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**ENVIRONMENT DIRECTORATE
ENVIRONMENT POLICY COMMITTEE
TASK FORCE FOR THE IMPLEMENTATION OF THE ENVIRONMENTAL ACTION
PROGRAMME FOR CENTRAL AND EASTERN EUROPE, CAUCASUS AND CENTRAL ASIA**

Water Supply and Sanitation Sector Reform

Financing Water Services and the Social Implications of Tariff Reform

5-6 June 2005

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EXECUTIVE SUMMARY

The water supply and sanitation sector in EECCA is chronically under-funded and as a result has been deteriorating for more than 20 years. If this trend is to be reversed, and the internationally-agreed targets for water supply and sanitation (Millennium Development Goal 7 target 10) achieved, appropriate policy and institutional frameworks will have to be put in place to ensure the financial sustainability of the sector. This paper focuses on identifying the key issues and challenges that are involved in achieving this objective.

Between 50 and 90% of water utility revenue currently is generated by user charges; the rest mostly comes from public budgets. However, these funds are insufficient even to cover operational costs, not to speak of maintenance and capital costs. In many countries utility revenue covers only about 60% of operation costs. Between USD 15 to 34 per capita per year of additional finance would be needed if present infrastructure were to be properly maintained and renewed, where this is necessary. To achieve the Millennium Development Goals on water supply and sanitation, it has been estimated that a total of about EUR 7 billion would be needed, roughly double the current level of available finance. In these circumstances, most utilities in the region have been decreasing the levels of service that they provide in order to save on costly inputs such as electricity and chemical reagents for water treatment. In addition, utilities have been unable to carry-out basic maintenance, further accelerating the deterioration of infrastructure. This has significant negative impacts on public health and the environment, as well as for economic development.

There are no simple solutions. To reverse these trends, EECCA countries will have to combine all sources of finance to enhance synergies, avoid crowding out other sources, and maximize leverage on total flows.

The most important source of finance is, and will continue to be user charges. A number of EECCA countries could still significantly increase user charges before reaching affordability limits. In others, there may be less room for increases. While there are legitimate affordability concerns, they should be addressed directly and not used to keep tariffs at levels that undermine the financial sustainability of utilities. Requiring municipal budgets to cover the difference between cost-recovery and tariff levels has proven to be one effective way of addressing this issue. Of equal importance is the establishment of sound tariff - setting rules and mechanisms. These have to ensure transparency and predictability, as well as tariff levels that are economically justifiable, and which do not allow utilities to exploit their monopoly position.

Public budgets are another source of potential additional revenue. Many EECCA countries are currently spending a much smaller share of their public budgets to invest into environmental protection than most EU and EU accession countries. However, some EECCA countries (Moldova, Georgia, Kazakhstan, Russian Federation and Ukraine) devote a share of their national income to environmentally-related expenditures that is comparable to OECD and EU accession countries. At the same time, tax collection and public capital expenditure are at very low levels in many places of EECCA. In many cases, there is, hence, a potential to both increase the total amount of public budgets (the size of the pie), as well as increasing the share of these resources that is being allocated to environmental protection (the size of the piece).

A few countries have recognised this and have significantly increased their public spending for the water supply and sanitation sector. Due to affordability constraints in the populations of most EECCA countries, it is expected that public budgets would need to play an important role, both in supporting capital expenditures¹ and in providing funds for social expenditures related to the water sector. Public budgets can also play an important role in helping to leverage other sources of finance such as loans from IFIs and

¹ In OECD countries, taxpayers rather than consumers have financed the bulk of investments in water infrastructure.

donors or from private capital markets. While national budgets are still playing a dominant role at this time, local public budgets will need to increase, too.

Official development assistance (ODA) is another potential source of finance for the EECCA water sector, albeit a much smaller one. ODA would play a similar role to EECCA public budgets. Flows of ODA into the EECCA water sector have been at persistently low levels since the beginning of the 1990's, with EUR 50-100 million per year. International commitments taken within the framework of the Millennium Declaration and the "Monterrey Consensus" may ultimately lead to an increased availability of ODA funds for the EECCA region. Indeed, overall levels of ODA globally have increased in the last two years, though it is not yet clear what this means for the water sector in general nor for the water sector in EECCA in particular. However, these funds will only flow into the water sector if significant progress can be achieved both in reforming the water sector and in improving local capacity to prepare and implement projects.

Financial flows from IFIs into the EECCA water sector have usually represented a small share of these ODA flows in recent years. However, IFI projects are widely recognised to have particularly positive effects by the demonstration and catalytic effects that they often generate.

Similarly, the private sector will most likely only play a limited role in the foreseeable future in financing water infrastructure (depending on a country risk profile). Domestic and foreign direct investments in the sector will remain constrained by the low incomes and high risks caused by several institutional and policy obstacles. For several years, the main value added by the private sector will, therefore, be improved management practices and efficiency of operations (e.g. billing, customer relations), rather than financing.

In order to ensure the social and political feasibility of water sector reforms in EECCA, it will be crucial that the potential social impacts of these reforms are carefully managed. If user charges for water were to be increased to levels that allow for the recovery of operation and maintenance costs, many poor people would not be able to afford water. Social assessments in a number of EECCA countries show that as much as 50% of the population may in some cases exceed the 4% of income threshold which is often used as a "rule-of-thumb" to determine the maximum acceptable level of spending on water. The poorest 20% of the population may sometimes have to spend close to 10% of their income.

It is therefore crucial that adequate social protection mechanisms are being introduced in EECCA, prior or in parallel of reforming tariff systems. Many countries have such mechanisms in place, either in the form of income support or through cheaper tariffs. The usage of increasing block tariffs (where water tariffs increase step-wise as consumption levels increase, with a first subsidised block), which is now widespread in the OECD, is only possible where connections are metered, and therefore usually not yet an option in most EECCA countries. Armenia is an exception since a programme for the forgiveness of arrears that required parallel installation of household water meters pushed the share of metered connections in Yerevan to about 80%, but no usage of increasing block tariffs is currently envisaged.

Existing social protection in EECCA, however, is often not effectively targeted at the poor. In many cases, targeting could be improved by enhancing the procedures for determining and verifying household incomes, and namely by toughening means testing. If this is done, social protection measures can be an effective way to overcome social resistance to increased user charges, and help to generate significant additional revenue for water utilities.

INTRODUCTION

At the Millennium Summit in New York, 2000, the international community agreed a target to halve the proportion of the population without sustainable access to safe drinking water by 2015. Two years later, the World Summit on Sustainable Development in Johannesburg adopted a complementary target to halve the proportion of the population without access to basic sanitation, also by 2015. From a humanitarian perspective, these internationally agreed targets for water might be considered as modest: even if they are achieved, more than half a billion people will still not have access to safe water, and more than 1 billion people would not have access to sanitation. On the other hand, the measures that would need to be implemented to achieve the international targets are far reaching. Studies that have assessed the financial costs of achieving the millennium development goals on water supply and sanitation in the EECCA region, find that almost euro 7 billion per year would be needed to cover the costs of achieving these objectives².

Currently not even half of this amount is available, which signifies that a tremendous financial effort is needed to close the gap. The challenge is even more important when seen in light of chronically insufficient public budgets, serious affordability constraints that apply to user charges, and low levels of official development assistance for the water sector in the region. Action to create a framework that ensures financial sustainability for the EECCA water supply and sanitation sector is also urgent, since chronic under-funding for at least the last 20 years has led to continuous deterioration of water infrastructure and water services. If nothing is done, many parts of this infrastructure are likely to collapse, creating a critical situation for public health and the environment.

This paper seeks to describe the financial situation in the EECCA water supply and sanitation sector, as well as discussing some of the key issues. The paper analyses the potential for additional finance from various sources: user charges, public budgets and official development assistance. It also analyses and discussed the social aspects of water sector reform, and presents a number of social protection measures that policy-makers can use to alleviate pressures on the poor.

The paper builds to a large extent on data that has been generated in the framework of water sector financing strategies developed and implemented in several EECCA countries and regions. These financing strategies were developed using a methodology jointly developed by the Government of Denmark and the OECD-EAP Task Force, of which a detailed description is provided in annex 2.

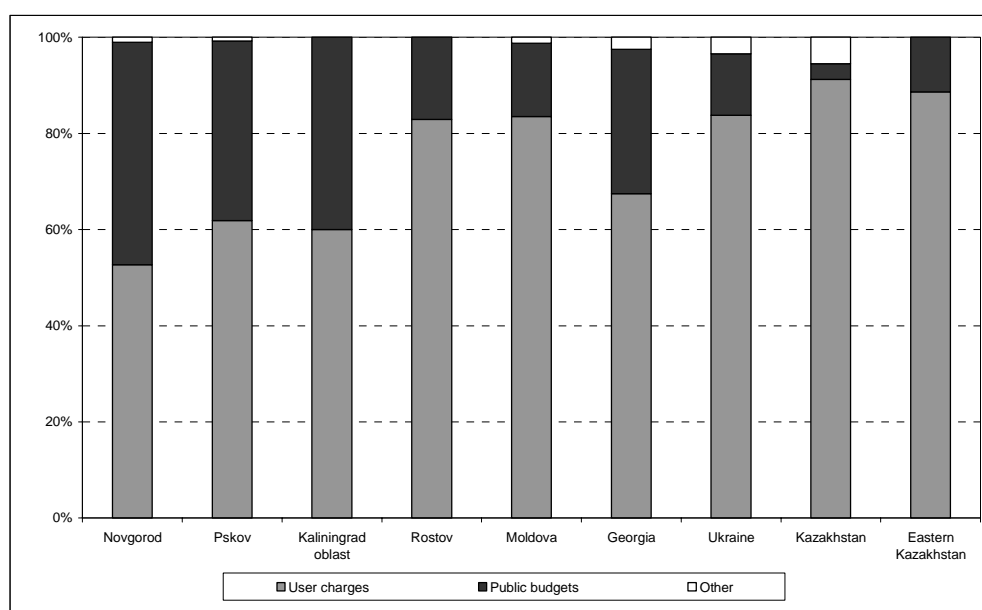
² COWI (2004)

EXISTING FINANCING SITUATION IN THE EECCA WATER SECTOR

In EECCA, user charges are the most important source of finance for water supply and sanitation infrastructure. They account for about 50% in Novgorod, Russia, and for more than 90% in Kazakhstan (Figure 1). The remaining funds for water utilities come mostly from public budgets. The share of other resources such as bank credits, bonds, environmental funds, foreign grants and loans is marginal compared to user charges and public funds.

This situation reflects the degree of reforms in the water and wastewater sector - in particular, the extent to which cost recovery policies have been implemented. It also shows poor access to debt financing of water and wastewater infrastructure.

