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DEMAND MANAGEMENT AND INCENTIVES PRICING

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INTRODUCTION

This position paper is one of EUREAU's contributions to the European Commission's Common Implementation Strategy of the Water Framework Directive. EUREAU supports the Commission's objective of furthering a consistent implementation of the Water Framework Directive across Europe. EUREAU is the representative organisation for Europe's water and wastewater industry which serves about 400 million people.

EUREAU's members' customers will be making a major financial contribution to the implementation of the WFD. It is important that the payments made by water customers for their water services are calculated and collected in a way which furthers the objectives of the WFD; water and sewerage bills should promote not just sustainable water uses but economic and social sustainability also and take account of geographic and climatic conditions.

This position paper is concerned with the implementation of the WFD provision in Article 9 that 'Member States shall ensure by 2010 that water-pricing policies provide adequate incentives for users to use water resources efficiently (...)'. In other words, the Directive provides that pricing should be used to further what is often referred to as 'demand management' (Annex A for definitions).

This paper uses the concept of 'water use' and 'water user' as defined in the context of the WFD. Any activity which has a significant effect on the water environment is a water use (as defined in Article 2.39 of the WFD).

The operations of water service operators are a special case of water use. The customers of such services are water service users while other water users include agriculture, navigation and various activities like the chemical industry which may be discharging trade effluents into the water environment.

ABSTRACTION AND DEMAND MANAGEMENT

The role and importance of demand management is linked to the value of the water which could be saved. This value varies significantly between geographical areas because it depends upon water scarcity, or water availability compared to water demand. Scarcity depends on the local environment – natural and human. The relatively high cost of transporting water ensures that local conditions (population density, industry demand, hydrological conditions, etc.) determine water valuations which are specific to each local area.

Raw water may be abstracted for two main types of water user:

- For own use – water users at this stage of the water supply chain are agriculture, other primary activities (such as mining) and some commercial and industrial (including energy) activities
- As an input to a water operator's water supply system – customers are domestic customers and some industrial and commercial activities

Demand management needs to apply to both types of customers and, therefore, needs to apply to the abstraction of raw water if the water supply and demand balances are to be managed sustainably in each local water area. It is essential that demand management at the raw water stage is applied in a consistent way across all abstractors. If demand management is carried out effectively at that stage, it will support sustainable demand management at all other stages of the water supply chain and facilitate the use of incentive pricing at the end-user stage as required by the WFD (see Annex B for a supply chain summary).

In practice, management of raw water demand is carried out through a system of abstraction permits which is supported by an abstraction pricing regime or other economic instruments in a number of countries. Existing and proposed abstraction management instruments need to be reviewed for their conformity to the WFD principles. In particular, where abstraction charging is already in place, it needs to be reviewed to ensure that it complies with the costing and pricing principles set in the WFD. Three main issues need to be addressed:

1.- Sound economic principles – The allocation of permits and abstraction pricing must be based on sound economic principles which recognize and reflect that the value of raw water varies between local areas. Soundly based abstraction fees can help manage water demand and protect the water environment but only as part of a balanced policy of incentive pricing at other stages of the supply chain. In those countries where abstraction fees are in use, they should not be just another tax lost among other government's revenues. Abstraction fees need to be raised only if water is scarce enough in a particular area to warrant them, and to warrant the cost of collecting them.

2.- Incidence of abstraction fees – The incentive effects of abstraction fees depend on how they affect the price that end-users pay for water, namely the fees' incidence. For incentive pricing to function effectively, the costs of the abstraction management system – abstraction fees in particular – must be transferred to end customers without distortions – whether they are 'self-supply' large industrial users or water service users. The efficiency benefits of pricing abstraction in an economically sound way are not obtained if end customers pay charges which are not fixed in accordance with WFD principles. If customer charges are distorted by various taxes and the costs of dealing with pollution caused by other water users, it is inefficient to raise an abstraction charge, even if it is calculated in an appropriate way. It is important to look for a first-best solution where the WFD cost and pricing principles are implemented throughout the water supply chain.

3.- Use of abstraction fee proceeds – As abstraction fees have the objective of managing raw water demand and limiting it to a sustainable quantity, their proceeds should be used exclusively to improve (or maintain) the state of the water environment in the river basin or area where they have been collected (where water has been abstracted) and to increase the supply or quality of raw water therein.

