	9	£500
Large house	1 x 20	110	1 x 20	104	Band H
High School	1 x 25	2,000	1 x 25	1,900	£18,000
Hotel	1 x 50	15,000	1 x 50	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 are shown in Table 3.9.

Table 3.9: Additional standard trade effluent customers

Name	Volume		Load		Average strengths	
	Annual (m^3)	*Daily (m^3)*	*Total suspended solids (kg/day)*	*Biological oxygen demand (kg/day)*	*Total suspended solids (mg/l)*	*Settled chemical oxygen demand (mg/l)*
Bakery	200	0.55	0.5	0.75	575	1,600
Clothing manufacturer	12,000	32.9	1	1	20	300
Abattoir	90,000	246.6	150	250	600	1,500
Electronics business	550,000	1507	15	50	10	75
Printers	10,000	27.4	5	40	100	2,500
Distillery	150,000	411.0	7	55	15	200

Method for setting retail and wholesale charges

The changes to the competition framework contained in the Water Services etc. (Scotland) Act 2005 allow new entrants to obtain a licence to provide retail services to non-household customers. These new entrants would be retail specialists who would buy water and sewerage services wholesale from Scottish Water. To determine the appropriate overall level of wholesale charges we first needed 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 view is that retail activities include all matters relating to:

- retail pricing and tariffs;
- the billing process;
- collection of charges;
- debt follow up and debt management;
- meter reading and customer meter operations;
- 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;
- marketing;
- managing connection/disconnection process;
- scheduling septic tank emptying; and
- supporting wholesale emergency responses.

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 3.5: Scottish Water's value chain

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

Possible approaches to setting wholesale prices

We considered four approaches to setting the overall level of wholesale charges:

- the efficient component pricing rule;

- the long run marginal cost approach;
- accounting approaches; and
- comparator approaches.

We have used the accounting approach.

The accounting approach

We decided to use our regulatory accounts to define the accounting costs of the wholesale and retail businesses. These accounting costs 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 have also attempted to analyse other network utility industries that have wholesale and retail activities to confirm our setting of charge caps. 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.

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 2003.

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 household customers, current legislation[21] 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.

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-household (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.

[21] 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.

Chapter 4
The scope for operating cost efficiency

Introduction

The role of this Office, as economic regulator, is to set a regulatory framework that provides incentives to Scottish Water to achieve efficiencies and improve customer service.

In this chapter we explain:

- how the regulatory regime can create incentives to improve performance;
- how we have determined the level of operating costs that Scottish Water should be allowed to incur; and
- how best to ensure that customers receive an appropriate level of service.

Incentive-based regulation

Regulation seeks to limit the power of a natural monopoly and ensure that it acts in the customer interest. Regulation ensures that the monopoly:

- restrains charges, by setting charge or revenue limits; and
- delivers acceptable levels of customer service.

Providing incentives through regulation

We believe that price cap regulation (RPI-X) is the most applicable form of regulation to the current position of the water industry in Scotland. The RPI-X approach is widely used in the regulation of utilities in the UK. Using this approach in Scotland allows more direct comparison with the industry in England and Wales. This is important as it is through benchmarking the performance of Scottish Water with other water companies that we can determine the extent of efficiencies that are possible.

In the context of regulated utilities, incentive regulation has been defined as "the use of rewards and penalties to induce the utility to achieve desired goals where the utility is afforded some discretion in achieving goals[22]."

In the case of the water industry, the "desired goals" would include:

- keeping charges to customers as low as possible;
- meeting environmental and water quality objectives;
- delivering the required investment programme;
- maintaining the long-term sustainability of the industry; and
- meeting customer service targets.

As part of its 2004 price review[23], Ofwat listed the general criteria that it considered should apply for incentive mechanisms. Ofwat stated that the mechanism should:

- be in the long-term interests of customers;
- offer meaningful and worthwhile rewards for genuine out-performance;
- offer adequate penalties for under-performance;
- provide timely rewards and penalties;
- stimulate continuous improvements;
- be known in advance;
- be straightforward in concept;
- follow simple rules;
- be simple to apply; and
- avoid retrospective changes.

We believe that these criteria are as relevant to the public sector as to the private sector water industry. Our use of the RPI-X mechanism would seem to be consistent with these criteria.

22 Lewis, Tracy and Garmon, Chris 'Fundamentals of incentive regulation'. PURC/World Bank International Training Program on Utility Regulation and Strategy, June 1997.
23 Ofwat, 'A further consultation on incentive mechanisms: Rewarding future outperformance and handling underperformance of regulatory expectations', June 2003.

Table 4.1: Criteria for an effective framework for incentives

Criteria	How well does RPI-X fit the criteria?
In long-term interests of customers	Good. It is widely agreed that RPI-X works well in incentivising firms to improve efficiency in operation and investment. There are risks that firms may seek to cut corners in service delivery, but proper scrutiny from regulators and customer committees should reduce this risk.
Meaningful and worthwhile rewards for genuine out-performance	Good. Regulated companies in the UK have improved their efficiency. This suggests that regulated firms believe the benefits to be worthwhile. The context of 'rewards' for a public sector company may be different.
Adequate penalties for under-performance	We are not aware of any evidence that shows that the penalties for under-performance are inadequate.
Timely rewards and penalties	Acceptable. A regulatory period of four to five years ensures that the incentive framework can reward (or penalise) managers who are responsible for out-performance (or underperformance). The period is not so long that there is an inordinate delay in transferring the benefit to customers.
Stimulate continuous improvements	Good. This can be further enhanced by implementing a rolling incentive mechanism.
Known in advance	Good. The targets for the regulatory period are set out in advance. The mechanism is well understood by all stakeholders.
Straightforward in concept	Good. The concept is relatively straightforward. Companies are motivated to meet and beat the targets set by the regulator.
Simple rules	Acceptable. In its initial form, simplicity was one of the merits of the framework. However, the rules have inevitably become increasingly complicated.
Simple to apply	Acceptable. No new information, which is not already collected either during the initial price setting or through ongoing monitoring, is required. The rules are well documented.
Avoid retrospective changes	The incentive framework relies on consistency and transparency. These are two of the Better Regulation Task Force Principles that we have adopted.

Some commentators have suggested that RPI-X promotes short-term planning by utilities instead of encouraging the long-term investment planning that could sustain efficiency improvements and would be more beneficial to customers. We agree that there is a risk that regulated companies are likely to maximise their short-term performance. It would be desirable to ensure that regulated companies planned for the long term. We consider that transparent and consistent regulation are likely to be at least as important as other potential regulatory actions. We have also adapted our approach to setting the allowed level of capital expenditure to reduce the risk of a short-term view being taken by Scottish Water.

Our view is that there needs to be a balance between short-term and long-term pressures. It is important to both customers and to the service provider that we are clear about the long-term prospects for prices. It is equally important, however, that there is a current pressure to deliver value for money to customers. On balance, we believe that RPI-X does work in the customer interest. If the regulator monitors service levels and asset condition and performance effectively, he can reduce the risk that a company seeks short-term benefits and stores up problems for the future. Regulatory consistency and transparency are essential, but so too is the strength of the regulatory framework. The regulated company must believe that the regulator can and will apply incentives or penalties.

Employee incentives

It is important that the benefits of any out-performance encouraged by RPI-X regulation are shared appropriately between the various stakeholders.

Our second open letter to Scottish Ministers explained our suggestion that if Scottish Water out-performed its regulatory contract there could be scope to reduce customers' charges before the end of a regulatory control period. We intend to comment on Scottish Water's performance in our three annual reports. Our view is that employee incentives should be closely tied to performance against the regulatory contract.

The detailed nature and scope of incentives for management and employees is clearly outside our remit. However, the potential benefits to customers of improved and sustained performance are important considerations for this Office. From a customer perspective, we believe that incentives should be designed to encourage exceptional performance. Management bonuses should also be seen to reflect improvements in the value for money that is achieved for customers. The best way of achieving this would be for customers' bills to be reduced to reflect better than expected performance.

This is not without precedent in quasi-public, regulated organisations. Two examples of other benefit sharing schemes indicate the scope of what is possible.

Glas Cymru[24]**:** the remuneration of Glas Cymru's executive directors is designed in such a way that a high proportion of the maximum potential pay is linked

[24] Source: Interim statement of Glas Cymru policy for the remuneration of directors, Glas Cymru Cyfyngedig Annual Meeting (2001).

directly to company performance. Half of the maximum bonus is based on financial performance (measured by growth in financial reserves) and the other half is based on how well the company delivers services to customers.