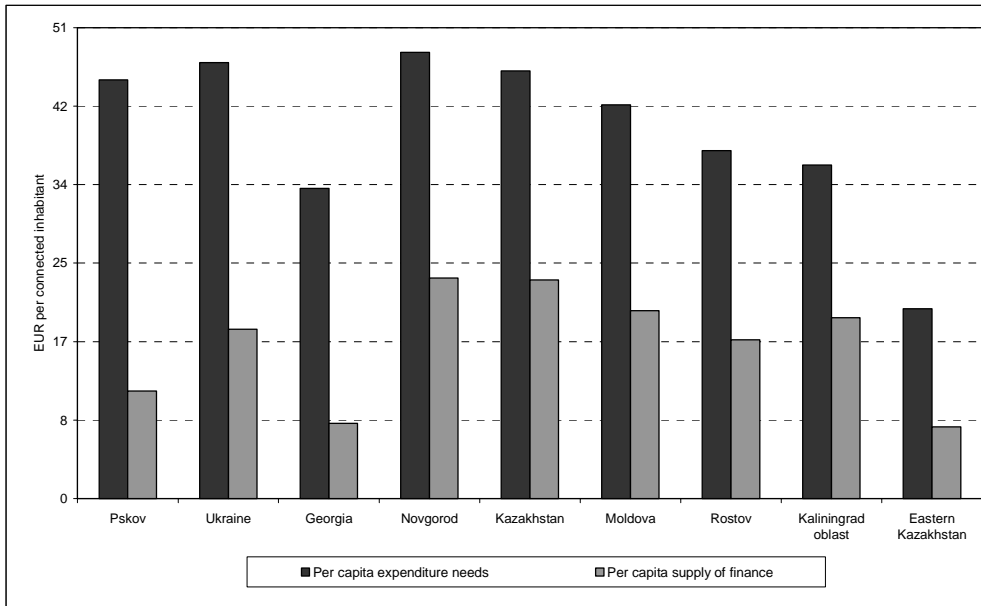
Figure 1 Existing sources of financing water and wastewater utilities



Source: (2003), Financing Strategies for Water and Environmental Infrastructure, Paris

The environmental financing strategies (EFS) that have been carried-out in a number of EECCA countries and regions have tended to show that available finance is usually very insufficient to cover financial needs. Figure 2 Expenditure need and supply of finance in EUR per connected inhabitant in the first year of the baseline scenario below, the expenditure and supply of finance are compared. The expenditure need was estimated as the expenditure needed to operate, maintain and re-invest so as to keep the value of the existing assets constant.

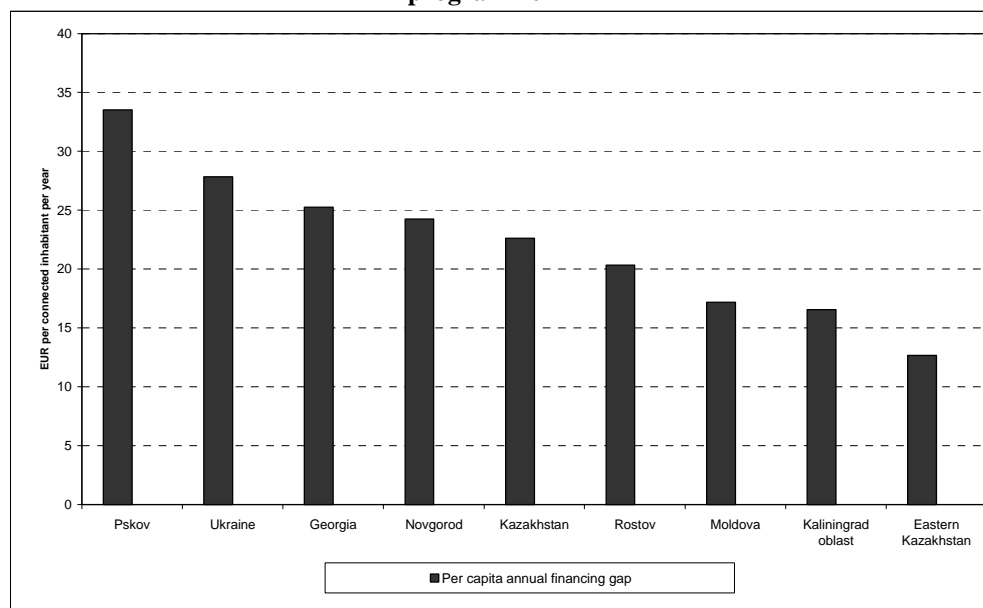
Figure 2 Expenditure need and supply of finance in EUR per connected inhabitant in the first year of the baseline scenario



Source: FEASIBLE, except Kaliningrad oblast for which individual model calculations are presented

In all countries, a significant financing gap was estimated even if no extension of infrastructure is envisaged. Only around half of the necessary funds are currently being provided. In per capita terms the estimated annual additional funding requirements varies among countries and regions, from EUR 34 in Pskov to around EUR 15 in Eastern Kazakhstan (Figure 3). It is also noticeable that there is significant variation within the countries. This is demonstrated by the comparison of the individual regions in Russia and by comparing the overall estimations for Kazakhstan with the assessment for the Eastern Kazakhstan region.

Figure 3 Financing gap per connected inhabitant on an annual basis (EUR), in the first year of implementation programme



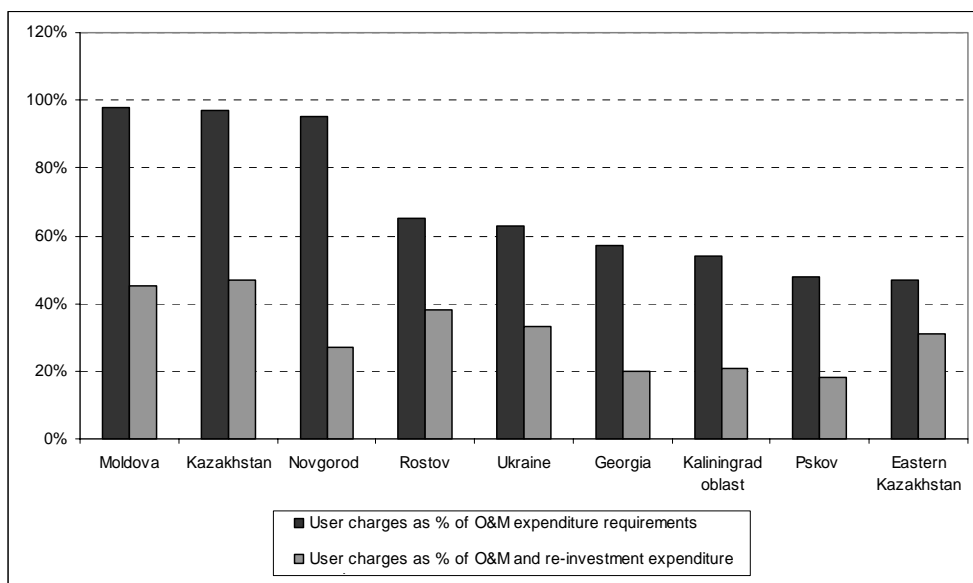
Source: FEASIBLE, except Kaliningrad oblast for which individual model calculations are presented

A significant increase in the supply of finance, in parallel to implementing cost reduction measures, is therefore needed, if the existing extensive water supply and sanitation infrastructure in EECCA is to be maintained. However, this involves significant burdens on some countries in EECCA. In order to fully cover the operation and maintenance costs of the currently operating urban water infrastructure alone, Moldova would, for example, need to spend 3.2% of the current GDP, Georgia, 3.0%, and Kazakhstan, 1.2% per year. In all cases, this would imply doubling or tripling the current level of expenditure on the water sector. The cost burden on the economy appears heavy when compared with the estimates for the EU candidate countries in CEE. For example, it was estimated that Lithuania would have to spend from 1.0% of the GDP in 2005 to 2.6% of the forecasted GDP in 2020 to implement the entire body of environmental directives of the European Union (DANCEE/Anderson and Semeniene, 2001). These figures include annualised investment and O&M costs for all environmental directives including the drinking water and urban wastewater directives. A similar relative cost burden has been calculated for other accession countries, such as the Czech Republic (2.5% to 3.7% of GDP) and Poland (1.3% to 3.7% of GDP).

The additional payments for operations and basic maintenance would have to come from those financing sources that are available for such expenditures, i.e. practically only users and taxpayers (budgets). The users' charges in particular (as shown in Figure 0.3) have no realistic alternative as a source of covering regular operation and maintenance costs.

In the Soviet times, water supply and sanitation services were subsidised in many ways – directly from the budgets and indirectly, e.g. by providing energy below cost price. Over the last decade, the user charges have not caught up with the rapid liberalisation of input prices (e.g. of electricity and chemicals), and they have not made up for budget expenditure cuts. In many cities, user charges do not even cover the cost of operating the remaining, partly functioning infrastructure. Among the countries and regions studied, only Moldova and Novgorod, on average, charge users almost full operating costs, but collected user charges nowhere cover more than half the costs of both operating and maintaining existing assets (Figure 4). Some variation within countries is also present. While the average for Kazakhstan demonstrates that user charges cover close to all operating costs, in Eastern Kazakhstan, they are only able to provide financing for half of the total operating and basic maintenance expenditure need.

Figure 4 Collected user charges as % of expenditure needed in the first year of the baseline scenario to properly operate infrastructure (only what was in use) and maintain the present service level



Source: FEASIBLE, except Kaliningrad Oblast for which individual model calculations are presented

Capital investments have been rare and mainly in emergencies reflecting the focus on breakdown maintenance (as opposed to preventive maintenance). Furthermore, they have not always been allocated strategically to improve the efficiency and sustainability of services. A few large cities have, however, embarked on more strategic capital improvement programmes, usually with foreign assistance.

POLICY OPTIONS TO CLOSE THE FINANCING GAP

Given this situation, just maintaining the present, very low level of water and wastewater services, although this may not look ambitious as a policy objective, would impose significant cost burdens on the countries studied.

There are essentially three options that can be used to close the currently existing financing gap:

- Cost savings through efficiency improvements. The current high energy consumption, large water losses in the distribution network of water utilities, implies room for substantial *cost savings*. Utilities therefore need to target scarce maintenance and re-investment funds to achieve such cost savings.
- Increased supply of finance, including user charges, public budgets and ODA.
- Decreased service levels.

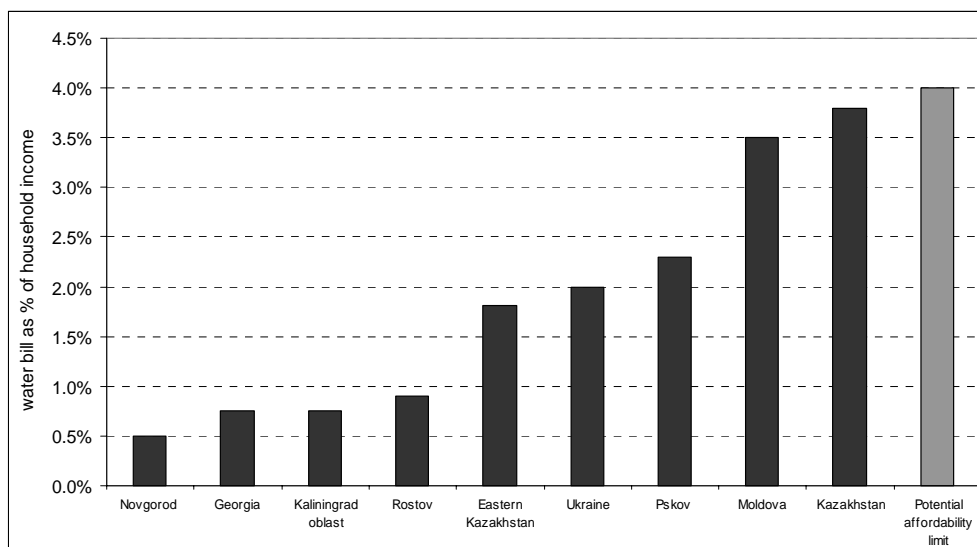
The latter two will be discussed in more detail here.

