



# **Analysis of cost / revenue balance in water and sewerage charges**

**A REPORT PREPARED FOR THE WATER INDUSTRY COMMISSION FOR  
SCOTLAND**

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## Executive summary

### INTRODUCTION

Frontier Economics has built on its previous study of wholesale charges to assess the cost / revenue balance between various customer groups. The aim of the analysis is to assist the Commission in advising Ministers as part of the current Ministers' policy statement and will be used to help determine charges for the Strategic Review of Charges 2010-14.

The figures presented are the best estimate of the imbalances. The analysis considered a range of sensitivities around the best estimates but these do not impact the findings materially.

### MAIN FINDINGS

The diagram overleaf summarises the cost / revenue balance for the main customer groups. This is based on data for 2005/06, but makes allowance for the impact of expected changes in charges to 2009/10.

The main findings from this assessment are as follows:

- Overall water and wastewater revenues are in line with costs.
- There is a rebalancing of £22 million between households and non-households required to bring costs and revenues into line, with households facing an increase in bills while average bills for non-households will be reduced<sup>1</sup>.
- To bring costs and revenues into line, smaller non-household water customers may see a modest decrease in their charge, whilst larger customers may see an increase of 27%.
- Within the non-household sector there would be significant increases in trade effluent bills (up to 74% - and even higher if all rebalancing focused on non-special agreement customers) but correspondingly significant reductions in foul sewerage bills.

### IMPLICATION FOR STRATEGIC REVIEW OF CHARGES

- The scale of the household imbalance is slightly less than SRC06-10. In a broad framework of price stability, this imbalance can be managed through setting slightly higher charge caps for household customers.
- The scale of imbalances on non-household customer charges creates more difficult challenges. This is particularly true in relation to trade effluent customers.
- Experience indicates that the impact of rebalancing on specific customer groups can be more easily managed in an environment of stable or generally falling prices.

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<sup>1</sup> Before taking account of rebalancing within non-household sector.

Water ↑ +£1.6m +0.4%				Wastewater ↓ -£1.6m -0.3%			Imbalances increase as granularity increases  ↓
Non-household -£5.6m ↓ -6.1%		Household +£7.2m ↑ +2.5%		Non-household -£16.1m ↓ -8.7%		Household +£14.6m ↑ +4.7%	
0-100MI -£3.2m ↓ -3.8%	100-250MI +£0.6m ↑ +8.8%	250-1,000MI +£1.5m ↑ +27%	1,000MI+ -£4.5m ↓ -43%	Trade effluent +£20.5m ↑ +74% <sup>2</sup>	Foul -£46.5m ↓ -58%	Surface drainage +£9.9m ↑ +11%	

<sup>2</sup> If the revenue imbalance in trade effluent was recovered only from non-special agreement customers then the implied rebalancing would even greater.



# 1 Introduction

This report provides an analysis of the balance between revenues and costs for different groups of customers for water and sewerage services in Scotland. The aim of the analysis is to assist the Water Industry Commission for Scotland (the Commission) in advising Ministers and to help determine charges for the Strategic Review of Charges 2010-14.

The assessment presented in this report builds on the cost allocation exercise undertaken for the Commission and Scottish Water as part of the analysis of wholesale charges. The analysis considers the balance of revenue and costs for the following customer groups:

- water customers: divided into households, non-households consuming less than 100Ml per annum and non-households consuming more than 100Ml per annum;
- sewerage customers: divided into households, non-households with water consumption less than 100Ml per annum and non-households with water consumption more than 100Ml per annum; and
- trade effluent customers.

The report is structured as follows:

- Section 2 assesses the extent of cross-subsidy based on data for 2005/06;
- Section 3 projects the extent of cross-subsidy forward to 2009/10;
- Section 4 provides an assessment of sensitivities and uncertainties in the analysis.



## 2 Analysis of costs and revenues in 2005/06

### 2.1 COSTS BY CUSTOMER GROUP

Table 1 provides the breakdown of costs (retail and wholesale costs) for the different customer groups, including household (HH) and non-household (non-HH), for 2005/06. The final row of the Table shows the costs for each group expressed as a percentage of total costs (£968.8m).

