

Methodology Information Paper 15: Establishing the operating cost efficiency gap – our alternative model

Introduction

This paper describes our alternative model, developed in 2001, which provides a second approach to assessing the scope for Scottish Water to improve its operating cost efficiency.

The paper begins with a brief account of how we developed the alternative model. It goes on to describe the activities that are being modelled, the cost drivers for each activity, and the economies of scale associated with the cost drivers. The paper concludes with an outline of our proposals for the next price review.

Further technical details about the alternative model have been published and are available on our website¹.

Development of the alternative model

We originally developed the alternative model as part of the Strategic Review of Charges 2002-06. It was developed in response to the Competition Commission's view² that Ofwat should not rely solely on its suite of nine operating expenditure models to assess relative efficiency. The alternative model provides a separate, second approach to assessing the scope for Scottish Water to improve its efficiency.

In developing our alternative model we took particular care to use a different approach to that used in Ofwat's econometric models³. In our view, for an alternative method to have value, it has to provide an independent check. Our alternative model is therefore based on the premise that asset use, volumes and/or customers are the main drivers of most running costs. The model calculates the impact of each of these drivers separately on each of a number of activities. In contrast, the Ofwat econometric models examine the interrelationships between drivers, and focus on the drivers that explain differences in the observed costs of the companies most effectively. The Ofwat models do not separate the impact of each individual cost driver.

¹ 'Our work in regulating the Scottish water industry: The scope for operating cost efficiency', Section 3, Chapter 9, Water Industry Commissioner, October 2004.

² 'Mid Kent Water Plc: A report on the references under sections 12 and 14 of the Water Industry Act 1991', <http://www.competition-commission.org.uk>, 2000. The Competition Commission has recently reiterated its view in 'South East Water Limited and Mid Kent Water Limited: A report on the completed water merger of South East Water Limited and Mid Kent Water Limited', <http://www.competition-commission.org.uk>, 2007.

³ Methodology Information Paper 14 gives details of our use of Ofwat's econometric models.

Our alternative model used information from the ten water and sewerage companies in England and Wales. In preparation for the Strategic Review of Charges 2006-10 we developed a second version of the model, which had the same structure but incorporated management information from Scottish Water. We used both of these models at the Strategic Review of Charges 2006-10.

Alternative model activities

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. As with the econometric models, we populate the model with published information from the annual returns of Scottish Water and the companies south of the border. We use this information to predict what it would cost, on average, to carry out each activity. We are primarily interested in the total predicted costs for the water service, the sewerage service and the combined services. The results of our modelling allow us to compare total predicted costs with actual reported costs.

This comparison indicates the likely scope for improvement.

Cost drivers

Tables 1 and 2 set out the cost drivers (for water and sewerage respectively) that we identified for each activity.

Table 1: Alternative model – cost drivers by activity for the water service

Activity	Cost drivers used in the model, associated with each 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	Average pumping head in abstraction and treatment
	Boreholes and springs				
	River and burn abstraction				
	Simple water treatment works				
	Complex water treatment works				
Water distribution	Large diameter water mains	Length of network	Number of connected customers	Annual distribution input	Average pumping head in the distribution system
	Small diameter water mains				
	Water pumping stations	Number and average size of each asset type			
	Service reservoirs				
Business activities			Number of billed water customers – household (unmeasured, measured) and non-household (unmeasured, measured)		Annual number of water samples taken
Bad debt					Annual revenue billed

Table 2: Alternative model – cost drivers by activity for the sewerage service

Activity	Cost drivers used in the model, associated with each activity				
	Assets operated	Asset attribute	Customers served	Volume	Other
Sewage collection	Sewers	Length of network	Number of connected customers		Size of area served
	Pumping stations	Number and average size			
	Storm outfalls	Number			
Simple sewage treatment	Sea outfalls – screened and unscreened	Number and average size		Load treated	
	Preliminary treatment works				
	Primary treatment works				
	Public septic tanks	Number			
Complex sewage treatment	Secondary treatment works using i) activated sludge processes and ii) biological processes	Number and average size		Load treated	
	Tertiary treatment works using i) activated sludge processes and ii) biological processes				
Processing sludge	Own sludge works and sludge treatment centres	Number and average size		Tonnes disposed (dry weight)	
Business activities			Number of billed water customers – household (unmeasured, measured) and non-household (unmeasured, measured)		
Bad debt					Annual revenue billed

We use information from Scottish Water and from the water and sewerage companies south of the border for each of the cost drivers listed above. The aim is to understand the costs associated with each driver, and to add up each of these costs to obtain an estimate of the total cost of each activity. We also need to take account of any economies of scale. This is discussed below.

Economies of scale

Economies of scale at an asset level can be significant in the water industry. In the alternative model, we are particularly interested in economies of scale that are a function of the type and size of the assets. We have used information from the annual returns of the companies and of Scottish Water to estimate economies of scale associated with different types of assets. As far as possible, we have sought to ensure that our estimates of economies of scale are reasonable. For example, we have different estimates of economies of scale for simple sewage treatment works and for complex sewage treatment works.

We combine information about the size of the assets that are operated by each water and sewerage company and our estimates of economies of scale, to determine a 'standard' size for each type of asset within the model. This allows us to calculate how many such 'standard' size assets each water and sewerage service provider has in its asset base and consequently to calculate a single unit cost for each asset type. We multiply the number of 'standard' assets by the appropriate unit cost to calculate the predicted costs of operating each company's assets.

We assume that economies of scale do not apply to non-asset costs. The model simply uses the information relating to customer numbers, volumes and so on that is provided by the companies south of the border and by Scottish Water.

Proposed approach for 2010-14

We propose to continue to use the two forms of the alternative model that we developed for the last price review. We intend to recalibrate the models using detailed information for 2007-08 taken from the annual returns of the water and sewerage companies and Scottish Water.

We propose again to use these models to confirm the results of our analysis of both the original Ofwat and our revised econometric models.

Related documents

'Strategic Review of Charges 2002-06', Water Industry Commissioner for Scotland, November 2001.

'The Strategic Review of Charges 2006-10: The draft determination', Volume 6, Water Industry Commissioner for Scotland, June 2005.

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