Guidelines for User Fees and Cost Recovery

For Urban Water and Sanitation

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List of abbreviations

ADF	African Development Fund
AFDB	Africa Development Bank
CGP	Country Governance Profile
CPIA	Country Policy and Institutional Assessment
GDI	Gross Domestic Income
GDP	Gross Domestic Product
IWRM	Integrated Water Resources Management
LRMC	Long Run Marginal Cost
MDGs	Millennium Development Goals
O&M	Operation & Maintenance
PPP	Polluter Pays Principle
RMC	Regional Member Country
WACC	Weighted Average Cost of Capital
WPP	Water Partnership Program
WTP	Willingness To Pay

Foreword

The Guidelines presented here touch upon a very critical issue for all urban water sector investments: how to ensure that urban water and sanitation services are financially viable, in addition to being environmentally and socially sustainable?

Urban water and sanitation utilities fulfil a unique role in an urban setting. Often seen by governments as instruments for achieving social and economic policy, utilities are unsustainable unless they are operated on commercial principles.

The authors of these Guidelines suggest that the varying capacity of customers' ability and willingness to pay can be accommodated through technology choice and customizing service levels to reach an affordable tariff. Such an approach, it is hoped, can achieve both social and financial goals.

The Guidelines were developed through the support of the Water Partnership Program and were extensively reviewed by the Bank.

This publication will provide important and useful guidance for task managers within the Bank Group as well as among stakeholders working with the critical issue of financial sustainability for urban water sector investments.

Ali Kies, Director OWAS / AWF

Executive summary

i The Africa Water Vision and the Millennium Develoent Goals (MDGs) relating to water and sanitation services are to halve by 2015, the proportion of people who do not have access to safe drinking water and basic sanitation. Sector experience strongly suggests that sustainability is critical to the achievement of MDGs for water, sanitation and irrigation projects. There are three key dimensions to sustainability: environmental, social and financial. This set of guidelines focuses on the financial dimension, while taking into account the social and environmental dimensions. A robust cost recovery system is necessary to achieve financial sustainability of water sector projects and programmes.

ii Cost recovery through the levying and collection of user fees serves two principal functions:

- Strengthening internal generation of sufficient revenue to support continuing delivery of services to users over the long-term, including extension of service coverage, particularly to low-income households, and improved service quality;

- Promoting better use of scarce water resources and management of wastewater disposal to preserve the natural environment by signalling to consumers the cost to the economy of the resources used by the services.

iii The Bank Group's Integrated Water Resources Management (IWRM) Policy considers water as an economic, social and environmental good. In a context of growing water scarcity exacerbated by rapid population growth and urbanization, climate change and environmental degradation, mismanagement of water resources, and misallocation of budgetary resources, the Bank Group and its Regional Member Countries (RMCs) have to adopt a new approach to water resources management anchored on sustainability in all its dimensions.

iv The recovery of financial costs (operating and maintenance expenditure, investment capital including interest on debt finance, indirect sector support costs including environmental and economic regulation and resource opportunity costs) is necessary in the context of integrated water resources management (IWRM). In particular, economic and financial pricing of water serves to guide consumers collectively towards an allocation pattern of water resources among the various

competing uses that maximizes public welfare. Sustainability also requires adequate wastewater management and implementation of the Polluter Pays Principle (PPP).

v However, the point of departure varies by country, sector, and sub-sector: in some cases, cost recovery is extensive, well established and effectively implemented. In other cases, it is minimal – either through lack of policy commitment to the objective or poor implementation of policy. Similarly, willingness and/or capacity to pay by customers (and willingness to charge by service providers and regulators) varies by country and within countries (for example, between urban and rural) and by technology (networked or non-networked water and sanitation services).

vi In sum, these factors create a continuum of contexts and opportunities for cost recovery interventions, which in turn influences what is feasible, desirable and the timescale that may be required to meet specified policy objectives. These Guidelines, through a logical step-by-step approach, are intended to facilitate that progress. The key point is that failure to attain financial sustainability of water and sanitation projects is highly likely to hinder scaling-up and therefore delay achievement of the MDGs for the water sector.

vii These Guidelines, one of three covering the water sector (urban, rural and irrigation), focus on urban water supply and sanitation. The guidelines apply to urban areas (including cities and towns) with piped water and sewerage networks. In the common situation where urban water is networked but for the majority of urban inhabitants sanitation is non-networked, it is necessary to refer also to the Guidelines for Rural Water and Sanitation, for guidance on on-site sanitation issues.

viii Five (5) key steps are proposed to be followed in developing, setting and implementing user fees and cost recovery systems for urban and other networked water supply and sanitation projects:

- **Step One**: Determine the economic, policy, and institutional context in the country, with respect to water and sanitation services. An understanding of the country's economic conditions, including the institutional and social environment is necessary to facilitate the promotion of effective cost recovery through user fees.

- **Step Two**: Set cost recovery and service objectives. A systematic approach should be followed to reconcile financial and policy objectives. Setting user fees is an

iterative process of considering service objectives, calculating cost reflective tariffs then, having taken into account potential efficiency savings, judging the proposed tariffs against affordability and willingness to pay. Cost recovery and service objectives are best negotiated with stakeholders.

- **Step Three**: Undertake investment planning, costing and appraisal of the services (selected in Step Two), to determine the costs to be recovered and the overall revenue requirements. The total revenue requirements to cover all expenditures should be determined and the sources of those funds identified. The total costs for a water and sanitation utility can be broken down into the cost of capital (including replacement cost and the opportunity cost of capital), operations and maintenance expenditure (to ensure the resulting fixed assets are professionally run and remain serviceable for their projected useful life). The process of moving towards cost reflective tariffs (where total user fees, and therefore revenues, are matched with the total costs) should be commenced and accelerated in order to enhance sustainability of services.

- **Step Four**: Determine the basis for levying user fees. The basis for charging user fees (tariffs) should be as simplified as possible. The key criterion is that tariffs should be adequate (cover costs), fair and enforceable. In addition, they should include an effective signal relating to the increased costs, financial, economic and environmental, of demanding ever-greater amounts of water. The main approaches to computing user fees include: a fixed or variable volumetric fee based upon the measured amount of water taken (though recognizing the significant additional cost of metering) and a fixed or variable fee based upon some housing, household or pipe characteristic.

