

Fair And Sustainable: Paying For Water WHAT THE GOVERNMENT COULD DO

Bob Hills, Meg Huby and Peter Kenway

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PREFACE

During this research study, the New Policy Institute organised two seminars to discuss the issues, involving the water companies, relevant government departments, academic, pressure groups and others. The first of these seminars discussed the problems and was a great success: everyone agreed on the nature of the problems, and there was a real sense of working together. The second discussed possible solutions and revealed fundamental, but long-standing, differences. Some people believe that the future lies with extending current metering arrangements to the whole population, while others view this prospect with horror but have no obvious longer term alternative.

The lessons we draw are threefold. First, it is only by the government taking a clear lead that a way forward will be found. Second, the issue is not metering per se, but the tariff structure which accompanies the metering. Third, the problems require rational analysis without being wedded to either of the current arrangements (fixed charge only or volumetric charges proportional to water usage) as the longer term solution.

The other point that stands out is the importance of social justice in the argument. Simply put, the charges which 90 per cent of the population currently pay (fixed charges based on rateable values) vary according to a proxy for ability to pay, whereas the charges being introduced as part of metering (volumetric charges proportional to usage) do not. Without government action, the progressive move to the present metered-base tariff will have serious financial consequences, particularly (but not exclusively) for the poor and vulnerable in society. The extent to which the tariff structure should be influenced by ability to pay is a key decision for government to take before any sort of longer term plan can be formulated.

The social implications of changes in the ways that service industries operate is a recurring theme of much of the New Policy Institute's work. Our previous report on home ownership demonstrated how large such implications can be and our recent conference on financial exclusion illustrated how such problems are becoming worse over time.

A government committed to the principles of inclusion and social justice must find ways of turning such principles into practical change. We suggest that the major service industries - from financial institutions and legal services to railways and postal services - represent a major opportunity for achieving this. We believe that this can often be achieved by changing the environment within which the relevant institutions make their decisions, while remaining in a market economy, such that their effects on the population are more in line with the values of a decent society.

Guy Palmer
October 1997

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Responsibility for content and any errors, of course, remain with the authors alone.

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1. EXECUTIVE SUMMARY

Problems

THE SHORT TERM PROBLEM

90 per cent of households in England and Wales are currently charged for water via a bill based on the rateable value of the dwelling they inhabit. Yet the Water Industry Act of 1991 forbids the water companies from continuing to base their charges on a valuation list after March 2000. A new basis for the vast majority of dwellings is therefore needed. However:

- The natural successor to rateable values, namely the system of banding underlying the council tax, is also ruled out by legislation (the 1992 Local Government Finance Act).
- Even if everyone wanted to replace charges based on rateable value by charges based on the volume of water used (volumetric charging), the installation of water meters on the scale that would be required to meet the deadline of the year 2000 is impractical.

At present, therefore, there is no satisfactory answer as to how to households should be charged for water after the year 2000.

THE STRATEGIC PROBLEM

Domestic consumption has been increasing since at least the 1960s and is projected to go on rising over the coming decades in response to both demographic and climate changes. Yet the present charging system contains no financial incentives for households to encourage water economy and to help keep future demand in line with supply.

The scale of this strategic problem, though, is not clear cut. For example:

- Total abstraction of water from the environment for all purposes is actually lower than it was 25 years ago, since abstraction for non-household purposes has been falling.
- A reduction in the levels of leakage, allowing higher levels of consumption to be supported by the same level of abstraction, would provide some temporary relief to offset rising household demand.
- Difficulties are more acute in some regions and in some years than others.

Overall, it appears that there is a significant strategic problem, but one that might not become pressing until, say, the year 2020. If radical options, such as the widespread metering of households, are needed, then it is in response to these timescales.

The two problems above apply over very different time frames and cannot be solved simultaneously. We argue that the need to find solutions to the problem of charging for water in the short term presents an opportunity to facilitate the achievement of longer term objectives.

The role of government

The choice of a new charging system is a commercial decision for the water companies to make. But the unique status of water means that the decision has considerable social and environmental implications. The government therefore has a proper interest in the matter.

Through OFWAT, the government already takes an interest in the *overall level of charges* to households. As a steward of the environment, it has an interest in seeing that there are *incentives for the sensible use of water* by both the water industry and consumers. For reasons of social justice, it also has an interest in the *mix of charges between households*.

Finally, by proscribing both the continued use of rateable values and one obvious alternative (council tax bands), the last government was involved in charging methods.

EXERCISING LEADERSHIP BY SETTING CRITERIA FOR A WATER CHARGING SYSTEM

There is no reason to suppose that the public interest is necessarily or inevitably at odds with the water companies' interest. Instead of proceeding on this basis, assuming the problem to be an inherently adversarial one, the government could try to lead the water companies towards decisions that would command political and public support.

We propose that the government should exercise its leadership by setting out criteria relating to the effects of any new system of payment. The criteria we suggest are that a system of charging should:

- **Be efficient in economic terms.**
- **Sustain the environment.**
- **Produce socially just outcomes.**

These criteria reflect a range of factors, including standards and aspirations already announced by the government, existing EU and other international commitments (such as the 1992 Rio declaration) as well as Labour's core values. There are certainly other important attributes that any charging system should possess - for example, to be understandable to users - but criteria of efficiency, sustainability and justice are likely to be fundamental determinants of the acceptability or not of any system..

APPLYING THE CRITERIA

One way of applying these criteria is to frame a set of more specific questions to ask of any particular charging system. In order to meet a particular criteria, a charging system must provide a satisfactory answer to *all* of the questions associated with it. For example:

Criterion	Questions to ask to establish whether the criterion is met. Does the system:
Economic efficiency	Allow for water to be appropriately priced at the margin? Provide a balance of incentives for both households and water companies to use resources efficiently?
Sustain environment	Help protect the ecosystem, in terms of both the quantity and quality of water? Address the strategic water problems foreseen by the water company in its region? Stimulate water companies to promote non-financial measures for the saving of water?
Social justice	Protect households from pressure to economise on water where health and hygiene could suffer? Reflect consumers' ability to pay for water to meet essential needs? Include payment options to help with budgeting and arrangements for exemptions and rebates?

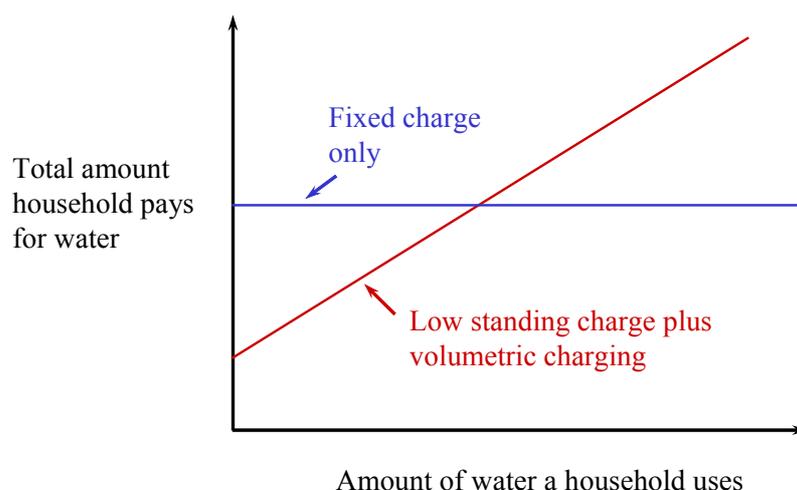
Any system put forward to solve the strategic problems should be required to satisfy *all the criteria and not just some*. But, since it is unlikely that such a system could be in place by 2000, a system to deal with the short term problem should at least provide a foundation for the longer term, strategic solution.

Possible charging systems

CURRENT CHARGING SYSTEMS - THE TWO EXTREMES

There are two extreme forms of water charging system. One is where the bill is independent of the volume of water used and is wholly determined by the fixed charge(s). The other is where there is no fixed charge and where the bill is proportional to the volume of water used. Interestingly, these extremes are close to representing the two systems actually in existence for households in England and Wales at the moment:

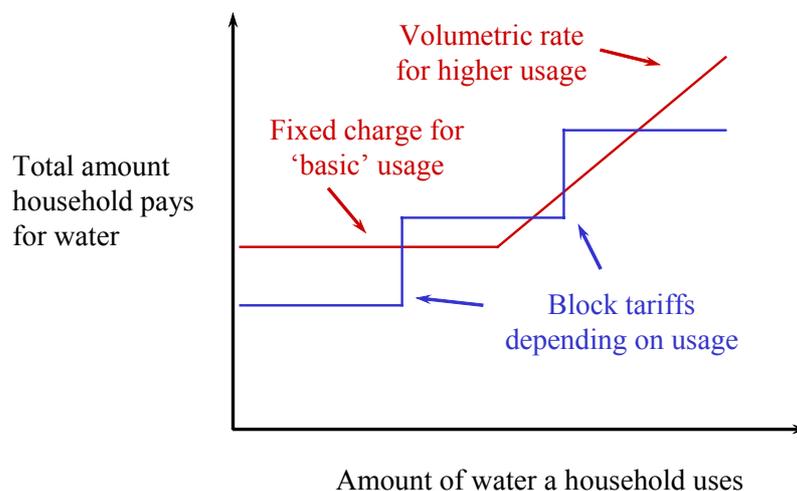
- Most households currently pay for water via a fixed charge only, set according to rateable values (see blue line in the diagram below).
- The 10 per cent of households who are now metered pay according to the volume of water they use, plus a small fixed charge (see red line in the diagram below).



INTERMEDIATE EXAMPLES

Clearly, and as with most utilities, it is possible to 'mix and match' the charges with a combination of fixed charge and volumetric charge - indeed, the actual metering tariff at the moment is a hybrid of a sort. Two possible examples are:

- A tariff structure that combines a standing charge with a volumetric charge that only starts to apply above a given level of 'basic' water usage (the red line below).
- A block tariff structure, where the amount paid still depends on the volume of water used but does not vary continuously with it (the blue line below).



This analysis highlights the observation that any water charging system combines a level of fixed charge with one or more volumetric charges for differing volumes of water usage. The practical questions in devising a particular tariff structure then concern:

- The relationship between the fixed charge and the volumetric charge(s).
- Whether any of them should vary between households.
- How the information necessary to set a particular household's tariff should be obtained.

An assessment of the current charging systems

These comprise:

- Rateable values (the present English and Welsh system).
- Council Tax Bands (the present Scottish system).
- The present tariff for households opting for volumetric metering.

SOME PRINCIPLES

If the marginal price (which corresponds to the slope of the line in the diagrams above) is too low, then the consumer has little incentive to economise on usage. Conversely, if the marginal price is too high, then the supplier has little incentive to encourage its consumers to economise on usage. Theories of economic efficiency suggest that, over time, the price paid by the consumer for an extra litre of water at the margin should equal the cost incurred by the water company in providing that additional water (plus, perhaps, the environmental costs).

Note that economic efficiency is only concerned with the cost at relatively high levels of usage (where the consumer is faced with a decision whether or not to use water) and not at lower levels of usage (where the consumer will use the water anyway). So any charging system where payment according to the volume used starts to apply above a certain level of consumption is in principle capable of satisfying this efficiency criterion.

Like economic efficiency, environmental sustainability may also depend on the marginal price because any element of charging for water according to volume used creates financial incentives for households to economise. But, as there is no reason to suppose that households will respond *only* to price incentives, it is important that water companies also have the incentive to encourage such economy by other, non-financial means. This requires that the marginal price paid by households be no greater than the marginal cost.

Social justice on the other hand depends much more on the total bill (both volumetric and fixed charges). So, for example, the fixed charge should be such that it is affordable for poor families and the costs at low levels of usage should be such that that no household is unable to afford the water for ordinary domestic usage that it needs for essential purposes.

OUR ASSESSMENT

Applying these principles shows that none of the present charging systems is adequate:

- ***Flat rate charging systems***, such as the present ones based on rateable values or council tax bands, cannot satisfy either the economic or the environmental criteria because the marginal price of water is zero. On the other hand, the present flat rate systems are to some extent a proxy for the ability to pay, and may therefore meet the criterion of social justice.

- The *present tariff for metered customers* also seems to fail to satisfy the economic criterion, but for the different reason that its marginal (volumetric) price is arguably too high compared with the future long run marginal cost (see detailed discussion in the main text). As a result, the tariff structure does not provide a proper balance of financial incentives as it leaves water companies with little or no financial interest in households saving water. Moreover, as the fixed charge element is levied as a uniform fee per household, it also cannot meet the social justice criterion, as water bills are unrelated to customers' ability to pay.

An alternative option that could meet all the criteria

LONGER TERM

Although the present metered tariff does not meet the criteria, it is possible to see how it could be altered to ensure that it did. For example:

- First, if the volumetric charge for water were reduced to bring it into line with a revised view of the long run marginal cost of water, both the economic and the environmental criteria could be met.
- Second, if volumetric charging were only to begin once a household exceeded its 'basic usage' (set to reflect essential water needs), this would contribute to the social justice criterion being met.
- Third, the fixed charge would need to be raised to offset the fall in the water companies' income resulting from the two changes above. But if this higher standing charge were allocated among households according to some proxy for the ability to pay, for example, council tax banding, then the social justice criteria could still be met.

We conclude that charging systems can be found that satisfy the multiple criteria of economic efficiency, environmental sustainability and social justice. But they have to be sophisticated systems. Whilst this implies widespread metering, the accompanying tariff must reflect social justice concerns in a way that the present metered tariff does not.