Increased supply of finance: User charges

Simulations of various *options to increase the supply of finance* to cover the operation and maintenance gap have shown that user charges are the only realistic long-term source of finance for these expenditure categories. Most households seem to be able to pay more than they actually do. In several countries studied, the average charges paid for water and wastewater as a proportion of average household income (0.5-2.5%) are well below international benchmarks for countries of similar income levels (typically 3-

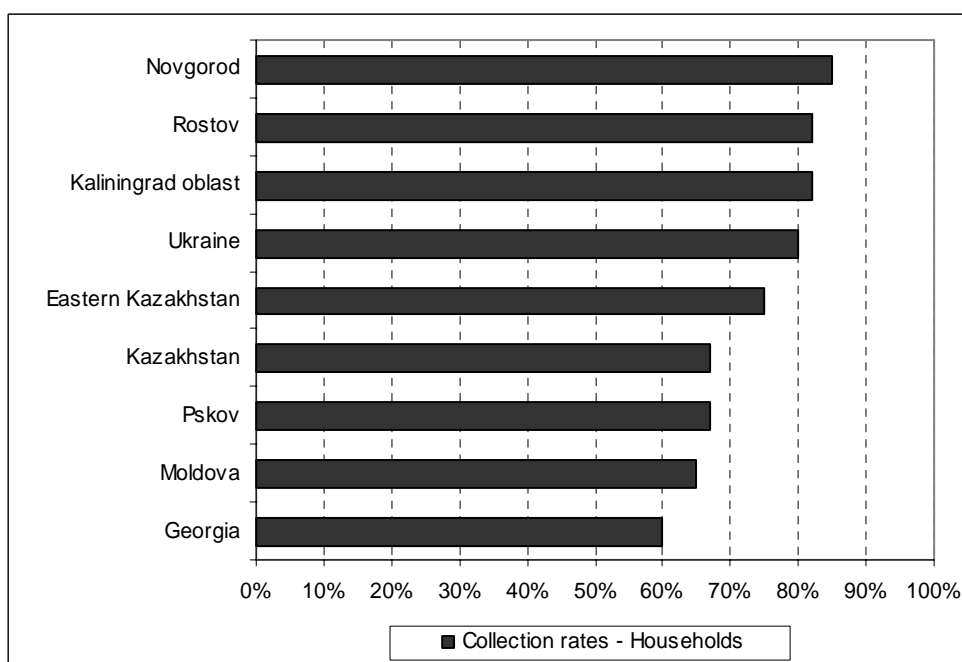
5%). On the other hand, Kazakhstan (on the country level) and Moldova are recovering a much higher share of costs from households, with charges approaching the limits of what the households can probably afford(Figure 5).

Figure 5 Water bill as percentage of average household income



Another problem is the often low level of collection of user charges from households. In several countries average collection rates are as low as 60-70% of billed amounts. Strengthening of the payment discipline has been shown to generate substantial additional funding in itself (Figure 6).

Figure 6 Collection of user charges from households



Source: Data collected within country and regional environmental financing strategies (EFS)

Probably the main obstacle to water pricing has been its perceived social impacts, and their political consequences. In OECD countries, taxpayers rather than consumers have financed the bulk of investments

in water infrastructure. Although many OECD countries have achieved full cost recovery there are still some where user charges are below this level. Those countries that have reached full cost recovery have done it over several decades. Hence, full cost recovery is probably a distant objective for most developing countries. Nevertheless, there are opportunities to move progressively in this direction, while ensuring that poor and vulnerable groups have access to water services. Indeed, there is probably no alternative: governments in developing countries may not be able to afford to emulate the policies followed in OECD countries where public finance (taxpayers) was the dominant source of finance.

Obstacles to going this route are potential social resistance (this will be discussed later), political opposition to raising tariffs, as well as lack of capacity in municipalities for adequate financial planning and properly calculating tariffs accordingly. These obstacles are reinforced by the absence of appropriate tariff setting rules.

Flat tariffs based on consumption norms are the primary tariff formula for consumers in most EECCA countries. Tariffs for the population are set for an undetermined period and can be changed at any time. This creates economic uncertainty for both companies and consumers. At the same time, for political reasons, tariffs may remain unchanged for three years or more, despite inflation rising steeply. This has been one of the main causes of the poor financial of water utilities.

Since most countries have decentralised responsibility for water supply and sanitation infrastructure to the local level, municipalities have become the main regulator, including for tariff-setting. Despite the obvious lack of capacity at the local level to deal with these complex issues, only a few EECCA countries (even though the number is increasing) have developed tariff-setting rules to guide municipalities in their task. Spreading similar approaches to a greater number of countries will be an important prerequisite to using user charges more extensively to finance water services in EECCA.

Tariff setting rules should provide for the transparency of the process of tariff-setting, ensure that the outcome of the process is sufficiently predictable (i.e., based on economic, not political considerations), as well as allowing for all relevant costs to be included, including regular adjustments for price inflation in main inputs (see box 1 for an example).

Box 1. Tariff-setting and affordability in Poznan, Poland

The tariff-setting mechanism in Poland has been established so as to minimize obstacles to raising tariffs for political reasons. Utilities are required to develop rolling, long-term development plans which cover all aspects of their activities. Each year they must submit these plans, together with proposals for tariff adjustments, to the city council via the mayor, at least 70 days before any tariff adjustment is due to take effect. If the council accepts the utility's development plan, and if the mayor determines that the tariff adjustments have been established in accordance with national law and are necessary to achieve the planned results, then the tariff adjustments must be approved. If the council does not approve the proposed tariff adjustments within 45 days, they are approved automatically. If the council considers that there is an affordability problem, it may decide that the tariffs for all or some consumers should be increased by less than proposed. However, the resources to finance the subsidy to the designated consumers must be drawn from the city budget and transferred to the utility. More generally, support for poor households is provided through social services that are financed by the municipality. Recently the utility in Poznan set up a small fund to alleviate difficulties that poor families may encounter because of increased tariffs, which has helped support the political acceptability of tariff increases.

Source: Kayser 2004.

Increased supply of finance: Public budgets

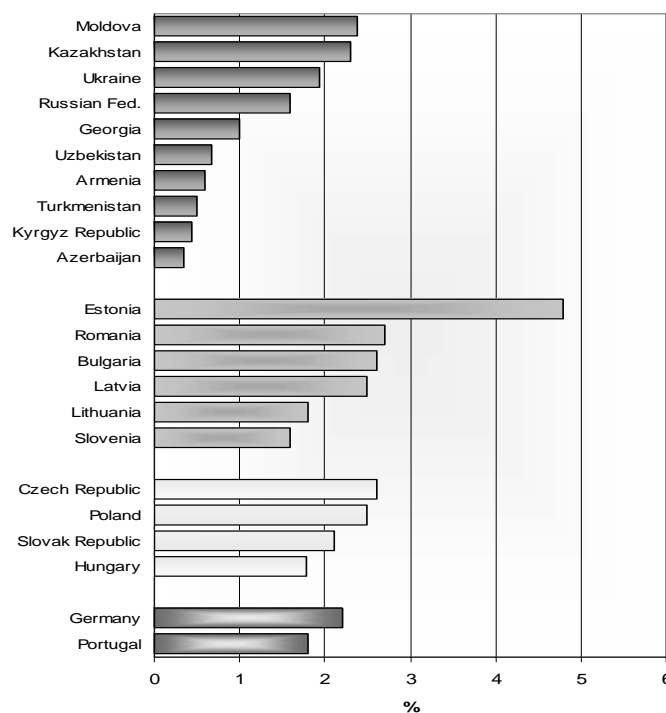
Public sources of financing, albeit scarce, will have to play an essential role in leveraging financing for capital investments for rehabilitation and major development of the infrastructure. There are no substitutes for public funds to provide social protection of poor and vulnerable groups and to facilitate access to debt

financing. However, in order to play these roles effectively, budgetary funds and donor grants need to be strategically concentrated on fewer priority programmes. These programmes no longer need to include immense investments, but rather modest rehabilitation of strategic parts of the system that bring about operational efficiency and cost savings. In some countries, for example in Kazakhstan, public expenditure on water and wastewater infrastructure has been particularly dramatically constrained, partly due to the government policy to encourage full cost recovery at the local level. The study has shown that such an ambitious policy, while having several merits, will be difficult to sustain in the medium and long run if infrastructure development targets are to be achieved. As a matter of fact, Kazakhstan has just recently put in place a Sectoral Drinking Water Programme for 2002-2010 that focuses on halting the deterioration of water supply and sanitation infrastructure and includes about USD750 million for capital expenditure.

As shown on Figure 7, many EECCA countries (in particular Moldova, Kazakhstan, Ukraine and Russian Federation, Georgia) seem to devote a significant *share of their incomes to environmentally-related expenditures* (e.g. up to 2.4 % in Moldova), where water usually plays an important role. This is more than some EU accession countries and most EU member states. Using this indicator, it seems that most EECCA countries are more committed to improving environmental and water supply quality than is commonly thought. This suggests that at least for some countries, it may be the low ability to pay due to low incomes, rather than lack of willingness to pay in EECCA countries, that is the main obstacle to higher levels of domestic environmentally-related expenditure. On the other hand the available data illustrated on figure 6 show clearly that in the other EECCA countries environment has been clearly marginalized among domestic spending priorities.

The *total volume of environmental investment expenditures* in EECCA, however, remains relatively small. It is still more than three times smaller than in EU accession countries (about €4 and 1.3-1.7 billion respectively).

Figure 7 Environmentally related expenditure as a share of GDP, 2000



Source: Eurostat, national statistics, OECD.

For detailed notes on individual countries please see the reports on *Trends in Environmental Expenditures and International Commitments in EECCA* (prepared by the OECD EAP TF Secretariat) and *for CEE/SEE* prepared by the REC EAP TF Secretariat and submitted to the Kyiv Conference.

In some countries this has now been recognised. Armenia, for instance, which was previously devoting only 0.7% of its public expenditure budget to the water supply and sanitation sector has increased this to 1.2% in 2004 and is committed to maintain this effort in the coming years. In other places very low tax collection rates associated to low levels of public capital expenditure per GDP (compared to other countries and regions) suggest that public expenditure for the water sector could still be significantly increased. In any event, it is clear that additional financial efforts from public budgets would need to be sustained for many years if improved water services are to be achieved in the region.

Increasing the supply of finance: Official Development Assistance (ODA) and other sources

Except in a few very poor countries, domestic rather than external resources will be the dominant source of finance. Nevertheless, external finance, whether concessional (for example, grants or soft loans) or non-concessional (IFI loans), can play an important catalytic and demonstration role. External finance can support financial and governance reforms in the sector, build capacities, and introduce international disciplines and good practices. On the other hand, care must be taken to avoid crowding out domestic financial sources, inducing subsidy dependence, or removing incentives for essential reforms.

If the internationally agreed water targets³ are to be achieved, official development assistance (ODA) would need to rise substantially (the Camdessus Report argued that ODA would have to at least double). The need for increased levels of ODA was recognized at the International Conference on Financing for Development held in Monterrey, Mexico, 18–22 March 2002.⁴ The “Monterrey Consensus” established a new international partnership for achieving internationally agreed development goals, including the Millennium Development Goals. Essentially, developing countries pledged to promote sound policy reform, good governance, and increased domestic financial resource mobilization in return for increased international financial flows.