  A demand-responsive approach should be used to balance service levels with affordability and willingness to pay. A service and price differentiation approach should be used to provide users with service levels and technologies that they can afford and are willing to pay for, to ensure sustainability. After determining total revenue requirements, it may be necessary to reconsider service and cost recovery objectives (Step Two).

- **Step Five**: Implement the user fees and cost recovery system. Since user fees are only useful as a source of revenue if they can be collected, an

effective, transparent and accountable revenue collection system should be put in place. The selection and use of appropriate mechanisms should be a matter of practical convenience: it is a good principle to use a system that is already in place, and which either works or can be made to work with minimum investment. Consideration of levels and structures of user fees should include payment mechanisms.

- Water and sanitation utilities should make the payment process as easy as possible to facilitate collection and preclude evasion. For the lower-income customers, a suitable system should provide for payments that are "little and often", coupled with a lifeline subsidized consumption level to match capacity to pay. Such flexible payment mechanisms increase bill collection efficiency without undermining social equity and the public goods attendant on universal access to water and sanitation.

  An example is provided by pre-paid meters that simplify the billing and collection processes, working either on a time-limited or a volume-limited basis. Utilities should have a clear and effective disconnection policy to enforce user fees. Disconnection should always be a last resort. If used regularly, it indicates a failure in revenue collection procedures. Existing and potential customers should be involved in the process as outlined in the four key steps. Where stakeholders have been involved, implementation of user fees is usually more acceptable and much smoother.

Details of each of these five steps are explained in the Guidelines and a summary is presented in Table1.

Introduction

Background to the cost recovery guidelines

User fees have an important role in meeting social, economic and environmental policy objectives. User fees, and their structure, provide signals to users about the cost of the service, the scarcity of resources used to provide the service, and the priorities that governments place on provision of services to particular groups.

At a minimum, user fees for cost recovery provide the basis for financial sustainability: failure to provide for adequate funding leads to the degradation of water and sanitation systems, deteriorating performance and services, and further unwillingness to pay – a commonly observed 'vicious circle'.

In 2000, the Bank produced an IWRM Policy statement. The policy stated that getting the prices right is at the very core of improving water resources management. These Guidelines have been developed to assist in the implementation of the Bank Group's water policy, particularly with regard to financial sustainability.

The Guidelines for user fees and cost recovery for urban water and sanitation projects apply to urban areas (including cities and towns) with piped water and sewerage networks. In the common situation where urban water is networked but for the majority of urban inhabitants sanitation is non-networked, it is necessary to refer also to the Guidelines for Rural Water and Sanitation, for guidance on on-site sanitation issues.

Objectives of the guidelines

The main objective of these Guidelines is to provide guidance to Bank Group Task Managers and other stakeholders as well as to enhance the design and implementation of financially sustainable water sector projects and programmes. The ultimate goal of the Guidelines is to improve water and sanitation service provision, in order to accelerate growth in economic development as well as improving the health of all households, particularly the poor. The Guidelines recognize the economic and institutional environment in which Regional Member Countries are operating.

A key objective of these guidelines is to enable service providers to deliver better services to all, within the context of a protected environment, through accessing enhanced revenue and finance flows whilst acknowledging that direct full cost recovery may not be achievable in all urban areas in the near term. In this context, it is recognized that part of the process of moving towards direct cost recovery has to be through ensuring that appropriate service levels and technologies are chosen so that users obtain the services they desire and for which they are willing to pay.

However, the multiplicity of objectives of water sector projects and programmes (such as viewing water as both an economic and a social good) and the trade-offs involved often make the subject of utility services pricing controversial.

Much of the controversy stems from the lack of consensus on the boundaries to be drawn between the role of utilities as instruments of government social and economic policies, and as commercial entities that need to effectively provide quality services and also balance their books. The implications of economic, financial and policy objectives may conflict in particular instances, and pricing decisions may involve trading off one objective against another.

These guidelines stress the iterative nature of reflecting anticipated user fees against proposed service levels and the need to reconsider these levels when subsequent willingness and ability to pay indications are that such services would not be able to recover sufficient costs for sustainability. By matching service levels and technology options (service differentiation), a service provider can serve all customers at differentiated prices that correspond to customers' willingness to pay, and thus achieve both social and financial objectives.

The Bank's Guidelines for Financial Governance and Financial Analysis of Projects provide detailed information on standards and procedures for financial accounting that are comprehensive in scope and fully adequate to guide financial accounting aspects of ensuring overall revenue sufficiency once the scope of a cost recovery approach has been identified.

The main steps of the guidelines

There are five key steps to be followed in developing, setting and implementing user fees and cost recovery systems for urban water and sanitation projects :

1. Determining the economic, policy, and institutional context in the country, with respect to water and sanitation services;

2. Setting cost recovery and service objectives;

3. Undertaking investment planning, costing and appraisal, to determine costs to be recovered and overall revenue requirements;

4. Determining the basis for charging user fees; and

5. Implementation of user fees and cost recovery system.

The five steps are summarized in Table 1 in the annex.

1. Step one

1.1 Determining the economic, policy and institutional environment

1.1.1 Promoting cost recovery through user fees requires an understanding of the country's economic conditions, including the institutional and social environment. Useful economic indicators include average household wealth and Gross Domestic Income per capita. The level of economic wealth is already recognized in AFDB's classification of RMCs and is an important predictor of possible levels of cost recovery.

1.1.2 Another useful indicator is the 'tax-to-GDI' (or GDP) ratio that not only illustrates the potential for supporting water and sanitation services through direct taxation (through budgetary support to the water and sanitation provider) but most importantly the likelihood of the sustainability of this source of finance. Some countries have achieved good water and sanitation services through a tax-based system with only limited user fees. However, such successes are unusual, particularly in low-income countries and this approach does not assist in the IWRM goal of appropriate sharing of scarce resources based upon the principle of "water as an economic good."

1.1.3 Analysis of the institutional framework gives an indication of any institutional weaknesses which need to be addressed to ensure viable organizations and the necessary supporting framework for service delivery and cost recovery. Useful indicators can be obtained from the Country Governance Profile (CGP), which identifies the strengths and weaknesses of governance arrangements in a country. The Country Policy and Institutional Assessment (CPIA) should also be considered as it gives an indication of the governance potential to deliver sufficient autonomy to support a cost recovery sustainability policy.