Network Rail Limited[25]**:** Network Rail's Management Incentive Plan (MIP) is designed to: "*create the potential to reward outstanding performance based on individual contribution and the overall success of Network Rail in meeting the objectives of the Business Plan.*"[26]

Setting the allowed level of operating costs

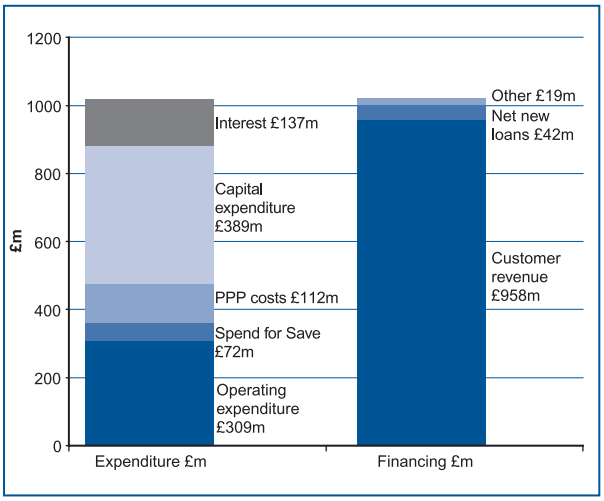
Operating expenditure comprises day-to-day running costs such as employment costs, electricity, materials, hired and contracted costs, local authority rates, insurance, software licences and vehicle running costs. Bad debt is also regarded as a running cost.

We do not include the following in operating costs:

- maintenance of the asset base;
- depreciation;
- infrastructure renewals charge; and
- costs of Public Private Partnership schemes.

Operating expenditure accounts for some 30% of revenue. This is illustrated in Figure 4.1, which shows that in 2003-04, Scottish Water's operating expenditure was £309 million.

Figure 4.1: Scottish Water expenditure and funding 2003-04



We collect information about the operating costs incurred by the water and sewerage service undertakers in the UK using a consistent breakdown of operating expenditure. This facilitates comparisons with other water and sewerage companies.

Underlying operating expenditure

In order to ensure that our comparisons are objective and fair, we exclude one-off items of expenditure that can affect reported operating expenditure. Examples would include:

- the costs of abnormal pension contributions;
- redundancy payments;
- rates rebates; and
- unusual weather conditions.

Base service operating expenditure

The baseline level of operating expenditure is the expenditure incurred in the base year. We apply future efficiency targets to this baseline. We have used the following process to set the baseline level of operating costs for the draft determination:

[25] Source: Management Incentive Plan Statement – 2002-03, Network Rail Limited.
[26] Ibid.

- We used the 2003-04 statutory accounts and June Return information to establish the total level of Scottish Water's operating expenditure in that year.
- We identified exceptional and atypical costs and subtracted them from total operating expenditure. This allowed us to establish the normal ongoing costs of running the business.

Finally, we assessed whether there was anything unusual about Scottish Water's cost allocation in 2003-04. We compared Scottish Water with the companies in England and Wales to ensure that its cost allocation practices are consistent with those in England and Wales. If necessary, we made appropriate adjustments to Scottish Water's operating expenditure.

The new Water Industry Commission will publish the final determinations in November 2005. It will have information for 2004-05 at that stage, and will revise its assessment of the baseline using information for 2004-05.

New operating expenditure

Scottish Water incurs 'new' operating expenditure to deliver improvements in:

- environmental standards;
- drinking water standards;
- levels of service to customers; and
- the supply/demand balance.

Such new operating costs are added to the baseline that we described above.

We used the same criteria to assess the level of new operating costs as in the Strategic Review of Charges 2002-06. These are as follows:

- Does the expenditure result in a level of service that exceeds the reported norms for England and Wales, or enable significant additional sewage treatment?
- Is Scottish Water required to provide this additional level of service, and for what reason?
- Has Scottish Water carried out a proper assessment of the proposed new operating expenditure, rather than relying on estimates from contractors/ manufacturers or on an arbitrary percentage of the capital cost?
- Has Scottish Water demonstrated management challenge and control over the proposed costs?
- Has Scottish Water compared alternative options on a whole life cost basis, within a project appraisal?
- Have full net present value calculations been provided?
- Do the alternative options include different mixes of operating expenditure and capital investment?
- Has Scottish Water quantified potential savings to baseline operating expenditure which arise from upgrading works or systems, and offset increases in new operating expenditure accordingly?

Like-for-like comparison

In order to make reliable like-for-like comparisons we need to understand the factors that can influence the level of costs incurred by the water and sewerage companies in the UK. These can typically be divided into those that are broadly controllable by management and those that are outside the control of management. These factors are called 'internal' and 'external' factors respectively.

It is possible to identify a number of external factors that affect the costs of the water and sewerage industry. They include the following:

- difficulty of operating environment (eg population density, topography, types of water source, etc);
- customer mix;
- customer requirements (resolving complaints, etc);

- environmental requirements (eg leakage levels, sewage effluent standards, etc);
- volumes (water consumption, peak use, sewage loads);
- nature of the assets operated and maintained in the short to medium term (size, mix, performance);
- regional variations in charges for local authority rates, water abstraction and sewage discharges;
- regional variations in services such as mains diversions and sewer diversions ('third party' services); and
- regional variations in market rates for salaries, electricity or other costs.

We can also identify a number of factors that are within the control of management. They include the following:

- the organisation's remuneration policy;
- the organisation's policy regarding the use of permanent or temporary employees;
- the organisation's policy regarding purchasing and stocks of materials and consumables;
- the organisation's policy regarding hired and contracted services, for example the use of lawyers and consultants; and
- in the long term, the nature of the assets operated and maintained (size, mix, performance) – over time, water and sewerage service providers can change the assets they own and operate, either by building new ones, decommissioning old ones or making changes to existing assets to modify the way in which they operate.

Calculating relative efficiency

In order to make objective comparisons we need to take proper account of the external factors that influence the level of costs of each company. We use two separate benchmarking models to allow us to assess the relative efficiency of the water and sewerage companies.

The models allow us to compare the actual costs incurred by a water and sewerage company with a predicted level of costs from our benchmarking models. The difference between the predicted and the actual level of costs is an indicator of the relative efficiency of the company. We adjust these results so that the average level of predicted costs is 100. The results for other companies have been adjusted in a similar way. Those with results which are lower than 100 are relatively efficient, while companies with scores higher than 100 are relatively inefficient.

Ofwat's methods of benchmarking

Ofwat uses econometric modelling to establish a relationship between the costs incurred by the companies and a number of cost drivers. These cost drivers take account of both engineering and economics. Ofwat developed these models jointly with Professor Mark Stewart of Warwick Business School in the early 1990s. They have subsequently been updated and improved.

The Competition Commission concluded that this methodology was sound in August 2000, following a detailed review, and in January 2000 Ofwat's approach earned wide endorsement as an example of best practice from the Performance and Innovation Unit of the UK Government Cabinet Office.

In January 2004, Ofwat published a revised suite of models for comparing operating expenditure. The 2004 models have been re-estimated using 2002-03 information from the companies south of the border and have been used as part of Ofwat's 2004 price review. There are nine models for operating expenditure[27]:

- water resources and treatment;
- water distribution;
- water power;

[27] There are eight econometric models for assessing capital maintenance efficiency, hence the 17 models referred to by the Performance and Innovation Unit in its report.

- water business activities;
- sewer network;
- large sewage treatment works;
- small sewage treatment works;
- sludge treatment and disposal; and
- sewerage business activities.

The purpose of each model is to establish a relationship between the costs reported by the companies and external cost drivers. The models themselves take different forms. These are summarised in Table 4.2.

Table 4.2: Summary of econometric models and explanatory factors

Model	Model type	Explanatory factors
Water resources and treatment	Linear model for unit cost	Population, number of sources, distribution input, proportion of supplies from rivers.
Water distribution	Log unit cost	Population, proportion of total mains length with diameter >300mm.
Water power	Log linear	Distribution input, average pumping head.
Water business activities	Log linear	Number of billed properties.
Sewer network	Log linear	Sewer length, area, resident population, holiday population.
Large sewage treatment works	Log linear	Total load, use of activated sludge treatment, tight effluent consent for both suspended solids and BOD5.
Small sewage treatment works	Unit cost	Works size, works type, load.
Sludge treatment and disposal	Unit cost	Weights of dry solids, disposal route.
Sewerage business activities	Unit cost	Number of billed properties.