SHORT TERM

No solution of the type advocated above, which includes widespread metering, could be fully implemented in time for the year 2000 deadline. So, a short term solution is therefore required, and one which recognises that the vast majority of customers will inevitably still be on unmeasured tariffs, and thus fixed rate charges, at the time.

A key principle is that any changes made for the year 2000 should be consistent with the longer term direction. Since only very limited progress has been made since 1991 towards replacing the old system based on rateable values, there is a strong case for arguing that at least some elements of the longer term solution should be introduced at the 2000 'deadline' in order to mark a real commitment to the new system.

If, as in the option above, the longer term solution includes fixed charges related to council tax bands or liability, then one or both of the following would be possible in 2000:

- Move the basis of charging for *unmetered* households from rateable values to council tax bands (i.e. to the present Scottish system).
- Move *metered* households from the present to the new tariff, where the fixed charge elements are based on council tax bands or liability instead of being a uniform fee per household.

The merits of these different short term moves will depend chiefly on the extent and nature of the incidence effects, as well as the practicalities of moving to a new system within three years. In practice, it is likely that some water companies will wish to retain rateable values as the basis of fixed charges in the short term, even if moving to council tax bands in the longer term. To accommodate this, the government would need to amend the 1991 Water Industry Act to allow rateable values to continue beyond the present deadline.

Potential criticisms of our argument

OPPOSITION TO THE PRINCIPLE OF SOCIAL JUSTICE

Consultations over an earlier version of this paper has revealed widespread agreement (including among water companies) that a substantial extension of the present metered-base tariff would have significant financial consequences, particularly for the poor and vulnerable in society. But consultation has also revealed widespread opposition within the water industry to the idea that the tariff structure itself should be influenced by social justice considerations.

We believe that this is a matter of both values and practical politics. One issue is whether water should be simply regarded as a commodity to be bought and sold or whether some part of its usage (for essential purposes) should be considered a social good. Another is the observation that 90 per cent of current bills are already based on a proxy for the ability to pay (i.e. rateable values); advocating social justice as a criterion for future tariffs would help retain this feature of the way that we pay for water at the moment.

Two other points are worth emphasising. First, it is clearly possible to reject some particular manifestations of the social justice criterion - for example, the idea that fixed charges should be based on council tax liability, including rebates - without rejecting the criterion as a whole. Second, social justice should be considered alongside other criteria, but should not take precedence over them.

OPPOSITION TO METERING

Consultation has also revealed continuing opposition to metering itself, usually from bodies representing the interests of consumers, whether in the water industry or more generally.

We acknowledge - indeed we emphasise - that that there are serious objections to an extension of metering on the present tariff, objections economic, environmental and social. But the fundamental fault lies with the tariff structure and the principles on which it has been constructed by the water companies, at the behest of the last government and OFWAT. We believe it is vital to distinguish between metering and the tariff structure, directing criticisms at the latter, because metering itself provides information on usage that will help manage society's use of water in the coming decades.

PRACTICALITIES OF SOPHISTICATED CHARGING SYSTEMS

Consultation has also highlighted a number of problems which arise inevitably from the sophisticated tariff structure needed to meet multiple criteria. These include:

- The cost implications of gathering additional information and administering the system.
- The setting of household-specific thresholds (e.g. for basic usage).
- Concerns arising from the confidentiality of some of the information required.

We recognise all of these as important issues which need to be addressed in any fully fledged solution. However, they should not be insuperable, given additional research, a realistic timescale for implementation and appropriate co-operation between the water companies and local authorities, who may have a significant role to play in overcoming some of these obstacles.

Recommendations for government action

PRACTICAL ACTIONS

Our principal recommendation is that government's role should be one of leadership, providing a framework within which water companies can develop new systems for charging their household customers.

To overcome the year 2000 problems, and as practical preparatory steps towards implementing a longer term strategy, we recommend that government:

- Amends the 1991 Water Industry Act to allow rateable values to continue as the basis of charging after the year 2000.
- Amends the 1992 Local Government Finance Act to allow council tax bands to be used as the basis of water charging.

To lead directly to a longer term solution, we recommend that government:

- Publishes criteria for future water charging systems, including the detailed questions needed to allow the criteria to be applied.
- Sets a timetable within which water companies must publish proposals for a new system in accordance with these criteria, their introduction to be subject to the agreement of OFWAT.
- Asks OFWAT to publish an assessment of the proposals and the reasons for its approval, or otherwise, of the schemes.
- Instigates an independent review of future long term costs in the water and sewerage industry.

2. INTRODUCTION

The structure of this paper

The purpose of this paper is to provide an answer to the question of what the government should do about the future problems of paying for water. To achieve this, it analyses the options for the future charging of water for households in both short and longer terms, with the material being organised as follows:

- **Section 3 - *The unique nature of water***, discusses what water is used for and why it therefore has a unique status.
- **Section 4 - *Some strategic problems with water***, discusses the factors likely to lead to continuing rising demand for household use of water and the problems this causes.
- **Section 5 - *The criteria for any new charging system***, uses the strategic problems of water (from section 4) to derive three broad criteria for future charging, and more detailed questions within each of these criteria.
- **Section 6 - *The anatomy of any charging system***, uses the current two methods of water charging (by rateable value and by metered usage) to derive the key elements of any water charging system.
- **Section 7 - *Assessment of the options***, analyses the key charging elements (from section 6) against the criteria (from section 5) and concludes the neither of the current methods adequately meets the criteria.
- **Section 8 - *The case for a multiple tariff with a two-tier volumetric rate***, presents a alternative proposed water charging system which does meet all the criteria.
- **Section 9 - *Key points and practical actions***, summarises the major points of the argument and lists our suggested actions for government to take.

The rest of this introduction provides some context by briefly summarising the current situation, then drawing some broad conclusions about the nature of the opportunity for government.

The current situation

Historically, water has been charged to households on a fixed rate basis, independent of usage, and with these charges based on rateable values. However, the Water Industry Act of 1991 forbade companies in England and Wales from charging on a rating valuation list from 31st March 2000. Council tax bands, the successor to rateable values, are currently ruled out by their own legislation, the Local Government Finance Act of 1992, which forbid their use for any other purpose.

The situation in both Scotland and Northern Ireland is different. In Scotland, charges have already moved onto a council tax banding basis. In Northern Ireland, funding for water is completely tax based, with no direct billing.

Although the original intention behind the legislation for England and Wales appears to have been to oblige the water companies to switch most households to a metered tariff by that time, progress in implementing the widespread metering required has relatively slow (still only 10 per cent of households) and it is now widely agreed to be out of the question in the timescale remaining.

The reason for the slow progress has been that metering of households is both expensive and voluntary. It has therefore been largely restricted to new houses plus (in recent years) those households who specifically requested it. All the major privatised companies have followed this approach but “*continue to oppose the principle of universal compulsory metering*” (Water Services Association 1997: 8).

Throughout the period since 1991, OFWAT has been consistently in favour of metered tariffs: “*metering is the fairest method of charging, as it relates to the amount of water used or sewage discharged and, hence, to costs*” (OFWAT 1997: 32).

The new government has not yet made its position clear, on either metering or future tariffs, although it has stated that it will “*review the system of charging for water, including future use of rateable values and metering policy*”.

In summary, therefore, the current situation is a mess: there is no practical solution currently on offer for the charging of water in England and Wales beyond the year 2000, charging methods are different in the different home countries, there is no clear route forward to universal metering, and there is no clear consensus between all the parties on the way forward.

And, as described in detail in this report, this situation is in the context of major longer term problems concerning how to reconcile increasing household demand for water with limitations on its supply, and increasingly serious regional problems.

The government's opportunity

Over the past few years, water has become something of a political hot potato. The water supply shortages of 1995 not only followed a winter of unusually heavy rainfall, but were also caught up in the melee of public outrage over the salaries of ‘fat cat’ utility directors. Although these events were not necessarily connected, they focused media and public attention unfavourably on to the newly privatised water industry.

In May 1997, the Deputy Prime Minister, Mr Prescott, addressed a high profile, specially convened water supply summit and set tough, mandatory leakage targets for the water companies.

If, as seems the case, demand management proves essential to providing sustainable water supplies in the UK, our view is that the government take a stance on pricing as well as leakages if it is to have an integrated approach to conservation. In so doing, it will need to take account of:

- The division of responsibilities created by privatisation between the government, the regulator and the water companies.
- The unique status of water, as essential to both personal consumption and the natural environment.
- Considerations of both fairness and economic efficiency.

The twin needs of conserving supplies and developing a new charging system provide an opportunity for the water companies, guided by the government, to make decisions which would command political and public support. One crucial element of this would be to ensure that the tariff structure is sufficiently flexible to cater for people in differing circumstances. It is also an opportunity for the new government to show that market-driven outcomes can conform to a different set of standards and ends from those of the previous government.

There is no reason to suppose that the government (and public) interest is necessarily and inevitably at odds with the water companies' interest. Rather, there is a real possibility that the government can guide the companies in devising a system to solve the strategic problem of supply meeting demand that satisfies the needs of social equity, environmental sustainability and economic efficiency.

3. THE UNIQUE NATURE OF WATER

This section provides context for the rest of the paper by discussing the unique nature of water under the following headings:

- The different uses of water.
- The objectives of water service provision.
- Saving water.
- The dual role of metering.
- Fixed and varying charges.
- Social good or commodity?
- Conclusion: principles and politics.

The different uses of water

Water is used for a wide range of human purposes, with its social and environmental benefits going far beyond the fulfilment of its vital role in sustaining plant and animal life. Adequate supplies of clean water and sanitation are essential for the maintenance of living standards, health and well-being.

Domestic water supply in England and Wales is used for drinking and for preparing and cooking food, but water is also used for bathing, for washing clothes, for general household cleaning and for disposing of sewage and other wastes. The private use of water for personal hygiene, and its controlled disposal in the sewerage system, lead to social benefits in terms of improved public health and a reduced incidence of communicable diseases.

A healthy population also relies on access to nutritious and safe supplies of food as well as on avoiding disease. Direct irrigation of food crops, livestock watering and the hygienic preparation of foodstuffs all require the use of water, whether supplied by water companies or abstracted directly from lakes and rivers.

Both individuals and society benefit from the use of water by the industrial sectors who manufacture and supply the plethora of goods and services which characterise present-day life styles. Particularly important in this respect is the electricity generating industry, where power stations use large volumes of water for cooling purposes.

Water increases human well-being through its use for leisure activities and around 3% of domestic water is used outside the home for gardens, washing cars and in swimming pools in England and Wales (Water Services Association, 1991). Perhaps the amenity value of water is most marked in the natural environment: most people like to live in pleasant surroundings or to visit and enjoy the countryside where water provides aesthetic and spiritual pleasures as well as opportunities for active sports and recreational activities.

Water plays a crucial role in shaping the natural environment, with the levels and flows of surface and ground water in particular areas helping determine patterns of vegetation growth and diversity of wildlife habitats. When it is abstracted from the environment for public supply or other purposes, the *quantity* of remaining water resources is lowered. After use, most water is eventually returned to the environment but the time delay between abstraction and return, geographical differences between the point of abstraction and point of return and the condition of the water returned as effluent all alter the *quality* of water available for future use.

The need to conserve wildlife and habitats provides a strong reason for protecting the aquatic environment. But arguments for environmental protection can be reinforced from a social perspective. Any decline in the quantity or quality of water in the environment has implications for its further use as a resource for human activity. The establishment of new reservoirs, the transportation of water in response to scarcity and the extension of the treatment of drinking water to deal with problems caused by deterioration in the quality of water sources all increase the costs of water services. As well as higher water bills, this also leads to rising costs for other goods and services. Rising food prices may result partly from increased costs of water used in agricultural production and partly because changes in patterns of natural water quantity and quality will affect the kinds of food which can be produced in particular areas.

The objectives of water service provision

The complex interactions between environmental and social well-being mean that, in the long term, water service providers must meet two related objectives:

- **To ensure continuity of adequate supplies of clean water and safe disposal of sewage for everyone.**
- **To protect the natural environment, conserving the quantity and quality of water resources.**

These long-term goals are in keeping with the agreement reached at the Earth Summit in Rio de Janeiro in 1992: “*Water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perennality of the resource, in order to satisfy and reconcile needs for water in human activities. In developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems.*” (United Nations, 1993: 18)

In the short term, water companies in England and Wales are faced with the need to revise their systems of charging for water services pending changes in national legislation. Responding to this need involves decisions about **how to charge** for water, for example using a flat rate charge or by charging customers on the basis of volume used. This is a separate problem from the issue of **how much to charge**, although the two problems are invariably linked in the current debate.

This paper argues that, the need to find solutions to the problem of charging for water in the short term presents an opportunity to facilitate the achievement of longer term objectives. The water companies currently have no legal responsibility to provide help for customers in difficulties but charging systems could operate to minimise the risk of any household facing hardship caused by inability to pay for adequate supplies for essential purposes. Methods of charging could also be devised to encourage consumers to view water as a scarce and valuable resource, increasing awareness of the need to conserve water and protect the environment. This in itself would act towards ensuring continuity of supply.

Saving water

Although water circulates continuously through the hydrological cycle of the earth and its atmosphere, the stock of fresh water available for use at any one time is extremely limited. Both the exploitation of new water sources and increasing rates of abstraction from existing sources can have significant detrimental effects on the environment.