2. Step two

2.1 Setting cost recovery and service objectives

2.1.1 These Guidelines on user fees and cost recovery suggest a systematic approach to reconciling financial and policy objectives, particularly with regard to cross-subsidization, reflecting also the 2005 Guidelines on Financial Governance which refer to the Bank policy on tariffs in general and the 1985 policy on tariffs and cost recovery . This long-standing guidance relating to tariffs and cost recovery continues to be relevant with the emphasis primarily on the sufficiency of revenues to finance operations and service debt. The policy requires the establishment of a tariff agreement preferably in the form of a rate of return covenant, i.e. a positive return on capital employed over and above operations and capital maintenance costs.

2.1.2 However, the earlier policy also recalls that social benefit must not be sacrificed for financial expediency. Sound project design requires an equitable distribution of benefits, including the use of cross-subsidies, where necessary, to provide the largest volume of benefits to the most deprived sectors of the population concerned. User fees for cost recovery necessarily reflect the cost of delivering a particular level of service. Setting user fees therefore is an iterative process of considering service objectives, calculating cost-reflective tariffs then, having taken into account potential efficiency savings, judging those proposed tariffs against indicators of affordability and willingness to pay.

2.1.3 Where the tariffs are deemed to be too high, for whatever reason, it is necessary to reconsider the objectives, investigating for example whether there might be over-investment in certain levels of service, for both water and sanitation. It is necessary to look closely at proposed levels of service, subsequent investment needs and potential efficiency gains before considering cross-subsidies.

2.1.4 Project design and appraisal necessarily take as a starting point the RMC's present system for charging user fees. Agreements with RMCs may require an overall tariff increase based upon the existing tariff structure as an achievable objective, recognizing that it requires significant inputs of professional time to facilitate changes in tariff structures. These guidelines for urban/networked water and sanitation services incorporate two critical components of cost recovery: the need to accept differentiated service standards to ensure costs are minimized to match potential affordability and a preparedness to accept that some specific user groups may be unable to afford to pay desired user fees even when supported by the maximum possible cross-subsidy within the sub-sector.

2.1.5 One of the reasons for failure in the water sector has been the unwillingness of direct providers to segment customers to a sufficient degree, both within and between countries and then to target levels of services accordingly. This error has been compounded by the presumption that subsidies to all will ensure affordable services to the poor.

2.1.6 In general, subsidies (through low tariffs) in water and sanitation are absorbed by customers often living in planned areas, who are connected to the existing network and more likely to be the higher-income groups rather than the low-income groups described above. Higher-income groups should not normally need to receive any subsidy for conventional services, beyond a cost of capital subsidy for ADF countries if service levels and service delivery have been designed appropriately. Revenue from the higher-income customers (note, not necessarily high-income) is critical to ensure the viability of the utility. For this reason, the use of 'lifeline blocks' can undermine or distort cross subsidy. Lifeline blocks should,

therefore, be discouraged for the average consumer or at the least proposals must consider very carefully whether any extension of an incremental block tariff system is really beneficial.

2.1.7 There is need for support to the poor to enable them access clean water and sanitation for health and convenience (time saving in collection, privacy for women for example). This support should NOT be delivered through below service cost user fees, but through cost reduction in the pattern of supply and differentiated services to meet the special needs of the poor. Service differentiation is what is sustainable in the long term, and not below-service cost user fees.

2.1.8 For example, the poorest may well need to access water services, bathing and sanitation communally, through stand-posts and public toilets, sanitary blocks and bathing houses. These services need to be well managed, perhaps through local private or community-based operators, to deliver an appropriate level of service at least cost, whilst making allowance for the destitute to be able to access at little or no cost.

2.1.9 The slightly better-off poor, usually in informal slums and shanties can generally afford, and want, to pay for differentiated household connections (such as variations of low pressure, limited hours, group meters, volumetrically controlled, prepaid meters etc). Because of the lower cost of connection, fees can be reduced (or removed altogether) and potentially some form of 'lifeline' block is appropriate for this specific consumer group. For households that have been used to paying the necessarily high costs for alternative services from, say, vendors, a water tariff that covers full operating and capital maintenance expenditures is normally affordable as long as the payment facilities are accessible for small and frequent payments. Designing flexible payment systems is therefore key to effective revenue collection among the poor customer segments.

2.1.10 The iterative process of determining appropriate service levels necessarily starts from consideration of existing service levels, in particular the extent of service coverage and the resulting costs and revenues. Costs can be benchmarked against the metrics of international comparators or the process benchmarks of other national utilities to determine both validity and efficiency. Public involvement in the private good of urban water supply is justified by the public health benefits it delivers to the entire urban population as well as the significant reduction in costs of water supply to the poor through a centralized system benefiting from economies of scale, particularly in abstraction and treatment.

2.1.11 Setting service objectives, and therefore user fees, should focus upon ensuring that health and convenience benefits are achieved by all but particularly by the poor. That water supply

supports economic activities (which in turn improve people's lives) should also be taken into account when setting service objectives.

2.1.12 Average weekly household payment to water vendors in informal housing areas suggests a level of potential revenue that can be accessed by a cheaper, better-quality piped service with the expectation that household payments can be reduced through the formal service. Such information, ideally verified by simple customer surveys and focus groups in the lowest-income housing areas, could include some form of willingness to pay survey based upon a menu or 'ladder' of alternative levels of service (service differentiation), at different prices (price differentiation). More sophisticated methodologies are available to investigate willingness to pay, such as using contingent valuation and conjoint analysis studies. It is however wasteful to over-invest in such studies.

2.1.13 Efficient water services at cost-reflective tariffs are generally affordable for the majority of customers, present and potential. This is not necessarily true for networked sanitation services (sewerage and wastewater treatment). Some low-income areas may initially have to access sanitation through non-networked on-plot and on-site systems. Condominial sewerage may be affordable where treatment costs are not included. Treatment costs can be reduced by using appropriate treatment technologies that are also more easily maintained to ensure protection of the environment.

