

# ECONOMIC PERSPECTIVE

## CHARGING FOR WATER IN SCOTLAND: OPTIONS FOR CHANGE

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### 1. Introduction

During the summer months the issue of charging for water services enjoyed a prominent position on the English and Scottish political agendas, for very different reasons. In England the prolonged period of fine dry weather focused political and media attention on charging as a means of demand management in areas suffering from an acute shortage of water. In Scotland, where the drought was less severe, the debate centred on the question of the level of charges to be imposed by the three new Public Water Authorities (PWAs)<sup>1</sup> due to take over responsibility for water services from the regional councils in 1996.

A by-product of this increased public attention was the recognition that the Government adopted quite different charging policies for domestic water supplies in Scotland, England and Wales. At the height of the drought the Government affirmed its support for a policy of progressive domestic water metering in England and Wales. This reinforced the stance taken by the quality regulator, the National Rivers Authority<sup>2</sup>, which continued its work on identifying a whole series of schemes to augment supplies and develop new water resources south of the border<sup>3</sup>. In Scotland research commissioned by the Scottish Office<sup>4</sup> confirmed the public perception that the country enjoyed abundant water resources. Pricing devices such as metering, used to supplement conventional demand management, were therefore rejected as being unnecessary and financially burdensome. Politically

more concern was expressed over the absolute level of charges rather than the way in which those charges would be levied.

Over the next few months, in the run up to Scottish local government reorganisation on 1st April 1996, appointees to the new PWA boards will be considering both issues: the overall level of charges and the way in which those charges will be levied. Faced with the tasks of raising additional revenue to finance large capital projects, harmonising regional charges and having their proposed schemes approved by the new customer watchdog the Scottish Water and Sewerage Customers' Council the authorities will be taking decisions, the effects of which will be felt by their customers well into the next millennium. With this challenge comes a unique opportunity to reassess one fundamental policy question from an economic point of view: how should Scottish consumers pay for their water services?

In this paper we endeavour to answer this question by outlining and analysing three alternative charging schemes available to the new PWAs. Section 2 of the paper sets out the current charging regime within the present institutional structure. Section 3 considers the impact on customers of moving from the current charging system to one of three alternatives: a licence fee, a per capita fee and a simple metering arrangement. In section 4 we analyse the potential impact of a movement to these different charging systems for customers of the new PWAs. We conclude by drawing out the policy implications of the analysis.

### 2. The Current Charging Regime

At present Scottish consumers pay for water and sewerage services through the local authority council tax system, charges being based on the council tax valuation banding of houses.<sup>5</sup> The fees

1 The North, East and West of Scotland Water Authorities will assume operational responsibility for water and sewerage services from the twelve Regional Councils on 1st April 1996.

2 The English and Welsh water quality regulator.

3 National Rivers Authority (1994) *Water: Nature's Precious Resource*, Publ: NRA.

4 The research concluded, "that there will be sufficient resources to meet average demands for public water supplies at the national [i.e. Scottish] and regional levels until at least 2016." The Scottish Office (1995) *Public Water Supplies in Scotland: An Assessment of Demands and Resources at 1994*, Publ: The Scottish Office, p xi.

5 The usual system of discounts applies. Adult households for

for water and sewerage services are, however, levied in slightly different ways; with water charges appearing as a separate item on council tax bills, but sewerage being financed from general tax revenues and therefore not identified separately. In effect Scottish consumers are charged for water and taxed for sewerage. For the purposes of this paper we confine our attention to water charges in order to abstract from the difficulties of imputing notional sewerage charges based on aggregate taxation figures. We argue that the analysis undertaken in the context of water carries over directly to sewerage and therefore nothing of substance is lost through making this assumption. The gains, however, in terms of data accuracy are considerable.

We adopt 1994/5 as the 'base year' for our analysis, using the charges levied by the twelve regional and islands councils during that period as the reference. There are two institutional reasons for doing this, both related to the reform of local government finance and organisation in Scotland. In the first place the base year is sufficiently far removed from the period in which Scottish local government finances were reformed previously, in the move from the controversial 'community charge' to the current council tax system, to have allowed early administrative difficulties associated with the change to have been resolved. Secondly it is well before opposition to the 1996 local government reorganisation crystallised. Consequently the 1994/5 charge levels are not tainted by short term funding measures taken by local councils in 1995/6 in order to hold charges at an artificially low level in the period preceding the reform.<sup>6</sup>

Tables 1 and 2 below set out the council tax property valuation bands and the regional household water charges relating to properties within each band.

