

Methodology Information Paper 17: Our overall approach to assessing Scottish Water’s capital expenditure requirements

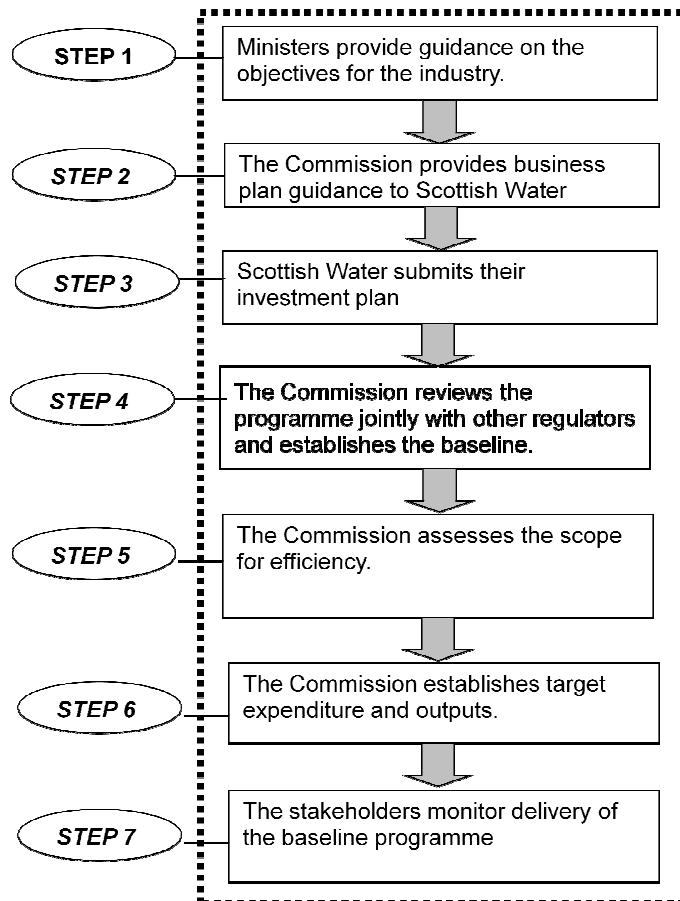
Introduction

This information paper sets out the key stages in our assessment of Scottish Water’s capital expenditure programme for the 2010-14 regulatory control period. Information papers 18 to 24 examine each stage in more detail.

Our high level approach

Figure 1 summarises our proposed approach.

Figure 1: Overall approach for assessing capital expenditure requirements



Step 1: Ministerial objectives

Scottish Ministers determine the high level objectives that Scottish Water is required to deliver. Ministers have already provided their initial guidance on these objectives through the 'Quality and Standards 3' process. The outcome from this process was published in February 2005. In the autumn of 2008 Scottish Ministers will issue updated guidance setting out the investment outcomes they require Scottish Water to deliver.

Step 2: Business plan guidance

We will issue guidance to Scottish Water concerning its draft business plans on 20 December 2007 and 15 October 2008. This guidance is designed to ensure that we have a clear and defined baseline for the capital programme that is required to deliver the outcomes specified by Ministers. It is, of course, for Scottish Water to decide how they plan to meet the ministerial objectives.

Information Paper 18 'Defining the baseline' sets out the information we will require from Scottish Water.

Step 3: Submission of the investment plan

Scottish Water will submit its proposed capital investment programme as part of its draft business plan submissions in May 2008 (first draft business plan) and March 2009 (second draft business plan).

Step 4: Reviewing the capital investment programme

We will review Scottish Water's proposed capital programme in detail. The key questions we will seek to answer at this stage are as follows:

- Is the programme properly defined?
- Does the level of definition allow the delivery of the programme to be monitored?
- Is the programme consistent with ministerial objectives?
- Is the programme properly scoped?
- Are the proposed solutions appropriate?

In reviewing the programme we intend to seek advice from the independent Reporter, as well as from independent consultants. Our aim will be to ensure that the capital investment programme is well-defined and sufficient to allow proper monitoring of the delivery of the ministerial objectives.

Information Paper 19 'Reviewing the baseline programme' sets out in more detail how we propose to review the capital programme.
 Step 5: Assessing the scope for efficiency

We will then apply a series of benchmarking techniques in order to identify the scope for Scottish Water to deliver the capital programme more efficiently. The techniques that we intend to apply include Ofwat's capital maintenance econometrics and cost base techniques, along with other high level comparisons. More information about this analysis can be found in the following Information Papers:

- Information Paper 23 'Ofwat's capital maintenance econometric models',
- Information Paper 24 'Capital efficiency', and
- Information Paper 25 'The cost base approach'

Step 6: We establish the allowed for level of expenditure

Based on the outcome of the review of Scottish Water's capital programme and our assessment of the scope for capital efficiency, we will establish the lowest reasonable overall cost to deliver the ministerial objectives. This allowed for capital expenditure forms a major component of our draft and final determination of charges for the 2010-14 regulatory period.

The draft determination will be published in June 2009 and the final determination in November 2009.

Step 7: Monitoring the programme

We will closely monitor delivery of the capital programme and its associated outputs. We receive detailed information quarterly from Scottish Water on its performance against the baseline capital investment programme.

A multi-stakeholder Output Monitoring Group (OMG) monitors the delivery of the ministerial objectives. The OMG meets quarterly and comprises representatives of the Scottish Executive, the Scottish Environment Protection Agency, the Drinking Water Quality Regulator, Waterwatch Scotland, the Commission and Scottish Water.

More information about the OMG and our approach to monitoring the delivery of the capital programme can be found in Information Paper 20 'Monitoring the capital programme'.

Related documents

'The Strategic Review of Charges 2006-10: The draft determination', Volume 5, Water Industry Commissioner for Scotland, June 2005.

'The Strategic Review of Charges 2006-10: The final determination', Water Industry Commission for Scotland, November 2005.

Methodology Information Paper 18: Defining the baseline

Introduction

In this information paper we set out how we propose to determine the baseline for Scottish Water's capital investment programme. The baseline defines the specific outputs that Scottish Water is required to deliver if it is to meet Ministers' objectives for the industry.