2.1.14 Desired levels of service (or standards) may be unaffordable, making cost recovery impossible. The extent to which the service levels or standards are deemed discretionary can be adjusted to match affordability. In addition, the apparent costs might be higher than necessary and can be reduced through efficiency savings in service provision where there are sufficient drivers to do so. It should be noted that the choice of technology is a significant factor in determining the costs of service provision.

2.1.15 One significant influence on tariff levels is the extent of "non-revenue water", which refers not only to physical leakage but also commercial losses (due to illegal connections, water sold through legal connections but not paid for and the water distributed free through standpipes). Investment in reducing non-revenue water is likely to be a component of cost-recovery programmes.

3. Step three

3.1 Determining revenue requirements

3.1.1 The first cost element usually considered in delivering water and sanitation is the capital cost, the amount invested in constructing fixed assets. Networked water and sewerage has a particularly high dependence upon fixed assets, sometimes described as "capital intensity". Capital Intensity is the ratio of revenues to fixed assets (at current costs).

3.1.2 Investments in fixed assets are necessarily occasional and therefore "lumpy" in investment terms, and are therefore best addressed through conventional "accrual" or fixed asset accounting procedures, a method of distributing these costs fairly (so as not to disadvantage any particular consumer group) over the lifetime of the assets. Capital investment in fixed assets is normally financed externally to the service provider and there are, therefore, costs to be reimbursed to the provider of finance. A relatively efficient direct provider serving a large number of customers in an urban area is able to share out the costs of capital investment through small charges to many customers over many years.

3.1.3 Similarly, the cost of ensuring that these assets are maintained in good and serviceable condition over many years can also be shared out, averaging occasional capital maintenance costs over time so that they are affordable. Actual delivery of services to users and consumers depends upon operating these fixed assets, i.e. employing staff to run the systems, providing power to run the pumps and motors as well as procuring chemicals for use in water treatment works etc.

3.1.4 The total costs for a water and sanitation utility can thus be usefully broken down into the cost of capital (to service the capital finance invested), capital maintenance expenditure (to ensure the resulting fixed assets remain serviceable) and operating and minor maintenance expenditure. The key to ensuring adequate revenues for sustainability of urban networked services is to begin the process of moving towards "cost-reflective tariffs", which indicates the aim to match total user fees, and therefore revenues, to the total of these three cost categories as closely as possible.

3.1.5 Operating costs are often referred to as operation and minor maintenance (O & M) costs and for many water providers the initial goal is to achieve tariffs that will at least recover those O&M costs. This might be a significant first step for under-performing utilities and particularly significant for politicians who have to "sell" any resulting tariff increase but this limited approach automatically builds in subsidies for (or failure to deliver) capital maintenance costs and costs of capital. For the majority of consumers these subsidies cannot be justified in the long-term.

3.1.6 The capital maintenance costs, also described as renewal, replacement or "rehabilitation" costs (though the latter term indicates a failure in asset management planning if assets have to be rehabilitated from a non-adequately performing condition), are the critical costs to ensure that services continue to deliver the required benefits in the long-term. There is a difficulty in networked water supply and sewerage in that once some elements of the system have been built, they are able to operate for a substantial period without any apparent failure in service and therefore apparently not requiring any maintenance. However, once a (difficult to determine) level has been reached,

failure to invest in capital maintenance leads to a steady degradation in service quality as well as an increase in costs of provision.

3.1.7 Where customers have not been paying for their fair share of these capital maintenance costs on a regular basis, the result is that systems tend, over time, to produce ever poorer quality water increasingly intermittently (with the poorest always at the end of the service receiving line), with eventually a very high additional cost to finance rehabilitation.

3.1.8 These guidelines, recognizing the difficulty of achieving full cost recovery in low-income economies at the beginning, nevertheless require calculations of user fees to concentrate on achieving a reasonable level of collection of capital maintenance costs (in addition to operation and minor maintenance costs). This is to ensure the ability of the direct service provider to be able to undertake the necessary maintenance works in a timely manner.

3.1.9 Waiting on governments for budgetary allowances to service providers to pay for capital maintenance has failed in nearly all levels of economies worldwide. Recovery of capital maintenance costs also signals to customers a better approximation of the cost of water and therefore the value allowing demand to be adjusted accordingly. To ensure sustainability of water and sanitation services in the long term, capital maintenance charges should be recovered.

3.1.10 The mechanism by which capital maintenance charges are recovered is known in accounting terms as “depreciation”. For a conventional business this is the measure of the using up of the value of the fixed assets needed to produce products for sale such that a real level of profitability can be understood. With changing technologies and products those assets might never be directly replaced. However, in the networked water and sewerage industries, particularly the underground assets comprising pipes and fittings, it can be assumed that those assets will always be needed and therefore the depreciation charge, over the long-term, represents the best estimate of the costs of keeping those assets in good, serviceable condition.

3.1.11 Traditionally, depreciation charges are based upon dividing the cost of the asset by the assumed life of that asset. Asset Management Planning is now the standard and expected tool to refine that process to ensure that the real costs of long-term asset maintenance for serviceability are charged for. The Bank expects to support utilities in setting up appropriate asset management plans as part of the move towards cost recovery, to ensure financial sustainability.

3.1.12 The third component of revenue requirement for water and sanitation services is the Cost of Capital, which is the cost of accessing the finance that has paid for the capital investments. The finance has to be paid for, “serviced”, either through interest payments

on the debt element or through "dividend" returns to the owners, i.e. the providers of the equity capital. Where governments have provided the equity through budgetary grants, they may not require any "dividend" or "financing" payments. The costs for this should, however, be established so as to know the actual costs of the services provided.

3.1.13 The two returns on capital, i.e. any dividend required and interest payments, are together referred to as the weighted average cost of capital (WACC), weighted according to the relative levels of debt and equity (gearing). For further information on WACC, users of these Guidelines are referred to African Development Bank Guidelines on Financial Governance and Financial Analysis of Projects (2006).

3.1.14 There is a number of situations where government provision of the cost of capital is an efficient direct subsidy to the utility, and therefore its customers, without affecting the performance level of the utility. However, the cost of capital should be included in all tariff calculations so that the level of subsidy is transparent to all stakeholders (users, civil society, etc) and therefore the value of water appropriately recognized.