Dealing with the problem of leakage can do much to reduce the need to develop new sources: between a quarter and a third of all water taken from natural systems by water companies is estimated to leak from pipes before it reaches end users so that much more water than is actually needed is currently abstracted. *“Over-abstraction, often for public supplies, has led to unacceptably low flows in some rivers in England and Wales, thereby damaging wildlife habitats and having an adverse effect on water quality and recreational and amenity value”* (HMSO, 1994: 57). Water saved by reducing leakage could substantially help to close the gap between supply and demand.

Water can also be saved by action on the demand side by encouraging more efficient use. Incentives to conserve water and avoid waste take two related forms:

- Information and advice services can be used to raise public awareness about the value of water as a limited resource and to encourage people to avoid waste. However, since privatisation, public attitudes have undergone a transformation, such that these non-price measures are unlikely on their own to provide sufficient reductions in demand.
- A charging system can be adopted which reflects the environmental costs associated with the abstraction and use of water, as well as the financial costs of providing water services. Charging systems must, however, recognise that the non-substitutable nature of water makes it essential for human well-being and must be applied in such a way that no-one goes without the basic water they need because of inability to pay for it.

The dual role of metering

The metering of domestic water supplies has been receiving a great deal of attention ever since OFWAT published its first consultation document on new charging systems in 1990 (OFWAT, 1990). Early consumer objections to metering stemmed from two related concerns. First, some customers in newly metered properties found their bills rising more sharply than those of neighbours, whose water use appeared similar but who were still charged according to rateable values. Such cases were given a high profile in the media which led to accusations of inequitable treatment of customers by water companies.

The second cause for concern focused on perceptions that metering was in itself the cause of higher bills. Such perceptions, however, do not fully recognise the distinction between using meters to measure volumes of water consumed and using particular tariff structures to determine how much to charge for that volume. In principle, meters could be used purely for the purpose of measuring consumption and leakage with a totally different basis used for determining charges. The extra information which metering would provide to households and water companies would make some sources of leakage faster and easier to locate for repair. It would also facilitate more accurate measurement of water consumption, improving the estimates used for longer term planning to balance supply and demand.

These two roles of metering, as a system for measuring flow and as a system on which to base charges, need not be automatically linked, and can be considered somewhat separately.

Fixed and varying charges

For more than 20 years now, most charges for water services have had two elements - a standing charge plus *either* an additional graduated element based on metering *or* a further fixed charge using rateable values as a proxy for usage. The setting of the first element has historically been considered relatively easy to deal with and recent debate has therefore focused on the second element.

For many people, the use of a second fixed charge, based for example on the rateable value of the property, offers a degree of predictability in the size of water bills, allowing easier budgeting. Where total bills are based solely on fixed charges, however, households have no financial incentive to save water and may indeed be unaware of the nature of water as a vital environmental resource.

The use of meters could help to remedy this situation since households would inevitably become more aware of the volumes they use. Many customers could reap financial benefits by cutting down on waste and by reducing their luxury or leisure uses of water. In addition, less tangible incentives for conservation would be likely to increase with changing ideas about the costs to the environment of over-abstraction.

It is, of course, possible that some households may respond to financial incentives by reducing their water use to the detriment of hygiene and well-being. Families living on low incomes, or where someone has a health condition which requires an exceptionally high rate of water use for bathing or laundering, may find themselves faced with a choice between financial hardship caused by high bills or forms of hardship caused by cutting down on essential use. Tariff structures or rebate systems are needed which minimise the likelihood that any household would go without sufficient water to meet their essential needs. The difficulties of designing such a system reflect the unique character of water in society.

Social good or commodity?

In so far as water is vital to life and health it displays the characteristics of essentialness and non-substitutability. The provision of piped supplies of clean water, sewerage collection and treatment and environmental protection carry positive externalities in the form of benefits to public health and social well-being so that water constitutes a merit good. Merit goods are “*goods that, on basically ethical grounds, society believes should be supplied to - and where appropriate actually consumed by - everybody, perhaps only to certain minimum levels, whether they like it or not and whether they can pay for it or not*” (Beckerman, 1986: 17). Taken together, these characteristics of water make it social good and place an implicit responsibility on government and water undertakers to ensure that it is available to all.

On the other hand, water is also used for non-essential. Used in these ways, water can reasonably be regarded as a commodity to be bought and sold in the market at prices determined by production costs and by fluctuations in supply and demand. As a pure commodity, developing a charging system would pose few problems.

Thus it is the dual nature of water as both social good and commodity which demands a more complex approach. It seems to point to the need for a tariff structure which recognises that an adequate supply must be provided regardless of individual ability to pay. At the same time, use over and above essential purposes can be priced to reflect the true economic and environmental costs of provision of water services.

Conclusion: principles and politics

The necessity to change the basis upon which water charges are calculated offers opportunities for re-considering not only *how* to charge, but also *how much* to charge. Restructuring the payment system has the potential to address problems of both social inequity and environmental deterioration. Nevertheless, even if we disregard the need for complex transitional arrangements, the difficulties of achieving radical change for sustainable development in the water industry are substantial. Because of the division of costs and responsibilities between a number of players, it requires examination of the relationships between the industry, its regulatory bodies (OFWAT, the Environment Agency and the Drinking Water Inspectorate), central government policy makers (the Departments of Environment and Social Security) and local authorities.

The companies are clearly responsible for the continuing provision of water services and must also encourage their customers to conserve water. As commodity suppliers, they are well placed to deal with issues of water pricing. There is, however, no obligation on the companies to deal with the question of social equity or the affordability problems faced by low income customers, both currently seen as lying within the remit of the Department of Social Security.

The nature of water as a social good highlights the inability of market mechanisms to take account of social and environmental externalities and underlines the need for close regulation of the industry. It has been argued that OFWAT should be given more powers to offer incentives to water companies to conserve water. The Deputy Prime Minister recently reinforced this message by announcing that water companies will be placed under a statutory duty to conserve water in carrying out their functions. This would indeed aid the regulatory task of the Environment Agency. But some important questions still remain about the dividing line between the companies' responsibility for water conservation and that of the customers.

Even more problematic is the issue of social responsibility. To some extent, the regulator plays a key role in setting limits to both fixed and varying water charges and in establishing the tariff systems to be used for charging. He can also issue guidelines for dealing with customers who have difficulty in paying their water bills. Nevertheless, he must also ensure that companies remain able to finance the proper carrying out of their functions. The objectives of customer and company protection do not always sit easily together.

4. SOME STRATEGIC PROBLEMS WITH WATER

The basic strategic issue discussed in this section is whether supply will continue to be able to meet demand. This breaks down into:

- Whether the environment can sustain predicted levels of abstraction.
- Whether there is the storage capacity to meet peak summer demand.
- Whether some regions face much more serious problems than others.

The material below uses some recent forecasting work to analyse the nature and scale of the problems in each of these areas, thus informing the questions of whether, where and when demand restraint measures are necessary, and whether those measures should be built in to the charging system or implemented through non-price means.

Environmental sustainability

Sustainability depends on maintaining the balance between the input of water to the environment provided by rainfall and the rates of abstraction of water from the environment.

CLIMATE CHANGE

According to the Centre for Ecology and Hydrology, recent summers have proved appreciably dryer and warmer than the average of the past 150 years. Winters seem wetter and hotter (House of Commons 1996: 198).

UK temperatures are expected to rise at a generally similar rate as the global mean - around 0.2 per cent per decade. If so, by the 2050s, a hot summer such as 1995 (currently a 1 in 90 year event) will become a 1 in 3 year event. Summer evaporation in southern UK in the 2050s will be 25 per cent higher than the 1961-90 average (House of Commons 1996: xiii). Changing rainfall patterns and increased evaporation rates will have important effects on supplies to surface reservoirs and aquifers.

TOTAL ABSTRACTIONS

Although the figure for total abstractions has been falling gradually over the past 25 years, the reduction is due almost entirely to falls in abstractions for electricity generation. However, as the NRA puts it, *“the large volumes of water required for through cooling, evaporative cooling and other purposes tend to be drawn from poor quality waters or waters which are tidal in nature. This water is usually returned to the river with little impact”*(NRA, 1994: 25).

The one element of total water abstraction which has been rising steadily over the past 25 years is that for the public water supply., with increasing household demand the single most important element governing this rise.

HOUSEHOLD DEMAND FOR WATER

Between 1971 and 1993, the total level of household consumption rose by 17 per cent (House of Commons 1996: 428). Evidence suggests that this figure go on rising over the next 25 years. There appear to be four main factors that will increase total levels of household demand:

- ***The growth in population:*** the population is projected to rise by 5.3 per cent between 1991 and 2011 (Office for National Statistics, 1997), implying equivalent increases in the use of water for personal use.
- ***Changes in average household size:*** the average number of persons per household, which decreased from 2.8 in 1976 to 2.6 in 1991, is predicted to fall further to 2.35 by 2021 (Herrington 1996b: 137). This decline in household size is likely to contribute to higher domestic consumption because per capita consumption is higher in smaller households. For example, Anglian Water's SODCON survey found that the average unmeasured daily per capita consumption for a one-person household was almost twice as much as for a six-person household (House of Commons 1996: 131). If we assume a linear relationship between household size and per capita consumption, these figures would suggest that the predicted change in household size is likely to lead to a 3 per cent increase in consumption.
- ***Increasing garden usage:*** it has been predicted that garden use of water will be two and a half times as large in 2021 as it was in 1991 - a result of demographic and lifestyle changes (Herrington, 1996b: 138) - implying a rise of about 6% in total domestic water usage. And, although sales of hose pipes and sprinklers almost doubled over the period 1992-5, the UK levels of ownership of such irrigation equipment still lag behind France and Germany (OFWAT 1994: 8-9)
- ***Changing patterns of personal water use:*** it has been suggested that the amount of water used for personal washing will increase considerably over the period as a result of more bathing and showering. This is predicted to increase the personal use of water by around 10 per cent per head (Herrington 1996b: 138).

Collectively, these figures suggest that household demand could rise by around quarter over the next two decades or so. This is in line with the 'high scenario' forecast for the period 1991 to 2021 made by the NRA (NRA 1994: 20). The companies themselves (in their strategic business plans to OFWAT) predicted a somewhat smaller increase in water delivered to households of 12.4 per cent over the period 1994/5 to 2014/5 but this figure included a number of assumptions about the positive effects of demand management programmes (OFWAT 1994: 8).

CHANGES IN LEVELS OF LEAKAGES

Not all of the predicted increase in household demand need inevitably translate into increased abstractions.

Improvement in leakage reduction programmes could potentially offset some of the increase in household demand. In 1995/6, 31 per cent of the public water supply was *estimated* to have been lost through leakage. The industry estimates that 26 per cent of the total leakage was supply pipe leakage (in other words, strictly speaking, the customer's responsibility), and 74 per cent was distribution losses (OFWAT 1996a: 12)

According to evidence presented at the Uff Enquiry into Water Supply in Yorkshire, “*the age and nature of the distribution systems means that there will always be a background level of leakage, caused by seepage from millions of joints*” (House of Commons 1996: 502). Background leakage is estimated to be between 9 per cent and 21 per cent of water put into supply, depending on the condition of the system. This suggests that there is considerable scope for meeting increased household demand without further increasing abstractions. Although it is not possible to measure leakage precisely, the Director General of Water Services has set some fairly stringent targets for leakage reduction.

Seasonal peaks in demand

The general trends of increasing household demand and changing patterns of rainfall masks the mismatches which occur between patterns of demand and supply on a seasonal, geographical and sectoral basis. In some areas, the need to reach a balance between fluctuating peaks in demand and supply is becoming increasingly marked; indeed, meeting peak demand is already a serious problem in some places, as shown most dramatically in the case of Yorkshire Water in 1995.

Long hot summers are characterised by increased use of water for irrigation and for garden hoses, sprinklers and swimming pools. Anglian Water, for example, shows that average usage per head over 1993-5 was 15-20 per cent higher in July than in February or November (House of Commons 1996: 131).

Although studies of peak demand between 1950 and 1990 did not find increases relative to average demand, recent research for the DoE forecasts that, with increasing garden popularity and assuming a 1.1 degree Celsius rise in temperature, peak demand in south and east England in 2021 will be 42 per cent higher than average demand, compared to 21 per cent in 1991 (House of Commons 1996: 430). It therefore seems that peak demand is likely to increase faster than average demand over the next 25 years.

Problems with peak demand can arise from the insufficient capacity of local service reservoirs, even where there is no problem with average demand. As Herrington has emphasised, they are of crucial importance: “*Peaks matter, and the extent to which they matter looks set to increase. They are important drivers of the amount of new and (occasionally replacement) capital expenditure on up to 90 per cent of an undertaking’s water supply assets; they are responsible for much of the forecast growth of public water supply use in England and Wales in the next 25 years; they were the major determinants of many water companies’ supply problems in 1995 and in one company nearly provoked system failure*” (Herrington 1996c: 1).

So although leakage reduction can solve some of the problem with **average** demand, there is certainly a problem when it comes to peak demand. The outlook becomes even more pessimistic when the situation is viewed region by region.

Regional variations

Although the proportions of rainfall experienced by each region has not altered dramatically in the period since 1941 (Water Services Association 1995: 14), rainfall does differ appreciably from area to area. Average annual rainfall in the former Anglian NRA region in 1994 was 646 millimetres - only 63 per cent of the average for England and Wales. On the other hand, the highest, rainfall in the Welsh region was 153 per cent of the average, and 144% of the average in the South West region.

When combined with differing storage capacities in different regions, it is clear that the problem of supply meeting demand is far more acute in some areas than in others. Using a set of high, medium and low demand increase scenarios, the NRA predicted (NRA, 1994: 22) the shortfall in average public water supply yields in 2021 in every (then) NRA region, if only existing source yields were used. These ranged considerably, from no shortfall in North West and Northumbria under medium and low assumptions, to a shortfall of 867 Ml/d (million litres per day) in the Thames region under a high demand scenario.