We explain our use of the Ofwat econometric models in Chapter 8 of Volume 6 of this draft determination. We also describe modified Ofwat models in Chapter 9. We have reworked these models to include information on Scottish Water's assets, customer base and costs.

The alternative model

At the time of the last Review we developed an alternative model to assess the efficiency of the water industry in Scotland. This model was used to check the results of the Ofwat econometric models. We were aware that the Competition Commission had concluded that, although the Ofwat econometric models were robust, alternative models could have a place in efficiency analysis.

In developing an alternative model we took particular care to use a different approach to Ofwat's econometric models so that the alternative model could provide an independent check on the results given by Ofwat's models.

The alternative model splits the water and sewerage business into ten different activities:

- water abstraction and treatment;
- water distribution;
- business activities (water);
- bad debt (water);
- sewage collection;
- simple sewage treatment;
- complex sewage treatment;
- processing sludge;
- business activities (sewerage); and
- bad debt (sewerage).

For each of these activities, we determine the principal factors that would affect comparisons of operating costs between Scottish Water and the water and sewerage companies in England and Wales.

We identified appropriate drivers for the costs that cannot be controlled by management. Tables 4.3 and 4.4 set out the cost drivers (for water and sewerage respectively) that we identified for each activity.

Table 4.3: Alternative model: cost drivers by activity for the water service

	Cost drivers used in the model, associated with each activity				
Activity	**Assets operated**	**Asset attribute**	**Customers served**	**Volume**	**Other**
Abstraction and treatment	Impounding reservoirs and lochs	Number and average size of each asset type	-	Annual distribution input[28]	Average pumping head[29] in abstraction and treatment
	Burns and springs				
	River abstractions				
	Boreholes				
	Water treatment works				
Distribution	Water mains	Length of network	Resident connected population	Annual distribution input	Average pumping head in the distribution system
	Water pumping stations	Number and average size of each asset type			
	Service reservoirs and towers				
Business activities	-		Number of billed water customers – household (unmeasured, metered) non-household (unmeasured, metered)		Annual number of water samples taken
Bad debt					Annual revenue billed

Table 4.4: Alternative model: cost drivers by activity for the sewerage service

	Cost drivers used in the model, associated with each activity				
Activity	**Assets operated**	**Asset attribute**	**Customers served**	**Volume**	**Other**
Sewage collection	Sewers	Length of network	Resident connected population	Volume per head	Size of area served
	Pumping stations	Number and average size			
	Storm overflows	Number			
Simple sewage treatment	Sea outcrops – unscreened – screened	Number and average size		Load[30] treated	
	Preliminary treatment works				
	Primary treatment works				
	Public septic tanks	Number			
Complex sewage treatment	Secondary treatment works – using activated sludge process – using biological process	Number and average size		Load treated	
	Tertiary treatment works – using activated sludge process – using biological process				
Processing sludge				Tonnes disposed (dry weight)	Disposal route (landfill, farmland, incineration, other)
Business activities			Number of billed sewerage customers – household (unmeasured, metered) – non-household (unmeasured, metered)		Number of sewage samples taken
Bad debt					Annual revenue billed

We used information from Scottish Water and the water and sewerage companies about each of these cost drivers. The model also takes account of economies of scale. We do this by calculating the number of 'standard assets' that each company has. The standard assets take account of the size and operating costs of the companies' assets.

28 Distribution input is the volume of water put into supply (including all leakage).
29 Average pumping head is the average lift through pumping of water put into supply. Pumping takes place as part of the abstraction and treatment processes, and within the distribution system, where treated water is provided to customers.
30 Sewage load is a measure of the amount of treatment that is required to make sewage safe for the environment.

The purpose of making adjustments to reported costs

It was important for us to consider the results of the Ofwat, modified Ofwat, and the alternative modelling approaches very carefully. Our models cannot take account of all of the external factors that influence cost. These factors may either increase or decrease the level of cost.

We needed to take account of all of these differences. For that reason, we asked Scottish Water to draw to our attention all factors (those not included in the models) that influence cost. This should include factors that both increase and decrease cost.

We want to ensure that our efficiency targets neither unduly penalise nor reward Scottish Water. Some commentators have argued that it is unfair to draw comparisons between Scottish Water's performance and that of the privatised water and sewerage companies in England and Wales. In particular, they question the application of Ofwat's econometric models in Scotland[31]. We believe that the fact that the Ofwat models have been successfully applied to companies as different as Thames[32] and South West Water[33], and to both large water and sewerage companies[34] and small water only companies[35], confirms that the models can reasonably be applied in Scotland. While we needed to take into account some special factors this did not invalidate the modelling process.

Commentators who question our benchmarking process cite the following differences between the industry in Scotland and that south of the border:

- Scotland's geography (its size, remote islands, long coastline and topography);
- its population settlement patterns (remote communities, concentrated dense urban areas);
- the extent of the assets required to serve customers in Scotland (long mains, small isolated treatment works);
- the quality of the assets inherited by Scottish Water (condition and performance of the mains, sewers, treatment works, pumps);
- the nature of the customer base;
- the fact that Scottish Water is in public ownership (political interest, Scottish Water's duty to Scotland, remit and freedom of management); and
- the short time that Scottish Water has had to mature and improve.

We first made what we believe were appropriate adjustments to the results of the models. To justify any further adjustments, we asked Scottish Water to provide evidence in the following areas to which we have had regard:[36]

- What is the justification for the special circumstances which demonstrates a material difference from industry norms? Scottish Water was required to set out whether the factors are the result of special obligations, the character of all or part of its customer base, or the result of historical development of the water and sewerage systems in its area of supply.
- What is the quantification of the impact of the special factors that demonstrate a net additional effect on Scottish Water's costs, over and above that which would be incurred without these factors?
- What has Scottish Water done to manage the additional costs arising from the special factors and to limit their impact?
- Are there other special factors that reduce costs relative to industry norms? If so, have these been quantified and offset against upward cost pressures?

31 See, for example, J Findlay, 'Financing the Scottish water and sewerage industry', paper to the Scottish Trades Union Conference, April 2004.
32 Thames Water covers the London area.
33 South West Water covers Devon and Cornwall.
34 Thames Water has some 12 million customers.
35 For example, Bournemouth & West Hampshire Water which covers just the water service for the Bournemouth area.
36 These questions are adapted from Ofwat's letter to Regulatory Directors, RD35/98, 1998.

Assessing the size of the efficiency gap

The term 'efficiency gap' refers to the difference between Scottish Water's actual reported operating costs and the costs reported by the comparator companies for providing a similar level of service. We had to distinguish between the efficiency gap that exists today and the gap that could exist in the future, as the companies in England and Wales are likely to continue to improve.

The efficiency gap is the difference between Scottish Water's actual costs and its adjusted predicted level of costs. We convert these differences to a relative scale in order to be able to complete the benchmarking. We call this the efficiency score. An example is presented in Table 4.5 below.

Table 4.5: Example illustrating how the efficiency score is calculated

	Adjusted observed £m	Predicted £m	Adjusted residual		Efficiency score
			£m	%	
A water & sewerage company	200.00	155.00	45.00	29.03%	129.03

In this example, a company has reported operating costs of £200 million, after adjustments. The econometric models predict costs of £155 million for this company. It is therefore relatively inefficient. We first calculate the residual in percentage terms:

$$100\% \times 45/155 = 29.03\%$$

The last step in the comparison process is to rebase efficiency scores such that the average efficiency score of companies south of the border is 100. This simplifies the presentation of a company's score.

Assessing the future efficiency gap

The efficiency of the comparator companies in England and Wales continues to improve. We have taken account of the way in which the performance of the companies south of the border is likely to change over the next regulatory control period. Otherwise customers in Scotland may have to pay more than is necessary.