Ensuring that the programme of investment is properly defined

The baseline for the capital investment programme is the agreed detailed list of capital projects that Scottish Water will deliver during the next regulatory control period. This is a key part of the regulatory contract between Scottish Water and its customers. The baseline programme must be such that if Scottish Water delivers the outputs specified in the programme, it will have achieved the ministerial objectives. The baseline programme allows stakeholders to monitor Scottish Water's progress in delivering these outputs.

Investment programmes in the water industry are typically split into three main elements:

- Capital maintenance - investment to maintain the current level of service to customers by replacing worn out plant and equipment that is at the end of its useful life.
- Quality enhancement - investment to bring about improved levels of service to customers, better water quality, improved environmental performance and to address service issues such as sewer flooding.
- Investment in the supply/demand balance¹ - investment to meet increased demand for water resources from existing or new customers.

The level of definition that is possible for each of these three elements varies. Capital maintenance projects tend to be more difficult to define than quality and supply/demand investment projects.

Defining the baseline programme

To define the baseline investment programme we are likely to require the following information:

¹ Supply/demand investment includes addressing the ministerial objectives to meet growth in demand from new customers and businesses

- **A detailed list of projects**

We will require a detailed list of all of the quality enhancement projects and supply/demand projects (including contributions²) and the larger capital maintenance projects. The smaller or less well-defined capital maintenance projects will require a programme-level definition. Each investment project or programme should have:

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

- **Defined outputs for each individual project**

All projects should have pre-agreed, defined and discrete outputs. This ensures that all planned investment outputs are covered within discrete, single projects. Scottish Water's investment plan is likely to be large and complex. Stakeholders will want to ensure that projects to address a particular local need are clearly identifiable in the baseline. By requiring clear links between outputs and individual projects we should avoid overlap between projects in Scottish Water's baseline programme.

- **Clear definition of capital maintenance proposals**

All capital maintenance projects and programmes should clearly identify:

- the work proposed (its size, quantity and type);
- whether the project or programme is planned or reactive;
- the project or programme costs; and
- whether the work is being brought forward to co-ordinate the activity with work being carried out under the enhancement or supply/demand programmes.

It is possible to make savings by carrying out capital maintenance work at a site at the same time as quality improvement or supply/demand work is underway. However, in these circumstances it is important that the costs for capital maintenance are properly allocated. We have recently had discussions with Scottish Water about their guidelines for capital expenditure allocation; we will look for evidence

² Contributions to the funding of projects can include grants and required contributions from customers

that proper policies are in place to ensure that capital maintenance expenditure is being properly recorded.

- **Definition of quality and supply/demand drivers, costs and outputs**

Quality and supply/demand projects should be clearly identified and costed. This should include:

- information about which agreed ‘drivers’ are generating the project;
- an allocation of costs between drivers and excluding any elements associated with capital maintenance;
- an appropriate measure of the output; and
- the number of units of that measure that the project delivers.

Examples of appropriate measures for outputs would include the volume of water delivered to customers that will become compliant with the required standard as a result of the work, or the population that will benefit from improvements at a sewage treatment works to meet environmental standards.

- **Profile of project delivery**

The timetable for project delivery should include:

- the annual projected investment spend for each project – this should include expenditure before or after the regulatory control period;
- key project milestones (for example when options have been developed, when the target cost has been agreed and when construction will reach beneficial use); and
- the expected completion date.

- **Clear links to the ministerial objectives**

The contribution that each project or programme of work will make towards meeting the ministerial objectives should be captured. This will confirm to stakeholders that delivering the agreed capital programme will ensure that ministerial objectives are met.

Benefits from defining a detailed baseline

Defining the programme in detail in this way brings clear benefits for customers:

- It allows us and other regulators³ to examine Scottish Water's proposals in detail to establish whether they meet the ministerial objectives.
- It also enables us, through a range of benchmarking and analysis techniques, to establish whether Scottish Water is delivering the objectives at the lowest reasonable overall cost.
- It enables Scottish Water's progress in delivering the required outputs to be monitored in detail.
- It provides customers with transparent information about what Scottish Water has to deliver at a local level.

We would expect Scottish Water's investment submission clearly to identify any elements of undelivered investment from the current 2006-10 investment period. We made it clear in the Strategic Review of Charges 2006-10 that customers will not pay twice for outputs that are already financed by the current settlement contract.

Related documents

'The Strategic Review of Charges 2006-10: The draft determination', Volume 5, Water Industry Commissioner for Scotland, June 2005.

'The Strategic Review of Charges 2006-10: The final determination', Water Industry Commission for Scotland, November 2005.

³ Including SEPA, DWQR and Waterwatch Scotland

Methodology Information Paper 19: Reviewing the baseline capital programme

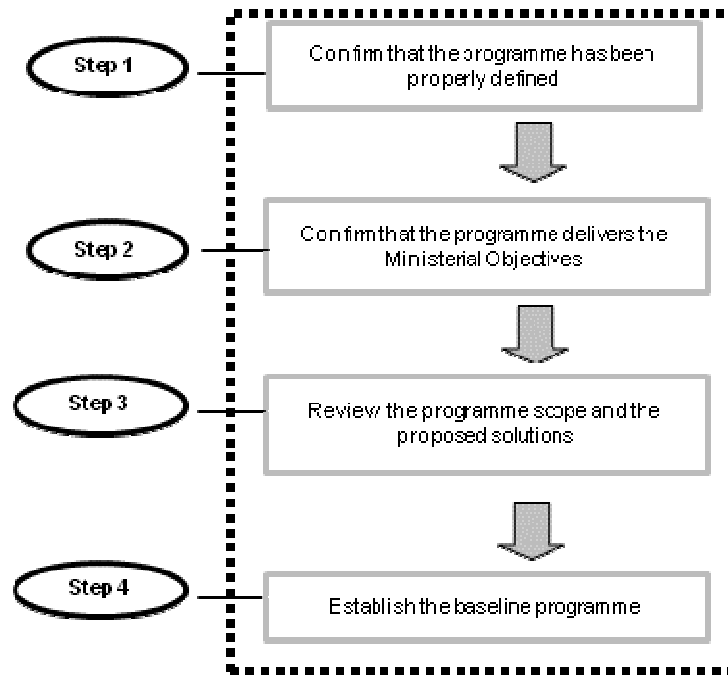
Introduction

This information paper sets out our proposed approach to reviewing Scottish Water's capital expenditure proposals. Our aim is to establish whether Scottish Water's proposals will deliver Ministers' objectives at the lowest reasonable overall cost. We will seek confirmation from the other industry regulators that Scottish Water's proposals will meet, but not exceed, Ministers' objectives.