This charging system has several attractive features. From the consumers' point of view it is simple, difficult to evade and fairly equitable with customers in similar circumstances paying similar charges. Administratively it is simple to operate and relatively cheap to collect. As a property based tax the revenues from it are certain and losses through evasion are less of a problem than with

other systems.

However it has several disadvantages as well. Firstly the system is allocatively inefficient. In other words, prices do not reflect the incremental (marginal) costs to the community of satisfying incremental (marginal) demands. Consequently a community's net benefits may not be maximised under the system. Secondly, the property based flat charge gives no incentive for consumers to conserve water. Technically, consumers face a zero price for water at the margin; which may result in water being overused. Thirdly, although the system appears horizontally equitable, house valuation remains a rather poor proxy for total household water consumption in that charges bear some relation to income levels. Clearly a family of four living in a band D property would consume more water than a two adult pensioner household living in a similar property. And whilst the system of discounts for single adults removes one of the worst anomalies created by the system, others still remain.

Overall then, whilst the present system of charges is administratively workable, and broadly acceptable to politicians and the public, there is a strong case to be made for examining closely practical alternative charging arrangements.

### 3. Alternative Charging Arrangements

The three alternative charging systems we consider in this paper are: i) a licence fee, ii) a per capita charge and iii) metering. The licence fee is assumed to be a flat rate charge of the conventional kind, applicable to every household<sup>7</sup> supplied with water. The fee is invariant with respect to the quantity of water consumed, the number of people comprising the household, the size or value of the property. The per capita charge resembles the old community water charge, being levied on individual consumers rather than household units. Again the charge is invariant with respect to the quantity of water consumed and the size of property inhabited. Under metering, consumers are charged on the basis of the quantity of potable water consumed (£ per cubic metre). For this option we assume that a small standing charge<sup>8</sup> of £10 is levied to cover the fixed costs of billing and other administration. Once again the charge is not related in any way to

example are entitled to 25% discount on their total bill.

<sup>6</sup> On 5/2/95 the Aberdeen Press and Journal reported that Grampian Regional Council would use £4million of accumulated reserves to subsidise water charges during 1995/6.

<sup>7</sup> Each household under this system is uniquely identified with a property.

<sup>8</sup> For the purposes of exposition we assume a zero standing charge for the first two options. Relaxation of this assumption is straightforward but does not radically alter the results of the analysis.

the size of the property inhabited by a household.

The first question to be addressed in this section is quite simply: what is the impact on customer charges of the three alternative schemes? To answer this we make two further assumptions. First, we assume that individual regions must raise as much revenue under the new charging arrangements as under the current council tax banding system.<sup>9</sup> In other words, an assumption of 'revenue neutrality' is made. Second, in order to calculate a unit charge for metered water we assume a consumption level of 148 litres per person per day: the median consumption figure arrived at by the Scottish Office's latest domestic water consumption survey.<sup>10</sup> Table 3 lists charges by region under the three alternative charging regimes.

Comparing the results reported in Table 3 to those in Table 2 it is clear that the level of the licence fee is very similar to the charge made to households in Band B of the current council tax system. The licence fee is in turn approximately twice the size of the per capita charge in line with the casual empirical observation of the preponderance of two person households. Generally there is a modest amount of variation in charges with the exception of the two outliers: Central Region (low) and Western Isles (high).

Whilst the absolute level of charges is of some importance, more interesting is the question of the impact that a change in charging arrangements would have on individual households. In other words, who would win and who would lose under the alternatives schemes? A comprehensive analysis of the question is outwith the scope of this paper. Therefore we limit our discussion to the impact of the changes on three 'typical' household types: one-person ('single'), two person ('couple') and four person ('family'). Table 4 lists the alternative charging schemes and notes whether the three household types are either net gainers or net losers in terms of the level of water charges paid when moving away from the Council Tax banding system.