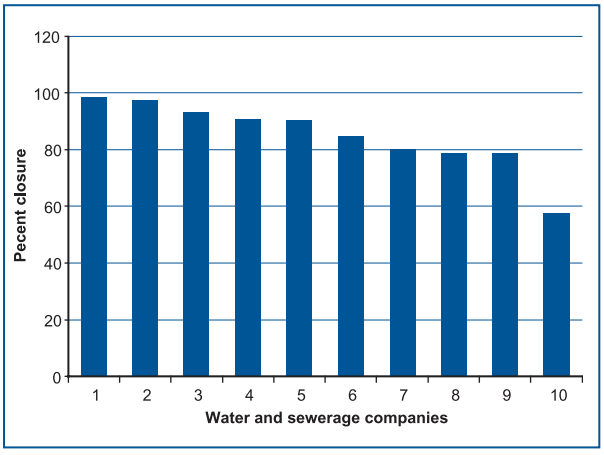
Ofwat published final targets and incentives in November 2004. This has informed our assessment of the scope for improvement by Scottish Water over the period 2006 to 2010. We have set an allowed level of operating cost that takes account of the improvements that Ofwat has required the companies south of the border to achieve.

Rate of improvement in efficiency

The final important area that we consider relates to the rate of improvement that we can expect from Scottish Water. In the Strategic Review of Charges 2002-06 we examined evidence from England and Wales about the rate of progress achieved by companies during the 1990s. We assumed that Scottish Water should be able to match the pace of change achieved south of the border.

Our analysis demonstrated that during their best five-year period, the companies achieved an average closure of 85% of the gap to the leading company. Figure 4.2 is taken from the Strategic Review of Charges 2002-06.

Figure 4.2: Closure of efficiency gap by water and sewerage companies over five years



We have conducted similar analyses to establish the rate at which Scottish Water should be required to improve during the 2006-10 regulatory control period. We have also looked at the performance that Ofwat has required the companies south of the border to achieve.

Calculating total allowable operating expenditure

We have set targets in terms of total allowable operating expenditure (not including depreciation). We have set total allowable operating expenditure at a level that we believe is sufficient for Scottish Water to carry out its operations for each year of the regulatory period. This is the amount that will be funded through customer charges. Figure 4.3 sets out the calculation.

Figure 4.3: Calculation of total allowable operating expenditure

Total allowable operating expenditure
=
Baseline operating expenditure
±
Assessed changes in baseline operating expenditure
-
Efficiencies in baseline operating expenditure
+
New operating expenditure
-
Efficiencies in new operating expenditure
+
Public Private Partnership operating expenditure
+
New Public Private Partnership operating expenditure
+
The impact of annual inflation on all of these components

We will no longer refer to a monetary value for the total efficiencies required. However, if stakeholders want to count the total monetary value of the efficiencies required in this regulatory control period, they should add:

- efficiencies in baseline operating expenditure; and
- efficiencies in new operating expenditure.

Then adjust for annual inflation.

This figure should be comparable to the targets set in the Strategic Review of Charges 2002-06.

Public Private Partnerships

The three former authorities decided to let a total of nine concessions for the building and operation of waste water treatment plants. These concessions were for a period of 25-30 years.

The concessions were let to joint venture companies which usually consisted of a consultant engineering and design firm, a construction contractor and an operations company. The companies had to accept responsibility for maintenance over the contract period and for the inherent risks of project delays, cost over-runs and volume changes caused by shifts in demand. They were also required to deliver the service within tightly specified parameters. An essential element of PPP is the transfer of risk from the public to the private sector.

The results of the nine projects would appear to have realised considerable tangible benefits in the short term. It is open to question whether these benefits still apply.

Guidance from HM Treasury makes it clear that the benefits of reductions in the cost of capital should be shared between the contractor and the public sector partner.

The nine PPP contracts represent a capital investment on behalf of customers of around £550 million, which contrasted with an estimated investment of more than £700 million under the conventional procurement route.

The contracted solutions for the collection, transmission and treatment of waste water and its resultant sludge are tailored to each project's particular location. The annual fees are therefore only comparable on an aggregate basis if the actual service delivered and the construction of assets are taken into account.

The nine projects are outlined in Table 4.6. The table also shows the projected fee payable to each consortium.

Table 4.6: PPP contracts with Scottish Water

Project name: company name	Contract signed	Duration (years)	Construction costs (£m)	Annual fee in 2002-03
Almond Valley, Seafield and Esk Valley: Stirling Water (Seafield) Ltd	1999	30	£100m	£25m
Levenmouth: Caledonian Environmental Services Ltd	2000	40	£46m	£5m
Highland (Fort William and Inverness): Catchment Ltd	1996	25	£33m	£9m
Tay: Catchment (Tay) Ltd	1999	30	£84m	£17m
Aberdeen: Aberdeen Environmental Services Ltd	2000	30	£64m	£13m
Moray: Catchment (Moray) Ltd	2001	30	£60m	£8m
Daldowie/Shieldhall: SMW Ltd	1999	25	£66m	£16m
Dalmuir: Scotia Water UK Ltd	1999	25	£37m	£7m
Meadowhead, Stevenston & Inverclyde: Ayr Environmental Services Ltd	2000	30	£59m	£12m
Scotland total			**£549m**	**£112m**

The impact of PPP on customers

We analysed the value for money of the PPP contracts in 2001. The evidence suggested that these schemes were all delivered at a much lower cost for customers than would have been achieved by the three authorities under traditional procurement.

In the Strategic Review of Charges 2002-06 we highlighted that there may be opportunities for Scottish Water to review the PPP contracts that it inherited. It seems clear that the implied operating costs of the PPP consortia are high relative to the expected level of operating costs associated with a waste water treatment plant of similar size. There would therefore appear to be some scope for improved efficiency. Moreover, the recent and continuing significant improvement in Scottish Water's operating expenditure efficiency would suggest that it is now quite likely that Scottish Water could operate these plants at equal or lower cost than the prices charged by the PPP companies.

We considered setting an efficiency target for PPP. Respondents to our methodology consultation did not consider that this was appropriate. However, one respondent did suggest that we should monitor costs carefully to ensure that the contractors were delivering the required level of service. Any future increase in PPP costs have had to be justified in detail.

Another respondent reminded us that PPP may represent the most practical or best value method of delivering the required output. We have taken this view into account in this draft determination.

Levels of service

Monitoring the levels of service

We monitor three broad aspects of service:

- asset performance measures;
- customer service measures; and
- public health and environmental performance measures.

Asset performance measures cover areas of service that depend on the water supply and sewerage infrastructure. They cover:

- pressure;
- planned supply interruptions;
- unplanned supply interruptions; and
- sewer flooding.

Customer service measures cover areas of service that depend on the management and employees of the organisation and the processes they use. Customer service measures cover:

- billing enquiries;
- written complaints;

- telephone contacts; and
- public health and environmental performance measures.

Public health and environmental performance measures cover areas of service that relate to the service provider's ability to comply with the requirements for quality standards. These standards are set by the respective quality regulators, DWQR[37] and SEPA[38]. These measures include:

- meeting drinking water quality standards;
- complying with abstraction consents for rivers;
- complying with discharge consents at waste water treatment works; and
- the number of pollution incidents.

There are also a number of Guaranteed Minimum Standards. Failure to comply with any of the guaranteed standards entitles the customer to financial compensation.

The approach for Scottish Water

We have developed our use of the benchmarking approach for quality of service regulation.

Our analysis of the scope for efficiency has not been adjusted to take account of differences in the level of service. We have set clear milestones for the customer service performance of Scottish Water. If Scottish Water does not meet these standards we would be minded to adjust the allowed level of future operating costs downwards at the next charge determination to reflect the lower level of service provided.

Monitoring operating expenditure and levels of service

Framework for monitoring

The Strategic Review of Charges 2006-10 is only the start of the regulatory process. During the regulatory control period we will monitor Scottish Water's progress in reducing costs and improving levels of service. We intend to build on the framework that we have already put in place to monitor performance, through:

- regular information submissions, comprising the Annual Return and more frequent updates of key performance indicators, and forecasts;
- independent audit of regulatory information;
- a process of query, challenge and confirmation of numbers;
- rigorous analysis of current and expected progress against targets;
- published reports; and
- the application of analytical tools which are designed to ensure that we can monitor real progress as opposed to apparent progress (for example, improvements that are due to the information for the Annual Return being calculated in a different way).

We also monitor Scottish Water's progress relative to that of the companies in England and Wales. We continue to use information from the companies south of the border. This information includes:

- companies' Annual Returns to Ofwat;
- comments on these returns by independent auditors, published by Ofwat;
- companies' published regulatory accounts;
- Ofwat's published analysis of companies' progress; and
- rigorous analysis of relative efficiency using our benchmarking tools.