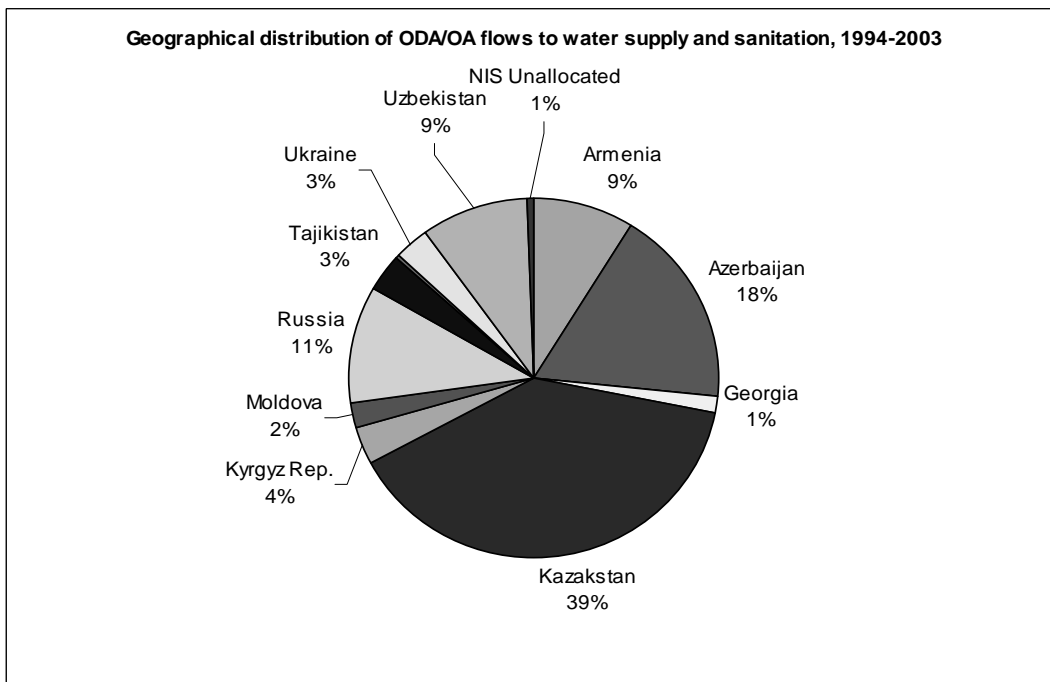
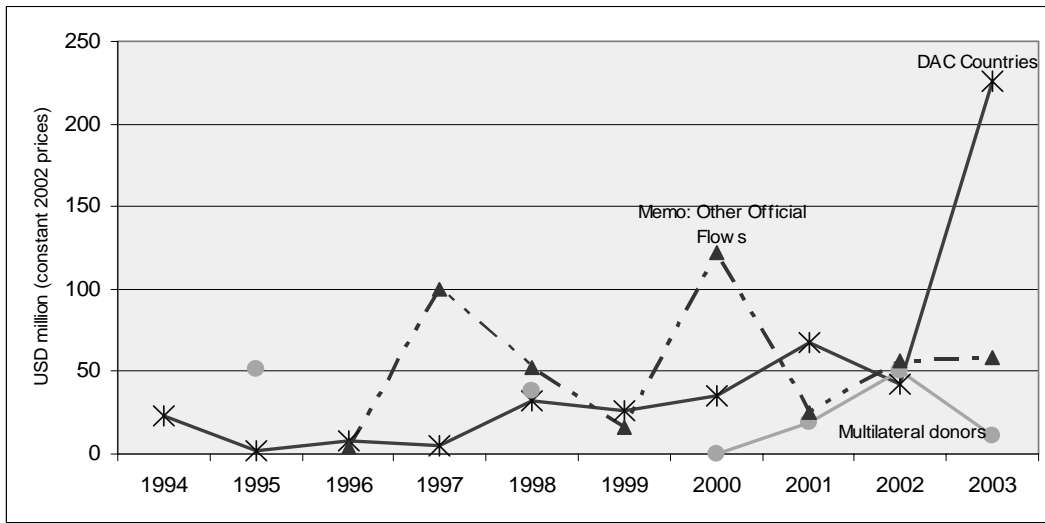
OECD data shows that flows of official development assistance for water in the EECCA region has been slightly increasing over the last 10 years (Figure 8). Most of it (2/3) is, however, concentrated in just three countries (Kazakhstan, Azerbaijan and Armenia). At the same time the absolute amount of ODA for water is at very low levels, with an average of euro 50-100 million per year (also see annex 1). This amount is clearly very modest when compared to the financial needs to achieve the millennium development goals on water supply and sanitation in EECCA, which have been estimated to as much as euro 7 billion per year.⁵ ODA is therefore going to remain a minor source of finance for the water supply and sanitation sector, even if significantly increased in the future.

³ Millennium development goal 7 target 10 stipulates to “halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation”.

⁴ See the UN Department for Economic and Social Affairs website on Financing for Development: <http://www.un.org/esa/ffd>.

⁵ COWI (2004), Draft main report “Financial needs of achieving the Millennium Development Goals for water and sanitation in the EECCA region”, commissioned by the Danish Ministry of Environment. Also see background paper for Almaty+5 conference “Meeting the Millennium Development Goals Drinking Water and Sanitation Target in the EECCA Region: a Goal within Reach?” for a discussion of the methodology in the COWI report.

Figure 8: Bilateral and multilateral official development assistance to water supply and sanitation in EECCA countries, annual commitments, million USD (constant 2002 prices)



Notes:

1. Other Official Flows (OOF): transactions by the official sector with countries on the List of Aid Recipients which do not meet the conditions for eligibility as Official Development Assistance or Official Aid, either because they are not primarily aimed at development, or because they have a Grant Element of less than 25 per cent.
2. The peaks in the chart are explained by three big projects: 1997 and 2000 IBRD non-export credits of 75 and 122 mln USD to Uzbekistan and Russia; 2003 a loan of 169 mln USD of Japan JBIC to Kazakhstan for the rehabilitation of water supply and sewerage plants.

Whatever the level of ODA flow, more could be done to improve its effectiveness and to improve coordination between donors. Some donors are now moving away from financing individual water projects to establishing local, financially sustainable, financing mechanisms. Greater use is also being made of output-based budgeting that focuses on achieving development outcomes, such as a number of increased connections, rather than focusing on inputs such as provision of pipes and pumps. Many donors are also working to strengthen the pro-poor dimension of their activities, amongst other things by finding ways to finance shortfalls in consumers' ability to pay when tariffs are increased.

Non-concessional loans from IFIs are important sources of long-term investment capital for developing countries, and are generally offered on terms that are more favorable than those available on local capital and financial markets; interest rates may be lower and/or the payback period longer. Substantial resources are available from the World Bank and regional development banks for loans to municipalities and water utilities, but there are a number of key bottlenecks that constrain their wider use.

For one thing, there is often a lack of bankable projects—that is projects where the IFI has sufficient confidence that the loan will be repaid. This may be because of a lack of capacity for project preparation or because the risks associated with proposed projects are unacceptably high. Projects may have to be above a threshold as high as US\$10 million to justify the transaction costs for the IFI. This obstacle can sometimes be overcome by bundling projects so that the value of the sum exceeds the threshold.

Governments may be unwilling or unable to borrow. Debts have to be repaid, typically either from public budgets or from user charges, and most IFIs require governments to provide a sovereign guarantee that this will indeed happen. Governments may be unwilling or unable to take on this additional obligation. If countries are heavily indebted and receiving support from the International Monetary Fund, the Fund may prohibit the country from taking on any additional debt. Some IFIs such as the European Bank for Reconstruction and Development are authorized to issue loans on the basis of a sub-sovereign guarantee—from a municipality, for example. While this creates more flexibility, the requirements to justify that the loan will be repaid are no less demanding than in the case of sovereign guarantees.

Loans to IFIs have to be repaid in foreign currency such as US dollars. However, the revenues to repay the loan are generated in local currency. When the local currency devalues against the currency in which the loan must be repaid, this can result in a sudden and substantial increase in the schedule for repayments, placing an unforeseen burden on public resources that may be already stretched. Guarantees can help to offset currency risks, but they are not cost free. Following the advice of the Camdessus Report, IFIs have taken a number of measures to enhance the use of guarantee instruments (see Winpenny 2004). The EBRD is now started lending in local currency in the Russian Federation.

Donors work with IFIs to make loans more accessible to developing countries. Usually this takes the form of providing grant support to help prepare bankable projects, to soften the terms of the loan, or to build capacities that are needed to implement the loan. One mechanism that was established specifically for this purpose is the Project Preparation Committee (PPC), a network of donors and IFIs who work together to accelerate the development and implementation of IFI loans through the provision of grant support.⁶

In EECCA, the private sector will most likely only play a limited role in the foreseeable future in financing water infrastructure (depending on a country risk profile). Domestic and foreign direct investments in the sector will remain constrained by the low incomes and high risks caused by several institutional and policy obstacles. For several years, the main value added by the private sector will, therefore, be improved management practices and efficiency of operations (e.g. billing, customer relations), rather than financing (see section on private sector participation in background paper for Almaty+5 conference: “Municipal reforms”).

⁶. See the PPC website: <http://www.ppcenvironment.org>.

Decreased service levels

Cities in EECCA countries react to high operating costs and insufficient revenues by not operating the infrastructure or operating it unevenly. Water and wastewater services are often unreliable with frequent interruptions and low quality. In many cities, water is supplied only a few hours a day, and it is insufficiently treated. Most wastewater treatment plants are bypassed or provide only basic mechanical treatment, if any at all. This allows utilities to lower their operation costs to match available revenues by saving electricity for pumping and costly chemicals for water treatment.

The most serious consequences are caused by the chronic shortage of funds for proper maintenance of infrastructure, such as small repairs, replacement of worn-out parts, small capital repairs and essential rehabilitation. This has initially implied a focus on breakdown maintenance (vs. preventive maintenance), and it has subsequently meant that the assets rapidly lose their economic value, physically fall apart and, finally, they get abandoned. In several cases, the infrastructure is so run down that there is a serious threat of complete collapse of the entire system if funds for maintenance and rehabilitation are not provided.

The *option of decreasing the service level* was considered only in few water sector financing strategies in EECCA. As the service level is already low, this alternative is politically undesirable. This alternative may also be financially self-destructive. It would be difficult to mobilise public support for tariff increases and for major reforms, while service levels are being lowered in parallel. People are willing to pay more for infrastructure only if they see that the level or quality of services improves. However, without a concentrated effort both to improve efficiency and to increase the supply of finance in selected places, a de facto deterioration of the service level will be the result across most cities.

While the decrease of service levels does not appear to be a viable option, many EECCA countries will have to make difficult choices, nevertheless. In Georgia, for instance, the water sector financing strategy carried-out in 2000 showed that even if all sources of finance are being mobilised, the country could not afford to rehabilitate all of its water supply and sanitation infrastructure within the next 20 years. As a result, Georgia will have to select the municipalities where it intends to rehabilitate the infrastructure, while leaving other places with current low levels of service for many years to come.

USER CHARGES AND THEIR SOCIAL IMPACTS

The preceding discussion suggests that the internationally agreed water targets will not be achieved without increases in user charges; in some cases, substantial increases. Indeed, failure to move in the direction of charging consumers for the costs of providing water services has a number of perverse effects: it inflates demand for water and sanitation services and hence investment needs; it creates vested interests and dependence on the subsidies that governments provide in place of user charges; it undermines efforts to put the sector on a more financially sustainable basis; it results in chronic under-funding of utilities and deterioration of assets; and more generally it impedes reform of the governance of the water sector.

It is sometimes argued that water is a basic right or a “gift of god”—something that people are entitled to and should not have to pay for. However one regards water, it is also true that its provision to urban populations requires pipes, pumps, and other materials as well as labour and institutions to make it all happen. These cost money and someone has to pay, ultimately users and/or taxpayers.

Probably the main obstacle to water pricing has been its perceived social impacts, and their political consequences. In OECD countries, taxpayers rather than consumers have financed the bulk of investments in water infrastructure. Although many OECD countries have achieved full cost recovery there are still some where user charges are below this level. Those countries that have reached full cost recovery have done it over several decades. Hence, full cost recovery is probably a distant objective for most developing countries. Nevertheless, there are opportunities to move progressively in this direction, while ensuring that poor and vulnerable groups have access to water services. Indeed, there is probably no alternative:

governments in developing countries may not be able to afford to emulate the policies followed in OECD countries where public finance (taxpayers) was the dominant source of finance.