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9 We assume that there are no switching costs in moving between systems and that there are similar levels of non-payment under each option.

10 The Scottish Office Environment Department (1993) " Domestic Water Consumption in Scotland in 1991", Foundation for Water Research, Marlow, Bucks. We argue that there is little variation in median domestic consumption across the Scottish regions.

Although regional differences persist, some general national patterns emerge. Unsurprisingly a move from the council tax to the licence fee disadvantages all householders living in band A properties. A flat licence fee is more regressive than a graded council tax payment system. Single person households benefit from the per capita option, however households living in properties with a lower valuation are disadvantaged under the scheme if they contain more than one resident. Metering appears to affect the greatest number of households adversely, particularly those containing a large number of people. This result may require revision, however, if it is found that the larger households benefit from economies of scale in water use. In other words, a four person household may require an amount less than four times the median consumption figure for individuals. The metering figures also take no account of potential savings should households economise on their water use.

In general the results reinforce the conclusion that despite its flaws in terms of allocative efficiency the present system is more progressive than the per capita and licence fees. A change to either of these options would yield relatively greater benefits to those residing in properties in the higher valuation bands. Given the widespread opposition to community charge arrangements for local authority finance at the beginning of the decade we conclude that it is unlikely that either of these two options would be acceptable to consumers or the Government. in the short or medium term. The metering option however deserves further examination.

We have already outlined the benefits of metering, noting its promotion of allocative efficiency and the incentive to conserve water. In the light of the Government's commitment to a policy of sustainable development throughout the economy this payment system, which would limit or reverse the rise in domestic consumption and could be used as a demand management tool on a selective basis, would encourage efficient consumption<sup>11</sup> and also delay the development of new resources. This brake on the pace of development would limit the environmental impact of such work, reduce overconsumption, and is another reason why metering may be seen as the 'first best' long term charging option for Scottish water. At present the

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11 As consumers would face a positive price for each unit consumed.

capital costs of installing meters in domestic premises are considered by policymakers to outweigh the benefits of this charging method. In addition the simple metering scheme outlined above shares with the other two alternatives the feature that it is more regressive than Council Tax arrangements. This, however, could be corrected through the implementation of a slightly more sophisticated set of metered charges. For example a 'block tariff' arrangement of the sort used by many electricity companies.<sup>12</sup>

Given the long term upward trend in demand for potable water, and growing concern over the issue of conservation, we argue that a policy of installing water meters in all newly built properties throughout Scotland would be to the long term benefit of the country's water consumers.<sup>13</sup>

#### 4. The New Water Authorities: Charging Options

On 1st April 1996 three new public water authorities (PWAs) will assume operational responsibility for water services in place of the regional and islands councils. It is therefore of some interest to discuss the impact that this institutional change will have on the water bills of consumers in the various Scottish regions. For this section of the paper we once again assume that the amount of revenue raised by the authorities under any alternative charging regime should correspond to revenue raised by the component regions under the present scheme: i.e. revenue neutrality.<sup>14</sup> We also assume a consumption level of 148 litres per person per day for the calculation of metered charges.

Before examining the alternative charging arrangements, we report illustrative charge figures for households in the different council tax bands within each of the new PWA regions. These are set out in Table 5. Two main assumptions were employed in the construction of this table. Firstly the charges were calculated using 1994/5 data. This has the advantage of allowing a comparison with the figures reported in Table 2<sup>15</sup>, but does not

reflect the impact of price inflation since then. Secondly, the 1994/5 information fails to reflect the impact on charges of the large capital investment programme required to meet new European Union quality standards.<sup>16</sup> The impact of both of these assumptions is to reduce the estimated PWA charge levels quite substantially. Nevertheless, given these caveats the table is of interest in terms of illustrating relative charge levels.

As anticipated the Northern Water Authority, serving many sparsely populated regions potentially has the highest charges. The figures contained in the table also give some indication of the extent to which a policy of charge harmonisation within water authority areas will affect consumers in different regions. To mention just one case, inhabitants of the Western Isles would experience a substantial reduction in the level of their water charges at the expense of consumers in Grampian and Tayside. It remains to be seen whether the boards consider such a policy workable within their particular areas.