The NRA then applied those figures to a scenario in which all local resource options are developed (including some which may be ruled unacceptable on environmental grounds). In six areas (North West, Northumbria, Yorkshire, Wales, Southern and South West), there was no shortfall at all under high, medium or low demand scenario. Thames's maximum shortfall was 629 millions of litres per day, compared to 252 in Severn Trent, 128 in Anglian and 84 in Wessex.

This suggests that the areas facing a more imminent problem of meeting are in the South and East, in particular in the Thames, Severn Trent and South West areas. By contrast, in Northumbria, there is no forecast problem.

Conclusions

Household demand for water is currently increasing on average by 1 per cent a year. Leakage is currently around 30 per cent of supply, and it would be fair to expect it to reduce to, say, 20 per cent by 2021. This indicates that some of the projected demand growth over the next two decades could potentially be accommodated by progressive reductions in leakages. Since other elements of the public water supply are unlikely to rise significantly. But, in the longer term, the situation would seem to require either stabilisation of demand or (highly undesirable) increases in abstractions. The questions of how far and how soon abstraction rates will need to be increased depends partly on the success of proposed measures for leakage reduction and partly on the effectiveness of demand management.

There is also considerable regional variation. NRA predictions show that, under a high demand scenario, the shortfall in average public water supply yield in 2021 will be over 60 times as great in Thames as in Northumbria. Furthermore, peak demand (which is largely to do with infrastructure capacity) is already a problem in some areas.

So, although there is no problem on average demand at the moment, such problems are likely to occur progressively over the next three decades, and peak and regional aspects mean that there is already a problem in some parts of the country in some years.

5. THE CRITERIA FOR ANY NEW CHARGING SYSTEM

The proper role of government

The main question addressed in this section is what sorts of action would it be appropriate for the *government* to take to ensure that the future system for paying for water is the right one.

We are not arguing that it is the government's responsibility to provide a direct answer to the question of what the charging system should be for water, either in the year 2000 or in the longer term. Decisions on charges are an operational matter which it is the responsibility of the companies themselves to decide. However, since the decision has considerable social, environmental and therefore political significance, the government has a very proper interest in the subject.

Rather, our argument is that the government's concerns should focus on the *effects* of any new system in a number of areas, including the economic, the environmental and the social. In order to express those concerns, and to ensure that its priorities are taken into account by the companies in reaching their decisions, the government should set out the criteria which it believes a charging system should satisfy. Although this does not exhaust its role, it is the setting of these criteria that is the first, and primary role of government in this matter, and they should be derived from the values that the new government espouses.

The material below sets out what these criteria might be, while later analysis reviews the possible alternatives in the light of these criteria. Inevitably, this process leads to a ranking of the alternatives, with one or more them being designated as 'preferred'. It is important, though, to emphasise that the aim of this exercise is *not* to come up with a recommended charging system but rather to demonstrate that the criteria can discriminate between different alternatives and to illustrate the sorts of system that these criteria *apparently* point towards.

When the various possibilities are considered in detail by the companies, it may be that different conclusions will be reached from those indicated here. This does not matter, provided the conclusions can be shown to conform to the government's criteria.

Suggested criteria for any new charging system

We suggest that there are three criteria for judging any new charging system:

- That it should be efficient in economic terms.
- That it should sustain the environment.
- That it should produce socially just outcomes.

Note that these do not explicitly recognise the companies' internal responsibilities towards their shareholders. In the present situation, the companies can be expected to develop solutions that satisfy their shareholders' interest without any external stimulus from government.

The choice of criteria themselves is influenced by a range of factors. These include standards and aspirations the government has already announced, both in its 'Water Manifesto' and in the speech given by Mr Prescott in May 1997. They also reflect existing commitments (for example, to the 1992 Rio declaration) and external conditions (as set by the European Union). Last but not least, they reflect the Labour Party's traditional objectives: increasing social welfare of those in need and ensuring that free market capitalism does not merely benefit the few. There are other important criteria - such as consumer understandability and administrative simplicity - but the three we have chosen are likely to be the fundamental determinants of whether or not any system is acceptable.

We now look at our suggested criteria in turn, both to expand on what each entails and to identify a series of specific questions to be used in assessing whether each criterion is met by particular proposals for new charging systems.

Note that it is obviously essential that any new system for charging should be both acceptable to the public in general and also understandable, and whatever the option chosen it will need to be implemented such that it also supports this objective.

ECONOMIC EFFICIENCY

Broadly speaking, economic efficiency simply means that the structure of prices should reflect the structure of costs (including any costs of installation and maintenance). The fact that water companies, like other household services providers such as power and telecommunication companies, present their customers with a regular bill is a great advantage in this respect since it allows them to distinguish between the different elements of total costs according to the reasons why they arise. In particular, it means that they can distinguish between those costs which are related to the volume of water used and those which are independent of it.

- One implication of this is that *a high marginal price for marginal water consumption does not require that overall bills be high*: they can be high or low depending on whether earlier usage is priced high or low.
- A second implication is that paying according to the volume of usage (as measured by meter) and, for example, the use of council tax bands need not be mutually exclusive, since the latter (or something similar) may still be desirable as the basis for the fixed charge.

The specific questions that we are suggesting in order to establish whether the proposed charging system is economically efficient are therefore:

- 1. Does the system allow for water to be appropriately priced at the margin?**
- 2. Does the tariff structure provide a balance of incentives for both households and water companies to use resources efficiently?**

ENVIRONMENTAL SUSTAINABILITY

The importance of water within the environment is probably the most immediately pressing of all the external pressures on the water industry. The recent prolonged period of below average rainfall has served to raise the public awareness of the issue and has made the issue of leakage a matter of political attention and action.

The specific questions we are suggesting regarding economic sustainability are:

- 3. Does the system help protect the ecosystem in terms of both the quantity and quality of water?**
- 4. Does the system address the strategic water problems foreseen by the water company in its region?**
- 5. Does the system stimulate water companies to promote non-financial measures for the saving of water?**

In section 7, we look at some various possible charging systems and assess them in the light of these criteria. Before, doing so, we need to look in more detail at the anatomy of any charging system to help inform this assessment.

PROMOTION OF SOCIAL JUSTICE

The dual nature of water means that the social implications of any new charging system must be given a high priority. There are two aspects to this:

- The first is the notion that as something essential for life and health, *the 'basic' needs for water must be met*, irrespective of the ability to pay.
- The second is the fact that any change in the charging system involves gainers and losers. Promoting social fairness means that any new system should produce a pattern of costs to households which, to some extent at least, is *related to the ability to pay*. This can be achieved either by proxy or by systems of exemptions and rebates.

In this context, we are suggesting that an assessment of any charging system against the social criterion should ask the following questions:

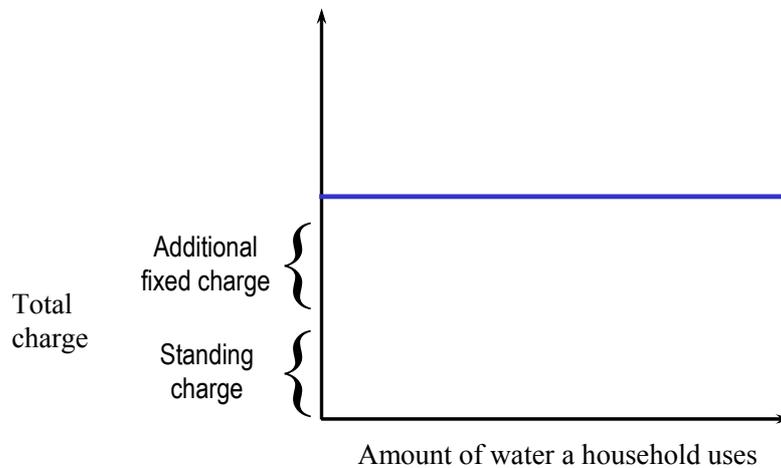
- 6. Does the system protect households from pressure to economise on water where health and hygiene could suffer?**
- 7. Does the system reflect consumers' ability to pay for water to meet essential needs?**
- 8. Does the system include payment options to help with budgeting and arrangements for exemptions and rebates?**

6. THE ANATOMY OF ANY CHARGING SYSTEM

The simple extremes

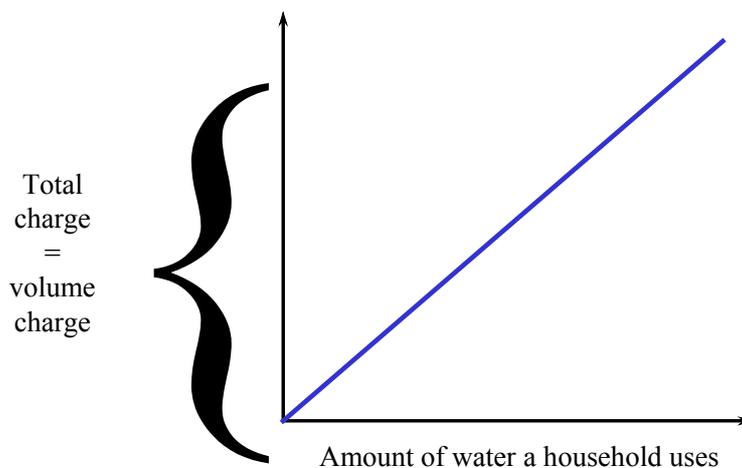
The simplest possible system for charging for water would involve a simple flat rate charge independent of the volume used. The current system for non-measured bills comes close to this: the total bill comprises a small standing charge plus an additional fixed charge calculated on the basis of the rateable value of the property. The total amount payable is therefore unaffected by the level of consumption.

DIAGRAM 1: FIXED TOTAL CHARGE



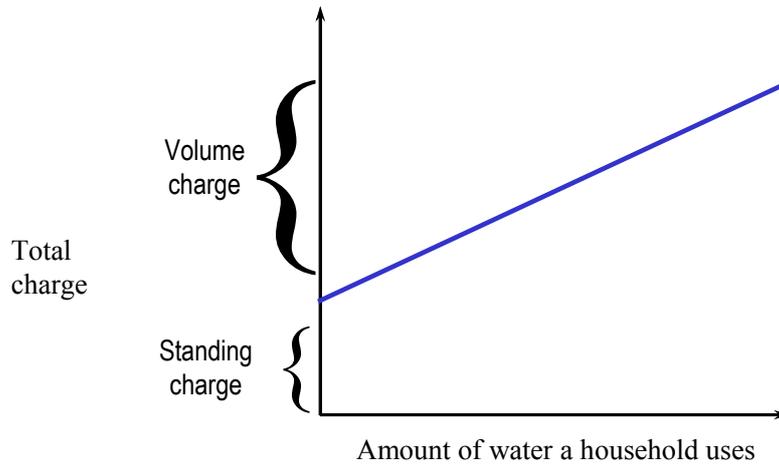
At the other extreme it would be possible to charge for water purely on the basis of the volume used.

DIAGRAM 2: TOTAL CHARGE PROPORTIONAL TO VOLUME OF WATER USED



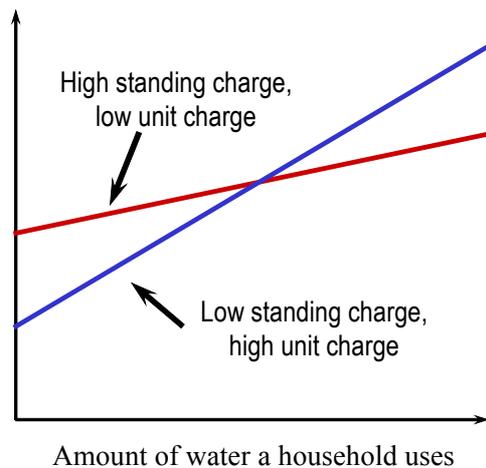
The current system for measured charging, however, combines a small standing charge with a further charge based on the volume of water used.

DIAGRAM 3: TOTAL CHARGE A MIX OF STANDING AND VOLUMETRIC CHARGES



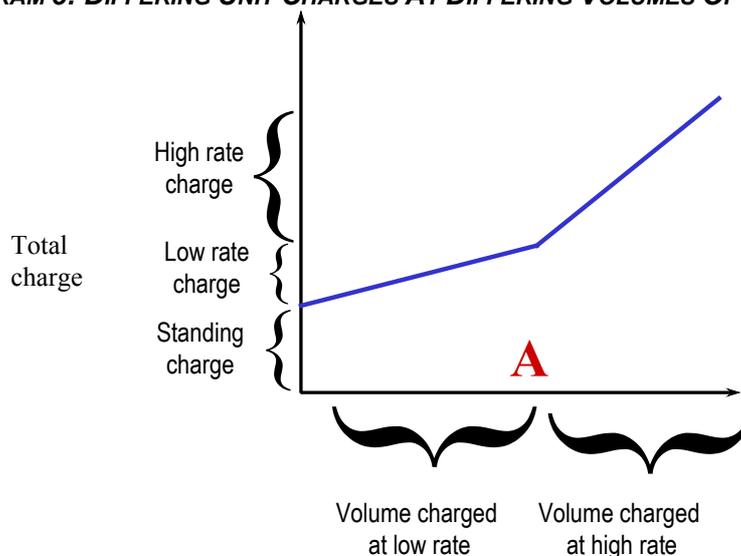
The introduction of volumetric charging, and associated metering, opens up possibilities for designing more sophisticated charging systems, possibly using different charging rates in different circumstances. These can be combined with a standing charge in a number of different ways.