Monitoring operating expenditure

Our monitoring covers the following:

- baseline operating expenditure;

[37] DWQR – Drinking Water Quality Regulator – www.DWQR.org.uk
[38] SEPA – Scottish Environment Protection Agency – www.SEPA.org.uk

- new operating expenditure;
- Public Private Partnership operating expenditure;
- year-on-year progress on each of the above against targets; and
- progress on baseline and new operating expenditure, relative to England and Wales.

Table 4.7 sets out our framework for monitoring progress on operating expenditure.

Table 4.7: Framework for monitoring progress on operating expenditure

Sources of information	Operating expenditure			Relative performance
	Baseline	New	PPP	Baseline and new[39]
Scottish Water				
Annual Return	✓	✓	✓	✓
Regulatory accounts (from 2005)	✓	✓	✓	✓
Monthly operating expenditure returns	✓			
Quarterly investment returns[40]		✓		✓
Independent comments by Scottish Water's Reporter	✓	✓	✓	✓
England and Wales				
Companies' annual returns				✓
Company regulatory accounts				✓
Independent comments by Reporters in England and Wales				✓
Ofwat's published annual reports				✓
Reporting progress	↓			
	Costs & performance reports			

Monitoring levels of service

We monitor the level of Scottish Water's customer service performance by using the overall performance assessment (OPA) that Ofwat has developed. We will monitor improvements in customer service relative to the OPA.

The OPA combines results for customer service measures with other information about performance in drinking water quality and environmental compliance to derive an overall score for the level of service.

Our framework for monitoring performance focuses primarily on the levels of service measures that comprise the OPA. We also monitor performance against Scottish Water's Guaranteed Minimum Standards.

Table 4.8 sets out our framework for monitoring levels of service performance.

Table 4.8: Framework for monitoring levels of service performance

Sources of information	Guaranteed Minimum Standards	Overall performance assessment
Scottish Water		
Annual Return	✓	✓
Customer Service Performance Return	✓	✓
Quality Performance Assessments	✓	
Independent comments by Scottish Water's Reporter	✓	✓
England and Wales		
Companies' annual returns		✓
Independent comments by Reporters in England and Wales		✓
Reporting progress	↓	
	Customer service reports	

Conclusion

We believe that our framework for monitoring Scottish Water's performance is robust. The introduction of regulatory accounts in 2005 has further strengthened this framework.

We will continue to publish reports on progress made by Scottish Water, in order to inform stakeholders and encourage discussion and debate. These reports will pay particular attention to changes in the level of service that is provided to customers. They will also examine whether such changes are consistent with any new operating costs claimed by Scottish Water.

39 Comparisons of relative performance exclude PPPs as there is no direct parallel in the water and sewerage industry in England and Wales.
40 We use the quarterly investment returns to help monitor new operating expenditure because this expenditure is driven largely by Scottish Water's capital investment.

Chapter 5
The scope for capital expenditure efficiency

Introduction

This chapter describes how we have set the level of expenditure allowed to Scottish Water to meet the investment priorities outlined in the Ministerial Guidance at the Strategic Review of Charges 2006-10.

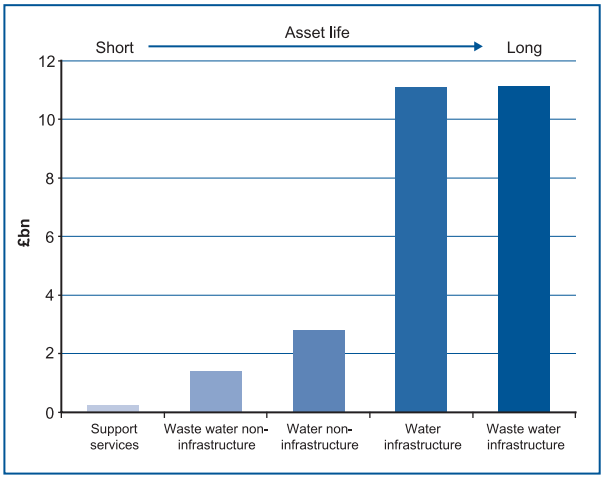
Capital expenditure in the Scottish water and waste water industry

The assets required to deliver a water and waste water service can be divided into five broad types:

- water infrastructure;
- water non-infrastructure;
- waste water infrastructure;
- waste water non-infrastructure; and
- support services.

Figure 5.1 illustrates the replacement cost and expected life of Scottish Water's assets.

Figure 5.1: Replacement cost and asset life by type of asset[41]



Scottish Water is responsible for a larger geographic area than any of the water and waste water companies in England and Wales. However, the asset bases either side of the border appear to have many similarities.

This is illustrated in Table 5.1. The high proportion of the Scottish population that lives in the Central Belt and coastal communities may explain the possibly unexpected result.

Table 5.1: Comparison of the asset base

	Scottish Water	Ranking	Water and waste water companies in England and Wales		
			Smallest	Mean	Largest
Length of water mains (km)	46,508	1st	11,226	27,706	45,674
Length of main per property (m)	18.74	5th	9.07	15.94	21.10
Length of sewers (km)*	44,854	3rd	8,820	30,573	67,151
Length of sewer per property (m)*	13.34	7th	11.93	13.68	14.85
Number of water treatment works	371	1st	33	102	154
Number of waste water treatment works**	616	4th	349	630	1,071

* Excludes lateral sewers as they are not part of the sewer network in England and Wales.
** Excludes 1,220 very small public septic tank installations, which are uncommon in England and Wales.

Historic investment in Scotland

Investment in the water industry in Scotland began to increase significantly after the three former water authorities were established in 1996. This was delivered both by conventional procurement and by PFI.

The level of investment in England and Wales increased significantly after privatisation in 1989. By 1996-97, the privatised companies were investing some £3.5 billion per year.

Investment in England and Wales has recently stabilised at around £3 billion a year. The Strategic Review of Charges 2002-06 foresaw investment in Scotland stabilising at an average level of around £450 million each year.

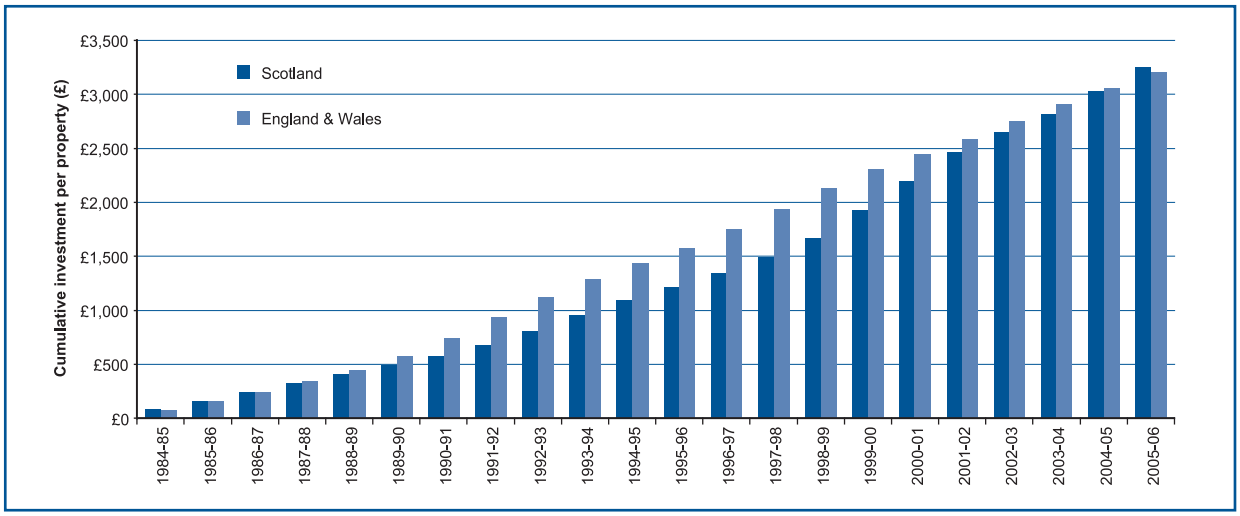
We can compare the level of investment in Scotland with that in England and Wales using the measure of investment per property. Information about investment in Scotland is available for the years before 1996 from the capital account of local authority returns. This may actually understate the level of investment in Scotland as it will exclude any spending on assets from the revenue account.