Eureau's position is that, without a sound consistent framework for environmental pricing and taxing throughout the water supply chain, an abstraction fee, even if correctly calculated for the purpose of managing the local water environment, would not be sufficient to implement the WFD adequately. If abstraction fees, together with other water supply costs, are correctly reflected in the prices that end consumers pay for water, these are more likely to respond adequately to the incentives that abstraction fees are designed to convey. Price signals should not be obscured by the addition of other, unrelated costs in the price of water. This entails that the use of economic instruments such as abstraction fees must be accompanied by adequate measures to ensure that water customers are not charged for the cost of removing pollution emanating from other water users, like diffuse pollution.

In summary, demand management includes the use of appropriate abstraction fees or the imposition of other obligations on abstractors, which take into account local circumstances and are used to improve the local environment. However, these should not be put in place until all the factors and activities that significantly affect the environment are appropriately controlled and subject to the Water Framework Directive discipline, including the principle that polluters should pay.

DEMAND MANAGEMENT FOR WATER SERVICE USERS

It is generally accepted, and Eureau supports this view, that metering is an essential component of demand management. There is evidence that end-user pricing for demand management through metering creates correct incentives for industrial and commercial customers.

For domestic customers, metering satisfies the perception by most people and water operators of what is a 'just' or 'fair' way of charging for water. For that reason, customers in many countries in Europe expect metering as charging mechanism. Some people argue that the cost of water should be related to the ability to pay of the domestic customer receiving a supply. Generally, Eureau does not believe that water pricing should be related to ability-to-pay because:

- A water bill should not be a tax but a payment by water customers for a service which they receive
- It is not normally possible for a single economic instrument – tariffs – to be effective in achieving two objectives. Demand management requires one instrument and social protection requires another. A charging regime based on ability-to-pay will give reduced incentives to manage water demand and risks becoming ineffective and very expensive. Better to ensure that the Government social security system provides poor households with a sum of money sufficient to cover the cost of their basic water needs (see fuller discussion of the issues in Annex C).

Even with pure cost-reflective pricing, Eureau thinks that the incentive effects of metering – to help control water demand - are limited. The two main reasons are:

- Metering has a high transaction cost. Since water consumption is carried out at household level, metering should ideally also be carried out at household level but the cost of metering individual dwellings compared to that of metering blocks of flats or

residential developments may be too high compared to the value of the resulting reduction in water consumption.

- The proportion of fixed costs in water operations is high. With cost-reflective pricing, this high fixed cost is reflected in a tariff structure which has a high fixed component and, thus, limits the incentive effects of metering to a small fraction of the customer bill (Annex C discusses the possibility that peak pricing might increase the variable part of customers' bills, if feasible and justified by demand patterns).

For a pricing mechanism to function well, customers need to be able to control their consumption and reap the financial benefits of this control in the form of reduced bills. But, with current metering practices, the reduction in bill may be too small to create effective incentives. Additionally, it has to be taken into consideration that in many countries in Europe the price elasticity of water demand is relatively low. That might be due to the fact that the share of a water bill in a households budget is relatively small. It has also been noted that the price elasticity of water demand increases as income falls.

As a consequence of these factors, Eureau believes that it should be up to water service operators - if national legislation allows for it - to determine whether, and to what extent and in what way, metering is justified as a demand management tool.

Eureau recognizes the educational value of metering in drawing attention to the value of water. It believes that education and information of customers is an essential part of demand management, whatever the role pricing may also play. Incentive pricing needs to be supplemented with a large programme of information and education to help customers control their consumption.

Unlike other economic sectors, where suppliers vie with each other to improve customer knowledge so as to increase demand, customer information is not an automatic state of affairs in water. Effective water demand management benefits society generally, as it creates a better environment for all. Therefore, the information and education of domestic customers is an important responsibility not only of the water industry but also of governments and customer representative organisations.

Eureau and its members would like to engage in a debate with all the industry's stakeholders, including the European Commission and Member States governments, on how customer education can be further provided and on the respective roles of interested parties. This debate should be wide-ranging and include, for instance, manufacturers of white goods (labelling for energy and water efficiency) and water saving devices.

CONCLUSION

Eureau believes that a coalition of interested parties should engage in customer information and education because incentive pricing, as required by Article 9 of the WFD, is unlikely to achieve a satisfactory control of water demand on its own.