DIAGRAM 4: DIFFERING STANDING AND UNIT CHARGES



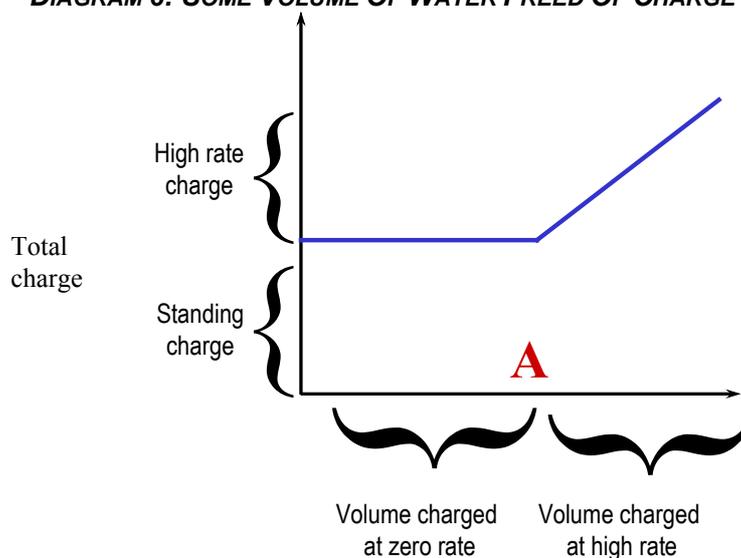
Volumetric charging rates can also be varied according to the amount of water used. The diagram below, for example, shows a system with a standing charge to which is added a low rate charge for water consumed below a certain volume (A) and a higher rate charge for water consumed in excess of (A).

DIAGRAM 5: DIFFERING UNIT CHARGES AT DIFFERING VOLUMES OF WATER



Under the system illustrated in this diagram, it is also clearly possible to charge for volumes of water below (A) at a flat rate.

DIAGRAM 6: SOME VOLUME OF WATER FREED OF CHARGE



The key elements of the water charging system

The analysis above highlights the three key elements of any water charging system:

- The level of the standing charge and any additional fixed charge.
- The price charged for water by volume (i.e. the slope or slopes in diagrams 1 to 6).
- If applicable, the volume of water (A) above which a higher volumetric price is applied.

(Currently, unmeasured water bills include both a standing charge and an additional fixed charge related to rateable value. But, since both are set independently of the volume of water used, they are treated together as a single fixed charge element in this analysis.

The practical questions in devising a particular tariff structure then concern:

- The allocation of the fixed charges between households.
- The balance between the fixed and volumetric charges.
- How volumetric charges should change for individual household levels of consumption.

Armed with these basic questions, the next section assesses the various possibilities for charging in the light of the criteria set out in Section 5.

7. ASSESSMENT OF THE OPTIONS

Principles for assessment

ECONOMIC EFFICIENCY

The marginal price paid for water is the price of consuming an additional unit of water. The marginal cost is the cost of producing that unit. Theories of economic efficiency imply that, over time, these two be equal to one-another (i.e. marginal price should equal the long run marginal cost).

In our diagrams, the marginal price corresponds to the *angle of the slope of the line*. Where the line is horizontal, the marginal price is zero. Under a pure fixed charge system, where the line is horizontal at all levels of consumption, the economic efficiency criterion cannot possibly be met. However, as it is only *marginal* usage that needs to be priced at marginal cost, charging systems where payment according to the volume used only starts to apply above a certain level of consumption *are* capable of satisfying this efficiency criterion.

ENVIRONMENTAL SUSTAINABILITY

Environmental sustainability may also depend on the marginal price because any element of charging for water according to use creates financial incentives for households to economise. But, as there is no reason to suppose that households will respond *only* to price incentives, it is also important that water companies have the incentive to encourage such economy by other, non-financial means. Ensuring that water companies have a financial interest in stimulating household water economy implies that the marginal price paid by households should be no greater than the marginal cost.

SOCIAL JUSTICE

Social justice, too, depends on the angle of the slope, at least for basic usage, where too steep a slope provides a financial reason for a household to save water when it is not in the best interests of their health or well-being. However, social justice also depends on the total bill and its relationship to the household's ability to pay.

Allocation of the fixed charge

THE OPTIONS

There are at least four different ways that a fixed charge can be allocated between households. This applies equally, whether we are talking about a fixed charge as the only component of the household's bill, or as just one part of a bill that contains a volumetric component too. The four different ways that we consider here (and in more detail in Appendix A) are:

- Rateable Value.
- Council Tax Band.
- Flat Fee (Licence Fee).
- Water Service Factor.

The first two of these are the basis on which local authority tax revenues are or have been raised. As such, fixed charges levied on either of these bases would vary between households according to their liability for the corresponding tax, i.e. rates or council tax. By contrast, a flat fee levies the fixed charge uniformly on all households. In contrast again, the water service factor (which has been suggested recently by Thackray (1997)) seeks to allocate fixed charges between households in proportion to average costs. This generally means that bigger properties and properties that are more dispersed both pay more.

OUR ASSESSMENT

From a social justice point of view, all fixed charge systems have the considerable advantage of avoiding the possibility that low income households might try to save money by saving water to the extent that their health and hygiene is placed at risk. Beyond that, there are considerable differences between them when judged according to the social criterion.

- **Rateable Values** provide a proxy for ability to pay, but are obsolete as the basis of local taxation, and would be difficult and costly for the water companies to update. There are no obvious provisions for exemptions or rebates.
- **Council Tax Bands** are also a proxy for ability to pay. Although the broad banding does not allow that much discrimination between households, there is an established system for rebates and exemptions within these bands. The resulting **council tax liability** could provide a more reliable indication of the ability of poorer households to pay than does the basic broad banding structure, although there are problems both of administration and confidentiality with the use of this information.
- **A Licence Fee**, levied uniformly on all households served by a company takes no account of ability to pay.
- **Water Service Factors** provide a basic proxy for ability to pay, but would be costly and difficult to implement. There are no obvious provisions for exemptions or rebates.

Whether used on their own or as the basis for the fixed element within a metered system, this analysis suggests that council tax liabilities (which are more responsive to social criteria than council tax bands) come closest to meeting the social justice criterion.

The balance between fixed and volumetric charges

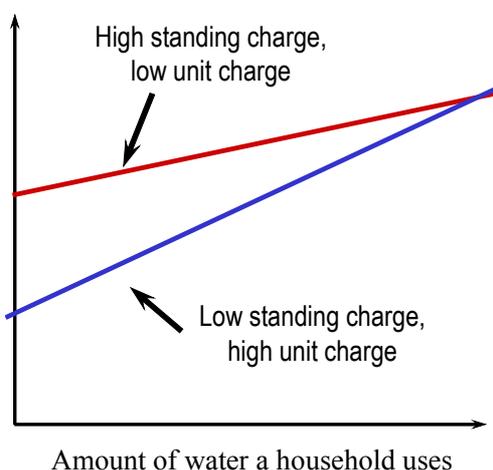
The present metered tariff broadly corresponds to diagram 3 in section 6, and single-tier tariffs more generally correspond to diagram 4.

By allowing for charging according to the volume of use, any metered tariff possesses the potential to satisfy the economic criterion. Likewise, by providing financial incentives to households to save water, they also possess the potential to meet the criterion of environmental sustainability.

On the other hand, the financial pressure they create to save water even at low volumes can lead to social hardship. Furthermore, whether they come close to mirroring the ability to pay depends on both how the fixed charge is set and the proportion of the total bill that this fixed charge represents.

Currently, the fixed charge under metering is only a small proportion of the total bill and its allocation between households is therefore not, in practice, that important. Rather, the more important question is whether the combination of a low fixed charge and a high marginal price of water is satisfactory from an economic point of view.

The same total revenue for the industry can be achieved through either a higher fixed charge combined with a lower volumetric rate or a lower volumetric charge combined with a higher volumetric rate:



To analyse this issue, it is necessary to examine the industry's cost structure.

THE PRESENT BALANCE

Table 1 presents figures for nine water and sewerage companies for 1996/7 and shows the share of the average metered customer's bill taken by the standing charge and the volumetric component.

Measured Charges For Household Customers 1996/97: Standing Charge, Total Average Bill And Percentage: Water, Sewerage And Combined ¹									
	Water Supply			Sewerage			Water + Sewerage		
	SC	TOT	per cent	SC	TOT	per cent	SC	TOT	per cent
South West	21	106	20	9	167	6	30	273	11
Dwr Cymru	23	106	22	11	120	9	34	226	15
Anglian	24	106	23	12	128	9	36	234	15
Yorkshire	24	90	27	18	100	18	42	190	22
Southern	24	83	29	28	113	25	52	196	26
Wessex	28	105	27	36	116	31	64	221	29
Thames	20	88	23	36	95	38	56	183	31
North West	33	96	34	51	104	49	84	200	42
Northumbrian	27	91	30	60	107	56	87	198	44
MEDIAN			27			25			27

It shows the standing charge for water and sewerage combined as varying between 11 per cent and 44 per cent, with a median of 27 per cent. The medians for water and sewerage separately are similar, but sewerage standing charges vary much more (6 per cent to 56 per cent) than water standing charges (20 per cent to 34 per cent).

¹ Source: Water Services Association (1996).

OFWAT's view on the appropriate size of the standing charge for metered customers implies a figure significantly lower than this 27 per cent: "*The Director believes that generally the total measured standing charge for water and sewerage should be no more than the annual customer-related costs for unmeasured customers plus the additional cost of metering.*" (OFWAT 1997: 24). OFWAT calculates these costs to be £34 (OFWAT 1997: 24) which represents just 16 per cent, or about $1/6^{\text{th}}$, of the average metered bill. It follows from this that the volumetric price for water should be set to $5/6^{\text{ths}}$ of the industry's average unit cost.

So, the issue is whether this 1 to 5 ratio between the fixed charge and the volumetric component is reasonable.

THE CASE FOR A LOWER VOLUMETRIC CHARGE AND A HIGHER FIXED CHARGE

The *principle* on which the setting of the volumetric price should be set is not at issue here, for, as OFWAT states: "*In order to give sensible incentives, measured tariffs should be structured so that, as consumption increases or decrease, resultant changes in costs incurred by the company are reflected in customers' bills.*" (OFWAT 1997: 24)

In Appendix C, Paul Herrington analyses 'resultant changes in forward-looking costs'. His conclusion is that the forward-looking volumetric rate is approximately 50 per cent of the industry's total average cost. The implication is that the fixed charge should be around 50 per cent of the average metered household's bill. His analysis differs somewhat from that of OFWAT because the sewerage side of the industry incurs little extra cost as a result of increased domestic water usage, even though the future costs of water supply would be greater.

Although not definitive, this analysis does cast doubts on whether the present balance between the fixed and volumetric components is the right one: 50 per cent is a substantially different proportion than OFWAT's 16 per cent.

IMPLICATIONS OF HAVING THE BALANCE WRONG

If the volumetric rate is very high then the extra revenue the company earns from the household consuming another litre of water exceeds the extra cost the company incurs in providing that water. Obviously, the higher the price charged for the extra litre of water, the greater is the incentive *for households* to economise on water. But if the change in the company's revenue is greater than the change in its costs as the consumption of water varies, then two, closely related problems arise:

- First, in these conditions, *it is not in the companies' direct financial interest for households to economise on water* - quite the contrary, since their profits will rise the more households consume. It will not, therefore, be in the companies' commercial interests to encourage water economy by non-financial means, whether by promoting better practice in the home and garden, or via encouragement towards the makers of water-using appliances such as washing machines to increase their efficiency. This implicitly conflicts with the statutory duty held since 1 February 1996 by each company to promote the efficient use of water by their customers, and potentially undermines OFWAT's regulatory function in this respect.
- Second, if households did actually save on water then company revenues would fall further than their costs, and their profits would therefore decrease. So, volumetric charges which are too high would not be in the companies' commercial interest.

Of these two points, the first is of great importance for a government committed to raising the status of environmental issues - while the second shows why the companies should also be concerned. A charging system in which the industry's interest lies in greater consumption cannot be effective in delivering water economy. Far from encouraging water economy, the introduction of metering under this sort of charging system may even achieve the opposite result from the one intended if the incentives companies have to encourage water usage outweigh the (financial) incentives households have to save it. Nothing illustrates what is perhaps this paper's fundamental argument better than this: it is not metering itself that will promote sensible water economy but the tariff structure that accompanies it.

In summary, the analysis above suggests that the present tariff for metered customers fails on the criteria both of economic efficiency and environmental sustainability. This is not a statement about metered tariffs in general, but about the particular one currently in operation.

Conclusion

This section has provided an assessment of the current metered tariff against the criteria previously identified and has concluded that the volumetric charges may be too high, perhaps substantially so (the government could usefully consider sponsoring further research into this subject). It concludes that there is a strong case for a lower volumetric charge combined with a correspondingly higher standing charge.

The higher the standing charge, the greater the importance of its allocation between households. Moving standing charges from the current system of rateable values to one of equal allocation between households would have substantive implications for social justice. Consequently, there seems to be a strong case for allocating standing charges according either to council tax liabilities or to council tax bands. Such a decision would be made after considering their relative merits: of greater sensitivity to social criteria and administrative simplicity.

Whilst not definitive, this analysis clearly suggests that there are problems with the current metered tariff and it is in this context that the next section provides a possible alternative.