41 Scottish Water's Annual Return 2003-04.

Our analysis shows that investment per connected property in Scotland will have matched that in England and Wales over the period 1985-2006. Although investment in England and Wales was higher immediately after privatisation, the situation has reversed in recent years as figure 5.2 shows.

By the end of Quality and Standards II, the Scottish water industry is set to have invested more in cash terms for each connected property than was invested in England and Wales over a ten-year and a 20-year period.

Figure 5.2: Cumulative investment per property in Scotland and in England and Wales 1984 -2006[42]



The conclusion from this analysis, therefore, is that if there is a significant backlog of investment in Scotland relative to that in England and Wales, it can only be a result of historical inefficiency, not a lack of investment funds. We are not persuaded by Scottish Water's argument that the percentage of the total asset base that has been replaced in England and Wales over the same period is much greater than in Scotland. To be useful, such a comparison would rely on both a robust asset inventory and asset valuation. Scottish Water has accepted that more work is required in this area. Customers in Scotland have paid for, and so deserve, an equivalent standard of service to that which customers in England and Wales receive.

Potential overhang from Quality and Standards II

We expect that over £270 million of the Quality and Standards II investment programme will not have been delivered by April 2006. The post-efficiency value of the programme is £1,808 million. Capital investment inflation is likely to increase the efficient cost of delivering this investment programme to approximately £1.93 billion. Scottish Water was also allowed to spend £50 million of capital expenditure on spend to save initiatives. Scottish Water has also been tasked with delivering a further £110 million of new outputs. This brings the total efficient cost of the investment programme for the current regulatory control period to approximately £2.04 billion.

[42] Adjusted for inflation and for the effect of PFI investment. Efficiency adjustment is not included. The forecast expenditure in Scotland for 2004-05 and 2005-06 is based on figures supplied by Scottish Water.

According to its second draft business plan, Scottish Water expects to invest a total of £1,941 million by the end of March 2006. The plan also states that some £283 million will have to be invested after March 2006 in order to deliver the Quality and Standards II objectives.

We have accepted Scottish Water's estimate of the overhang, although we have removed the claim for extra capital inflation beyond the current regulatory control period. Our analysis has shown that Scottish Water will deliver £274 million of the Quality and Standards II investment programme after March 2006. Accordingly, we have adjusted the initial RCV down to reflect the remaining outputs.

We will continue to monitor all of the projects in the WIC18 baseline until we are satisfied that Quality and Standards II has been delivered. The Reporter will have an important role in confirming that the full investment programme has been delivered.

Investment programme deliverability

Our analysis suggests that there is a limit to the size of a capital programme that can be delivered efficiently. We have examined the capital programmes delivered south of the border and the improvement in capital efficiency that has been achieved in the past few years. We believe that there is a risk that having a capital programme that is too large could adversely impact on efficiency.

The Quality and Standards II investment programme was approximately £1.9[43] billion over four years. This total investment is equivalent to £833 per household in Scotland.

Five water and sewerage companies in England and Wales are either broadly the same size as Scottish Water or larger. Thames Water, Severn Trent Water and United Utilities are larger; Anglian Water and Yorkshire Water are similar in size to Scottish Water.

Table 5.2 compares the size of programmes delivered or defined by the companies with the Quality and Standards II programme.

Table 5.2: Summary of relative size of Quality and Standards II[44]

	Largest four-year programme	Median four-year programme	Largest four-year programme per connected property
Thames	£2,200m	£2,012m	£543
Severn Trent	£2,773m	£2,130m	£856
United Utilities	£2,554m	£2,223m	£861
Anglian	£1,856m	£1,587m	£954
Yorkshire	£1,727m	£1,367m	£854
Quality and Standards II	£1,930m[45]	–	£833

This shows that Quality and Standards II was a very large investment programme. It was larger than the largest programme ever delivered by Anglian Water and Yorkshire Water (the two companies of similar size to Scottish Water). It is also large in terms of investment per connected property.

In its second draft business plan, Scottish Water has suggested that it can deliver a capital programme of just under £600 million a year (2003-04 prices) without compromising its efficiency. We have taken full account of this view in this draft determination of charges.

How Ofwat assesses capital expenditure efficiency

The methods that Ofwat uses to assess capital expenditure efficiency for the companies south of the border have been developed over a number of years. Ofwat uses these methods as part of its price setting process. We have used Ofwat's methods to monitor Scottish Water's progress towards achieving the efficiency targets set in the Strategic Review of Charges 2002-06.

Capital maintenance econometrics

Ofwat's econometric modelling uses statistical regression analysis to establish a relationship between the costs incurred by companies and a defined set of cost drivers. These cost drivers have a significant impact on costs but are outside the control of the management of the company. By controlling the principal external cost

43 The original £1.81 billion investment programme included in the Strategic Review of Charges 2002-06 increases to £1.93 billion as a result of higher than expected capital outputs inflation.
44 All values rebased to 2003-04 prices.
45 See footnote 43.

drivers in the models, Ofwat can determine relative efficiency with a degree of accuracy.

The cost drivers that are included within the econometric models are known as 'explanatory factors'. There are nine models and they take different forms. These are summarised in Table 5.3.

Table 5.3: Summary of econometric models and explanatory factors

Model	Model type	Explanatory factors
Water resources and treatment	Unit cost	Total connected properties
Water distribution infrastructure	Log linear	Length of main; total connected properties
Water distribution non-infrastructure	Log linear	Pumping station capacity; water service reservoir and storage tower capacity
Water management and general	Log linear	Billed properties; proportion of billed properties that are non-household
Sewerage infrastructure	Log linear	Length of sewer; number of combined sewer overflows; proportion of critical sewers
Sewerage non-infrastructure	Unit cost	Number of pumping stations
Sewage treatment	Log linear	Total load; total number of works
Sludge treatment and disposal	Unit cost	Total weight of dry solids
Sewerage management and general	Unit cost	Billed properties

We have used these models to assess the level of capital maintenance for Scottish Water. Using these models enables us to ensure that we have allowed an appropriate level of capital maintenance which should ensure that customers receive value for money both in the short and in the longer term.

Capital works unit costs

We have used the Ofwat capital works unit costs, or 'cost base', approach to assess the relative efficiency of Scottish Water in procuring and implementing capital projects. Ofwat uses this technique to inform its assessment of relative efficiency for both capital maintenance and capital enhancement expenditure.

The cost base is a database of costs, termed 'standard costs', for a wide range of standardised projects, or units of work. We have compared the standard costs submitted by Scottish Water and the companies south of the border to assess relative procurement efficiency.

The cost base approach to assessing relative efficiency has been subject to detailed scrutiny by the Monopolies and Mergers Commission and by the Competition Commission. Both found the approach to be fit for purpose. Capital maintenance econometrics are something different.

Ofwat reviews the submissions received from the companies in order to:

- ensure that the standard costs which are submitted comply with the specifications and guidance;
- ensure that the engineering judgement grades (EJG)[46] have been correctly applied and interpreted;
- confirm that companies have derived their standard cost estimates independently;
- subject all submissions to an independent audit; and
- ensure comparability between companies.

Ofwat uses the lowest reported cost as the benchmark standard cost, provided it complies with the following criteria:

- the standard cost used to derive the benchmark closely complied with the standard cost specification;
- at least 3% of the industry (measured in terms of turnover) reported unit costs at or below the benchmark standard cost;
- the standard cost was sufficiently robust to warrant an EJG of B3 or better;
- single company standard costs were generally used to derive the benchmark for items commonly procured from a single source over a range of sizes; and

[46] EJG – comprise two elements: 1. Reliability band (denoted by letter A-E) related to main source of data used in standard cost estimation 2. Accuracy band (denoted by nos. 1-4) related to the accuracy of the company's standard cost estimate compared to the actual cost the company would incur in undertaking the works as specified.

- the relevant benchmark is independently endorsed by consultants to Ofwat.

Adjusting the Ofwat approach for Scotland

There may be factors that influence investment costs which are not adequately reflected in the analysis techniques that we have described above. We asked Scottish Water, as part of its business plan submissions, to draw to our attention all factors that influence cost. This included factors that would both increase and decrease cost.