Annex A:	Definitions
Annex B:	Supply Chain Summary
Annex C:	Organisation

Annex A – Definitions

DEFINITION OF DEMAND MANAGEMENT

In the context of water supply, demand management is often described as an activity designed to limit demand and match it to supply. In economic sectors other than the water industry, demand is usually limited by means of the price mechanism; pricing also acts to increase supply so as to bring demand and supply in balance. Pricing can also be used in the water sector but its application is limited in practice by the peculiar cost structure of water operations. Pricing incentives need to be supplemented by other, non-price, mechanisms. The expression ‘demand management’ sometimes refers to these non-price techniques only. This paper considers demand management in general, of which pricing policy is normally an essential tool.

ECONOMIC LEVEL OF DEMAND MANAGEMENT

Demand management is a special issue in water because it has a real and significant resource cost, particularly significant when compared to domestic water bills. Consumption pricing as a tool of demand management requires metering, which has a capital and an operations cost. Other forms of demand management also have a cost (customer education, provision of advice...).

Since the purpose of demand management is to promote sustainable water use, the costs of demand management must be weighed against the benefit of water conservation. Sustainability and WFD principles require that demand management techniques should be used only where the value of the water saved is greater than demand management costs. There may be cases where demand management does not provide results which justify its costs.

PRICING POLICIES

Eureau (First Position Paper – 2002) has developed a number of pricing principles which create incentives for customers to manage their water demand. In this regard, Eureau’s objectives are:

- To promote water pricing policies which implement sustainability principles fully (e.g. environmental, economic and social sustainability), recognising that these different elements may sometimes conflict and need to be balanced. Pricing policies will have the triple objective of: a) encouraging the efficient use of water, b) stimulating pollution reduction, and c) ensuring that environment protection is carried out only after benefits have been carefully balanced against costs, which do not necessarily refer to economic measures only.
- To support the principle of full cost recovery. As a consequence, to seek to establish, among others, the principles “the user pays” and “the polluter pays”.
- To encourage the application of the personalised measurement of consumption, where cost-effective, with the aim to objectify and personalise the amounts to be paid by users.

SUPPLY CHAIN

The water supply chain runs from the abstraction of raw water, usually followed by transport, treatment and storage, until water is supplied to a final customer, or water service user. Water service operators – with their treatment and distribution infrastructure - are most likely to be part of the supply chain for domestic customers. Conversely, the water supply chain for agricultural and industrial customers – water users – may include abstraction activities only and very little else, particularly if they ‘self-supply’. While the water supply chain differs between classes of customers, it is important that consistent demand management measures are put in place because all water uses share the need to obtain water from the environment.

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Annex B – Supply Chain Summary

SUPPLY CHAIN SUMMARY

The table at next page summarises the issues raised by the WFD objective of promoting water efficiency through, in particular, incentive pricing. The first column outlines the main stages of the water supply chain which applies to the provision of water services. The second, third and fourth columns outline cost characteristics at each stage of the water supply chain, including the self-supply case, when only the abstraction stage of the water supply chain is relevant. Three more columns draw conclusions for pricing policy.

Notes to the table

The reality of demand management along the supply chain is different from the schematic outline below for a number of reasons. Many of the differences are due to distortions which would not exist if the Water Framework Directive was fully implemented. Examples include:

- End customers are charged taxes, etc.
- Treatment and Transport includes the costs of cleaning up others’ pollution and additional transport costs because local water sources are exhausted or too polluted
- Abstraction fees, when raised, are not applied to all water users on the same basis
- The system of abstraction licensing is not applied consistently across all water users
- Abstraction fees are raised even when the rest of the water supply chain is not priced according to the WFD principles

Demand Management through the Supply Chain

SUPPLY CHAIN	DOMESTIC COST CHARACTERISTICS (supplied through water service operator)	NON-DOMESTIC COST CHARACTERISTICS (supplied through water service operator)	WATER USER COSTS + SELF-SUPPLY COSTS	PRICING OF DOMESTIC WATER SERVICE USERS	PRICING OF NON-DOMESTIC WATER S. USERS	PRICING OF WATER USERS + SELF-SUPPLY
End customer	Cost related to supply point	Cost related to supply point (relatively small)	N/A	Fixed part of two-part tariff	Same	N/A
Treatment & Transport	Fixed Cost \Rightarrow related to expected capacity required by each supply point \Rightarrow LARGE* Variable Costs \Rightarrow chemical and energy costs \Rightarrow SMALL*	Fixed Cost \Rightarrow related to connecting pipes only \Rightarrow SMALL* Variable Costs \Rightarrow chemical and energy costs \Rightarrow LARGE* (relatively)	N/A	Fixed part of two-part tariff \Rightarrow LARGE* Variable part \Rightarrow SMALL* \Downarrow Small incentive \Downarrow Economic level of incentive charging	Variable \Downarrow LARGE* \Downarrow Large incentive	N/A
Abstraction	Environmental and Resources costs \Rightarrow Variable between regions and volume-related + Engineering, etc costs	Same	Same	<ul style="list-style-type: none"> - Related to quantity of water used - Depends on value and scarcity of water - Must be on same basis for all water service users and water users - Should exist only as part of a consistent pricing framework for the whole of the supply chain 		