Water services often fail to reach the poor, who bear the main burden of inadequate access, service deficits, poor water quality, unreliable supplies, and unsanitary disposal of wastewater and solid waste. Subsidies are often justified in terms of keeping services affordable to poor households, but there is mounting evidence that they are often not well targeted and not very effective. Instead of benefiting the poor (who are frequently not connected to water distribution and sanitation networks), such subsidies often benefit richer people who are capable of paying the full costs of water services. The effectiveness of public spending on water infrastructure could be much increased if subsidies were restructured and better targeted.

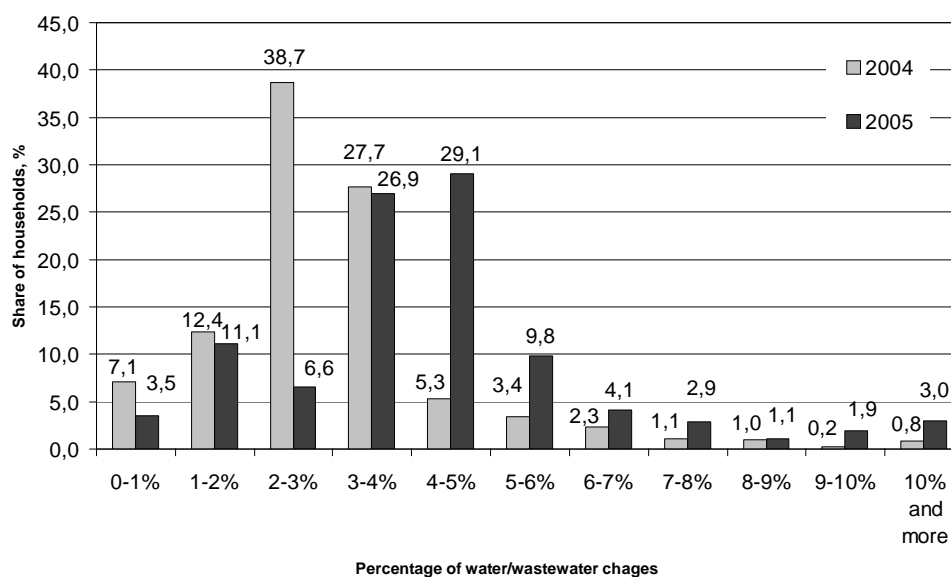
Water charges are not a significant burden on most households in OECD countries; typically they account for less than 1 percent of household income⁷. However, in EECCA countries they may represent a more significant portion of income. International financial institutions often use a benchmark of 4–5 percent of household income for water tariffs when they plan water infrastructure investment projects. However, such estimates need to be complemented by more detailed analyses of how projected tariff levels would impact different income groups. For example, projected tariffs may be less than 4 percent of *average* household income, but for the poorest 25 percent of the population they might represent 5–20 percent of income. It would not be feasible to introduce such a tariff policy unless measures were taken to mitigate the impact of the increased user charges on these groups.

Social assessments of water sector reform policies in the city of Khmelnytsky, Ukraine have shown that if water tariffs were to be increased to recover operational costs more than 40% of the population would have to pay more than 4% of their income for their water bill⁸. Similarly, in Yerevan, Armenia, the 20% of the population with the lowest income would have to pay about 8% of their income if water prices were increased close to levels that allow the recovery of operational and maintenance costs, and almost half of the population would have to pay more than 4% of their income (Figure 9).

⁷ OECD (2003), *Social issues in the provision and pricing of water services*. Paris: OECD

⁸ OECD (2003), *Key Issues and Recommendations for Consumer Protection – Affordability, Social Protection, and Public Participation in Urban Water Sector Reform in Eastern Europe, Caucasus and Central Asia*, Paris

Figure 9 Distribution of Yerevan Households by Expenses for Water/Wastewater Services as a Percentage of Household Consumer Expenditures, 2004 and 2005 Projections (Scenario 1)



Source: OECD/EAP Task Force (2004), Consumer Protection in Urban Water Sector Reforms in Armenia: Ability to Pay and Social Protection of Low Income Households, Paris

In OECD countries, a variety of approaches have been developed to mitigate or offset the impacts of tariff increases on the poorer sections of the community.

- *Income support.* Measures providing income support aim to compensate poor households for tariff increases that are judged to be unacceptably burdensome. The support may be directly linked to water use. For example, support may be provided if the water bill is above a certain percentage of household income, or may be calculated to maintain an absolute level of income after the utility bill is paid. It can be paid either directly by the government to the utility or through a voucher system. This type of support represents a financial burden on the state and reduces incentives to conserve water. Alternatively, the support may not be linked to water consumption, but to income levels. The people receiving the support can choose themselves how to spend it—on water or on other goods and services. In this way, the costs fall on the state budget rather than the utility. If combined with appropriate water charges, it does not encourage over-consumption of water.
- *Tariff-related measures.* The tariff structure can be designed in such a way as to mitigate the potentially adverse impacts of tariff increases on poor households. The approach used in an increasing number of OECD countries involves a “block-tariff” structure. In this approach, the price paid is linked to the amount of water consumed, and the charge levied for each unit or “block” of water used increases with the total amount used. The initial block may be free or charged at a very low rate, assuring that poor households have access to a basic level of water services for free or at low cost. The system needs to be designed to take account of the number of people in each household in order to avoid penalizing larger families. This system can move in the direction of full cost recovery by providing a cross-subsidy from households that use lots of water to those that use little water. It can be implemented by the utility and does not draw on the central

government budget. It also provides a very strong incentive to conserve water, and targets those who use little water for the subsidies rather than all water users. But the drawback is the need for metering of water use—which can involve high upfront costs and, sometimes, social opposition.

- *Facilitating payments:* In many countries, householders are not disconnected from the water supply system even if they are unable to afford their water bills. In part this is because water is essential for life and dignity, but also because of the high reconnection costs. In such cases, utilities in many OECD countries work with consumers to make them aware of how to reduce water consumption, to manage their budgets by paying water bills at short intervals, and to provide other forms of advice and assistance to ensure that consumers have access to water services but pay their bills.

In EECCA the most wide-spread approaches to provide social protection to the poor are (i) through the provision of reduced tariffs for so-called “privileged” consumers (a tariff related measure), or (ii) the provision of housing subsidies (income support).

Discounted Tariffs or Privileges

Most EECCA countries continue the provision of *privileges*. Under this system, certain categories of citizens are granted discounted or free services based on their social or professional status (e.g. war invalids and handicapped; police, judges and firemen). While there are poor people among the recipients of privileges, these programmes do not specifically target them, and often are not justified economically and socially. But there is significant political and social resistance to removing them, even if public budgets find it increasingly difficult to finance such programmes. So far, only a few countries (Armenia, Kazakhstan and Moldova) have undertaken radical steps to eliminate and transform the system of privileges, first of all occupational privileges. In other countries (e.g., the Russian Federation), reforms have been targeted at monetising these subsidies in order to reduce incentives for over-consumption and to include these subsidies into existing income support mechanisms.

It should be noted, that in some cases there may be a rationale for continuing to operate the “privilege system” for certain categories of the population. Where a certain social or professional category provides a good proxy for targeting the poor, using the privilege system may be preferable to more sophisticated, and hence costly to administer, means testing approaches. This needs to be assessed on a case by case basis.

Housing Subsidies

Several EECCA governments have introduced targeted income support subsidies for the poor. Armenia, Belarus, Kazakhstan, Kyrgyz Republic, Russia and Ukraine have established programmes of housing subsidies. Under these programmes, the central government provides compensation for housing and communal services (including water) when expenses exceed a certain level of total household income (e.g. households should not pay more than 20% of their income in Ukraine, 22% - in Russia, and 30% - in Kazakhstan). In 2001 in Ukraine 11% of households received the housing subsidy in summer and 17% in winter, 100 USD per year on average. For single pensioners, this subsidy represented on average 49.2% of their pension.

A key problem of income support measures is the targeting of these measures. In Armenia, the national family support programme, which provides means tested income support to poor families through a scoring system, the targeting was identified to be very unsatisfactory. All income groups receive some level of income support, ranging from 13% in the lowest income group to 6% in the highest income group (Table 1). It is obvious that unless targeting is improved, the family support programme will be largely ineffective in protecting the poor from losing access to water.

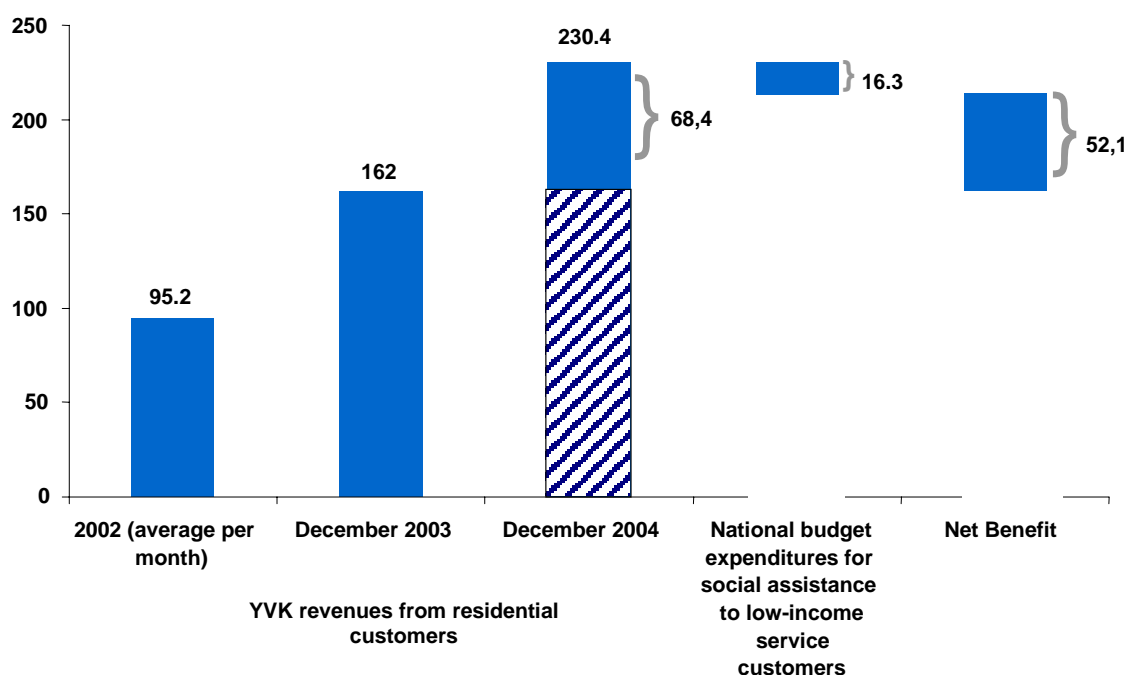
Table 1. Distribution of Family Poverty Benefit Recipients over Income Deciles, Armenia

Indicators	Decile groups by average per capita consumer expenditures										Total
	1	2	3	4	5	6	7	8	9	10	
Households receiving family benefits	79	75	79	66	65	48	53	53	42	35	595
Share of family benefit recipients in decile, % of total recipients	13.3	12.6	13.3	11.1	10.9	8.1	8.9	8.9	7.1	5.8	100.0
Share of the amount of benefits in decile, % of total amount of benefits	15.2	13.3	14.3	11.5	9.7	7.9	9.2	8.3	5.8	4.9	100.0

Source: National Statistics Service of the Republic of Armenia

Housing subsidies, covering communal services including water supply and sanitation and provided as a form of means-tested income support, allow for significant savings for public budgets; they help channel support to those most in need, while ensuring revenue for utilities, including from the poor. If one assumes that tariff increases will only find social acceptance if the poor are sufficiently protected, social protection can be seen as an instrument to generate additional utility revenue. Analysis carried-out under a social assessment for the Armenian water sector shows that even in countries with wide-spread poverty (as mentioned earlier under increased tariffs more than 50% of the population would need financial assistance to pay for the cost of water), one dollar invested into social protection can generate four dollars of additional revenue for water utilities (Figure 10).