In Table 6 we report PWA charge levels calculated under the three alternative charging schemes.

Once again we assert that the absolute level of charges is of less interest than the analysis of the impact of a change in charging arrangements on individual households. Table 7 mirrors the earlier Table 4 therefore in setting out the potential impact on customers of the new PWAs of a movement to these different charging systems.

The regional differences apparent in Table 4 are attenuated in Table 7. However, once again some general patterns emerge. For example the move from the council tax to the licence fee puts all households in band A and most in band B at a disadvantage. Single person households again benefit from per capita charges. Overall, however, households living in properties with a lower valuation are more likely to face higher charges than those living in properties classified in bands F, G and H.

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12 Consumers are charged at one rate for the first block of water consumed and at a different rate for usage over and above this level.

13 This policy has been working in England and Wales for several years.

14 Throughout the analysis we set to one side the question of additional economies of scale that may be exploited by the new PWAs.

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15 Calculations were made using the same Scottish Office data that was used to set charges shown in Table 2. The figures contained in Table 2 are however slightly higher than Scottish Office estimates would suggest, as Regions made small upward charge adjustments to reflect particular local circumstances.

16 Estimated by the Scottish Office to be £5 billion over the next 15 years, The Scottish Office (1992).

We note once again that despite its flaws, the council tax system of payment is more progressive than either the per capita or licence fee arrangements. Only metering offers the prospect of encouraging economy and efficiency in water consumption and we would argue that consumption savings would, over time, offset the capital cost of meter installation. Public policy considerations may lead the Government and the PWAs to delay the move towards metering on the grounds that water charges are a suitable device for the redistribution of income. Consequently they may wish to continue with the current charging system, despite its inadequacies, arguing that despite its imperfections it is the only truly progressive charging system available immediately. As discussed above slightly more sophisticated metering arrangements have the potential to remove this blemish leaving the new PWAs with a flexible, equitable and robust new charging system.

## 5. Conclusion

Although water metering may be a desirable long run policy objective for the new PWAs, the present council tax based system is a workable interim measure, perfectly capable of 'holding the fort' until universal domestic metering arrives. We argue that there is an inevitability about this process when seen in the light of growing public concern over the environment, and the Government's own attachment to the idea of sustainability development. Consequently the PWAs would be well advised to work towards this policy objective through devices such as the compulsory domestic metering of new properties.

In the meantime they should reaffirm their commitment to the council tax system<sup>17</sup>, rejecting any return to per capita or flat rate licence fees, whilst promoting the conservation of water through educational or advertising initiatives. By attending to matters such as leakage control the PWAs may take the opportunity to portray themselves as working in partnership with the public to achieve long run policy objectives such as sustainability. Ultimately, Scottish consumers will benefit through access to an abundant supply of high quality water at a reasonable price.

## Acknowledgement

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<sup>17</sup> This was also the conclusion arrived at by the Monopolies and Mergers Commission in their 1981 report on the operation of Severn Trent Water Authority, South Staffordshire and East Worcestershire Water Companies.

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## Bibliography

Ofwat (1990) *Paying for Water: A Time for Decisions*. Publ: Ofwat, Birmingham.

The Scottish Office (1992) *Water and Sewerage in Scotland: Investing for our Future*. The Scottish Office, Edinburgh.

The Scottish Office Environment Department (1993) *Domestic Water Consumption in Scotland in 1991*. Foundation for Water Research, Marlow, Bucks, 1993.

The Scottish Office (1994) *Water and Sewerage Costs 1994-95*, The Scottish Office, Edinburgh.

**Table 1: Council Tax Property Valuation Bands**

Council Tax Band	House Value
A	not exceeding £27,000
B	exceeding £27,000 and not exceeding £35,000
C	exceeding £35,000 and not exceeding £45,000
D	exceeding £45,000 and not exceeding £58,000
E	exceeding £58,000 and not exceeding £80,000
F	exceeding £80,000 and not exceeding £106,000
G	exceeding £106,000 and not exceeding £212,000
H	exceeding £212,000

Source: Scottish Office.

**Table 2: Domestic Water Charges Per Household 1994-95.**

Charges refer to households containing two or more adults.