3.1.15 This explanation of quantifying revenue requirements makes no mention of amortization, in other words paying back the capital amount of debt or loans. Repaying capital is a component of financing rather than revenue requirement. There should be sufficient cash flow from operations to pay for actual capital maintenance costs (not necessarily directly comparable to depreciation charges in any particular year) and to meet debt repayment requirements. Where these numbers do not balance conveniently, issues of financing or cash flow have to be addressed in addition to the three main components of revenue requirements.

3.1.16 For smaller water and sanitation systems where investment is supported by a single loan, the total revenue requirements may be recognized as the sum of operating expenditure and loan amortization (interest and principal repayment). This functions conveniently where the repayment period of the loan principal is likely to be concluded before the need for significant capital maintenance – which is then necessarily financed by a further loan.

3.2 Calculating average user fees

3.2.1 The discussion above relates to accounting costs which are by nature "historical", i.e. recording costs that have already been incurred. It is of course possible and normal to project these costs into the future to ensure adequate tariff levels for cost recovery, taking into account future needs to ensure continued sustainability of services.

3.2.2 The projection will be able to indicate a reasonable rate of "catch-up" from existing tariffs to what is needed in order to be reasonably cost

reflective. Depending on the existing level of user fees, it may not be desirable to expect customers to bridge the gap between them and cost reflective fees in one adjustment. Depending upon the size of the gap, and the economic conditions, it might well be appropriate to plan for a transition period through implementation of several adjustments to achieve cost reflective user fees.

3.2.3 It is now normal practice to make these projections using present day costs on the understanding, or rather the requirement, that tariffs will be increased by the level of inflation each year before taking account of any possible savings from efficiency or increases from improvements to the service. Indexation of tariffs, maintaining the value of the user fees over time, is critical for long-term sustainability of capital-intensive networked services.

3.2.4 Having determined total revenue requirements for water and sanitation services, specific user charges can be calculated according to the "Basis for charging" in Step 4. Some regulatory systems have found it helpful to summarize the necessary elements of an annual tariff increase as "Inflation" plus "K", measured as a percentage increase on the existing user fees. "Inflation" (measured by an appropriate price index) is independent of any water activities, whilst the "K" factor describes those elements under the control of the direct service provider. In the context of Bank lending, "K" is defined as being equal to "Pc", representing a "catch-up" factor, minus "X", a value representing an estimation of future efficiency gains by the utility, plus "C" to pay for extending Coverage, particularly to the poor, plus "Q" for any environmental Quality enhancement, water supply and particularly waste water treatment, plus "V" for any security of supply (representing enhanced storage & leakage reduction), plus "S" for any improvements to customer Service levels.

Future Revenue Requirement = Existing Revenue x (1 + (Inflation + K))

Where K = Pc – X + C + Q + V + S (all as percentages)

3.2.5 The purpose of this formula is to assist utility managers and governments explain the reason for tariff increases. Unless customers and their representatives, politicians and civil society can decipher, understand and argue about the components of tariff increases in a transparent manner, there is likely to be little acceptance of the need for the increases and even less willingness to pay those increases. Experience shows that where stakeholders understand the reasons for charging given levels of user fees, then there is greater acceptance of such user fees.

3.2.6 In this context, governments find it useful to have a semi-autonomous body to determine appropriate tariffs. Economic regulators have generally been introduced in the context of commercialization and/or private sector participation in the water sector, where it is clear

that a monopolistic service provider might have incentive to raise prices higher than costs. Some level of "independent" or objective economic regulation of public providers is also beneficial.

3.2.7 One of the key tasks of a regulator, in the absence of whom it remains the duty of utility senior management, is to move towards reducing costs thereby ensuring continual efficiency gains. This may be difficult in a situation where there are no incentives to reward efficiency and where there may be a tendency by government as owner to require ever more staff to be employed. However, users can only be expected to pay cost-reflective charges when those costs are reasonably fair and efficient. On-going reforms in many water and sanitation institutions provide a good basis for improving services and simultaneously implementing cost-reflective user fees.

3.2.8 Overall, the most effective driver for efficiency, where monetary rewards are not appropriate, is through some form of comparative competition. Comparing the performance of one utility or section of a utility with another, and bringing out strengths and weaknesses in each often acts as a powerful driver for improvement amongst professionals and good staff who want to demonstrate that they are equally competent.

3.3 Future costs for sustainability

3.3.1 There is an additional approach to ensuring sustainable cost recovery which focuses upon the future costs of supply. It is in the nature of water supply that each new source to meet increased demand tends to be more expensive than the existing source. Costs of future water consumed are therefore nearly always higher than present costs. There is an argument therefore that some (large) users should pay more at present to signal the likely additional costs of delivering those levels of service in the future if they continue to access water resources at a similar rate as total water demand rises. These "long-run marginal costs" are nearly always higher than "average historical costs" and are a key component in achieving IWRM goals.

3.3.2 Long run marginal costs are best estimated through a process known as average incremental costing whereby the capital costs and the operating costs of the next major source of water (including the necessary additional treatment & transmission costs, etc) are calculated in "present value terms" relative to additional water delivered. For further information please see the "Toolkits and Knowledge Resources for User Fees and Cost Recovery for Water, Sanitation and Irrigation Projects".

3.4 Support to revenue through societal contributions (subsidies)

3.4.1 Subsidies play an important role in ensuring adequate revenue for effective operation of utilities in low-income economies. Particularly for the lowest-income urban communities, smaller secondary towns and rural areas, subsidies are often a necessary element of ensuring sustainability until economic growth is sufficient to enable greater dependence upon local resources.

3.4.2 Subsidies, which are societal contributions to ensuring adequate services for all, may contribute towards revenue needs from within the water sector (cross-subsidies), from a national tax base or from international contributions. However subsidies, particularly subsidies for capital investment, can make it difficult for governments and utility managers to determine the true cost of maintaining capital-intensive infrastructure, usually leading to a gradual rundown in service quality.

3.4.3 Within the context of ensuring overall revenue adequacy, subsidies should be clearly specified, targeted and limited, either by time or by an acceptable indicator of the likelihood of fully cost-reflective tariffs. Subsidies should also be transparent, ideally with each bill communicating the extent to which actual water and sanitation costs are being subsidized in order to signal the true cost, and therefore value, of water and sanitation service.