The outcome of our review will be an agreed baseline investment programme against which Scottish Water's performance in delivering the programme can be monitored.

Reviewing the programme

Once Scottish Water has submitted its business plan, we intend to go through the following stages:



Step 1: Ensuring that the programme is properly defined

We will seek confirmation from the Reporter that Scottish Water has defined its investment programme adequately and met the requirements set out in our business plan guidance.

If there is insufficient information about elements of the programme, we will ask Scottish Water to provide clarification. Where insufficient information is provided, we may need to draw our own conclusions on the level of capital expenditure to allow for. We would base our conclusions on empirical and/or comparator information.

Step 2: Confirming that the proposed capital programme delivers ministerial objectives

We will seek confirmation from the Reporter and other industry regulators (the Scottish Environment Protection Agency (SEPA), the Drinking Water Quality Regulator (DWQR) and Waterwatch) that, if delivered in full, Scottish Water's investment proposals will meet the ministerial objectives. It will also be important to ensure that we do not finance any proposed outputs that are not consistent with the objectives.

Step 3: Reviewing the programme scope and the proposed solutions

We will ask the Reporter to examine Scottish Water's proposals in detail. We also propose to seek independent engineering advice on any aspects of Scottish Water's proposals where we consider that there may be scope for savings.

We will ask the Reporter to place particular emphasis on:

- The scope of requirements.
Is the scope of the proposed requirements consistent with meeting the ministerial objectives at the lowest reasonable overall cost?
Are strategic solutions employed?
Are best practice approaches being used?
- The technical solutions proposed.
Are the solutions employing the most appropriate technology?
Are better solutions available through the use of operational measures?
Has due account been taken of Scottish Water's obligations to ensure sustainable development?
- The profile of delivery.
Is the profile of delivery reasonable?
Has due account been taken of the impact of any overhang of investment from the previous period?

We will also ask the Reporter to analyse Scottish Water's approach to costing the investment programme. We will seek confirmation that Scottish Water's costing of its capital investment programme is

consistent with both its out-turn costs for delivering the 2006-10 investment programme and the costs provided in Scottish Water's 'cost base'¹ submission.

The Reporter may identify aspects of the programme where there is insufficient evidence that Scottish Water's proposals meet the ministerial objectives at the lowest reasonable overall cost. We may seek independent advice in this instance.

This is consistent with our approach to the Strategic Review of Charges 2006-10. At that time the Reporter identified concerns about the scoping of aspects of Scottish Water's proposals, including the programme for water treatment works and improvements to unsatisfactory intermittent discharges (UIDs). We therefore commissioned independent engineering consultants Faber Maunsell to review those elements of Scottish Water's proposals in detail. We also asked Ofwat to compare Scottish Water's proposals for water treatment works and UIDs with those of the companies in England and Wales. Through this work, we identified significant over-scoping of requirements and an over-reliance on capital expenditure solutions when lower cost operational solutions were available. As a result, we made substantial reductions in Scottish Water's planned level of capital expenditure.

Step 4: Establishing the baseline programme

The output of our review will be a properly costed, fully defined list of capital investment projects, which, if delivered in full, will meet the objectives set out by Ministers for the regulatory control period.

Once the baseline programme has been established we will assess the scope for efficiency. This process is set out in Information Papers 24 and 25 'Capital Efficiency' and 'The Cost Base Approach'.

Related documents

'The Strategic Review of Charges 2006-10: The draft determination', Volume 5, Water Industry Commissioner for Scotland, June 2005.

'The Strategic Review of Charges 2006-10: The final determination', Water Industry Commission for Scotland, November 2005.

¹ In the Strategic Review process we use the 'cost base' approach, which was developed by Ofwat. The approach compares companies' costs for a range of benchmark projects to establish relative efficiency. It is important to establish that Scottish Water's cost base submission is consistent with the actual costs used in its investment plan.

Methodology Information Paper 20: Monitoring the capital programme

Introduction

This Information Paper sets out how we propose to monitor Scottish Water's delivery of the capital programme through the Output Monitoring Group (OMG).

Monitoring delivery of the baseline investment programme

To ensure that customers receive value for money we monitor and report on Scottish Water's performance in delivering its investment programme. Customers and stakeholders need to have confidence that investment will deliver the outcomes specified by Scottish Ministers. Monitoring by the economic, water quality, environmental and customer service regulators plays an essential part in this.

The OMG was established in 2006 to monitor the delivery of Ministers' objectives for Quality and Standards 3a (2006-10). The group is made up of senior officials from the Scottish Executive, the Scottish Environment Protection Agency, the Drinking Water Quality Regulator, the Commission, Scottish Water and Waterwatch Scotland. The OMG provides a single, objective source of information on progress. This allows all stakeholders to monitor Scottish Water's progress in delivering the outputs agreed in its capital investment programme baseline.

The group can also jointly discuss and propose any changes to the capital investment programme baseline that are required to meet the ministerial objectives. The group has established mechanisms so that agreed, minor changes to the baseline investment programme (for example to take account of new information) can be accommodated.

Where proposed changes would have a material impact on either delivery of the ministerial objectives or on Scottish Water's financial performance, alternative mechanisms, beyond the remit of the OMG, are employed. These include, where appropriate, the ability to 'log up' or 'log down' the impact of changes to the baseline. If the net present value of the impact of the proposed change exceeds 10% of Scottish Water's annual turnover then we may conduct an 'interim determination of charges'. The mechanisms for logging up/down and interim determinations are set out in Information Note 5 (available on the Commission's website).