Figure 10. Financial Implications of a Two-Fold Increase of Water/Wastewater Tariff in Yerevan Water Utility from a Social Welfare Perspective (AMD million, month)



Studies that assess consumers' willingness to pay can also provide important information in relation to user charges. Analyses conducted in the countries of the former Soviet Union and elsewhere suggest that consumers are often willing and able to pay more for water services than is frequently thought. Detailed studies are also important because they can reveal the upper limit of the proportion of their income that people are ready to spend on water, and therefore help policymakers to establish affordable tariff levels. This suggests that studies of this kind can help design policies that can generate the revenues that are needed to finance water infrastructure while ensuring that poor and vulnerable groups have access to water services.

ANNEX 1: TABLE OF EBRD MUNICIPAL WATER PROJECTS IN EECCA

Op ID	Op Name		EBRD Signed	Finance	Operating Assets
TAJIKISTAN					
34583	Khujand Water Supply Improvement Project	Water and Sewage	0,9		0,0
			0,9		0,0
UZBEKISTAN					
29167	Tashkent Water Supply Improvement Project	Water and Sewage	7,7		0,1
			27,7		1,1
RUSSIAN FEDERATION					
1913	St Petersburg Water & Environmental Services Improv. Program	Water and Sewage	6,8		6,8
3717	Kaliningrad Water and Environmental Services Project	Water and Sewage	13,7		1,6
13383	Yaroslavl Municipal Water Services Development Programme	Water and Sewage	13,5		1,4
17523	Surgut Municipal Services Development Programme	Municipal Services	37,3		14,3
19105	St Petersburg South-West Waste Water Treatment Plant	Water and Sewage	35,5		22,2
20699	Archangelsk Municipal Water Services Development	Water and Sewage	9,5		0,0
21962	St Petersburg Northern Waste Water Treatment Plant Incinerat	Water and Sewage	23,8		0,0
22163	Komi Municipal Water Services - Syktyvkar	Water and Sewage	9,6		0,0
			149,7		46,3
AZERBAIJAN					
1859	Baku Water Rehabilitation Project	Water and Sewage	8,7		8,7
			8,7		8,7
MOLDOVA					
2831	Chisinau Water Services Rehabilitation Project	Water and Sewage	12,2		12,2
			15,6		15,6
UKRAINE					
Direct					
2857	Zaporizhzhia - Water Utility Development & Investment Progr.	Water and Sewage	19,3		12,6
			19,3		12,6
Total			221,9		84,4

ANNEX 2: ENVIRONMENTAL FINANCING STRATEGIES AND THE FEASIBLE MODEL

The Concept

The environmental financing strategy methodology was developed in response to the limitations of national environmental strategies and action plans to adequately address associated financial issues. Environmental financing strategies aim to organise information in a form that facilitates decision making, whether in setting policies and targets, creating or strengthening institutions, or mobilising sources of financing. The key (and this was the major limitation of NEAPs) is to impart realism, and promote the concepts of affordability and cost-effectiveness in the implementation of environmental programmes.

An environmental financing strategy is a methodological framework for medium- to long-term strategic balancing of environmental and infrastructure service targets with available financing. It is applicable in the environmental sectors that require investment-heavy environmental infrastructure.⁹

The basic idea behind the environmental financing strategy concept is quite simple. There should always be a balance between the money needed to meet the target and the money available to do so. Applying this concept yields a number of benefits, which can most easily be explained through a stylised example as included in the Box 01 below.

⁹ The methodology as implemented in the FEASIBLE model was developed by the OECD EAP Task Force. The model itself was developed by the Danish consulting company COWI in close co-operation with the OECD with financial support by DANCEE.

Box 0-1 Financing strategies - an illustrative stylised example

Assume that the target in a country is to have mechanical and biological treatment of all municipal wastewater. Developing a financial strategy for the water and wastewater sectors would imply a need to estimate the costs of this target and establish a coherent strategy for its financing. The costs include not only the investment in new treatment plants in the towns which do not currently have such plants, but also, and equally important, the operation and maintenance costs of the existing and new facilities.

Assessing all these costs and subsequently comparing them with the available supply of finance may reveal that significant additional financial resources will be required to achieve the target. A financing strategy aims to close the gap between the financial requirements and the supply of finance currently available. That can happen through a combination of three types of measures:

- Cost reduction related to efficiency improvement.
- Increased supply of finance.
- Reduction of the target service level.

Through the analytical process, it may become clear that cost reduction through re-investments aiming at energy savings combined with the maximum affordable user charges will not be sufficient to close the financing gap. In that case, the conclusion may be that the target cannot be achieved or the time schedule for implementing the target has to be extended. In our example, it might be necessary to postpone the deadline for achieving wastewater treatment in the small and medium-sized towns.

Having this kind of formalised financial strategy will be very useful for stakeholders. For the authority that distributes investment resources, the result of the financing strategy gives an important input to the overall prioritisation of the investment funds. If no formalised financing strategy exists, there is a risk of ad hoc prioritisation and resulting non-optimal distribution of the investment funds. In such case investment in infrastructure may end up being wasted if there is, subsequently, no money for proper operation and maintenance.

In this way, the financing strategy can be used by many stakeholders to identify what they need to contribute in order to achieve a given service level. In our example, the municipalities may have to contribute through subsidies and/or by allowing user charges to increase to full cost recovery level or to the highest affordable level.

The process of preparing the financing strategy is as important as the technical calculation. By engaging all relevant authorities responsible for finance, economy, construction, environment – it promotes dialogue and eventually consensus on the specific actions that each should take. Thus the process of developing government programmes of action, if well organised, builds a bridge to effective implementation.

Application

The development of an environmental financing strategy aims to verify the realism and affordability of the general long-term objectives of sector policies and programmes. The strategy provides a long-term predictable framework for preparing mid-term investment programmes and for project pipelines in the

public sector at different levels of government. It helps streamline the annual budget process and the preparation of individual capital investment projects.

Historically, environmental action plans have often been prepared without proper regard to how the identified activities should be financed and whether people could afford them. These issues have been particularly difficult to analyse realistically for large-scale environmental programmes that require heavy capital investments in public infrastructure and have a long time span. As a result, the subsequent implementation has often been impeded by resource constraints and characterised by interruptions, delays, cost overruns, conflicts over resource allocation, and ad hoc spending decisions. An environmental financing strategy assists in determining realistic and affordable service levels and in demonstrating the roles that different sources can play in financing the required expenditure. Thus, a well prepared environmental financing strategy increases the chances of successful implementation.

In most countries, if there is not enough money to reach policy objectives, policy makers try either to mobilise more money or to revise the objectives. In the EU candidate countries and EU member states, the targets of environmental and infrastructure development programmes are, to a large extent, externally determined by the EU laws. Under these circumstances, the purpose of the environmental financing strategy is to identify, in quantitative terms, the measures that would ensure an adequate supply of finance in the right places and times. This can help EU accession countries to design feasible implementation programmes for complying with EU directives.

An environmental financing strategy provides a framework for systematic costing of environmental targets in line with the best international standards and for assessing the implications of aggregated costs on liquidity and household affordability. It develops scenarios that show where the bottlenecks lie, and what kind of funding and other intervention may be needed. It offers a commonly understood language of communication among all relevant stakeholders involved in the development of the environmental and municipal infrastructure sectors, especially among environmental, technical and financial stakeholders.

The financing strategy methodology presented here is a strategic planning tool designed for governments operating in market economies, i.e. governments that are policy makers and regulators of economic activity, rather than the central planners and owners of all assets and projects. Developing financing strategies by the government does not imply that the government should finance all or most expenditure, or own all projects. In fact, relying on the public budget to finance e.g. operational and maintenance costs of collective infrastructure is not a sustainable solution. Users, financial markets, capital markets and local budgets all need to complement each other in effective financial packages. Governments, however, create the legal and regulatory framework in which private financial institutions operate. Governments have several instruments to stimulate or hinder their willingness to provide finance for public environmental infrastructure. Hence, the financing strategy framework is not only needed to plan the government budget, but also to plan and reform those government policy instruments that affect the capacities and decisions of other public and private financial agents.

Environmental financing strategies can be used by transition and developing countries as well as western market economies:

- To assess total investment needs of alternative policy targets.
- To bring about practical implementation programmes taking into considerations what the economy and households can afford.
- To identify investment projects and build short- to medium-term project pipelines.
- To identify the policies and measures which are necessary to ensure effective financing of the project pipelines.
- To support claims of environment and other ministries responsible for municipal services on the public budget.

- To support transition country requests for donor and IFI financing.
- To measure and report on the progress in the implementation of programmes and policies.
- Environmental financing strategies are also used by donor countries and IFIs:
- To check if local co-financing commitments are realistic.
- To co-ordinate different donor and IFI programmes.
- To identify country pipelines of supported investment projects.
- To provide an additional dimension (bigger picture) for appraisal of the financial viability of individual investment projects.

An illustrative example of several of these points is provided in Box 2-2 below, which summarises the role of the environmental financing strategy for Georgia in linking feasibility studies and macro-level planning.

Box 0-2 Environmental financing strategies - linking feasibility studies and macro-level planning

Environmental financing strategies can help link feasibility studies at the project level with macro-economic and budget planning, a linkage that is often not examined. Although both municipalities and IFIs analyse the affordability and liquidity related to individual investment projects, environmental financing strategies provide a framework for systematic aggregation of these and other projects at regional and national levels in order to assess their joint implications for domestic policies and budgets.

This value added was clearly demonstrated in Georgia, where the World Bank was developing a project for rehabilitation of the water and sanitation system in Tbilisi, while the European Commission was encouraging rehabilitation of the wastewater treatment plants along the Black Sea coast. Each party was making independent assumptions about the availability of co-financing from the central budget of Georgia, without full information of the aggregated claims on the consolidated budget. Merging these two ambitious investment programmes, as well as other programmes related to water services in other parts of Georgia, into the framework of an environmental financing strategy helped identify, in quantitative terms, the difficult trade-offs that the Georgian budget planners would face if they wanted to fulfil all these commitments.

Implementation to Date

To date, about a dozen environmental financing strategies have been developed in EECCA countries and regions covering water supply, wastewater treatment and municipal solid waste. An overview of these strategies is provided in Table 01.

Table 0-1 Overview of environmental financing strategies in CEE and EECCA countries

Country	Region	Sectors covered	Finalised
EECCA			
Georgia	National	WS & WW	2001
Moldova	National	WS & WW	2000
Russia	Kaliningrad	WS & WW	2002
	Novgorod	WS & WW	2000
		MSW	2002
	Pskov	WS & WW	2001
	Rostov on Don	WS & WW	2003
	Rostov on Don	MSW	2003
	Yaroslavl	MSW	2003
Kazakhstan	National	WS & WW	2001
	Eastern Kazakhstan Oblast	WS & WW	2003
Ukraine	National	WS & WW	2003
Armenia	National	WW	2003
CEE			
Lithuania	National	WS, WW & MSW	2001
Latvia	Riga	MSW	2002
Other Transition and Developing Countries			
China	Sichuan Province	WW	2003

Note: WS (Water supply), WW (Wastewater treatment), MSW (Municipal Solid Waste).