8. THE CASE FOR A MULTIPLE TARIFF WITH A TWO-TIER VOLUMETRIC RATE

The issues with both the present fixed rate system and the present metered tariff begs the question of possible alternatives. This section discusses an alternative integrated solution that conforms more closely to the cost structure of water provision, while retaining a socially just base.

Given that the long term problem of providing and charging for water services is subject to short term practical constraints and legal imperatives, no radical comprehensive solution could be implemented immediately. In reaction, one possible approach is to define the characteristics that such a solution might have, in order to see how shorter term changes might be used to work towards an ideal system. One such solution is proposed below and is made up of a number of elements which, taken together, could operate to the benefit of both society and the environment in ways which would offset any immediate financial costs.

A possible long term solution

The argument below is based on addressing the following problems with the present metered tariff:

- There are financial pressures on households who are metered to save on water they need.
- The volumetric charge seems too high and the fixed charge correspondingly too low.
- The fixed charge is levied on households on a uniform basis with no consideration of ability to pay.

CHARGE FOR A BASE LEVEL OF DOMESTIC SUPPLY AT LOW OR ZERO PRICE

The most radical way to overcome the first of these drawbacks is to grant each household an allowance of water to be consumed at no additional charge. The volume of water constituting this 'base level' of supply could perhaps be determined on a *per capita* basis for each household. Current information on water use by metered customers could be used to estimate the volume which would be allowed per capita to ensure that sufficient water is available to meet basic needs for water consumption and hygiene.

Clearly, this suggestion would require the practical difficulties of obtaining the information on individual household composition necessary to calculate the base level to be overcome.

CHARGE FOR ADDITIONAL USE AT THE MARGINAL PRICE

In order to avoid the second defect with the present tariff, charges for water beyond this basic rate would be at a marginal price lower than the current metered tariff. This two-tier tariff structure - of a zero marginal price up to a certain level of consumption and at the proper economic price beyond that - is compatible with the principles of economic efficiency and environmental sustainability.

LEVY THE FIXED CHARGE ACCORDING TO COUNCIL TAX BANDS OR LIABILITY

The allowance of water constituting the base level of supply still has to be paid for, and this could be achieved via a further addition to the fixed charge. When combined with the fact that the fixed charge should be higher than it is now even on a one tier tariff, this implies that for any household using less than its total allowance of water, the water bill would be composed entirely of the fixed charge element. In these circumstances, it is essential that fixed charges be allocated between households in some way that proxies the ability to pay.

We see attractions in using the council tax banding of the property. This could possibly take into account reductions and exemptions for each household (i.e. council tax liability), although there are arguments equally for and against this adjustment. Data for the purpose of determining council tax liability is already held by local authorities, although there may be problems of administration and confidentiality in allowing a private company to access it. It would, however, be more sensitive to criteria of social justice. The 25 per cent tax reduction for people living alone would mean that households with two or more adults would pay a slightly lower rate than single person households, reflecting the economies of scale of water use likely to occur in the latter. At the same time, low income households dependent on certain state benefits are exempt from paying council tax and therefore would not be billed for their basic water supply. They would have to pay only for water used in excess of this level.

Supporting measures

WIDESPREAD METERING

At the heart of the proposal above is the idea that the multiple criteria of social justice, environmental sustainability and economic efficiency can only be met by a sophisticated charging system. Sophistication requires information, a crucial part of which is most obviously obtained by metering domestic usage.

Any extension of metering to its greatest practicable extent would inevitably take some considerable time. During the transitional period, it will be important that all water users are treated fairly. Under the current system, where customers can choose to have a meter installed, those doing so are likely to be the ones who believe they can benefit from lower bills, often with low water use and living in properties with high rateable values. We understand that revenue lost to the water companies when these customers move to a measured tariff may currently be recouped by increasing charges to other customers, and this situation is a cause of concern to the Director General of Water Services (OFWAT, 1997).

INFORMATION AND ADVICE ON WATER CONSERVATION AND ITS ENVIRONMENTAL IMPLICATIONS

It may well be that some people currently waste water because they simply do not think of it as a scarce resource, and have been encouraged to view it, post-privatisation, as a commodity like any other. If so, extensive provision of information on water and the environment could provide additional incentives for conservation by raising awareness about the vital importance of protecting the aquatic environment.

SUBSIDISE THE DEVELOPMENT, PURCHASE AND INSTALLATION OF WATER EFFICIENT APPLIANCES

Even if all domestic water were paid for on a volumetric basis, the extent to which demand would be limited would depend on the options available to households for conserving water. Not everyone is aware of the comparative water costs of various appliances, or the existence of alternatives. Even those who are, may not be able to purchase and install them. In New York, the local authority introduced schemes in the 1980s to subsidise the replacement of old lavatories and to install low-flow showers (Environmental Data Services Report 257, 1996). But although water undertakers in England and Wales have had a duty to promote the efficient use of water by customers since 1995, no such schemes have yet been introduced here.

SUBSIDISE HOUSEHOLDERS FOR THE COSTS OF LEAKAGE PROTECTION AND REPAIR

Some water companies offer help in locating water leaks on domestic premises, but in general it is the customers who are responsible for repairs and maintenance of domestic pipe work. Some may be unaware that leaks exist and some may simply be unable to afford to do anything about them. The use of meters would help to identify where leaks have developed outside of properties but unless financial help is made available, the costs of repair may prove prohibitive.

Benefits

SOCIAL BENEFITS

The system outlined above provides financial incentives for households to economise by conserving water beyond what is basically necessary without risking social hardship. Water supplies would be protected for people living on very low incomes, regardless of their geographical location. The need for disconnection and reconnection procedures, which can result in more hardship and often further water debt, would be substantially reduced.

All these benefits depend on the base supply and rate being set at appropriate levels across the country. The use of metering and the provision of information, advice and subsidies will be vital if households are to be able to monitor and control their use of water to meet their needs. More affluent households could still choose to use water for luxury and leisure purposes but at a price which would reflect both costs of provision and environmental costs.

ENVIRONMENTAL BENEFITS

The use of widespread metering would facilitate the detection of leaks in both distribution systems and domestic piping. Subsidies for repair would help to ensure that domestic leaks are remedied quickly, preventing unnecessary waste of water. Meters are also useful in water resource management for monitoring water use and aiding estimates of projected future demand.

Information and advice would raise awareness about the environmental value of water, both as a resource for human use and as a source of less tangible benefits when it is left in the environment. This would provide additional incentives, supplementing simple financial incentives for water conservation.

FINANCIAL SAVINGS

If increased demand for water was successfully curtailed, water companies might then make substantial savings through the reduced need to develop new sources and to transport water from one area to another. They may also benefit from the reduction of costs incurred in debt recovery, costly court action and disconnection procedures. Any reduction in the need for court action would also result in administrative savings to central and local government.

Central government, in particular the Department of Social Security, would benefit if the new system removed the need for a direct payment scheme for water. Access to direct payments is currently allowed at the discretion of an adjudicating officer who makes each decision ‘in the interests of the family’. But this scheme is administratively very expensive and, following a recent review, the last Secretary of State for Social Security has already announced his intention to make it ‘better targeted’ - a phrase which often means cut backs.

More indirect government savings could be made in the National Health Service if access to clean water reduced demand for treatment of water-related illness. And, finally, the whole population would benefit from the removal of external costs accruing from environmental damage.

FINANCIAL COSTS AND RESPONSIBILITY

The problems of implementing the scheme above largely centre on financial costs and the allocation of responsibilities.

Water companies might be expected to be responsible for meeting the costs of meter installation and of repairs to leaks in the distribution system. But it is more problematic to decide who should pay for the provision of water advice and information and who should subsidise the costs of repairing domestic leaks and providing water efficient appliances. Consideration of such decisions is likely to involve not only the water companies but also the regulators (for example, OFWAT and the Environment Agency), central government (for example, Environment and Social Security) and local authorities.

Comparative assessment of the options

In order to highlight how much of an improvement such a system would be, compared with both the present metered tariff and also the present system based on rateable values, Table 4 scores each of them against the eight questions previously identified to determine whether the three criteria of social justice, economic efficiency and environmental sustainability are actually met.

While some of the positive answers for the multiple tariff option assume that the correct marginal price is charged, its superiority over the other two cases seems marked.

Summary Assessment Of Rateable Value, The Present Metered Tariff And A 2-Tier Tariff			
	Rateable value	Present metered tariff	Possible 2-tier tariff
Social Justice			
Are households protected from pressure to economise on basic use?	✓	X	✓
Does the bill reflect ability to pay?	✓	X	✓
Is there a system of exemptions and rebates?	X	X	✓
Economic Efficiency			
Is appropriate marginal pricing possible?	X	✓	✓
Is there a proper balance of financial incentives	X	X	✓
Environmental Sustainability			
Will the charging system help protect the ecosystem?	X	X	✓
Does the system relate to the strategic problems in the region?	X	X	??
Does system encourage companies to use resources efficiently?	✓	X	✓

A possible short term solution

No solution of the type advocated above, which includes widespread metering, could be fully implemented in time for the year 2000 deadline. So, a short term solution is therefore required, and one which recognises that the vast majority of customers will inevitably still be on unmeasured tariffs, and thus fixed rate charges, at the time.

A key principle is that any changes made for the year 2000 should be consistent with the longer term direction. Since only very limited progress has been made since 1991 towards replacing the old system based on rateable values, there is a strong case for arguing that at least some elements of the longer term solution should be introduced at the 2000 ‘deadline’ in order to mark a real commitment to the new system.

If, as in the option discussed above, the longer term solution includes fixed charges related to council tax bands or liability, then either of the following would be possible in 2000:

- Move the basis of charging for *unmetered* households from rateable values to council tax bands (i.e. to the present Scottish system).
- Move *metered* households from the present to the new tariff, where the fixed charge elements are based on council tax bands or liability instead of being a uniform fee per household.

The merits of these different short term moves will depend chiefly on the extent and nature of the incidence effects, as well as the practicalities of moving to a new system within three years. In practice, it is likely that some water companies may wish to retain rateable values as the basis of fixed charges in the short term, even if moving to council tax bands in the longer term.

To accommodate this, the government would need to amend the 1991 Water Industry Act to allow rateable values to continue beyond the present deadline, perhaps putting back the deadline to 2005. Such a move could have to be accompanied by a requirement for all of the water companies to publish (and perhaps start to implement) their longer term solution by 2000, to ensure that this does not become an excuse for inertia.

9. KEY POINTS AND PRACTICAL ACTIONS

Ten key points

SUMMARY OF RECOMMENDATIONS

1. There is a short term problem and a strategic problem. The challenge is to solve the former in a way that facilitates the solution of the latter.
2. The short term problem is the legal requirement that the present system of charging according to rateable value be replaced by March 2000.
3. The long term problem is that household demand is set to rise by 1 per cent a year for the foreseeable future, with only limited scope for this to be offset by reductions in other abstractions and in reduced leakages.
4. The government should lead the industry to suitable solutions by setting out criteria relating to the effects that any new system of payment must have. Our suggested criteria fall under the broad headings of economic efficiency, environmental sustainability and social justice.
5. None of the charging systems presently on offer, including the present metered tariff, satisfies all of our criteria: broadly speaking, the rateable value system fails on the economic and the environmental criteria while the present metering tariff meets none of the three.
6. Without government action, progressive extension of the present metered-base tariff will have significant financial consequences, particularly for the poor and vulnerable in society. An urgent decision for government is whether such social justice considerations are best met through maintaining some relationship between water bills and ability to pay, or whether they should be addressed solely through the benefits system.
7. There are other charging possibilities which do seem to meet all the criteria, incorporating a higher standing charge than under current metered arrangements, a lower volumetric charge cost, and an allocation of the standing charge between households that has some relationship with the ability to pay.
8. One specific variant is for a fixed charge for a basic volume of water usage coupled with volume-related charges for water consumed beyond this level, and with the fixed charge being set according to council tax bands or liability.
9. Satisfying multiple criteria requires a sophisticated charging system which in turn depends on the detailed information that metering can yield. But specific metering proposals can only be judged in the light of the tariff structure that accompanies it.
10. In the short term, before the year 2000, the vast majority of people will inevitably remain unmetered, and their tariff structure necessarily based on fixed charges. The choice of particular solutions depends on an assessment of incidence effects and the relationship with longer term direction. To facilitate such short term, government should remove legislative barriers to the continued use of both rateable values and council tax bands.

Practical steps for government

This paper has argued that government's role should be one of leadership, providing a framework within which water companies can set charges which meet a variety of economic, environmental and social criteria. To enable this, we are suggesting six practical steps for the government to take:

ALLOWING SHORTER TERM SOLUTIONS

- **Amend the 1991 Water Industry Act to allow rateable values to continue as the basis of charging after the year 2000.**
- **Amend the 1992 Local Government Finance Act to allow council tax bands to be used as the basis of water charging.**

LEADING TO A LONGER TERM SOLUTION

- **Publish criteria for future water charging systems, including the detailed questions needed to allow the criteria to be applied.**
- **Set a timetable within which water companies must publish proposals for a new system in accordance with these criteria, their introduction to be subject to the agreement of OFWAT.**
- **Ask OFWAT to publish an assessment of the proposals and the reasons for its approval, or otherwise, of the schemes.**
- **Instigate an independent review of future long term costs in the water and sewerage industry.**

A. THE POLICY OPTIONS IN DETAIL

DOMESTIC RATEABLE VALUE

STATUS

A form of property tax related to the notional rental value of the dwelling. In operation in England and Wales since the 1973 Water Act.

WHAT IS THE BASIS OF THE CHARGE?