4. Step four

4.1 The basis for charging user fees

4.1.1 The determination of total revenue requirements, and an understanding of long-run marginal costs, is the starting point for determining the actual user fees (prices/tariffs) that customers should pay for sustainable services. There are then four main approaches to computing domestic user fees: a fixed or variable volumetric fee based upon the measured amount of water taken (though recognizing the significant additional cost of measuring water used i.e. metering) and a fixed or variable fee based upon some housing, household or pipe characteristic.

4.1.2 Many tariff systems use different combinations of these four approaches. These guidelines anticipate only limited changes to the basis for charging in any particular RMC in the short-term. The first priority is to ensure an adequate overall increase in existing user fee levels to achieve the desired movement towards adequate revenues. Subsequently, the guidance is to work with RMCs to simplify their basis for charging wherever possible.

4.1.3 User fees are required not only to ensure revenue adequacy but also to reflect social issues, such as service to the poor, as well as to reflect environmental issues related to economic values of water. It is at this stage that the basis for charging becomes more complex with most

utilities using some combination of fixed and variable tariffs and some utilities using ever more complex variations between groups of customers to meet these, sometimes conflicting, requirements for charging: revenue adequacy, affordable service to the poor and water demand management.

4.1.4 The "meeting all requirements approach" is generally attempted through some form of "block tariffs" system whereby users who consume different amounts per period of time (usually per month but also bi-monthly, quarterly etc) pay a different amount for each cubic meter consumed within any particular consumption band. There is no universal consensus as to what amount of water per month might fairly constitute a reasonable "lifeline" amount of water. If it is too small then large families (who are often the poorest) and multiple households sharing one connection cannot access the amount of water they need without moving into the higher tariff bracket. However, if it is too large, then the majority of households will be able to access their water needs within the amount allowed for the subsidized "lifeline" tariff, and the total revenue may be insufficient to ensure sustainability.

4.1.5 Although metering is essential for purposes of measuring amounts consumed and monitoring incremental blocks, it should be noted that metering can add upwards of 25% to the cost of water supply. Metering is, however, extremely essential for demand management purposes. Large users, who coincidentally are usually cheaper to supply, may be imposing an unfair burden on the supply system (and the water resources environment) by assuming that they can take ever-increasing quantities of water at a given charge.

4.1.6 The integrated water resources management approach requires that tariffs include a "signal" relating to the increased costs, financial, economic and environmental, of demanding ever greater amounts of water. Large users should therefore pay more at present, at a higher tariff block representing the long-run marginal cost of water, to indicate the likely additional costs of extending the service in the future.

4.1.7 The approach in some countries has been to take this latter point as a reason to increase charges on large users to such an extent that they not only pay the long run marginal cost but also they are in effect subsidizing all domestic consumers (not just the poor). This then becomes a tax on industry and commerce, which may hinder economic development and employment. It can also reduce the competitiveness of developing countries in a globalized world.

4.1.8 An alternative (or additional) approach is to introduce 'seasonal tariffs'. Again, because most water supply costs are fixed, it is unreasonable to size (and pay for) plant and equipment and pipe networks to meet demand

in only a small fraction of the year. Seasonal charges may be used with higher charges for large users during, for example, the hottest period of the year. Utilities also address this issue through the use of 'interruptible tariffs' whereby large users can choose to pay a lower average tariff but the utility can cut their supply (with due notice) at times of peak demand on the system. Similarly some utilities reduce the size of any incremental blocks during periods of drought.

4.1.9 Where incremental block pricing cannot be avoided it is recommended that, in addition to specific connection size fixed charges:

- Large users are charged the incremental cost of water;
- Average domestic (and institutional) consumers are charged the average historical accounting cost of water, always updated by inflation; and
- There is a limited lifeline block (5 or 6 m3 per connection per month) for the poorest only with, ideally, some provision to reflect household size and/or numbers of households per connection.

4.1.10 The level of the lifeline block is not judged only by affordability but also by the amount of surplus revenue raised through the excess of large user incremental tariffs above the average cost of providing water. This is to ensure the imperative of adequate revenue collection to ensure capital maintenance. It is recommended that the charge for the lifeline block not be less than the operation and minor maintenance (O&M) costs so as to limit the potential for distorting customers' understanding of the value of water.

4.1.11 Infrastructure development charges and connection charges, payable as new customers connect, are an apparently useful means of raising capital funds to pay for extensions of distribution systems to service new customers and to pay for the tapping of the main water pipeline and the pipeline to the house. However, they assume that existing customers have paid the full cost of connecting, which is not always the case.

4.1.12 A difference has to be recognized between commercial, industrial and housing developers, individual, middle-income household connectors and low-income, tenement, slum and shanty, room-renting households wanting to connect. For the latter group the infrastructure development charge and the connection charge is simply an unaffordable barrier to entry which needs to be removed. Initially this might be achieved through special arrangements where the charges are initially absorbed by the utility and an additional monthly fixed payment is made by the household to pay back the costs of connection over one, two or more years. Alternatively those costs are absorbed into the average tariff paid by all consumers.

4.1.13 As for water supply, the operating expenditure, capital maintenance expenditure and cost of capital is determined for the sewerage network and for whatever wastewater treatment is undertaken. Where the water supply is metered, it is appropriate to apportion the total wastewater costs relative to metered water consumption, though possibly with an allowance for non-returned (to sewer) water of approximately 20%. The total revenue collected necessarily remains the same, but it may be charged on 80% of the water consumed in order to help the customer understand that the charges are fair.

4.1.14 Where wastewater is treated to secondary level and sludge appropriately disposed of, the cost of the sewerage system may be in the region of 100-120% of the real water cost. Where water services are not metered, the costs can be similarly apportioned by the number of households receiving the service (not all households as in some systems) though for social reasons this can be made more 'progressive' with charges weighted according to property characteristics.