The OMG is continuing to develop the processes for monitoring output delivery. It has approved a reporting format, which allows progress to be monitored against the targets set out in Scottish

Water's delivery plan. The group publishes a quarterly report on progress (available on the Scottish Executive's website).

We will seek to build on this improved monitoring of delivery. We propose to ask Scottish Water to set out, in its business plans, its expected output delivery profile during the regulatory control period. In particular we will be interested in Scottish Water's view of the minimum level of progress that is consistent with the delivery of all the ministerial objectives within the regulatory control period.

We also report on delivery of the capital programme in our annual 'Investment and asset management report'. This provides customers with information on Scottish Water's performance in achieving the targets set out in the final determination of charges for 2006-10.

Related documents

'The Strategic Review of Charges 2006-10: The draft determination', Volume 5, Water Industry Commissioner for Scotland, June 2005.

'The Strategic Review of Charges 2006-10: The final determination', Water Industry Commission for Scotland, November 2005.

Methodology Information Paper 21: Ofwat's approach to assessing capital maintenance requirements.

Introduction

This information paper sets out Ofwat's overall approach to assessing capital maintenance expenditure and whether it can be applied to Scottish Water.

Ofwat's approach

Ofwat employs a four-stage approach linked to the UKWIR common framework¹ for capital maintenance planning.

The four stages of Ofwat's approach are:

- Stage A: Maintaining serviceability to customers to date. Ofwat assesses the companies' current serviceability to customers and examines previous expenditure to maintain this level of serviceability.
- Stage B: Is the future period different? Ofwat asks the companies to set out how they expect future investment and serviceability trends to change in the future and to provide reasons for their judgements.
- Stage C: Scope for improvements in efficiency. Ofwat uses cost-base and econometric techniques to assess the potential for the companies to improve their efficiency.
- Stage D: Impact of the enhancement programmes. Ofwat takes account of the overlaps between the companies' quality enhancement programmes and their capital maintenance plans.

Could the Commission adopt the same approach?

We consider that there is currently insufficient information available in Scotland to implement Ofwat's approach to assessing the appropriate level of capital maintenance to allow for. In particular, there is insufficient historical information on the levels of capital maintenance expenditure and the performance of the network to allow the use of an UKWIR common framework approach to price setting.

¹ This is an industry-standard, forward-looking risk-based approach to capital maintenance that Ofwat first used in setting prices for 2005-10. The approach requires a large amount of reliable information about companies' costs and their asset bases, collected for a number of years.

We allowed for £15 million in the Strategic Review of Charges 2006-10 for Scottish Water to improve its information in this area. We are working with Scottish Water to ensure that the relevant information is identified and collected with accuracy. Despite Scottish Water's much increased focus on improving its information about the serviceability to customers of its assets, it is likely to be at least 6 to 8 years before we are in a position to apply the UKWIR Common Framework approach.

We set out our proposed approach for the 2010-14 review in Information Paper 22 'Our proposed approach to determining the appropriate level of capital maintenance expenditure to allow for.'

Related Documents

Ofwat, "Future Water and Sewerage Charges 2005-10: The Final Determination", November 2004, Chapter 11.

Methodology Information Paper 22: Our proposed approach to determining the appropriate level of capital maintenance expenditure to allow for

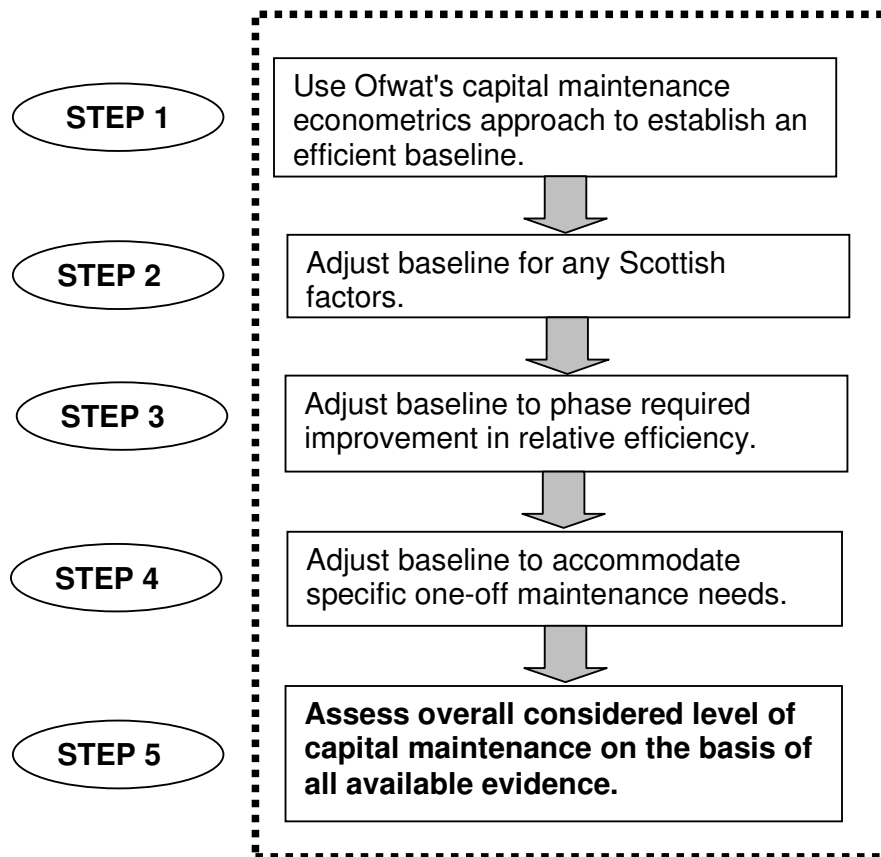
Introduction

This information paper sets out how we propose to establish a level of capital maintenance expenditure that will deliver stable customer service levels during the 2010-14 regulatory control period.