The rateable value of the house or flat, as set either in the last general review of domestic rates in 1973, or subsequently, if it was built or modernised after that. Rateable value was calculated to reflect both the size of the dwelling as well as the nature and standard of the facilities (such as central heating, number of toilets etc.) it contained.

Rateable value was replaced as the basis of local taxation in 1989 by the community charge. Dwellings built after that do not have a rateable value and are charged for water according to the volume used, measured by meter whose installation is compulsory. In addition, any household can switch voluntarily to volumetric payment, although this of course requires the installation of a meter.

HOW IS THE WATER BILL CALCULATED?

A bill based on rateable value contains four elements: two standing charges, for water supply and for sewerage, and two charges directly related to rateable value, again for water and sewerage separately. A water and sewerage company therefore sets four charges that apply uniformly to all domestic customers in its region, i.e., two standing charges and two charges 'per pound of rateable value'.

WHAT OPTIONS ARE THERE FOR THE TARIFF STRUCTURE?

Few. Automatic garden sprinklers attract an additional standing charge. In some areas, dwellings with e.g. swimming pools are required to install water meters.

WHAT IS THE COLLECTION SYSTEM?

Direct billing by water companies.

WHAT ARE POSSIBLE EXEMPTION ARRANGEMENTS?

There are no exemption arrangements. Since 1986, there has been no direct DSS grant for water payments.

WHO IS RESPONSIBLE FOR CREATING/UPDATING THE CHARGING BASIS?

Since rateable value is obsolete as the basis for local taxation, any updating of values would presumably fall on the water industry itself.

DOES THIS CHARGING ARRANGEMENT REQUIRE CHANGES TO LEGISLATION?

Yes. At present, the 1991 Water Industry Act forbids the use of rateable values beyond March 2000.

DOES THIS CHARGING ARRANGEMENT REQUIRE TRANSITIONAL ARRANGEMENTS?

No in as much as it is the status quo - but see below for 'other comments'.

HOW QUICKLY COULD THIS CHARGING ARRANGEMENT BE INTRODUCED?

Very quickly, requiring only the repeal (or amendment) of one section of the Water Industry Act 1991.

WHO SUPPORTS THIS?

OFWAT advocates the gradual extension of metering in its document *Paying for Water: the Way Ahead* (1991); the last Conservative government announced its intention of extending the deadline for replacing RV, although it did not actually act to repeal the necessary legislation.

OTHER COMMENTS

In practice, domestic rateable values are accompanied by an option of voluntary volumetric metering, which many companies are actively seeking to extend. This may not, however, represent a stable solution due to the gradual movement from payment by rateable value to payment by volume, currently led by new dwellings, dwellings with low use and dwellings with a high rateable value.

COUNCIL TAX BANDS

STATUS

A form of property tax reflecting the market value of the dwelling. In operation Scotland since 1996. It would replace the rateable value as the basis of charging.

WHAT IS THE BASIS OF THE CHARGE?

The valuation bands (A to G) employed by Local Authorities in fixing Council Tax bills. Each dwelling is allocated to a band according to its estimated market value in 1991.

HOW IS THE WATER BILL CALCULATED?

A single charge is set for dwellings in band D, with charges in other bands related to it in fixed proportions statutorily given. Whether water companies used these proportions or others would be open to decision.

WHAT OPTIONS ARE THERE FOR THE TARIFF STRUCTURE?

The arrangements for rateable values could apply. It would also be possible to include standing charges for water and sewerage uniformly for all dwellings as well as charges related directly to the Council Tax band.

WHAT IS THE COLLECTION SYSTEM?

Either direct billing by water companies or (as happens in Scotland, where the companies are not privatised) billing and collection on their behalf by local authorities where water and sewerage charges are shown as part of the Council Tax demand.

WHAT ARE POSSIBLE EXEMPTION ARRANGEMENTS?

There is a well-defined exemption and rebate system, including exemption for students, percentage reductions for people living alone, and reductions for the disabled. There is also a separate Council Tax benefit, calculated and administered by the local authorities. If this system were applied to water, local authorities could administer discounts and/or rebates on a commission basis for the companies (who would have to bear all the associated costs), relieving the burden on the Department of Social Security.

WHO IS RESPONSIBLE FOR CREATING/UPDATING THE CHARGING BASIS?

As long as Council Tax remains the basis of local taxation, responsibility for any updating would not lie with the water companies. There are currently no plans for a revaluation, which is at the discretion of the Secretary of State for the Environment. The National Audit Office estimate that a full revaluation would take in 21 million properties, at an average cost of £2.40 per property. The original valuation took 12 months, and a revaluation would be expected to take slightly less time.

DOES THIS CHARGING ARRANGEMENT REQUIRE CHANGES TO LEGISLATION?

Yes. The legislation which created the council tax, the Local Government Finance Act of 1992, forbade the use of its bandings for anything other than the collection of the tax itself. Also, the use of any valuation list is forbidden by the Water Industry Act 1991. The requirement for charges to have regard to costs would also have to be repealed (even though rateable values have little more regard to costs than council tax bands), as would the relevant section of the Data Protection Act. The weighting of values between England and Wales would need to be removed.

DOES THIS CHARGING ARRANGEMENT REQUIRE TRANSITIONAL ARRANGEMENTS?

Large changes in bills (compared with those based on rateable values) may occur, particularly for old, undervalued and rural properties. There are potential anomalies in areas where almost all properties fall into one or two bands, and in the three companies which substantially cross the Welsh border. Although not itself applicable, there is precedent in the Council Tax system for transitional relief, which was put into practice after the change from community charge.

HOW QUICKLY COULD THIS CHARGING ARRANGEMENT BE INTRODUCED?

Fairly quickly - it relies only on existent data.

WHO SUPPORTS THIS?

The TUC (at its 1995 conference) and the Liberal Democrat Party (1996 conference policy paper 24) are believed to favour this option.

OTHER COMMENTS

This could be combined with optional metering, as it has been in Scotland since 1992, although fewer than 50 people had taken up this option by 1995.

LICENCE FEE

STATUS

A form of property tax wholly independent of either the value or the physical characteristics of the dwelling. It would replace the rateable value as the basis of charging.

WHAT IS THE BASIS OF THE CHARGE?

Simply the existence of a property itself.

HOW IS THE WATER BILL CALCULATED?

A uniform fee per property is set by the water company. Presumably, this would be a 2-part charge, for water and sewerage, to accommodate the Water-Only companies.

WHAT OPTIONS ARE THERE FOR THE TARIFF STRUCTURE?

Few if any.

WHAT IS THE COLLECTION SYSTEM?

Direct billing by the water company.

WHAT ARE POSSIBLE EXEMPTION ARRANGEMENTS?

A system of social security charges would follow the model of housing benefit, treating water as an unavoidable, essential public good. Allowances for water were taken away in the 1986 Social Security Act.

WHO IS RESPONSIBLE FOR CREATING/UPDATING THE CHARGING BASIS?

There would be almost no external factors upon which the water company bases its charge, except to monitor changing usage of particular houses (e.g. conversion into flats).

DOES THIS CHARGING ARRANGEMENT REQUIRE CHANGES TO LEGISLATION?

No.

DOES THIS CHARGING ARRANGEMENT REQUIRE TRANSITIONAL ARRANGEMENTS?

Since this requires a flat fee to replace a graduated fee (RV), there will be considerable changes in most people's bills, and in many of those cases, transitional allowances would be necessary. Old, small, inexpensive properties are likely to lose out, and new, large and expensive properties are likely to be the winners.

HOW QUICKLY COULD THIS CHARGING ARRANGEMENT BE INTRODUCED?

While apparently simple, this option still requires a re-evaluation of household units to be charged separately, e.g. blocks of flats. Since the exemptions and rebates would be linked directly to existing DSS data, this should not take too long to implement.

WHO SUPPORTS THIS?

This is the favoured option of the National Consumer Council. It was also formerly supported by Welsh Water and some of the smaller water-only companies.

WATER SERVICE FACTORS

STATUS

A property-based charging factor reflecting those measurable characteristics that are associated with the actual or long term potential incidence of the majority of water costs. It could replace the existing arrangements either in whole or in part (i.e. for those dwellings charged according to rateable value or council tax band).

WHAT IS THE BASIS OF THE CHARGE?

A Water Service Factor, which is a single number unique to every property, which can be calculated by the water company. The Factor would be based on the gross floor area, the spacing between properties, the size of roof and parking areas. In addition, garden area, combined with metering where necessary and cost effective, could be used to reflect garden water potential and actual use.

This emphasis on property area and density reflects the importance within water costs of the networks of supply and sewerage pipes. This is a form of property charge that aims to be fair between dwellings (by being proportionate to cost and specific to this particular purpose).

HOW IS THE WATER BILL CALCULATED?

The bill is directly related to the Water Service Factor, the water and sewerage company setting appropriate rates that would be multiplied by the Factor to obtain the bill. This would include water and sewerage together. Customers of the Water Only companies would be billed only for water by their company. Customers could influence their own charges by measures such as fitting a plastic flow regulator, by disposing of rainwater drainage to soakaways, or signing an agreement to limit use of garden irrigation apparatus.

WHAT OPTIONS ARE THERE FOR THE TARIFF STRUCTURE?

There could be separate factors for each service at an appropriate rate per unit of WSF. There would be no standing charge, except where it is necessary to reflect the additional costs of metering.

WHAT IS THE COLLECTION SYSTEM?

Direct billing by water companies.

WHAT ARE POSSIBLE EXEMPTION ARRANGEMENTS?

There are no mentions of exemptions.

WHO IS RESPONSIBLE FOR CREATING/UPDATING THE CHARGING BASIS?

The water companies themselves. The data needed to calculate a dwelling's Water Service Factor could be obtained from computer-held Geographical Information Systems, supplemented by a system of inspection, particularly if customers build new features into their homes. Periodic updating would take place as a check that garden watering arrangements are being adhered to.

DOES THIS CHARGING ARRANGEMENT REQUIRE CHANGES TO LEGISLATION?

No.

DOES THIS CHARGING ARRANGEMENT REQUIRE TRANSITIONAL ARRANGEMENTS?

Some bills will change dramatically - where larger houses in poorer areas are undervalued for RV, bills are likely to rise; where smaller houses in richer areas which are overvalued for RV are likely to gain. Transitional allowances and phasing will be required.

HOW QUICKLY COULD THIS CHARGING ARRANGEMENT BE INTRODUCED?

Every property affected would need to be assessed to calculate its Water Service Factor, at a cost of £10-15 per dwelling; no estimate on timing. The process could be rapid if an efficient appeals procedure were put into place.

WHO SUPPORTS THIS?

The Public Utilities Access Forum, a grouping including 'national organisations concerned with citizens and money advice services, families, the elderly, consumers, energy efficiency, local government and the regulators', commissioned and published a paper written by John E Thackray (1997) setting out the argument for the system. The views are solely Thackray's. During the OFWAT *Paying for Water* consultations of 1990, certain Customer Service Committees supported what was then known as "banding".

OTHER COMMENTS

The scheme is intended to be compatible with optional metering for low usage households. It will need pilot testing by each water company to work out the degree of "banding" desirable. A simplified version of this approach is currently in use for substantial numbers of households in the Severn Trent region for part of their charges. The system could also be applied to small non-household properties such as corner shops.

VOLUMETRIC METERING WITH A UNIFORM PRICE PER LITRE

STATUS

A charging system in which the amount the household pays varies with all usage of water, i.e. 'from the very first litre of water consumed'. 10 per cent of households in England and Wales now pay for their water this way. The different water companies have different tariff structures for their metered domestic customers.

WHAT IS THE BASIS OF THE CHARGE?

The volume of water used plus one or more standing charges.

HOW IS THE WATER BILL CALCULATED?

The charge is directly related to the volume of water used i.e. a unit price per litre set by the water company is applied to the number of litres used by the household. To this volumetric component are added standing charges which are usually, under the present tariffs, levied uniformly on all households.

WHAT OPTIONS ARE THERE FOR THE TARIFF STRUCTURE?

In contrast to the previous options, there is in principle considerable scope for varying the balance between the volumetric price and the standing charge. As explained in chapter 5, the present tariff is of the 'higher volumetric price and lower standing charge' variety. The argument there was that if this is the basic system to be employed, the tariff should be of the 'lower volumetric price and higher standing charge' variety. This opens up the possibility - indeed arguably the necessity - of levying the standing charge/s in a non-uniform way (e.g. according to council tax bands or rateable values) so as to achieve social objectives and avoid unacceptable incidence effects in the transition from the present flat rate tariff to the metered tariff.

WHAT IS THE COLLECTION SYSTEM?

Direct billing by the water companies.

WHAT ARE POSSIBLE EXEMPTION ARRANGEMENTS?

This would depend on the basis for the fixed charge (e.g. the well-defined exemption and rebate system for the Council Tax could be used if that were the basis).. The present tariff offers few obvious opportunities.

WHO IS RESPONSIBLE FOR CREATING/UPDATING THE CHARGING BASIS?

This would depend on the basis on which standing charges were levied. The metered element would not need updating and neither would a standing charge if it were levied uniformly. Even if the standing charge were levied according to e.g. council tax bands, the water companies would only need access to that information from local authorities, any updating being the responsibility of the latter.

DOES THIS CHARGING ARRANGEMENT REQUIRE CHANGES TO LEGISLATION?

The metering element is fully compatible with existing legislation. The use of rateable values or council tax bands would require legislative changes.

DOES THIS CHARGING ARRANGEMENT REQUIRE TRANSITIONAL ARRANGEMENTS?

It is impossible to answer this without reference to the particular tariff structure adopted.