Applied methodology

Most of the financing strategies have been developed using the modelling-based FEASIBLE methodology. However, the financing strategies for Kaliningrad and Lithuania have been developed without the use of FEASIBLE using a more project based approach.

While the project based approach can achieve a higher degree of accuracy, its need for project level data limits its applicability to smaller countries/regions and centrally-planned, sectors and makes it more difficult to do the “what-if” scenario analysis, which has proved to be useful for policy development and implementation when applying FEASIBLE.

The FEASIBLE Model

A major challenge when developing environmental financing strategies in EECCA is the lack of available data on investment and rehabilitation needs at the individual facility level. In order to overcome this challenge and enable successive iterations of alternative policy combinations in an environment where detailed and credible data is scarce, a software tool was created to enable realistic estimation of total financing needs by aggregation of individual needs.

FEASIBLE is a software tool developed to support the preparation of environmental financing strategies for water, wastewater and municipal solid waste services. The first version of FEASIBLE, a spreadsheet based version for water and wastewater, was released in 2001. FEASIBLE Version 2 is a stand alone application based on a database. It is released concurrently with this publication.¹⁰

The present chapter provides a brief description of FEASIBLE, its main functions, what it can and cannot do. A detailed description of the model is available in “The FEASIBLE Model, Version 2, User Manual & Documentation, 2003”.

Using FEASIBLE

FEASIBLE can be used to facilitate the iterative process of balancing the required finance with the available finance. It provides a systematic, consistent and quantitative framework for analysing feasibility of financing environmental targets. A computerised model, FEASIBLE may be used to analyse “what if” scenarios that simulate what would happen if some present policies were changed. FEASIBLE presents the financial impacts of these changes in a systematic and transparent manner.

FEASIBLE requires specific, technical city-by-city data on the present size and state of infrastructure. It also requires that policy makers specify their objectives in terms of specific, measurable and time-bound targets. FEASIBLE calculates the investment, maintenance and operational expenditure that would be required to reach specific targets determined by local policy makers. Targets and objectives are not entered directly, but expressed in terms of selected technical measures. The translation from objectives and targets to technical measures is done as a pre-modelling exercise by the user. FEASIBLE calculates expenditure needs under different assumptions concerning input data and parameters related to:

- Objectives and targets.
- Technical measures.
- Macro-economic projection.
- Technical and price correction coefficients.

The expenditure requirements are subsequently compared with forecasted levels and sources of finance. All sources of finance (public, private, domestic, foreign, etc.) and all financial products can be simulated.

FEASIBLE compares the expenditure needs with the supply of finance on a year-by-year basis and computes cash flow forecast, i.e. financing deficits or surpluses, both annual and accumulated. Not only the magnitude of total cash flow deficits/surpluses is presented. The structure of the financing gaps is also shown, e.g. coverage of capital investment expenditure by various funding sources that can be used to

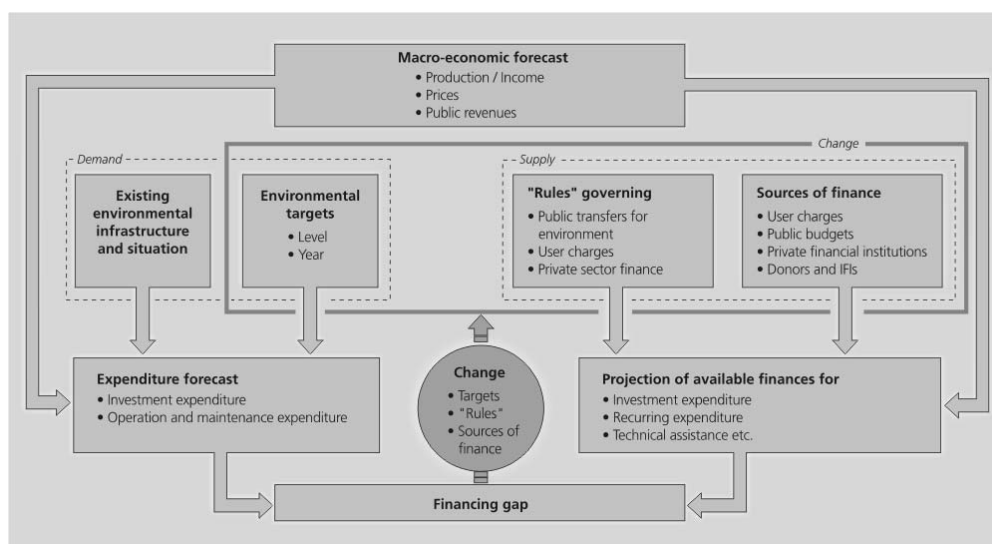
¹⁰ The FEASIBLE model is freeware and can be obtained through the web pages of the OECD, DEPA and COWI.

finance fixed assets, operation and maintenance costs, etc. These results help policy makers understand where the main bottlenecks are, as well as where, when and what additional policy interventions are needed to facilitate effective financing of infrastructure development programmes.

An environmental financing strategy can be developed through series of iterative runs of FEASIBLE with different assumptions describing targets and measures to mobilise additional finance or to re-allocate available funds. This process engages many policy makers and local experts who should reach a consensus, first on targets and then on the most realistic package of specific measures that can mobilise sufficient financial resources to meet the desired targets. The use of FEASIBLE introduces an additional layer of realism into this multi-stakeholders dialogue. In FEASIBLE, any increase in supply of finance is compared with what the national economy, public budgets¹¹ and households¹² could potentially afford. This comparison serves as a test of whether suggested policy options are realistic. If affordable measures to mobilise additional finance cannot be found, FEASIBLE allows environmental or service level targets to be changed in order to simulate the effect of decreasing the demand for financing.

The chart below provides a schematic overview of the iterative process of the FEASIBLE methodology.

Figure 0-1: Overview of the FEASIBLE environmental financing strategy methodology



This iterative process informs decision makers how to use the limited funds of the public sector to achieve the biggest effect, and what needs to be done to mobilise sufficient financing from private and foreign sources. In several countries, it has proven to be a useful tool in the dialogue between the authorities responsible for infrastructure and environment, on the one hand, and authorities responsible for finance and economy, on the other. It has also been used to support negotiations on priority investment projects financed by IFI loans or through bilateral co-operation programmes.

¹¹ Additional public expenditure are assessed on the basis of detailed analysis and forecast of macroeconomic developments, examination of historical budget execution records, review of relevant expenditure patterns and trends in comparable countries, as well as extensive discussions of the medium and long-term budgeting and investment planning with national, regional, and local authorities.

¹² Households' capacities to sustain increased user charges are assessed against internationally adopted benchmarks for countries of similar income levels. In most of the environmental financing strategies covered by this review, the benchmark level for household water bill is established at 4% of average household income, under different assumptions on rates of future income growth.

Box 0-3 FEASIBLE - data need

The FEASIBLE model requires the user to collect and enter basic city-by-city and global data on the present infrastructure in the sectors covered by the financing strategy, including:

- Basic demographic data (population, income, local price levels).
- Existing service level (coverage, quality, capacity, technologies).
- Existing supply of finance (user charges, public budgets, international sources of finance).
- Environmental and service targets.

Although the model is able to run with a limited input and will propose default levels for some parameters, the value of the output increases with the accuracy of the data input.

The FEASIBLE methodology is quite specialised, and thus cannot serve all purposes. For example, it cannot optimise the selection of technical measures in terms of cost-benefit ratio or cost effectiveness. Box 0-4 below highlights the limitations of FEASIBLE.

Box 0-4 FEASIBLE - what the model cannot do

The FEASIBLE model cannot:

- Substitute for feasibility studies.
- Substitute for cost-effectiveness optimisation.
- Substitute for priority setting and cost-benefit analysis.
- Substitute for good policy making and effective implementation.
- Substitute for willingness-to-pay analysis.

It should, furthermore, be noted that proper use of FEASIBLE and interpretation of model results require extensive knowledge of the technical and financial aspects of the sectors analysed, as well as familiarity with computers. Hence, in some countries, local consultants and staff of beneficiary ministries will need to be trained in the use of FEASIBLE in order to be able to apply it appropriately.

Structure and Main Functions of FEASIBLE

FEASIBLE Version 2 enables analysis of the following sectors:

- Water supply and treatment.
- Wastewater collection and treatment.
- Municipal solid waste management.

Each module can be run independently of the others.

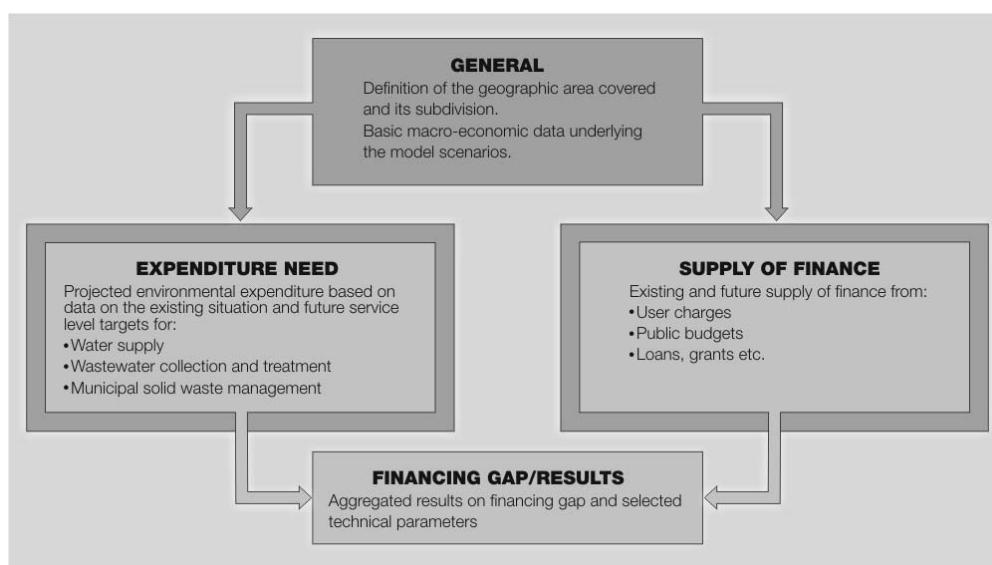
FEASIBLE is structured into four main components:

- **General information**, which contains the definition of the geographic area covered, subdivided into regions, municipalities and groups of municipalities, local cost correction coefficients, and the basic macro-economic and financial data underlying all model scenarios.

- **Expenditure need**, which calculates the projected environmental expenditure (for operation and maintenance, re-investment, renovation and new investments in environmental infrastructure), based on data on the existing situation, service level targets entered by the user and cost correction coefficients.
- **Supply of finance and affordability**, which describes the existing and future supply of finance from various sources and in various forms, for example, user charges, public budgets, loans, grants, etc. It also allows the user to define an affordability limit to which the potential increase in the corresponding source, for example user charges, will be constrained.
- **Financing gap/results**, in which aggregated results on financing gap and selected technical parameters are calculated and displayed in tabular and graphical format.

These components are composed as illustrated in Figure 0-2 below.

Figure 0-2 Structure of FEASIBLE



Water supply

The key parameters available to describe the service level and set targets for the water supply system are:

- Type of water intake and treatment technology.
- Volume of water production.
- Coverage of water supply (percentage of the population covered by central or local water supply).
- Renovation of intake, treatment and transmission system, as well as distribution network and service connections.