Overall approach

To assess capital maintenance expenditure in the Strategic Review of Charges 2010-14 we intend to build on the approach that we used in the 2006-10 Review. Our proposed approach is summarised in Figure 1.

Figure 1: Proposed approach to assessing Scottish Water’s capital maintenance requirements



Step 1: Use Ofwat's capital maintenance econometrics approach to establish efficient baseline

To establish a baseline for capital maintenance, we consider two related factors:

- the reference level of serviceability to customers; and
- the expenditure on maintaining the base level.

Reference level of serviceability to customers

In establishing the base level of serviceability to customers, we distinguish between:

- investment to maintain stable serviceability to customers of Scottish Water's assets; and
- investment to improve the level of serviceability of these assets to customers, deliver quality improvements and increase capacity.

To do this we establish a baseline level of the serviceability of Scottish Water's assets to its customers. Expenditure to maintain this level of serviceability would be classified as maintenance. Any expenditure to improve service beyond this level is classified as enhancement expenditure.

There are a number of approaches we could use to set a reference level of service. We could, for example:

- designate the level of customer service achieved by Scottish Water in a particular year;
- forecast levels of customer service allowed for in the regulatory settlement;
- benchmark against the level of customer service achieved by companies in England and Wales.

The ministerial objectives for the 2006-14 period established a defined minimum level of service to customers to be maintained throughout the period.

Regulators generally opt to define an actual level of service achieved in a base year as the level that is to be maintained. However, we consider that the ministerial objectives for 2006-14 also defined specific improvements to this baseline level of service on which Scottish Water was financed to deliver. As such these objectives should be used to define the baseline for the serviceability of assets to customers for the 2010-14 Strategic Review.

A number of technical adjustments may be required to convert the ministerial objectives to a workable definition of baseline serviceability. For example, information for some of the measures has improved and should be taken into account. In addition, a number of measures that were not specified in Ministers' objectives could also inform judgements about whether Scottish Water is at least maintaining a stable level of the serviceability of its assets to customers. We propose to take account of these factors.

Expenditure on maintaining the base level

We plan to use Ofwat's econometric modelling techniques to establish an initial estimate of the appropriate allowance for capital maintenance, consistent with a 2007-08 base year. These models are explained in Information Paper 23. We will revise the econometric models used by Ofwat to include information from Scottish Water.

We will also consider the practicality of updating these models for the Strategic Review of Charges 2010-14 in light of the latest available information from England and Wales and information in Scottish Water's business plans.

Step 2: Adjust for any Scottish factors

For an individual company, it is possible that there are additional factors that influence costs but which are not included in the models. These are known as 'special factors' because they may be relevant to just one or two companies' costs. Special factors can both increase or reduce costs. Perhaps not surprisingly, companies tend to concentrate on providing information about those factors that increase costs when explaining their efficiency to regulators.

As part of its business plan submissions, we will ask Scottish Water to submit its current view of the special factors that influence its costs. We propose only to take account of the special factors that are material and outside the control of management. We would then adjust the results of our models¹ to take account of these factors.

When considering special factors we expect to apply similar criteria to those used previously by the Commission and by Ofwat. For an adjustment to be valid, Scottish Water will have to provide a high standard of evidence in relation to the following questions:

- What are the special circumstances that produce a material difference from industry norms?

¹ See page 173 of the Strategic Review of Charges 2006-10 for this assessment in that Review.

- What is the overall net impact of the special factors on Scottish Water's costs?
- 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 the upward cost pressures?

We intend to seek confirmation of the evidence on the impact of these factors on Scottish Water's costs from the independent Reporter.

We will respond to Scottish Water's evidence on special factors that it provides in its first draft business plan. This will form part of our overall response to the first draft business plan, which we plan to publish on 31 July 2008. We will also hold a workshop with Scottish Water to discuss its evidence on special factors.

Step 3: Adjust baseline to phase required improvement in relative efficiency

With determined management, Scottish Water could outperform our capital expenditure efficiency assumptions for the 2006-10 regulatory control period. However, it also seems likely that the water and sewerage companies in England and Wales will further improve their efficiency during the same period. As such, it is likely that Scottish Water will continue to be less efficient than the benchmark water and sewerage company in England and Wales for capital maintenance. We will therefore need to assess the level of this inefficiency and determine an appropriate target for improvement².

We propose to use econometric and cost-base benchmarking techniques to assess Scottish Water's relative efficiency in its capital expenditure. We would assess capital maintenance efficiency relative to that of the leading water and sewerage companies south of the border in 2007-08. In our view Scottish Water should be challenged to deliver similarly stable serviceability of its assets to customers for an equivalent level of cost by the end of the 2010-14 regulatory control period.

Step 4: Adjust baseline to accommodate specific one-off maintenance needs

Scottish Water's 'bottom up' assessment of its capital maintenance may identify instances where future expected expenditure is different from historical levels. In general, we would expect such

² See page 242 of the Strategic Review of Charges 2006-10 for this assessment in that Review.

examples to be limited. There appears to be little reason to expect step changes in Scottish Water's requirement for capital maintenance. However exceptions may occur where there are significant one-off projects³.

It is worth noting that exceptional items may either increase or decrease costs. We would allow for such exceptional items in our modelling for the 2010-14 Review where Scottish Water can demonstrate that its claim:

- is based on reliable information;
- has been robustly costed, including external advice where necessary;
- has taken proper account of any offsetting factors;
- has withstood scrutiny by the Reporter;
- is not the result of economy-wide factors captured in inflation indices; and
- is not already accounted for in our benchmarking.

Step 5: Assess overall considered level of capital maintenance on the basis of all available evidence

From steps 1 to 4 of the process, we will be able to assess a level of capital maintenance expenditure required by Scottish Water to maintain stable serviceability of its assets to customers.

Our analysis would then compare our results against a range of other high-level approaches to assessing an appropriate allowance for capital maintenance⁴. This would include assessing whether there is any need to increase the level of spending in this area from the levels that have been seen since 2002.