HOW QUICKLY COULD THIS CHARGING ARRANGEMENT BE INTRODUCED?

The present system is already moving towards more widespread use of metering. Yet whether the approach is gradual or not, this will take time and cost money: perhaps £3 billion to install meters in all dwellings. The major practical question is how far it is actually possible to install meters. Blocks of flats, or even divided houses, may need to be metered as whole with the bill going to the freeholder/managing agent who then divides it between individual dwellings on some other basis (as is the case in Germany).

WHO SUPPORTS THIS?

Those opposed to metering in principle will not support this. Whether it is, or should be, supported by others will depend on the tariff structure adopted.

OTHER COMMENTS

The present arrangements for introducing metering on a (largely) voluntary basis depends for its success on the present tariff structure, which encourages both low users and highly-rated households to switch. This is not an approach that can possibly bring almost everyone to metering in the long term since high users and those in low-rated properties would lose out. Yet switching to an alternative tariff which would better protect the latter group's interest would presumably be at the expense of some of those who have already switched.

VOLUMETRIC METERING WITH A VARIABLE PRICE PER LITRE

STATUS

A charging system in which the amount the household pays varies with the amount of water it uses. In the simplest (two tier) version, consumption up to a certain level ('basic usage') is charged at a lower price while beyond that, water is charged at a higher price. The initial tranche is simply pre-paid.

WHAT IS THE BASIS OF THE CHARGE?

The volume of water used. There would be a standing charge based on council tax bands to reflect costs which vary with factors other than volume of supply.

HOW IS THE WATER BILL CALCULATED?

Meters would measure total consumption. The real practical difficulty with this arrangement is determining what the threshold at which the higher price starts to apply since it ought, if its to be socially acceptable, depend on an assessment of each individual household's needs. This, however, could be costly, impractical or sensitive.

WHAT OPTIONS ARE THERE FOR THE TARIFF STRUCTURE?

Since this is the system with the greatest number of variables, the options are in principle many.

WHAT IS THE COLLECTION SYSTEM?

Direct billing by the water companies is likely to be the only feasible option.

WHAT ARE POSSIBLE EXEMPTION ARRANGEMENTS?

This would depend not only on the basis of the fixed charge but also on the way that 'basic usage' was calculated.

WHO IS RESPONSIBLE FOR CREATING/UPDATING THE CHARGING BASIS?

The corresponding comments on the volumetric price and the standing charge from the previous example apply here too. However, at the moment there is no information on which to base to the calculation of 'basic usage' and the water companies would have to do that themselves, under the supervision of local or regional government.

DOES THIS CHARGING ARRANGEMENT REQUIRE CHANGES TO LEGISLATION?

The metering element is fully compatible with existing legislation. The use of rateable values or council tax bands would require legislative changes.

DOES THIS CHARGING ARRANGEMENT REQUIRE TRANSITIONAL ARRANGEMENTS?

The additional flexibility that the water tranche allows means that it may be possible to introduce this system without significant transitional arrangements. But a definitive conclusion here can only be made once the particular tariff structure is known.

HOW QUICKLY COULD THIS CHARGING ARRANGEMENT BE INTRODUCED?

Given that the introduction of meters is itself a slow process, the work required to obtain the information necessary to calculate 'basic usage' need not delay matters any further. Any system requiring legislative changes could not be implemented immediately.

WHO SUPPORTS THIS?

As far as we know, this is a new proposal but - if the tariff structure is right - it has the potential to satisfy those who are otherwise opposed to metering in principle.

B. THE EXISTING LEGISLATIVE AND POLICY FRAMEWORK

The legislative framework

THE WATER INDUSTRY ACT 1991 (SECTIONS 142-149)

- Water and Sewerage companies may charge for their services *either* in accordance with a charges scheme, *or* by agreement with the persons to be charged. A charges scheme may make provision for differences in circumstances or localities.
- A company may not charge for becoming a provider, water for fire-fighting, or highway drainage.
- Companies were forbidden to base their charges on a rating valuation list after 31st March 2000. This has been generally understood to include council tax bands as well as rateable values. In April 1995, following representations from the companies, the then Secretary of State announced the Government's intention to extend this deadline indefinitely. This legislation was not, however, ever put to Parliament.
- When a company requests the installation of a meter, it must bear the costs of installation and maintenance. The Secretary of State may make regulations concerning areas such as the positioning of a meter, the verification of a meter reading or the method for determining the level of charges when a meter has given an incorrect reading.

THE INSTRUMENT OF APPOINTMENT, OR LICENCE

This sets out the conditions by which a water and sewerage undertaker is appointed by the Secretary of State.

Condition E prohibits 'undue preference for, or undue discrimination against any individual or class of customer or potential customer'. It is unclear whether this is intended to prohibit a charging structure with a re-distributive element.

Since 1 February 1996, following an amendment to the Water Industry Act of 1991, companies have had the duty to promote the efficient use of water by their customers. They are required by the regulator to publish a water efficiency plan.

THE LOCAL GOVERNMENT FINANCE ACT 1992

Section 28 of the Act, which created the Council Tax, limits the use of Council Tax bandings in England and Wales to the collection of the tax itself.

The use of any valuation list is forbidden by the Water Industry Act 1991. There is some confusion as to whether or not this includes Council Tax bands. Associated issues include the repeal of part of the Data Protection Act (if Council Tax liabilities are to be used) and the repeal of the requirement in the licence for charges to equal costs. Another issue is the need to remove the weightings of values between England and Wales, particularly for the three companies that straddle the Welsh border.

The regulator's policies towards charging and the means at his disposal

After issuing a consultation document in November 1990, and evaluating public responses, the Director-General of OFWAT issued a set of guidelines in December 1991 for the companies' charging systems. His starting point was that paying according to use was "*the most popular choice expressed by customers...the fairest solution*". He went on to say that "*In the long term, metering is the only satisfactory way of achieving payments which are well related to the amount of water used. A rapid change to universal household metering would, however, be uneconomic. Instead, metering should be targeted, and should spread progressively.*" (OFWAT 1991)

Charges for metered customers must be set at a "*fair level - I am not convinced that current tariffs achieve this*". Standing charges should be low; capital contributions should be kept to a minimum. "*Volumetric charges should make up the bulk of the total bill. They must be simple and unit charges should not vary with use. In time it may prove desirable to introduce peak consumption charges.*"

Unmeasured customers should receive bills related not to local government taxation, but to costs and use of water, and so any banding system should reflect likely consumption. Some companies have already modified existing rateable value charges by adjusting fixed charges.

By 1997, the Director-General's view had not changed appreciably: "*metering is the fairest method of charging, as it relates charges to the amount of water used or sewage discharged and, hence, to costs. The Director believes that it is sensible to meter where it is cheap or economic to do so, for example in new properties, in non-households, where there is a high discretionary use of water (such as for watering gardens) and where resources are limited. He also expects companies to install meter boxes when undertaking work on service pipes, so that a meter can be cheaply installed at a later date. He does not advocate universal metering*" (OFWAT 1997: 32).

The strategy, policies and actions of the water companies

In January 1997, the nine privatised water companies who form the Water Services Association issued a document outlining their vision of the industry's future, entitled *Water: Meeting the Challenge*. Yet this document states merely that they will "*develop new charging systems to prepare for the possible replacement of rateable values as the basis for charging*", and that they will "*continue to oppose the principle of universal compulsory metering*" (Water Services Association 1997: 8).

The companies have different positions on an ideal long-term solution, but most are agreed on the need to extend the deadline for the prohibition of the use of RV beyond 2000. Few have tied their mast to any particular long term solution, although a company such as Anglian is making obvious steps towards large-scale volumetric charging.

At present, there is wide variation between the standing and variable charges used and contributions levied for those optionally metered by different companies, as well as on the basis of tariff structures. Some favour a high standing charge, on the grounds that most costs are related to capacity rather than output, and others reflect more directly total use.

The different situation in Scotland

Since 1st April 1996, public water and sewerage services in Scotland have been provided by three publicly owned authorities outside the remit of local government - East, West and North of Scotland Water Authorities. Ultimate responsibility rests with the Secretary of State for Scotland. This structure was created with the intention that the PFI be a major source of capital, but, by late 1996, only one proposal had even reached the tendering stage - a "Build, Own and Operate" contract worth £45m for two combined projects, for a sewage treatment works at Fort William and a main drainage scheme for Inverness (Stout 1996).

Water supply is charged on the basis of Council Tax band values. Since 1st April 1996, sewerage charges have also been based on Council Tax band values. Water supply and sewerage charges are levied as an additional element of Council Tax bills. There is some evidence that the authorities favour, as in England and Wales, an extension of voluntary metering, an option that has been available since 1992, although in the first three years, taken up by fewer than 50 people! (Chambers 1996: 40)

The different situation in Northern Ireland

Although the 1992 Conservative election manifesto promised privatisation of the water industry in Northern Ireland, this was postponed until after the next general election (1997). Currently, ultimate responsibility lies with the Secretary of State for Northern Ireland, water policy is determined by the Department of the Environment for Northern Ireland, and the service is overseen by the Water Executive, which has been organised as a Next Steps Agency since April 1996. The industry requires infrastructure improvements to the tune of £350m to £500m to meet EC directives, which is currently being met by the taxpayer.

Funding for water is 100 per cent tax based, from local and national sources. There is no direct billing. The intention is to move eventually to a charge-based service, but no timetable or details have been set.

C. LONG-RUN MARGINAL COST ESTIMATES IN THE PUBLIC WATER SUPPLY IN ENGLAND AND WALES

BY PAUL HERRINGTON, DEPARTMENT OF ECONOMICS, UNIVERSITY OF LEICESTER

Empirical estimates of the long-run marginal cost (LRMC) of public water supply deliveries in the UK are few and far between. The last comprehensive study was by Coopers and Lybrand for the Watts Committee in its 1985 investigation of domestic water metering. Their estimates are contained in an internal Department of the Environment report, *Water Metering*, prepared in July 1985 and subject to quite wide circulation outside the Department.

More recent figures prepared in connection with the Broad Oak reservoir proposal can be found in *Water for the Future in Kent: Issues and Options*, compiled and published by Binnie and Partners in July 1991.

The results of both these studies are discussed below.

The table below summarises the components of LRMC estimated by Coopers and Lybrand in its study for the two (then) water authorities studied in detail. These estimates were entirely forward-looking, reflecting the unit costs incurred as a result of the (then) estimated future growth in demand. Note that expenditures relating to quality (except when they are to maintain pressure in the face of increasing demands) to replacements and to new connections are excluded from the analysis, since the effect of domestic metering (lower demands) would not affect the timing of such investment.

Estimation Of Components Of LRMC Of Public Water Supply (all estimates in pence/m ³ , in 1984/5 prices)		
	Southern Water Authority	Yorkshire Water Authority
WATER SUPPLY		
<i>Operating expenditure</i>	3.0	
- operating costs		4.3
- rates		2.0
- 'fixed' operating costs (operation and maintenance costs in treatment works)		0.2
<i>Capital expenditure</i>		
- strategic	2.4	1.5
- distribution	13.4	11.0
SEWERAGE AND SEWAGE DISPOSAL	2.0	1.8
TOTAL	20.9	20.8

In the table below, these LRMC estimates are compared with the 1984/5 measured charges for water supply and sewerage, the latter being backward-looking average financial cost measures which reflected the then historic costs of the provision of supplies.

LRMC And Average Water Charges, 1984/5		
	Southern Water Authority	Yorkshire Water Authority
Measured volumetric water charge (p/m ³)	20.8	22.8
Hypothetical measured volumetric sewerage etc. charge (p/m ³)	27.3	20.7
LRMC estimate from table 1: water supply (p/m ³)	18.9	19.0
LRMC estimate from table 1: sewerage (p/m ³)	2.0	1.8
LRMC as percentage of measured charge:		
- water supply	91%	83%
- sewerage	7%	9%
TOTAL	43%	48%

Note that the LRMC estimates make no allowance for any environmental costs resulting from the provision of additional supplies and additional sewage treatment. If, as was claimed in a recent Yorkshire Water leakage report, the environmental costs of resource expansion schemes turn out to be ‘relatively small’ (Yorkshire Water 1997: 88), then it is arguable that the LRMC estimates should be increased by no more than, say, 10 to 20 per cent to give a more comprehensive *social* LRMC value. In the more closely-packed south-east of the country, however, it may be that environmental costs would be perceived to be relatively larger, in which case higher mark-ups would be justified.

The results in the table are striking. For water supply, the (historic) volumetric charge and the forward-looking LRMC estimate are close to one-another: within 10 per cent if environmental costs of the order referred to above are added into LRMC. For sewerage etc, however, the LRMC of additional domestic demands is estimated at only about one tenth of the 1984/5 volumetric charge. Overall, total LRMC works out at about half the total 1984/5 volumetric charge.

The only other UK LRMC-type estimates in the public domain relate to Broad Oak reservoir proposal. New traditional supply schemes being considered in 1991 by the three promoters, Mid-Kent Water Company, Southern Water and Folkestone and District, were claimed to have lower limit unit costs (defined as those associated with maximum yields) in the range 36-41 pence per cubic metre, but this excluded ‘trunk main and system enlargement costs’ (the latter presumably referring to distribution costs). Since Southern Water’s volumetric charge for water supply was 40.7 p/m³ in 1991/2, ‘true’ LRMC must have been equivalent to at least 100 per cent of volumetric charges at that time. This suggests rather higher relative figures for LRMC in the Southern Water Authority Area by the early 1990s, consistent with the idea of water supply costs increasing over time as demands rise.

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