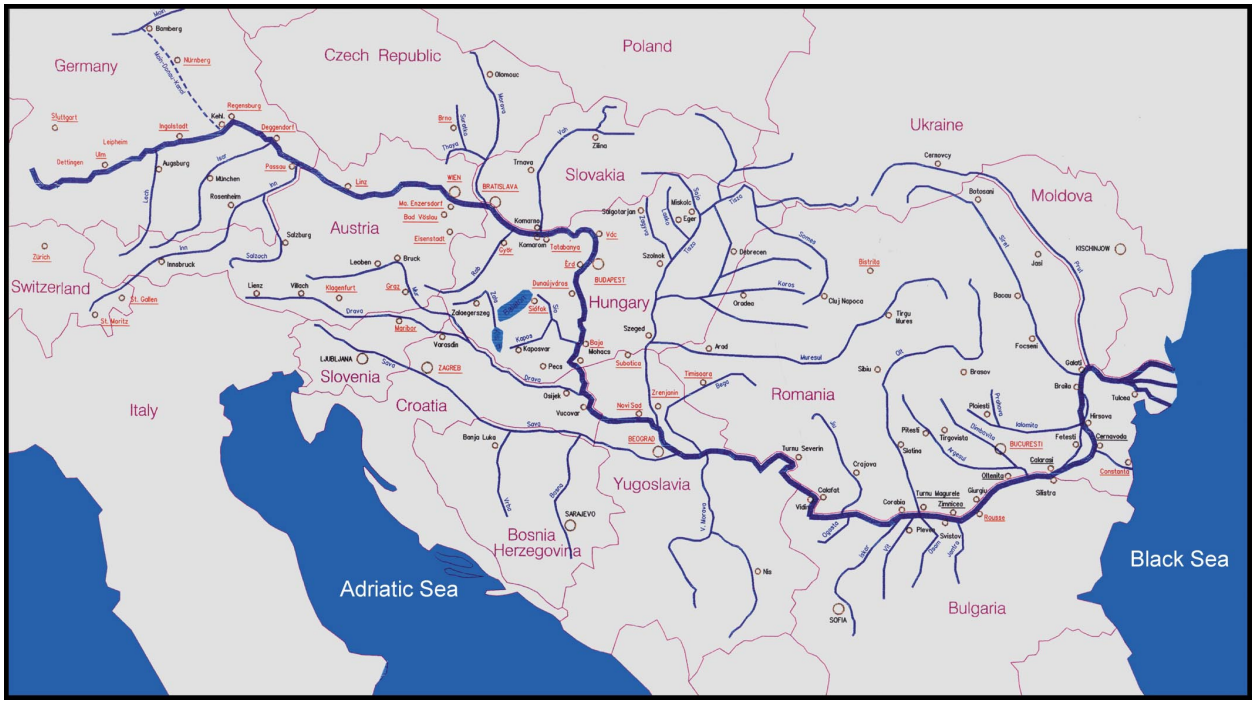
IAWD

UNOPS

Danube River Basin

Water Supply and Waste Water Management



Water Tariff Study

Charges, Fees and Fines compared with operating costs

(and investment demand)

Final Report - Executive Summary

August 2002

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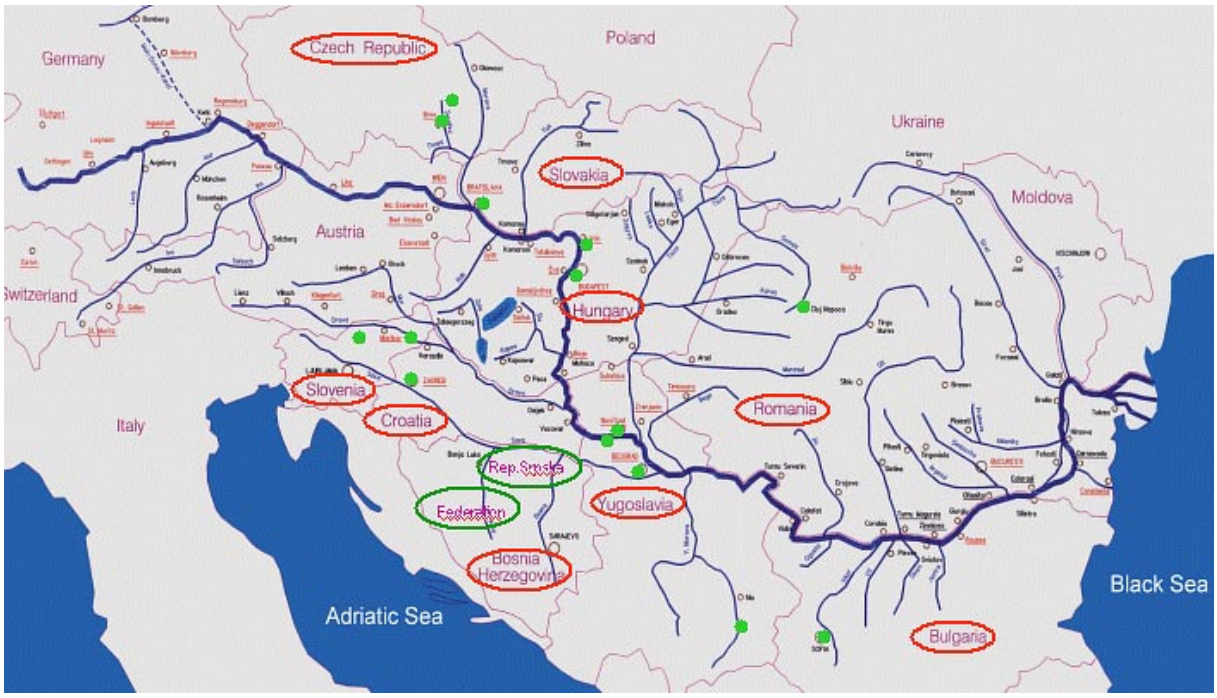
Participants of the Tariff Study