There are a number of alternative information sources that may reveal high-level information about Scottish Water's capital maintenance requirements, including:

- comparisons of information from the industry on the age profile and failure rates of different classes of assets; and
- the views of other stakeholders, particularly the Scottish Environment Protection Agency and the Drinking Water Quality Regulator.

In our operating expenditure benchmarking, we have developed an alternative model that we use to check the results of our

³ See page 239 of the Strategic Review of Charges 2006-10 for this assessment in that Review.

⁴ See page 242 of the Strategic Review of Charges 2006-10 for this assessment in that Review.

Volume 4 supporting material: capital maintenance expenditure

econometric benchmarking. We may be able to use some of the factors listed above to develop a similar alternative model for capital maintenance expenditure.

Related documents

'The Strategic Review of Charges 2006-10: The draft determination', Volume 5, Water Industry Commissioner for Scotland, June 2005.

'The Strategic Review of Charges 2006-10: The final determination', Water Industry Commission for Scotland, November 2005.

Methodology Information Paper 23: Ofwat's capital maintenance econometric models

Introduction

This information paper sets out Ofwat's econometric models for assessing capital maintenance expenditure efficiency.

Outline of the econometric models

Information Paper 21 sets out Ofwat's overall approach to capital maintenance expenditure assessments. Part C of that assessment is an assessment of the scope for future efficiency in capital maintenance expenditure.

Ofwat's relative efficiency assumptions for capital maintenance are based on a 50/50 split of its targets from its cost-base¹ approach and its econometric assessment of efficiency.

Summary of the econometric models

Ofwat published a consultation on its econometric models in May 2007². There are nine models for capital maintenance expenditure:

- water resources and treatment;
- water distribution infrastructure;
- water distribution non-infrastructure;
- water management and general;
- sewerage infrastructure;
- sewerage non-infrastructure;
- sewage treatment;
- sludge treatment and disposal; and
- sewerage management and general.

The purpose of each model is to establish a relationship between the costs reported by the companies and external 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, we can determine the amount of capital maintenance that should be allowed for with some accuracy.

¹ The cost base method is a series of standard costs for completing units of work used for benchmarking companies' relative procurement efficiency. We explain this further in Information Paper 25.

² 'Capital Maintenance Relative Efficiency Modelling for the 2009 Periodic Review', Ofwat May 2007.

The cost drivers that are included within the econometric models are known as ‘explanatory factors’. The models themselves take different forms. These are summarised in Table 1.

Table 1: 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 and number of combined sewer overflows
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 now explain each of the models in detail³.

Water resources and treatment

This model estimates the costs of maintaining those assets from which water is sourced (eg reservoirs, dams and aqueducts) and where water is treated (eg water treatment works and associated pumping stations). The model is based on the premise that capital maintenance expenditure increases uniformly with company size; that is, there are constant returns to scale. In the model, the number of connected properties is used as a surrogate for company size.

The model shown in Table 2 was published in May 2007 and was developed from 1997-98 explanatory variables and six-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

³ All monetary values are in 2005-06 prices.

Table 2: Ofwat’s model for water resources and treatment capital maintenance expenditure

Water resources and treatment	
This is a unit cost model. Each company’s average annual water resources and treatment capital maintenance expenditure is divided by the total connected properties. This is then compared with the weighted average industry cost.	
£ per connected property	Weighted average industry cost = 8.973
Number of observations: 22	

Water distribution infrastructure

This model estimates the costs of maintaining the network of water mains. The main cost driver in this model is the logarithm of connected properties per length of main.

The model shown in Table 3 was published in May 2007 and was developed from 1997-98 explanatory variables and six-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

Table 3: Ofwat’s model for water distribution infrastructure capital maintenance expenditure

Water distribution infrastructure		
Modelled cost	Log to base e of (annual average water distribution infrastructure functional expenditure (£m), divided by length of main (km))	
Explanatory variables	Coefficient	Standard error
Constant	-5.103	0.661
Log to the base e of (total number of connected properties (000s) divided by total length of main (km))	0.739	0.244
Form of model	Log to base e of (annual average water distribution infrastructure functional expenditure (£m), divided by length of main (km)) = -5.103 + Log to the base e of (total number of connected properties (000s) divided by total length of main (km)) x 0.739	
Statistical indicators	Number of observations: 22	R ² : 0.314

Water distribution non-infrastructure

This model estimates the costs of maintaining the non-infrastructure assets related to water distribution such as service reservoirs, pumping stations and meters. The model recognises that capital maintenance expenditure increases with pumping station capacity and water storage capacity.

The model shown in Table 4 was published in May 2007 and was developed from 1997-98 explanatory variables and six-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

Table 4: Ofwat's model for water distribution non-infrastructure capital maintenance expenditure

Water distribution non-infrastructure		
Modelled cost	Log to base e of (annual average water distribution non-infrastructure functional expenditure (£m), divided by pumping station capacity (kW))	
Explanatory variables	Coefficient	Standard error
Constant	-5.739	0.530
Log to the base e of (water service reservoir and water tower storage capacity (Ml/d) /pumping station capacity (kW))	0.941	0.206
Form of model	Log to base e of (annual average water distribution non-infrastructure functional expenditure (£m), divided by pumping station capacity (kW)) = -5.739 + ln (water service reservoir and water tower storage capacity (Ml/d)/pumping station capacity (kW)) x 0.941	
Statistical indicators	Number of observations: 22	R ² : 0.510

Water management and general

This model estimates the costs of maintaining those assets used in the management function of the water business such as IT equipment, buildings and vehicles. The model relates costs to the size of the company (using the number of billed properties as a surrogate for company size). It recognises that costs increase with a greater proportion of business customers.