Water			Wastewater					
432.3			536.6					
Water			Surface drainage		Foul sewerage		Trade effluent	
432.3			225.7		264.2		46.6	
Non-HH		HH	Non-HH	HH	Non-HH	HH		
118.1		314.2	104.6	121.1	39.5	224.7	46.6	
<100MI	>100MI				<100MI	>100MI		
87.3	30.8	314.2	104.6	121.1	38.7	0.8	224.7	46.6
9.0%	3.2%	32.4%	10.8%	12.5%	4.0%	0.1%	23.2%	4.8%

Table 1: Total costs – retail and wholesale - 2005-06 (£m)

Source: Frontier Economics analysis of WCIR (Wholesale Charges Information Request) and Annual Returns data

The cost results are based on the following data and analysis.

- The division of costs between water, surface drainage, foul sewerage and trade effluent is taken from data returns submitted by Scottish Water.
- The allocation of these costs between households and large and small non-household customers is based on the cost allocation exercise undertaken for the wholesale charges study. This allocates costs according to the appropriate volume or capacity driver.
- The above allocation applies only to wholesale costs. The retail costs have been allocated based on indicative retail margins for different customer segments. The level of retail costs is consistent with the data in the Final Determination.

### 2.2 REVENUE BY CUSTOMER GROUP 2005/06

Table 2 provides the breakdown of revenue for the different customer groups for 2005/06. These numbers are expressed as a percentage of the total.

Water		Wastewater					
44.3%		55.7%					
Water		Surface drainage		Foul sewerage		Trade effluent	
44.3%		21.9%		31.0%		2.8%	
Non-HH	HH	Non-HH	HH	Non-HH	HH		
13.3%	31.0%	10.2%	11.7%	9.1%	0.1%	21.7%	
<100MI	>100MI				<100MI	>100MI	
9.7%	3.6%	31.0%	10.2%	11.7%	9.1%	0.1%	21.7%
							2.8%

Table 2: Retail revenue 2005-06 (percentages)

Source: Frontier Economics analysis of Annual Returns, WCIR and WIC22 data

The revenue results are based on the following data and analysis.

- Household wastewater revenue is not divided between surface drainage and foul sewerage. For the purpose of this analysis the revenue has been allocated in the same proportion as the cost split for household wastewater services.
- The annual return data tables do not divide non-household revenue between customers below 100MI per annum and customer above 100MI per annum. The Annual Return reports:
  - volumetric revenue in terms of the blocks which have the same price; and
  - meter revenue in terms of the revenue from different sizes of meter.

In order to allocate these revenues to different sizes of customer it is necessary to estimate the proportions of each of these revenue sources (i.e. each volume block and each meter size) attributable to each group of customers.

We used volumes in the WIC22 database to categorise customers by size, and to split these consumptions into the relevant volume blocks. For each volume block, this gives the proportion of volume consumed by the different sizes of customer. These shares are used to allocate the revenue from each volume block to the respective customer groups.

For each size of meter we used the meter size / volume band mapping in W5.2 to infer the proportion of meters used by the different customer groups. These shares are applied to the corresponding revenue of each meter size, thus splitting revenue between the customer groups.

### 2.3 BALANCE BETWEEN COSTS AND REVENUE BY CUSTOMER GROUP 2005/06

Table 3 shows the rebalancing required (in £million) to bring the revenue in line with costs for each customer group. These figures are reported relative to 2005-06 costs. The rebalancing shown in any row in the Table will sum to zero across the customer groups.

Water				Wastewater				
3.0				-3.0				
Water				Surface drainage		Foul sewerage		Trade effluent
3.0				13.3		-35.8		19.4
Non-HH		HH	Non-HH	HH	Non-HH		HH	
-10.8		13.8	6.0	7.3	-50.1		14.4	19.4
<100MI	>100MI				<100MI	>100MI		
-7.0	-3.8	13.8	6.0	7.3	-49.7	-0.4	14.4	19.4

Table 3: Rebalancing required to move 2005-06 retail revenue in line with 2005-06 costs (£m)

Source: Frontier Economics analysis WCIR, Annual Returns, WIC22 and Final Determination data

The same results are shown in Table 4 except that the rebalancing is expressed as a percentage of revenue in that customer group. This provides an indication of the change in charges required for that group required to bring balance between revenue and costs. An important point to note is that for the non-household groups it is assumed that the change would not be applied to customers on special agreements. If the trade effluent imbalance was recovered from all trade effluent customers then the implied increase in charges would be 70%<sup>3</sup>.