4.1.15 Households with non-networked sanitation, septic tanks and pit latrines of various types, need to have the tank or pit emptied occasionally and the resulting sludge disposed of safely. Where the accepted discharge points are to the public sewers (or direct to the waste water treatment plant), then the user fees for discharging the effluent should be similar to the charges for disposal of industrial waste water. Industrial waste water disposal, also known as "trade effluent", and defined as "any waste derived from trade premises other than "domestic" sewage" should follow the Polluter Pays Principle. This means that tariffs should reflect the costs of treatment, which will depend upon the volumes and strengths of the wastewater that is taken away and/or treated. For details of industrial waste charging, please refer to the "Toolkits and Knowledge Resources for User Fees".

5. Step five

5.1 Implementation of user fees and cost recovery system

5.1.1 Establishing appropriate water user fees and full financial cost recovery for urban and/or networked water and sanitation services is a long-term process. The selection and use of appropriate mechanisms should be a matter of practical convenience, e.g. it is a good principle to use a system that is already in place and which either works or can be made to work with minimum investment. These guidelines emphasize the practical approach, looking for ways to balance IWRM principles with the needs of the utility to be financially sustainable whilst significantly expanding and improving services to the poor.

5.1.2 User fees are only accessible as revenue if they can be collected. Consideration of levels

and structures of user fees must therefore include proposals for payment mechanisms. The overall guidance is that utilities should make the payment process as easy as possible. For lowest-income customers, allowance must be made for payments to be 'little and often.' Pre-paid meters simplify both the billing and collection process, working either on a time-limited or a volume-limited basis. Many customers prefer the security of knowing that they are not liable to run up an unaffordable bill. Utilities need to have a clear disconnection policy if they are to enforce water user fees. Disconnection should always be a last resort, and if used regularly, indicates a failure in revenue collection procedures.

5.1.3 Depending on the policy environment in the country, each of these elements may require change in government policy and practice. Implementation of cost-reflective user fees is therefore often a reform issue or a "change management" process which is likely to require the setting-up, or strengthening, of some form of economic regulation, or even an economic regulator.

5.1.4 Customers, present and potential, should be involved, both formally through some level of 'customer committees' and informally through surveys and focus groups, particularly among the poor. Where stakeholders have been involved in the process as outlined in the four key steps, implementation of user fees is usually more acceptable and much smoother.

Conclusion

Cost-reflective user fees for urban (and networked) water and sanitation services are vitally important for achieving financial sustainability. In the urban sector, user fees are critical to ensure maintenance as well as extension and improvement of services.

Although user fees are important for all customer categories, well designed and appropriately implemented tariffs are especially important for the low-income customers. When appropriately designed, cost recovery facilitates access to low cost, clean and convenient drinking water and sanitation for all.

The key approach recommended in these guidelines is for service providers (utilities) to offer a menu of desired service levels (service differentiation) to different segments of the customer base, at different prices (price differentiation) that the various segments of customers require and are willing to pay.

Table 1: Summary of the five steps comprising guidelines for user fees and cost recovery for urban water & sanitation services

Country Programme Assessment	**STEP 1** **The Economic, Policy and Institutional Context**	Economic condition, growth and average income levels (GDP pc and Gini index); Trends in urban population growth rates, including peri-urban and informal/slum growth; Policy and institutional environment, laws and formal statements of cost recovery policy by relevant authorities; Country Policy and Institutional Assessment – likelihood of political support for accelerated move towards cost recovery for sustainability; Stakeholder analysis – likelihood of support/opposition to enhanced cost recovery; Relative objectivity of price-setting responsibilities; is there a semi-autonomous economic regulator? What level of independence? If none, are there plans to introduce appropriate objective capacity? Is there any system of comparative competition between service direct (service) providers in the country to promote efficiency?
Sector Review, Project Identification & Feasibility	**STEP 2** **Setting Cost Recovery and Service Objectives**	Existing RMC & AFDB policy on setting cost recovery targets from user fees What are the primary objectives of service delivery in this context – social, economic, financial, environmental? To what extent should attainment of desired cost recovery target be time-extended? What is the existing financial situation, levels of efficiency, levels of service provision of the direct service provider? What is the existing level of subsidies to average customers of water? And sewerage? How costly is access to bulk water? What levels of service are being accessed by the poorest? What quality and quantity of services are desired by users and consumers, both present and potential? Can services be delivered through alternative, differentiated, modes of provision? Does the service provider need to be introduced to concepts of service and price differentiation? What, if any, are the restrictions on serving 'illegal slums'? What is the affordability and willingness to pay for services at various levels of provision, particularly in the slums? Is there a need for detailed user surveys and focus groups in the slums?

Project Preparation and Appraisal	**STEP 3** **Investment Planning, Costing & Appraisal: Determining Revenue Requirements**	Investment Planning, Costing & Appraisal; understanding total revenue requirements; What are present operating expenditures, capital maintenance expenditures, costs of capital? What should they be at present service levels? What should they be at proposed service levels? Have these costs incorporated direct support costs? What is the average inflation rate? Is the direct service provider/regulator/ government prepared to accept indexation of user fees? **Future Revenue Requirement = Existing Revenue x (1 + (Inflation +K))** Where **K = Pc – X + C + Q + V + S** 'Pc', catch-up percentage necessary to achieve cost recovery at existing service levels; 'X' potential utility efficiency; 'C' to achieve MDG service coverage to the poor; 'Q' to achieve desired environmental quality enhancement; 'V' to achieve acceptable security of supply (and/or possible move towards 24/7 supply); 'S' to achieve any desired improvements in customer service levels. What are the future costs (LRMC) required to ensure water resources sustainability? Is the country investing sufficiently in indirect support costs? Is there a justifiable need for extra-sectoral subsidies, particularly related to the time-spread of achieving cost recovery?
	STEP 4 **The Basis for Charging User Fees**	What is the basis for charging user fees? Volumetric fixed or variable; Flat-rate fixed or variable? To what extent do the user fees reflect the principle of revenue adequacy, social fairness, water conservation and polluter pays, simplicity and enforceability? If incremental block pricing is used, are the sizing and pricing of the blocks appropriate? Is there a lifeline block that is being accessed by too many users to the detriment of the utility's (service provider's) revenue stream? Can the charges be simplified to aid customer's understanding and responsiveness? Is it an appropriate time to re-consider the basis for charging? Is there an appropriate balance in sharing the total revenue burden between different consumer segments? Do consumers accessing water at kiosks pay a proportionate share of the costs? Do the new connection fees allow/encourage access to the piped network by the poor? To what extent are sewerage (and any wastewater treatment) costs being recovered? Are industrial/commercial users being charged according to «polluter pays» principle? Is there sufficient enforcement to limit «polluter pays» avoidance? Is there sufficient willingness and ability to pay these user fees? Have women, the poorest and the most disadvantaged been consulted separately? If not, reconsider service objectives and modes of provision Step 2.
	STEP 5 **Implementation**	Are any additional sources of finance required to ensure coverage for all, especially to the poor? Is there an adequate strategy to communicate to customers the reasons for moving towards full cost recovery? What customer involvement mechanisms are planned? Are there appropriate user payment collection procedures (flexible payment systems) in place? Can lower-income customers pay little and often? Are there appropriate but enabling processes in place/planned for non-payment? Are public institutions paying their water fees? Is there any need for adaptation of local bye-laws to enforce compliance? Is there a system of financial control, monitoring and evaluation of the development of user fees?