Volume 4 supporting material: capital maintenance econometric models

The model shown in Table 5 was published in May 2007 and was developed from 1997-98 explanatory variables and six-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

Table 5: Ofwat’s model for water management and general capital maintenance expenditure

Water management and general		
Modelled cost	Log to base e of (annual average water management and general expenditure (£m), divided by billed properties (000s))	
Explanatory variables	Coefficient	Standard error
Constant	-5.543	0.255
Proportion of billed properties that are non-household	9.165	3.324
Form of model	Log to base e of (annual average water management and general expenditure (£m), divided by billed properties (000s)) = -5.543 + proportion of properties that are non-household x 9,165	
Statistical indicators	Number of observations: 22	R ² : 0.286

Sewerage infrastructure

This model estimates the costs of maintaining the sewer network. The model recognises that capital maintenance expenditure on sewerage infrastructure increases with company size and uses sewer length as a surrogate for company size. Combined sewers are recognised as having higher maintenance costs than foul sewers; the number of combined sewer overflows is used in the model as a proxy for the length of combined sewers.

The model shown in Table 6 was published in May 2007 and was developed from 1997-98 explanatory variables and six-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

Table 6: Ofwat's model for sewerage infrastructure capital maintenance expenditure

Sewerage infrastructure		
Modelled cost	Log to base e of (annual average sewerage infrastructure expenditure (£m), divided by the total length of sewer (km))	
Explanatory variables	Coefficient	Standard error
Constant	-6.141	0.211
Log to the base e of (the number of combined sewer overflows divided by the total length of sewer (km))	0.385	0.060
Form of model	Log to base e of (annual average sewerage infrastructure expenditure (£m), divided by the total length of sewer (km)) = -5.606 + log to the base e of (the number of combined sewer overflows divided by the total length of sewer (km)) x 0.379	
Statistical indicators	Number of observations: 63	R ² : 0.399

Sewerage non-infrastructure

This model estimates the costs of maintaining the non-infrastructure assets of the sewerage service, largely sewage pumping stations. The model is based on the premise that capital maintenance expenditure increases uniformly with the number of pumping stations.

The model shown in Table 7 was published in May 2007 and was developed from 1997-98 explanatory variables and six-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

Table 7: Ofwat's model for sewerage non-infrastructure capital maintenance expenditure

Sewerage non-infrastructure	
This is a unit cost model. Each company's average annual sewerage non-infrastructure capital maintenance expenditure is divided by the total number of pumping stations. This is then compared with the weighted average industry cost.	
£m/number of pumping stations (000s)	Weighted average industry cost = 3.304

Number of observations: 10

Sewage treatment

This model estimates the costs of maintaining sewage treatment works. The model recognises that maintenance costs increase with the volume of sewage that is treated. In addition, the model takes into account the economies of scale of maintaining a few large works relative to maintaining a large number of smaller works.

The model shown in Table 8 was published in May 2007 and was developed from 1997-98 explanatory variables and five-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

Table 8: Ofwat’s model for sewage treatment capital maintenance expenditure

Sewage treatment		
Modelled cost	Log to base e of (annual average sewage treatment functional expenditure (£m), divided by the total load received at sewage treatment works (kg BOD ₅ /day))	
Explanatory variables	Coefficient	Standard error
Constant	-7.849	0.300
Log to the base e of (the total number of works divided by total load received at sewage treatment works (kg BOD ₅ /day))	0.204	0.044
Form of model	Log to base e of (annual average sewage treatment functional expenditure (£m), divided by the total load received at sewage treatment works) = -7.849 + log to the base e of (the total number of works divided by total load received at sewage treatment works) x 0.204	
Statistical indicators	Number of observations: 60	R ² : 0.270

Sludge treatment and disposal

This model estimates the costs of maintaining the assets used for sludge treatment and disposal. The model is based on the premise that capital maintenance expenditure increases uniformly with the total weight of dry solids disposed of.

The model shown in Table 9 was published in May 2007 and was developed from 1997-98 explanatory variables and six-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

Table 9: Ofwat’s model for sludge treatment and disposal capital maintenance expenditure

Sludge treatment and disposal	
This is a unit cost model. Each company’s average annual sludge treatment and disposal capital maintenance expenditure is divided by the total weight of dry solids disposed of. This is then compared with the weighted average industry cost.	
£000/weight of dry solids (ttds)	Weighted average industry cost = 70.566
Number of observations: 10	

Sewerage management and general

This model estimates the costs of maintaining the assets that are used in the management function of the sewerage business, such as IT equipment, buildings and vehicles. The model relates costs to the size of the company and uses the number of billed properties as a surrogate for company size.

The model shown in Table 10 was published in May 2007 and was developed from 1997-98 explanatory variables and five-year average expenditure (2000-01 to 2005-06) for the water companies in England and Wales.

Table 10: Ofwat’s model for sewerage management and general capital maintenance expenditure

Sewerage management and general	
This is a unit cost model. Each company’s average annual sewerage management and general capital maintenance expenditure per billed property is calculated. This is then compared with the weighted average industry cost.	
£ per billed property	Weighted average industry cost = 6.768
Number of observations: 10	

Methodology Information Paper 24: Capital efficiency

Introduction

This information paper explains our thinking on the different types of capital efficiency that large, asset-intensive companies such as Scottish Water can achieve.

Capital efficiency

Capital efficiency involves delivering the same outputs to customers at a lower cost. There are a number of ways in which a company can improve its capital efficiency:

- strategic asset management,
- programme planning or investment appraisal,
- procurement, and
- innovation’.

Strategic asset management: ‘saving by not doing’

Strategic asset management savings can be achieved by simply not spending the money that was allocated. It is essential to bear in mind that not spending would only be considered to be an efficiency if this were done without compromising output and performance measures. An example would be replacing pumps every five as opposed to every three years.

Programme planning or investment appraisal: ‘doing it better’

Improved programme planning could reduce the number of times an asset is visited in order to achieve the required outcomes. If contractors are on site, it could, for example, be more efficient to accelerate some planned capital maintenance.

Procurement: ‘buying it smarter’

This is perhaps the most obvious area where there is scope for efficiency. We can assess the scope for procurement efficiency by comparing the prices paid by a full range of companies and authorities for standardised capital projects.

In price setting, regulators have tended to focus on measuring procurement efficiency as it is readily measurable and potentially provides the largest scope for savings. We set out the cost base method for assessing procurement efficiency in Information Paper 25 ‘The cost base approach’.