We want to ensure that our efficiency targets neither unduly penalise nor reward Scottish Water. Some commentators have argued that it is unfair to draw comparisons between Scottish Water's performance and that of the privatised water and sewerage companies in England and Wales.

We assessed special factors for capital expenditure in the same way as we assess special factors for operating expenditure. We considered these and other factors carefully before reaching our conclusions on the scope for capital efficiency.

Lessons learnt from establishing the baseline investment programme for Quality and Standards II

One of the disappointments of Quality and Standards II has been the difficulties faced by both stakeholders and customers in monitoring Scottish Water's delivery of the investment programme. This has resulted from the lack of clearly defined projects and associated outputs that comprised the baseline programme.

Quality and Standards II defined the investment programme for the period April 2002 to March 2006. In May 2001 we wrote our WIC18 letter to the three authorities. This letter sought to establish a baseline for the investment programme of each authority.

We did not envisage that the authorities would find it difficult to provide the information we required, as they had already provided detailed costs for Quality and Standards II. North of Scotland Water Authority and West of Scotland Water Authority were able to provide a relatively detailed investment programme. East of Scotland Water Authority, however, failed to provide the required level of detail. When Scottish Water was created in April 2002, this problem had still not been properly addressed.

A number of workshops were held in March 2003 where the key stakeholders examined the WIC18 programme lists, line by line, and allocated projects into two distinct categories. The 'red' category meant that the project was no longer required and was hence a candidate for replacement with an alternative project; while the 'green' category was for WIC18 projects that were still required.

The WIC18 experience has taught us that a fully defined capital investment programme must be in place at the outset of the next regulatory control period. Our discussions with SEPA and the DWQR have also led us to conclude that the outputs to be delivered by each project must be clearly defined and quantified.

The baseline investment programme for Quality and Standards III is published in full with this draft determination. We hope that publishing the investment programme will help ensure transparency and accountability in the delivery of agreed benefits to customers and to the environment.

Defining the investment programme

Our requirement for a clear and detailed baseline for the Quality and Standards III investment plan is broadly consistent with those that are required by Ofwat for the companies south of the border.

The baseline is a key part of the regulatory contract between Scottish Water and its customers.

The plan can be split into three main elements:

- capital maintenance;
- quality; and
- supply/demand.

We have required a detailed list of all of the quality projects and supply/demand projects. The detailed list was to include all capital maintenance projects that have a value of more than £250,000.

Each investment project was to have:

- a unique code;
- a unique name;
- a geographical reference (place name and water supply zone/drainage area); and
- a defined output.

All capital maintenance projects were to identify clearly:

- the work proposed (its size, quantity and type);
- whether the project is planned or reactive;
- the cost; and
- an appropriate output measure.

The timetable for the delivery of projects was to include:

- annual projected investment spend for each project – this had to include any expenditure either before or after the regulatory control period;
- identification of key project milestones (for example when planning consent is granted); and
- the project's expected completion date.

We have required identical information for any overhang from Quality and Standards II.

Scottish Water's second draft business plan did not provide the required level of detail for us to monitor Scottish Water's performance during the regulatory period in 2006-10. Following the submission of additional information by Scottish Water there was sufficient information for us to analyse the proper scope and cost of meeting the Ministers' objectives. We have endeavoured to ensure that the programme is properly defined but there will be a need to do further work in this area after the publication of this draft determination.

Investment programme review

All regulators review the draft investment programmes that regulated companies provide. We have worked closely with the Reporter, SEPA and the DWQR to review the investment programme proposed by Scottish Water.

The Reporter's assessment of Scottish Water's quality investment proposals formed a key part of our analysis. We provided detailed guidance to the Reporter on the particular areas we wanted his audit of the quality programme to address. These included an assessment of:

- whether Scottish Water had provided a consistent interpretation of legal obligations and the Ministerial Guidance;
- whether Scottish Water had included all of the agreed requirements of the quality regulators – we have also asked the Reporter to comment on Scottish Water's challenge of quality obligations placed on it by the quality regulators as part of Quality and Standards III;
- how Scottish Water has interpreted the Water Framework Directive and other key legislation which impact significantly on costs;
- the design criteria used by Scottish Water and whether these are consistent with the criteria used to develop the standards;
- Scottish Water's costing process;
- whether the additional operating costs identified from the quality programme are additional, reasonable and have been applied consistently;

- whether Scottish Water has costed the quality programme in an incremental way, taking full account of any optimisation and synergy benefits; and
- cost estimates for defined projects.

We also asked the Reporter to comment on Scottish Water's use of information from DMAs[47] and Drainage Area Studies in planning and scoping its investment programme.

In the light of the Reporter's comments we also drew on the expertise of two separate engineering consultants and Ofwat in conducting a detailed review of the investment plan. This review focused on areas where the Reporter's audit identified issues. This is a first important step in ensuring that the proposed programme meets the requirements of stakeholders and provides value for money for customers. It ensures that the scope of the proposals is appropriate to achieve the objectives set out by Ministers, and that the proposed expenditure is being effectively targeted.

It has been important to establish that the programme would deliver the agreed outputs effectively. We had to be sure that our efficiency analysis was appropriate and consistent with our goal of improving value for money to customers.

We have used the following criteria in our review of the investment programme:

- Was the programme sufficiently defined to allow customers and stakeholders to monitor delivery? In particular, did it meet the level of definition set out in our guidelines?
- If delivered in full, did the proposed programme meet the objectives set out in the Ministerial Guidance? If not, what were the omissions? If so, did it exceed the requirements? In particular, did the quality regulators, SEPA and DWQR, agree that the relevant quality objectives could be met by the proposed investment?
- Were there projects in the programme which do not contribute to the required objectives?
- Were there errors in the programme; for example, in the identification of projects and the associated outputs?
- Was the programme properly costed?
- Were the solutions proposed by Scottish Water appropriate?
- Did they represent best practice?
- Were the proposed solutions supported by the DWQR and SEPA?
- Had the projects in the programme been allocated measurable, defined outputs?
- Did the projects have clearly defined delivery dates?
- Were the delivery dates realistic, both in terms of individual project construction times and the overall capacity of the industry to deliver the programme efficiently?

The output from the review is an estimate of the pre-efficiency cost of the investment programme required to deliver the Ministers' objectives.

How we handled capital maintenance investment

It can be difficult to determine the correct level of expenditure on capital maintenance. Too much investment is likely to result in assets being replaced unnecessarily, leading to higher prices and little benefit for customers. Too little investment is likely to mean a gradual decline in performance and customer service.

Approach to capital maintenance in Quality and Standards II

During the Quality and Standards II process, an 'asset stewardship' approach was used to define the appropriate level of capital maintenance. This approach used three key parameters to identify the required level of capital maintenance:

47 District Metered Areas.

- condition;
- performance; and
- age.

Although the asset stewardship approach provides a reasonably sound engineering assessment of the state of the asset base, the approach had a number of weaknesses. Most notably:

- the gradings assigned for condition and performance were subjective and the approach to grading may have varied between companies;
- the information which underpinned the gradings and the assessment of remaining life may have been of varying age and quality;
- there was no assessment of the level of service that the asset provided to customers; and
- there was no assessment of the risks associated with failure of the asset.

In addition, the approach tended to overestimate the requirement for capital maintenance. This was because it overlooked the operator's capacity to:

- rationalise the assets (by assessing whether or not it is still required);
- adopt strategic solutions, by reorganising the network in order to reduce or remove the asset;
- use new technology; and
- implement cost-effective operational solutions to defer replacement.

At the last Strategic Review of Charges, we accepted the capital maintenance requirement identified in Quality and Standards II but we applied an efficiency target to reflect the scope for strategic asset management efficiency.

The serviceability approach

In its 1994 and 1999 price reviews, Ofwat used a serviceability approach when assessing whether the level of capital maintenance investment by the companies was appropriate. This involved monitoring a set of defined asset and customer service performance indicators for each company. If these indicators were broadly constant, or marginally improving, then it was assumed that the historic level of capital maintenance spend was about right. If the indicators showed a decline in performance, this indicated that the company had historically been investing too little in capital maintenance.

At the last Strategic Review of Charges we were not able to use the serviceability approach because at that time we did not have sufficiently good quality information about asset performance and customer service levels.