<sup>3</sup> Alternatively, if non-special agreement customers were given increases of 70% but special agreement customers were left unchanged then this would leave a revenue shortfall of around £6m to be recovered from other customers (i.e. less than 1% of non-trade effluent revenue).

Water				Wastewater				
0.7%				-0.6%				
Water				Surface drainage		Foul sewerage		Trade effluent
0.7%				6.2%		-11.7%		107.4%
Non-HH		HH		Non-HH		HH		
-8.8%		4.5%		5.9%		6.3%		-55.2%
6.7%								107.4%
<100MI		>100MI		<100MI		>100MI		
-7.3%		-14.6%		4.5%		5.9%		6.3%
-55.2%		-52.9%		6.7%				107.4%

Table 4: Percentage increase in bill required to move 2005-06 retail revenue in line with 2005-06 costs, assuming no further rebalancing for special agreement customers

Source: Frontier Economics analysis WCIR, Annual Returns, WIC22 and Final Determination data

The main findings from this assessment are as follows:

- Overall there would not need to be any significant rebalancing between water and wastewater services.
- There would be some rebalancing between households and non-households, with households facing an increase in bills while bills for non-households are reduced.
- With the non-household sector there would be significant increases in trade effluent bills and significant reductions in foul sewerage bills.

### 3 Projecting cost / revenue balance to 2009/10

The Final Determination of Charges for the period 2005-09 allowed for some rebalancing of revenue between different services. This was reflected in different K factors for different services over the period. As a result, in order to assess the extent of rebalancing that may be appropriate over the period 2010-14 the analysis should consider the impact of existing rebalancing upto 2009/10.

#### 3.1 PROJECTED REVENUE BY CUSTOMER GROUP 2009/10

Table 5 shows the projected revenue by customer group in 2009/10. This has been calculated by taking the revenue in 2005/06 and rolling forward by the K-factors in the Final Determination for the different services. These numbers are expressed as proportions of total revenue.

Water				Wastewater				
44.5%				55.5%				
Water				Surface drainage		Foul sewerage		Trade effluent
44.5%				21.8%		31.1%		2.7%
Non-HH		HH		Non-HH	HH	Non-HH	HH	
12.8%		31.7%		9.8%	12.0%	8.9%	22.2%	2.7%
<100MI	>100MI					<100MI	>100MI	
9.3%	3.4%	31.7%	9.8%	12.0%	8.8%	0.1%	22.2%	2.7%

Table 5: Proportions of retail revenue from applying K-factors through to 2009-10

Source: Frontier Economics analysis of Annual Returns, WIC22 and Final Determination data

The total revenue projection (and the split across groups) will differ from the projections that underpinned the Final Determination. The reason for this is that the out-turn customer number and volumes for 2005/06 are different to those assumed in the Final Determination<sup>4</sup>.

<sup>4</sup> Data is available on customer numbers and volumes for 2006/07. This data could be used to derive a potentially more realistic projection of revenue for 2009/10. However, the cost allocation is based on customer numbers and volumes for 2005/06 and these allocations would be altered by any changes to customer numbers and volumes. As a result, our view is that the most reasonable comparison of revenues and costs for 2009/10 is obtained by projecting forward the 2005/06 data.

### 3.2 BALANCE BETWEEN COSTS AND REVENUE BY CUSTOMER GROUP 2005/06

Table 6 shows the rebalancing that would be required (in 2005/06 £m) to bring revenues in balance with costs. This replicates Table 3 while taking account of the impact of differential K-factors to 2009/10.

Water				Wastewater				
1.6				-1.6				
Water				Surface drainage		Foul sewerage		Trade effluent
1.6				14.7		-36.8		20.5
Non-HH		HH	Non-HH	HH	Non-HH		HH	
-5.6		7.2	9.9	4.8	-46.5		9.7	20.5
<100MI	>100MI				<100MI	>100MI		
-3.2	-2.4	7.2	9.9	4.8	-46.2	-0.4	9.7	20.5

Table 6: Rebalancing required to move 2009-10 K-rolled retail revenue in line with 2005-06 costs (£m), expressed in 2005-06 costs

Source: Frontier Economics analysis WCIR, Annual Returns, WIC22 and Final Determination data

Table 7 shows the rebalancing expressed as a percentage of revenue in that customer group. This provides an indication of the change in charges required for that group required to bring balance between revenue and costs. Again, for the non-household groups it is assumed that the change would not be applied to special agreement customers. If the trade effluent imbalance was recovered from all trade effluent customers then the implied increase in charges would be 74%.