* relative to other parts of the costs or tariffs

Annex C – Organisation

METERING

It is generally accepted, and Eureau supports this view, that metering is the only way to measure demand. Some parties have suggested other methods for domestic customers, which rely on household composition, size of house and/or garden, etc. However, these methods are indirect, uncertain and can entail an acceptable loss of privacy. Moreover, they provide no incentive to control demand since bills do not come down if consumption does. If consumption is the basis for charging, metering must be the basis for measuring consumption and charging for it.

Metering also has the advantage that it satisfies many people's perception of what is 'just' or 'fair'. With metering, no one feels that his or her bill is increased because of the lavish consumption of others. A reduction in water use translates directly in a lower water bill. The recognition that metering allows a proper allocation of charges to individuals is likely to grow as water prices increase in real terms, as is likely for the foreseeable future. It is also likely that, as prices increase, customers themselves will want to see their bills better attuned to their consumption through metering. Finally, advances in technology and reduction in costs may permit metering by time-of-day, which would permit peak-pricing.

However, metering water consumption is not straightforward. A characteristic of water consumption is that it is carried out at household level but, in certain cases, it may be expensive to meter individual households, particularly if they live in blocks of flats. This often results from history, namely the way houses were designed and built before water became a sustainability issue. However, even with modern housing, metering individual households may be expensive and cumbersome. Generally, there is a cost to metering which needs to be weighed against the benefits which metering brings.

In England and Wales, the water industry regulator, Ofwat, estimates that metering, annually, adds £40-50 (about €65) as the annualised cost of a meter (including installation, maintenance and reading) to the costs associated with each customer supply point (for water and sewerage services). Managing demand through metering is justified economically only if the value of the water saved annually is worth more than metering costs.

Metering and its extent should be a commercial decision which must be taken by water service providers. The decision should be influenced by consideration of costs (providing a water supply and metering), practicability, and on the state of development of the water services themselves (basic or more developed).

TARIFFS

A related fundamental question is the correct design of the tariff which is to be applied. It is generally agreed – and this is consistent with the cost recovery principle in the WFD – that any water tariff needs to be a two-part tariff to reflect the structure of water supply costs: some costs, such as the cost of the network termination specific to a customer, are fixed and must be recovered even if a customer consumes no water. Other costs are related to the amount of water used. It is essential that the balance between the fixed and variable parts of a tariff be struck correctly.

A tariff where the fixed part is small in relation to the total bill – where the volumetric element is relatively large – has a maximum impact on demand. However, if the fixed part does not reflect all fixed costs, empty properties, second homes and holiday homes in particular, are not charged enough and impose costs on the rest of the customer base. This is not a desirable state of affairs, especially as holiday homes may be using water at a time when water is particularly scarce and expensive to provide, typically in summer.

Conversely, if fixed costs are believed to be high and the fixed tariff part is correspondingly large, the incentive effects of tariffs are more muted since the volumetric element of the bill is small and customers do not see a large benefit from reducing their consumption.

Many water operators believe that fixed costs are higher than is usually acknowledged. Fixed costs include not only specific network costs (pipes connecting individual properties) but also many of the costs associated with producing and transporting water. For instance, water treatment works need to be designed with a capacity sufficient for peak demand even if this demand materialises only during one month every year. The costs of investing in – and maintaining – system capacity arise whether or not this capacity is used. These are costs which are independent of the water actually used and they must be included among fixed costs, even if they are variable over the long term. Tariffs, therefore, need to include a large fixed element which recovers all fixed costs. This will ensure that all customers make an adequate contribution to the costs which they cause. Some water operators believe that around 80% of their costs are fixed and that, therefore, the majority of their revenue from domestic customers should come from fixed, per customer, charges.