REGION	A	B	C	D	E	F	G	H
Borders	61	72	82	92	112	133	153	184
Central	31	37	42	47	57	68	78	94
Dumf. & Galloway	56	65	75	84	103	121	140	168
Fife	39	46	52	59	72	85	98	118
Grampian	59	69	79	89	109	129	148	178
Highland	59	69	78	88	108	128	147	177
Lothian	52	61	69	78	95	113	130	156
Strathclyde	53	62	71	80	98	116	133	160
Tayside	46	54	61	69	84	100	115	138
Orkney	82	96	109	123	150	178	205	246
Shetland	78	90	103	116	142	168	194	233
Western Isles	129	151	172	194	237	280	323	388

Source: Scottish Office: Water and Sewerage Costs 1994-1995

**Table 3: Levels of Charges under Alternative Regimes: The Regional Councils**

REGION	Licence Fee £	Per Capita Charge £	Metering Charge £ per m <sup>3</sup>
Borders	68.80	31.02	0.49
Central	35.82	14.65	0.20
Dumfries & Galloway	67.11	27.25	0.43
Fife	43.07	17.79	0.25
Grampian	71.84	29.73	0.47
Highland	71.38	30.16	0.48
Lothian	63.57	27.33	0.43
Strathclyde	56.29	24.88	0.38
Tayside	53.11	22.86	0.34
Orkney	86.35	32.45	0.53
Shetland	87.07	35.27	0.58
Western Isles	131.58	51.63	0.88

Mean Charge	69.67	28.75	0.45
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**Table 4: Alternative Charging Regimes: Net Gainers and Losers**

The table below records the difference in the charge level for three different types of household, between the current Council Tax banding system and the three alternative regimes set out above. It is assumed that 1 person households receive a 25% discount under the present Council Tax system. No additional discounting adjustments are made for single households under the three proposed schemes.

Scheme	1 person household "Single"	2 person household "Couple"	4 person household "Family"
Licence Fee	In regions B,C,F,St,T,O,Sh,W, band A loses. In regions D,G,H,L bands A and B lose.		
Per Capita Charge	No households lose.	In regions B,G,H,L,St households in band A lose.	In regions B,C,D,G,H,L,St,T bands A-E lose. In regions F,O,Sh,W bands A-D lose.
Metering Charge	In regions B,D,G,H,L bands A-D lose. In regions St,T,Sh,W bands A-C lose. In regions C,F,O bands A-B lose.	In regions B,D,G,H,L,T,Sh bands A-F lose. In regions C,F,St,O,W bands A-E lose.	All households lose.

Note: B = Borders, C = Central, D = Dumfries and Galloway, F = Fife, G = Grampian, H = Highland, L = Lothian, St = Strathclyde, T = Tayside, O = Orkney, Sh = Shetland, W = Western Isles.

**Table 5: Domestic Water Charges: The New Water Authorities (1994-95 data).**

Domestic household water charges. Charges refer to households containing two or more adults.

Water Authority	A	B	C	D	E	F	G	H
Northern	56	65	75	84	103	121	140	168
Eastern	45	53	60	68	83	98	113	136
Western	51	60	68	77	94	111	128	154

**Table 6: Levels of Charges under Alternative Regimes: The New Water Authorities**

Water Authority	Licence Fee £	Per Capita Charge £	Metering Charge £ per m3
Northern	67.25	28.21	0.43
Eastern	54.23	22.96	0.32
Western	56.90	25.02	0.40

**Table 7: Alternative Charging Regimes in the New Water Authorities: Net Gainers and Losers.**

The table below records the difference in the charge level for three different types of household, between a Council Tax banding system and the three alternative regimes. It is assumed that 1 person households would receive a 25% discount under Council Tax arrangements.

Scheme	1 person household "Single"	2 person household "Couple"	4 person household "Family"
Licence Fee	In N,Ea bands A-B lose. In W band A loses.		
Per Capita Charge	No households lose.	In N,Ea band A loses. In W no households lose.	In N,Ea,W bands A-E lose.
Metering Charge	In N,W bands A-D lose. In Ea bands A-C lose.	In N,W bands A-F lose. In Ea bands A-E lose.	All households lose.

Note: N = Northern, Ea = Eastern, W = Western.