The water supply technologies available in the model are:

Urban	Rural
<ul style="list-style-type: none"> • Groundwater intake, no treatment. • Groundwater intake with normal treatment (chlorination, coagulation, sedimentation and filtration). • Surface water intake with normal treatment (chlorination, coagulation, sedimentation and filtration). • Surface water intake with advanced treatment (normal treatment + ozonation and filtration in a granular activated carbon filter). 	<ul style="list-style-type: none"> • Hand pumps, groundwater. • Electrical pumps, no treatment, groundwater. • Electrical pumps, treatment, groundwater.

Wastewater treatment

The key parameters available to describe the service level and set targets for the wastewater treatment system include:

- Type of wastewater treatment technology.
- Wastewater collection rate (percentage of the population connected to sewer system).
- The share of the population connected to a wastewater treatment plant.
- Renovation and upgrading of pumping stations (increasing energy efficiency).

The wastewater treatment technologies available in FEASIBLE are:

Urban	Rural
<ul style="list-style-type: none"> • Mechanical. • Chemical (phosphorous removal). • Biological. • Nitrification. • Denitrification. • Nitrogen removal. 	<ul style="list-style-type: none"> • Septic tanks. • Reed bed. • Biological sand filters. • Stabilisation ponds.

Municipal solid waste

The key parameters available to describe the service level and set targets for the collection municipal solid waste are:

- Coverage of collection system (% of population).
- Type of collection system implemented.

For treatment/recovery, FEASIBLE offers different types of treatment or recovery facilities, and the user is required to distribute collected waste to these facilities.

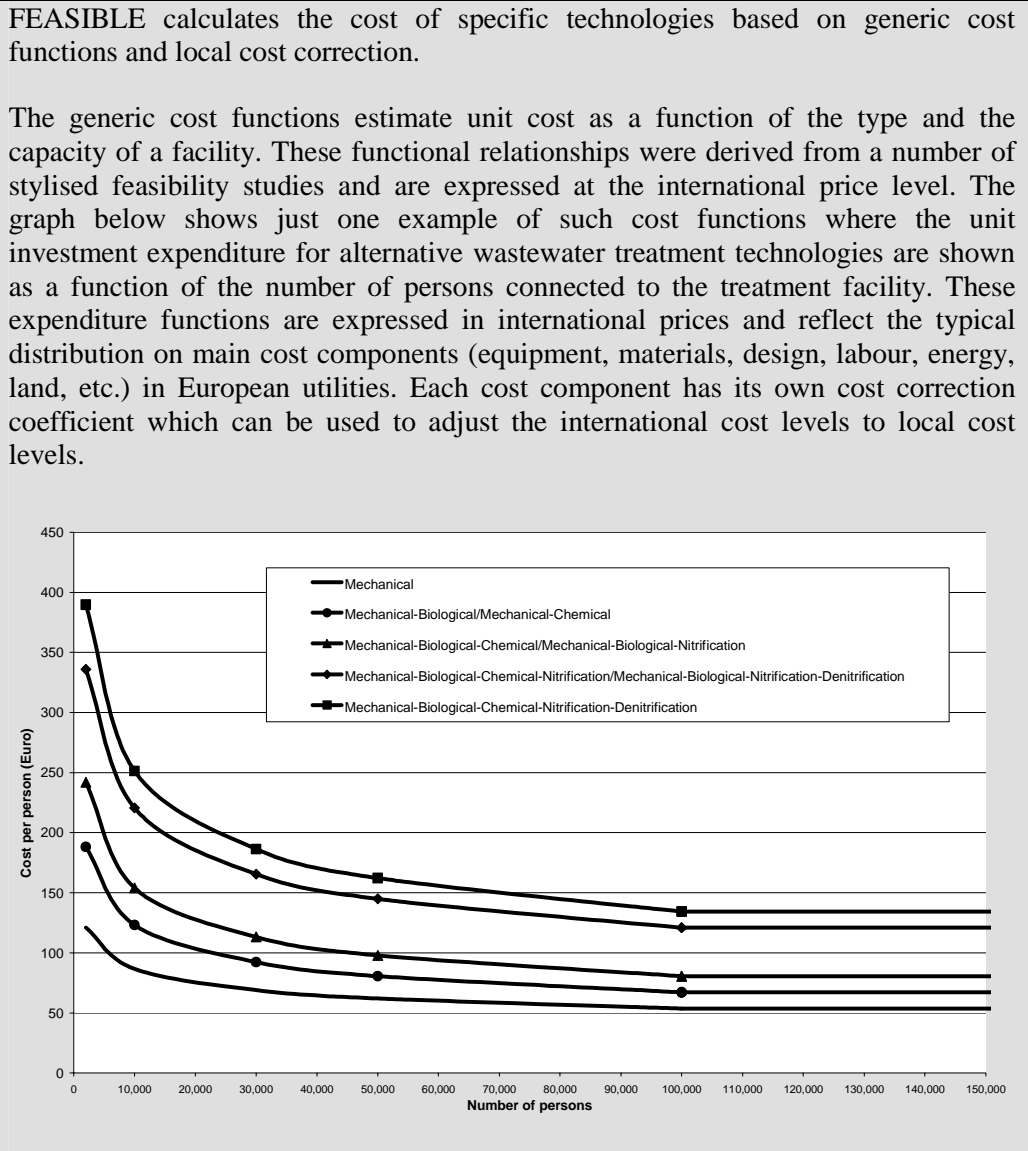
The municipal solid waste collection and treatment/recovery technologies available in FEASIBLE are:

Waste collection	Treatment/recovery
<p>For households:</p> <ul style="list-style-type: none"> • Kerbside, ordinary collection. • Kerbside, dual collection. • Drop-off, recycling station. • Drop-off, take back. • Drop-off, decentral. bring banks. • Kerbside, recyclables collection. <p>For commerce, industry and C&D:</p> <ul style="list-style-type: none"> • Container ordinary collection. • Container recyclables collection. 	<ul style="list-style-type: none"> • MRF - Mixed waste. • MRF - Recyclables. <ul style="list-style-type: none"> - Mixed recyclables. - Source separated recyclables. • MRF - WEEE. • Composting plant. <ul style="list-style-type: none"> - Windrow (garden waste). - In-vessel composting (food waste). • Bio gasification plant. • Landfill. <ul style="list-style-type: none"> - EU. - Controlled landfill. - Dump. • Incineration plant. <ul style="list-style-type: none"> - New - heat/electricity. - New - heat. - Old. • HHW treatment facility. • C&D recycling facility.

Generic expenditure functions

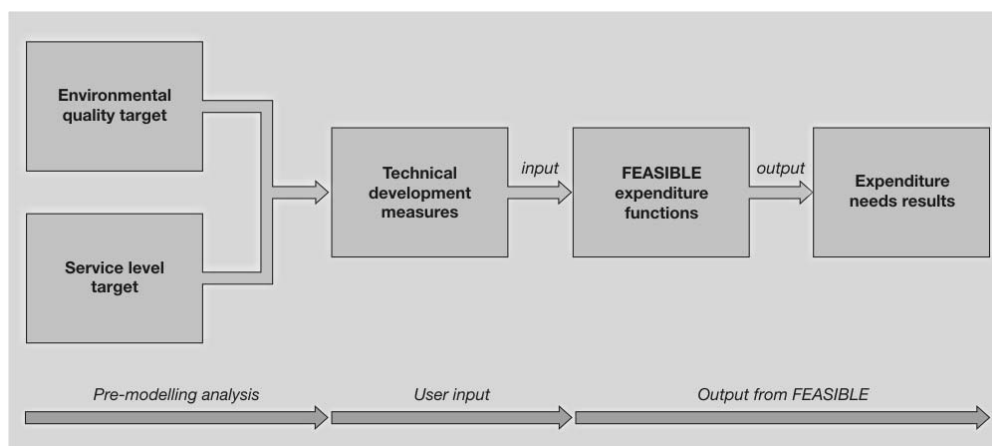
The calculation of the expenditure need is based on a number of generic expenditure functions that are incorporated into FEASIBLE. These expenditure functions allow easy estimation of the costs of alternative service and environmental targets with a limited data collection effort. They cover a number of technical measures within each sector.

Box 0-5 FEASIBLE - generic cost functions and local cost correction



This means that the existing situation and the target situation are mimicked in the model through the selection of specific technical measures which would lead to the fulfilment of a given target.

A very important pre-modelling exercise therefore consists in translating environmental quality or service level targets to technical measures as illustrated in Table 03 below.

Figure 0-3 Phases in the use of FEASIBLE

Hence, when modelling the existing situation in FEASIBLE, the user should select technical measures that are as close as possible to those actually applied in the relevant areas (regions, municipalities or groups of municipalities). Likewise, when modelling a target, the user should select technical measures that would lead to the achievement of the target according to the pre-model analysis.

The expenditure needs are calculated in international prices by the model, and a set of price correction coefficients is used by FEASIBLE to convert results from international prices to local prices. The user is, therefore, required to enter data concerning the local cost of key cost components, such as land, power, fuel, labour, equipment, building materials, etc.

In the supply of finance component, the user is required to specify data on the existing financing situation, as well as the future supply of finance. The forecast of the future supply of finance is done by the user as a pre-model exercise. The supply of finance is specified on a year-by-year cash-flow basis.

FEASIBLE distinguishes between the following sources and instruments of financing:

- User charges (from households, industry or other consumers).
- Public budget.
- Grants (from several sources).
- Loans (from IFIs or commercial banks).
- Other.

The financing gap/results component provides aggregated results on the financing gap, expenditure needs, supply of finance and selected technical parameters. The user may choose to see the gap for specific expenditure types and sources of supply of finance. Box 0-6 below shows some examples of types of financing gaps that may be analysed.

Box 0-6 FEASIBLE results - Examples of types of financing gaps

Total financing deficit/surplus

- Comparing the total expenditure need with the total supply of financing reflects the balance (or lack of balance) between the service level ambitions and the available financing.

Cost recovery deficit/surplus

- Comparing the O&M expenditure need with the supply of finance from user

charges reflects the extent to which tariff payments by direct users are sufficient to cover the necessary operation and maintenance of the infrastructure.

- Comparing the O&M and re-investment expenditure need with the supply of finance from user charges reflects the extent to which tariff payments provide a contribution to operation and renewal of fixed assets in the infrastructure.

Re-investment deficit/surplus

- Comparing the O&M and re-investment expenditure need with the total supply of finance reflects the extent to which the total available financing is sufficient to cover the necessary operation, maintenance and re-investment. If an accumulated gap (backlog) appears, the implication is that the infrastructure will deteriorate compared to the base year.

Investment expenditure deficit/surplus

- Comparing the expenditure need for renovation, upgrading and extension of the service level with the supply of finance targeted at capital expenditure reflects the balance between needed investments and financing available to finance such investments.

Due care should, however, be taken when interpreting the aggregated financing gap in a country or large region with numerous independent utilities in the environmental sector covered by the financing strategy, as user charges typically are not transferable across administrative jurisdictions. Hence, an aggregated balance may well reflect local imbalances. For this purpose, FEASIBLE allows analysis of financial surpluses/deficits at more disaggregated levels (groups of municipalities or individual cities).

Further reading

Readers who are interested in more detailed background material on environmental financing strategies and their practical application or on the computerised decision support tool FEASIBLE should refer, in particular, to the following publications:

- The FEASIBLE Model, Version 2, User Manual and Documentation, 2003.
- Financing Strategies for the Urban Water Sector in the NIS: Overview, Fifth Meeting of the NIS Environmental Finance Network, 21-23 May, 2001, OECD EAP Task Force.

A comprehensive list of relevant publications is provided at the end of this publication under literature.