Water			Wastewater				
0.4%			-0.3%				
Water			Surface drainage		Foul sewerage		Trade effluent
0.4%			7.5%		-13.1%		128.2%
Non-HH		HH	Non-HH	HH	Non-HH		HH
-6.1%		2.5%	11.1%	4.4%	-58.0		4.8%
<100MI	>100MI				<100MI	>100MI	
-3.8%	-10.5%	2.5%	11.1%	4.4%	-58.0%	-52.9%	4.8%
							128.2%

Table 7: Percentage increase in bill required to move 2009-10 K-rolled retail revenue in line with 2005-06 costs (£m), assuming no further rebalancing for special agreement customers

Source: Frontier Economics analysis WCIR, Annual Returns, WIC22 and Final Determination data

The main findings from this assessment are that the rebalancing based on the 2009/10 revenue data is broadly similar to the results based on 2005/06 revenue. The differential K factors make only a modest difference to the estimated imbalance between revenue and costs.



## 4 Assessment of sensitivities and uncertainties

The final section briefly considers the main sensitivities and uncertainties in this revenue and cost analysis.

### 4.1 COST ANALYSIS

The assessment of sensitivities at the cost level has focused on three areas:

- broad cost split across services;
- cost allocation to customer groups; and
- allocation of retail costs..

#### 4.1.1 Cost split across service

The broad division of costs across services is taken from data supplied directly by Scottish Water. For wholesale costs the information was provided in the Wholesale Charges Information Return and for retail costs the information is provided in the annual return. The data has been subject to independent audit and scrutiny and has a reasonably high degree of certainty attached to it.

#### 4.1.2 Cost allocation to customer groups

The next stage in the analysis is to allocate the broad cost splits by customer groups (household, small non-household and large non-household). This allocation was based on the work undertaken by Frontier for the wholesale charges study and involved the allocation of specific cost categories by driver (e.g. volume and peak).

The wholesale charges study identified a robust base case for these allocations. Nevertheless it is possible to consider the impact of alternative scenarios. We have repeated the wholesale cost allocation, varying the assumptions used in the base case analysis. The impact of these scenarios on the costs and rebalancing for the household sector is shown below.

	Water		Wastewater (surface and foul)	
	Total costs - HH	Rebalancing - HH	Total costs - HH	Rebalancing - HH
Base case	314.2	7.2	345.9	14.6
Scenario 1	324.2	17.6	348.6	17.8
Scenario 2	306.5	-0.9	343.5	11.8

Table 8: Total household costs and rebalancing required to move 2005-06 revenue in line with 2005-06 retail costs using different cost allocation assumptions (£m)

Source: Frontier Economics analysis of WCIR, WIC22 and Annual Returns data

The scenarios do not necessarily represent the extreme high case or low case scenarios that could be developed. Nevertheless, they do represent significant variation in the assumptions that underpin the cost allocation analysis. They show that the extent of the rebalancing required between household and non-household does vary to a moderate extent depending on the assumptions used.

### 4.1.3 Retail costs – non-households

The retail costs for non-households have been inferred by using indicative retail margins. We do not consider that the overall rebalancing results are particularly sensitive to this assumption.

## 4.2 REVENUE ANALYSIS

On the revenue analysis we have considered the sensitivity of results to (i) the allocation of revenue to large and small non-households and (ii) the treatment of special agreement customers.

### 4.2.1 Revenue by non-household size band

As described in Section 2 we undertook an analysis of the WIC22 dataset to divide non-household revenue by size band. We are confident that these results are robust and do not generate any material sensitivity.

### 4.2.2 Treatment of special agreement customers

The results in Table 4 and Table 7, which show the percentage increase in bill required to achieve balance between costs and revenues, assume that there is no rebalancing on special agreement tariffs. Alternative assumptions would potentially have a material impact on the percentage increase in bill for trade effluent and large non-household foul sewerage charges.



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