Some of the fixed costs are peak capacity costs which, ideally, should not be included in the fixed part of a two-part tariff but should be recovered through peak-pricing. Peak-pricing could have a significant impact on water demand, when water supplied is at its highest production cost, but it requires special meters. These have not been developed in a way which would reduce their costs and increase their reliability sufficiently to make them acceptable to water service operators and customers.

Barring the development of peak-pricing, a large proportion of costs are likely to be fixed, with a concomitant large fixed element in domestic customer tariffs. Tariffs may, therefore, have a limited effect on demand management because domestic customers have some control over a small part of their bills only. Of course, as bills increase generally, there will be additional incentives on customers to manage even a small proportion of their bills but the conclusion might be that tariffs may not have the incentive effect in water that prices have in other industries.

It should be an urgent research area for Eureau and its members, but also policy and law makers in Europe and within members states, to investigate the true extent of the costs which are determined by the number of customers instead of by their consumption. Special attention should be given to the costs of peak capacity, to see whether these costs are relatively large and might warrant investigations of the potential of meters capable of peak pricing at a low transaction cost.

A separate area of activity for all parties should be encouraging the development of low-cost water meters which can accurately record time-of-day and time-of-year information.

Such research, technological and commercial activities will have the following benefits:

- They will enable the water industry to determine how it can design tariffs which satisfy the Water Framework Directive provisions that water service costs should be, not only recovered, but also placed upon customers in a way that creates incentives for demand management
- If carried out transparently and openly across Europe, they will help the industry explain to governments, opinion formers and, first of all, to customers why water prices are what they are and must be paid.

DEMAND MANAGEMENT AND ABILITY-TO-PAY

A separate question is the belief of some people that the cost of water should be related to the ability to pay of the domestic customer receiving a supply. Generally, Eureau does not believe that water pricing should be related to ability-to-pay because:

- a water bill should not be a tax but a payment by water customers for a service which they receive
- it is not normally possible for a single economic instrument – tariffs – to be effective in achieving two objectives. Demand management requires one instrument and social protection requires another. A charging regime based on ability-to-pay will give reduced incentives to manage water demand and risks becoming ineffective and very expensive.

Some Eureau members found that it was possible to set up a charging system which takes some account of ability-to-pay and also achieve a demand management objective to some

extent. Other members have found that such charging system could be achieved, if at all, only at enormous cost (transaction, administration, loss of privacy).

The simple problem is that, when demand management creates a financial incentive for poor household to save water, some people argue that there is a risk that such households reduce their consumption of water below what other people might consider consistent with good sanitation, hygiene or health.

In a system where charges are not related to ability-to-pay, this difficulty can be overcome by ensuring that poor households receive a sum of money sufficient to cover the cost of their basic water needs (which government social services would assess according to household size, composition and health) and this sum may not be used for any other purpose than paying the household's water bill. The provision of this sum is a second economic instrument which achieves a social objective while tariffs are used to achieve the demand management objective. If poor households waste water, their water bills will be higher than the benefit payments they receive, which creates a powerful incentive for them to conserve water. If they manage their demand as expected, their basic water needs can be fully satisfied.

However, if the charging system itself is given the task of responding to ability-to-pay as well as encouraging demand efficiency, it requires of water operators that they assess all households to collect information on:

- Whether the household is 'poor' and in need of assistance (however defined)
- How many people live in the households, and of what age; also whether the household has special needs (additional water requirements because of illness, for instance)

The operator then needs to assess the basic water needs of each poor household, taking its characteristics into account. It still needs to measure consumption as for all other households as it needs to charge for the water consumed above the basic need threshold – if the household has consumed more than it was deemed it needed to do.

The required information is expensive to collect and maintain, and it intrudes into household privacy. Moreover, most of it is already collected by government and it is a waste of resources to expect other bodies to hold this information, manage it and use it to determine charges. Also, this information is sensitive and needs to be handled with special care to protect the people whom it concerns. It is usually special government departments only who should be handling this information.

There is also the fundamental difficulty of principle that the benefits conferred to poor households in such a case is paid for by other customers. These are paying a tax which is

collected in an indiscriminate way and which may weigh on customers whom a fair progressive taxation regime would not so burden.

For these reasons, Eureau believes that help to poor households should be provided through the tax and benefit system, not water charges. However, Eureau accepts that tradition, in some cases, has lead to water prices which are different from those required by economic efficiency. It believes that a transition to economic pricing is required but it accepts that the transition may take some time.