Guidelines for User Tariffs in Urban Networked Water and Sanitation

Sample Water Tariff Calculations for Urban Utilities

Scenario A: Government subsidy for Capital Maintenance and Cost of Capital, typically poor Non Revenue Water and limited Bill Collection Efficiency

	gives a resulting tariff of	0,29	CUs / m3	as shown in the calculations below	
	Tariff Calculations				
		%	Volume, m3	Currency Units (CUs)	
1	Operating Costs Energy Chemicals Labour			400,000 100,000 400,000	900,000
2	Depreciation (average Capital Maintenance Expenditure) Value of current Capital Employed			10,000,000	400,000
3	Required Return on Capital Employed (ROCE) Debt / (Debt + Equity) Ratio Average Cost of Debt Average Cost of Equity Weighted Average Cost of Capital (to service debt & equity)	50 % 7,5 % 2,5 % 5,0 %			500,000
4	TOTAL ANNUAL COST, CUs				1,800,000

		%	Volume, m3	Currency Units (CUs)	
5	Government Subsidy 1 - any cost of capital (debt or equity) not charged to utility	5 %		500,000	
6	Government Subsidy 2 -any direct budgetary subvention, usually for (deferred) capital maintenance			400,000	
7	Required Total Revenue from customers, CUs Water produced in year, m3 Non revenue water, % => m3 Billed water, m3 Bill Collection efficiency Water bills paid, m3	 35% 75%	 4,800,000 1,680,000 3,120,000 2,340,000		900,000
8	Average Tariff Required total revenue divided by water billed, CUs/m3				0,29

Guidelines for User Tariffs in Urban Networked Water and Sanitation

Sample Water Tariff Calculations for Urban Utilities

Scenario B: Government subsidy only for Return on Equity Capital - full Debt Servicing, reasonable Non Revenue Water and Bill Collection Efficiency

	gives a resulting tariff of	0,47	CUs / m3	as shown in the calculations below	
	Tariff Calculations				
		%	Volume, m3	Currency Units (CUs)	
1	Operating Costs Energy Chemicals Labour			400,000 100,000 400,000	900,000
2	Depreciation (average Capital Maintenance Expenditure) Value of current Capital Employed			10,000,000	400,000
3	Required Return on Capital Employed (ROCE) Debt / (Debt + Equity) Ratio Average Cost of Debt Average Cost of Equity Weighted Average Cost of Capital (to service debt & equity)	50 % 7,5 % 2,5 % 5,0 %			500,000
4	TOTAL ANNUAL COST, CUs				1,800,000

		%	Volume, m3	Currency Units (CUs)	
5	Government Subsidy 1 - any cost of capital (debt or equity) not charged to utility	1,3 %		125,000	
6	Government Subsidy 2 -any direct budgetary subvention, usually for (deferred) capital maintenance			0	
7	Required Total Revenue from customers, CUs Water produced in year, m3 Non revenue water, % => m3 Billed water, m3 Bill Collection efficiency Water bills paid, m3	 25% 85%	 4,800,000 1,200,000 3,600,000 3,060,000		1 675,000
8	Average Tariff Required total revenue divided by water billed, CUs/m3				0,47

Guidelines for User Tariffs in Urban Networked Water and Sanitation

Sample Water Tariff Calculations for Urban Utilities

Scenario C: No subsidy for private equity return, full Debt Servicing, good Non Revenue Water and Bill Collection Efficiency

	gives a resulting tariff of	0,53	CUs / m3	as shown in the calculations below	
	Tariff Calculations				
		%	Volume, m3	Currency Units (CUs)	
1	Operating Costs Energy Chemicals Labour			400,000 100,000 400,000	900,000
2	Depreciation (average Capital Maintenance Expenditure) Value of current Capital Employed			10,000,000	400,000
3	Required Return on Capital Employed (ROCE) Debt / (Debt + Equity) Ratio Average Cost of Debt Average Cost of Equity Weighted Average Cost of Capital (to service debt & equity)	50 % 7,5 % 10 % 8,8 %			875,000
4	TOTAL ANNUAL COST, CUs				2 175,000

		%	Volume, m3	Currency Units (CUs)	
5	Government Subsidy 1 - any cost of capital (debt or equity) not charged to utility	0 %			
6	Government Subsidy 2 -any direct budgetary subvention, usually for (deferred) capital maintenance			0	
7	Required Total Revenue from customers, CUs Water produced in year, m3 Non revenue water, % => m3 Billed water, m3 Bill Collection efficiency Water bills paid, m3	 15% 95%	 4 800,000 720,000 4 080,000 3 876,000		2 175,000
8	Average Tariff Required total revenue divided by water billed, CUs/m3				0,53

The Water Partnership Program and its mission

The Water Partnership Program (WPP) promotes effective water management policies and practices at regional and country levels. It operationalizes the African Development Bank's Integrated Water Resources Management policy in the Bank's regional member countries.

WPP pursues its goal through the generation and dissemination of a range of knowledge products, fostering dialogue on key sector issues and promoting partnerships that enhance knowledge sharing.

The Guidelines presented here touch upon a very critical issue for all rural water sector investments: how to build rural water and sanitation infrastructure that is, first and foremost, financially sustainable, in addition to being environmentally and socially sustainable?

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