Innovation: 'doing it the new way'

There is also likely to be some scope for efficiency to be achieved through innovation. We can compare current practice with new lower-cost techniques that are available.

How capital investment efficiency is assessed

We assess procurement efficiencies using Ofwat's cost base approach. As noted above, procurement efficiencies are often likely to form the largest part of potential cost savings¹.

The cost base approach does not assess the impact that strategic asset management, programme planning or innovation can have on reducing the costs of delivering capital investment outputs.

Information Paper 19, 'Reviewing the baseline programme', set out how we propose to carry out a detailed scope challenge of Scottish Water's capital investment proposals for 2010-14. This review will identify the potential for improved efficiency from strategic asset management, improved project planning and technical innovation.

Our incentive based approach to the regulation of Scottish Water will encourage management to maximise its capital efficiency. Our approach allows a determined management to outperform the regulatory contract and deliver the ministerial objectives for less than we allowed for. It is important to strike a balance between the price paid by customers now and ensuring that management have a reasonable incentive to improve their performance. At the next Strategic Review of Charges, we can pass any additional savings to customers in the form of lower prices.

¹ In 2001, the last time that each procurement area was discretely measured, Procurement inefficiency was around 29.5%. This compares to around 5.5% for innovation and 12.7% for the sum of strategic asset management and programme planning.

Methodology Information Paper 25: The cost base approach

Introduction

This information paper explains the cost base approach to measuring capital procurement efficiency. It sets out Ofwat's use of the approach in setting prices and our plans to use it in the Strategic Review of Charges 2010-14.

The cost base approach

We explained in Information Paper 24 that there are different types of capital efficiency that we can consider when reviewing Scottish Water's capital investment proposals. One area of potential efficiency savings is through greater procurement efficiency. We assess procurement efficiency using a methodology known as the cost base approach.

The cost base is a database of costs, termed 'standard costs', for a wide range of standardised projects or units of work. These standardised projects are typical of investment in water and sewerage services (both maintenance and enhancement investment).

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

Ofwat's use of the cost base approach

Ofwat uses the cost base approach to assess the relative efficiency of water companies in procuring and implementing capital projects. Ofwat uses the cost base technique to inform its assessment of relative efficiency for both capital maintenance and capital enhancement expenditure.

Ofwat's approach to analysing the cost base has a number of stages:

- review the submissions;
- assess company-specific factors;
- benchmark selection; and
- determine targets for catch-up improvement.

Review the submissions

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

- ensure that the standard costs that are submitted comply with the specifications and guidance;
- ensure that the engineering judgement grades¹ 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.

Assess company-specific factors

In its 2004 price determination, Ofwat allowed only one company-specific factor – an adjustment for regional variations in construction, labour and tender costs. Ofwat based its assessment of these adjustments on a study of the building and construction cost indices published by the Building Cost Information Service and the Department of Trade and Industry. Regional price factors were applied to the typical civil construction and plant installation elements of each standard cost submitted by the company. This generated company-specific regional price adjustments. The company-specific regional price adjustments ranged from 0.8-17.5% in the water service and 1.7-15.7% in the sewerage service.

Ofwat has not published detailed information about its methodology for calculating these price adjustments, nor has it published a list of the companies that were allowed adjustments.

Benchmark selection

Ofwat chooses as benchmark standard costs the lowest reported cost for each standard project, 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;

¹ Engineering judgement grades are used to assign both a reliability and accuracy grade to each individual cost. A grade of A1 indicates that the cost is based on accurate company-specific data relating to an activity in which the company has considerable experience, whereas a grade of D4 is based on international/national estimates with no company experience.

- the standard cost was of sufficient robustness to warrant an engineering judgement grade of B3 or better; and
- single company standard costs were generally used to derive the benchmark for items commonly procured from a single source over a range of sizes.

In addition, at the 2004 price review, Ofwat asked Babbie Group to compile its own cost estimates for each standard cost in advance of the company submissions being received. These estimates were used to test the appropriateness of the benchmark choice.

Determine targets for catch-up improvement

Ofwat calculates the relative efficiency of each company by first comparing each reported standard cost with the chosen benchmark and then weighting the result according to capital investment in the Review period. In this way, standard costs for projects that represent a large proportion of the capital investment programme have proportionately greater influence on the overall assessment².

How we propose to apply the cost base approach in the Strategic Review of Charges 2010-14

Overall approach

Our current plan is to use Ofwat's cost base approach to assess Scottish Water's capital expenditure procurement efficiency in the Strategic Review of Charges 2010-14. In doing so, we would be following the same approach we used at the 2006-10 Review.

To inform our assessment we would have to ask Scottish Water to submit information on its 2007-08 cost base.

Review of Scottish Water's submission

We propose to review Scottish Water's submission to:

- ensure that the standard costs meet our specification and guidance;
- ensure that the engineering judgement grades have been correctly applied; and
- confirm that Scottish Water has derived its standard cost estimates independently.

² For further information about Ofwat's approach see 'Capital works unit costs in the water industry: Feedback on our analysis of the March 2003 water company cost base submissions', Ofwat, May 2003.

Company-specific factors

We will consider any special factors that Scottish Water brings to our attention. There are a number of factors that could be considered:

- Scotland's geography (size, remote islands, long coastline, topography);
- Scotland's settlement patterns (remote communities and 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 etc); and
- the nature of the customer base.

However, we note that many of these factors could be relevant to one or more companies in England and Wales and that Ofwat did not take account of any such factors in its 2004 final determinations. Instead it only took account of regional pricing factors.

We also propose to take account of evidence about regional price variations in construction, labour and tender costs. As such, we would ask Scottish Water to bring any such factors to our attention.

Benchmark selection

We propose to apply the same criteria as Ofwat in determining the appropriate benchmark (these criteria are set out above).

Relative efficiency

In our view we should apply the same approach as Ofwat in calculating Scottish Water's relative efficiency (the approach is set out above).

Scope for improvement

Our current thinking is that Scottish Water should be required to narrow 75% of any assessed gap in its efficiency during the 2010-14 period.