The companies in England and Wales felt that the serviceability approach did not take sufficient account of the risk of asset failure in the future. Ofwat proposed a collaborative approach to addressing these concerns. The industry commissioned UK Water Industry Research (UKWIR) to devise a more strategic, 'top-down' approach to assessing capital maintenance. The result was the 'Common framework for capital maintenance planning'.

Ofwat set out a four-stage approach – consistent with the UKWIR Common Framework Approach – to assess the companies' capital maintenance requirements in the 2005-10 regulatory control period. The four stages are as follows:

Stage A Maintaining serviceability to customers to date

This involves understanding past performance, trends from the serviceability indicators, and company actions necessary to address serviceability issues. This 'backward looking' assessment is mainly informed by the serviceability indicators. There has been a lot of effort within the industry south of the border to ensure that these serviceability indicators are measured accurately.

Stage B Is the future period different?

This involves understanding what would be different about the next regulatory control period that would necessitate changes in the typical levels of activity that have been sufficient in the past. This element is informed by the company's assessment of its economic level of capital maintenance. This should be based on the UKWIR approach and should be both forward-looking and risk-based.

This risk-based approach must recognise that the companies are required to deliver a minimum level of service to all of their customers.

Stage C Scope for improvements in efficiency

This involves assessing the relative efficiency of each company in terms of its approach to capital maintenance and capital works, its capital/operating expenditure balance and the potential for each company to improve its efficiency over the next price review period. This uses Ofwat's established approaches for determining relative efficiency and assessing each company's scope for further efficiency improvements.

Stage D Impact of the enhancement programmes

This requires an understanding of the implications of each company's quality investment programme on the base capital maintenance programme. This is informed by an assessment of whether the quality programme defers or removes the requirement for capital maintenance expenditure.

Our approach to capital maintenance in the Strategic Review of Charges 2006-10

In assessing Scottish Water's capital maintenance requirements in the Strategic Review of Charges 2006-10, we have taken account of:

- Ministerial Guidance on the overall objectives of the investment programme;
- the capital maintenance requirement identified in the Quality and Standards III process;
- the capital maintenance requirement identified in Scottish Water's first and second draft business plans;
- the Reporter's assessment of Scottish Water's capital maintenance proposals; and
- the results of Ofwat's capital maintenance econometric model.

Our original intention had been to conduct a rigorous analysis of Scottish Water's planned capital maintenance investment. This has not proved possible for three reasons:

- Scottish Water has only recently introduced the systems required to capture and monitor the serviceability of its assets. There are some doubts about the quality and consistency of the information available.
- The proposed capital maintenance programme was not sufficiently disaggregated to allow us to analyse or monitor its content.
- It was not possible to verify that the proposals would meet the Minister's objectives for the water industry.

We have also reviewed Ofwat's comments on the companies' plans for capital maintenance in its final determinations[48].

Our methodology for determining the appropriate level of capital maintenance has therefore included the following stages:

- An assessment of the level of capital maintenance expenditure required by Scottish Water, given its current asset base. This assessment was carried out using Ofwat's capital maintenance econometric models.
- An adjustment to the required level of capital maintenance expenditure to take account of any circumstances specific to Scotland that could affect Scottish Water's costs.
- An assessment of the scope for efficiency. We used the cost base approach to determine the scope for

[48] Future water and sewerage charges 2005-10 – Final determinations, December 2004.

efficiency and drew on the evidence gathered by Ofwat on the scope for continuing improvement. We have taken account of the scope for efficiency in determining the allowed level of capital maintenance.

An overview of how we set the appropriate level of capital expenditure to deliver the priorities outlined in the Ministerial Guidance

We had to take account of a range of issues that will affect Scottish Water's ability to deliver its capital investment programme efficiently. These 'critical factors' were:

- the proportion of Quality and Standards II that was not likely to have been delivered by March 2006;
- historical evidence on the size of investment programmes that were deliverable; and
- the incentive for Scottish Water to improve its performance.

Our overall approach is set out in Figure 5.3.

We adopted a different approach to setting targets for capital efficiency in capital maintenance and in quality enhancement expenditure. However, in both cases, out-performance of targets would increase the resources that are available to add outputs to the baseline investment programme for the regulatory control period.

We set out our step-by-step process for each investment category below:

For both capital maintenance and capital enhancement

1. Establish a fully defined investment programme

Following Ministerial Guidance, Scottish Water submitted its investment plan broadly in line with the agreed format for the second draft business plan. This format provided a list of projects and their associated outputs. It also included a separate list

Figure 5.3: Framework for capital investment targets

	Ministerial Guidance on the objectives of the overall investment programme and the outputs required to be delivered	
Establish investment programme	**Scottish Water Investment Plan** submission with initial costs, project by project, and detailed information on outputs	
	Establish impact of Quality and Standards II overhang and build into baseline investment programme	
Review programme and establish a baseline	**Reporter & regulator challenge**: audit of scope of project solutions and costs **SEPA and DWQR scrutiny**: ensure that required outputs are in the investment baseline Additional scrutiny by consultant engineers and Ofwat	
	Capital maintenance baseline investment programme	**Capital enhancement baseline investment programme**
Assess relative efficiency	Ofwat capital maintenance econometrics and cost base	Ofwat cost base
Assess scope to improve	Ofwat targets for capital maintenance and scope for out-performance by companies	Ofwat targets for capital enhancement and scope for out-performance by companies
	Assess degree to which scope for improvement is limited by size of investment programme	Assess degree to which scope for improvement is limited by size of investment programme
Target expenditure and outputs	Determine the required level of capital expenditure and the maximum desirable outputs that can be delivered in accordance with Ministerial Guidance and within an overall level of investment spend that is consistent with efficient delivery	
Monitor progress	Monitor the baseline investment programme for 2006-07 to 2009-10, for capital maintenance and enhancements, including costs and outputs Delivery monitored by stakeholders	

that outlined the Quality and Standards II projects that are not likely to have been delivered by the end of March 2006.

2. Review the programme and establish a baseline

Scottish Water's investment plan has been scrutinised in detail by the Reporter, the quality regulators and this Office. We commissioned additional work from two leading engineering firms and Ofwat. We determined whether the programme met the objectives set out by Ministers. The output from this process was a baseline programme, which listed the projects required to deliver the investment requirements for capital maintenance and quality enhancement priorities.

For capital enhancement

3. Assess current efficiency gap

We have used Ofwat's cost base approach to determine the size of the procurement efficiency gap between Scottish Water and the companies in England and Wales.

4. Assess scope for further improvement

We have considered the scope for further improvement based on the targets set by Ofwat.

5. Establish the total allowable expenditure for capital enhancement

We used the results of Steps 3 and 4 to establish the total allowable expenditure for quality enhancement for each year of the next regulatory period.

For capital maintenance

6. Estimate the annual efficient level of expenditure for Scottish Water, consistent with the companies' recent performance

We used the capital maintenance econometric models developed by Ofwat to estimate the cost of maintaining serviceability of the current asset base at average levels of efficiency.

7. Adjust the results to take account of special factors

We considered representations from Scottish Water that would justify additional funding for specific capital maintenance objectives.

8. Check the adjusted results of the econometric models

We carried out a series of high-level comparisons to check that the adjusted results of the models did not underestimate Scottish Water's capital maintenance requirements.

9. Use the cost base approach to assess the current gap in capital expenditure efficiency

We used the cost base approach to determine Scottish Water's current capital efficiency position.

10. Assess the scope for further improvement

We took full account of Ofwat's expectations for improvement in capital efficiency when we set targets. Ofwat has published its final determinations[49] and we drew on the evidence accepted by Ofwat to inform our analysis of the further scope for improvement. This informed the targets that we set for each year.

11. Use the cost base results to set an appropriate level of capital maintenance spending

We used the results of the cost base to increase the adjusted allowance for capital maintenance that was suggested by Ofwat's econometric models. We considered these results with the observed capital maintenance spending of the highest spending company.

12. Set total level of capital expenditure and final baseline of projects with associated outputs

We set a total allowance for capital expenditure and a list of projects with associated outputs. This is the baseline against which we would expect stakeholders and customers to monitor and judge Scottish Water's performance.

[49] Future water and sewerage charges 2005-10 – Final determinations.

Water Industry Commissioner for Scotland
Ochil House Springkerse Business Park Stirling FK7 7XE
telephone: 01786 430 200
fax: 01786 462 018
email: draftdetermination@watercommissioner.co.uk
www.watercommissioner.co.uk

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