Generally, the Study is focussing on the Danube catchment area: Bosnia and Herzegovina (Republica Srpska, Federation), Bulgaria (Sofia district), Croatia (Zagreb), Czech Republic (Brno, Prerov), Hungary (Budapest, Miskolc), Romania (Cluj), Slovak Republic (Bratislava), Slovenia (Ptuj, Velenje), Yugoslavia (Belgrade, Indija, Novi Sad, Leskovac).



Foreword

One of the main objectives of IAWD according to our statutes is to solve water supply problems within the Danube catchment area and to improve solidarity and the transboundary cooperation in the area. It is obvious that the particular circumstances of water companies in the Eastern European countries need to be treated in a special way. Exchange of information, mutual transfer of know-how, and professional education and training are important tools. This will lead to institutional and technical capacity necessary in order to cope with the various problems of drinking water management. There is a large number of problems to be solved and we are facing a long way with a log of possible discongruity until reaching good and sustainable results which will improve the water sector. Moreover, every nation has its own special economic, social, topographic and historic conditions which have an important impact among factors we want to influence such as designing, financing and building water supply systems.

The “Tariff Study” - supported by UNOPS - should be seen as the beginning of an important process. Creating knowledge for decision makers in our member countries to assess the needs of their capital requirements on investment and operation. Additionally it should provide an overview on the status of water sector facilities in different countries along the Danube.

We agree that this study is a first step of improvement and we have to improve the methodology and the way of data collection, but we have to start facing it. IAWD is aware of all the other associations dealing with the topics mentioned above, and it will be our focus to cooperate with all national and international bodies to view best results for the benefit of our members.

Dipl.-Ing. Hans SAILER
IAWD - President

Preamble

The project was financed by the Austrian GEF Trust Fund, the counterpart as contracting authority being United Nations Office for Project Services (UNOPS) whereas the day to day project work was accompanied by the International Commission for the Protection of the Danube River (ICPDR)

Methodology and scope of data was discussed in the scope of three workshops with representatives from Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Romania, Slovak Republic, Slovenia and Yugoslavia.

The consistency and plausibility checks revealed imperfections in the Draft Final Report, namely in the field of systematic data collection and methodology (impact of planned investments on tariffs) which in the light of the very limited time budget had to be left uncorrected at the late stage. In particular the very ambitious task to look at future investment costs and operation & maintenance costs could not be achieved in a fully satisfactory manner.

It however has to be pointed out that this a well known problem of many other tariff surveys which have attempted to provide an international comparison, or even with surveys at national level. So far no other international tariff survey has looked at the impact of aggregated future investment costs and operation & maintenance costs on future revenue requirements and water/wastewater tariffs.

Max Hammerer
Project Manager

1. Objective of the Tariff Study

1.1 Original Wording

- Conceptional formulation:determine investment requirements for renewal/rehabilitation, extension and upgrade of facilities,
- estimate cost for investment, operation & management,
- determine future revenue/tariff requirements for capital investment, debt service,
- within the constraints of the target populations' ability and willingness to pay (to be assessed on the basis of readily available socio-economic data).

The overall objective was "to structure a water tariff system, which is appropriate to cover the main costs of water management activities (operating costs and part of investment depreciation) and is social acceptable which means, that the tariff should not exceed a defined percentage of average income."

1.2 Reality Check

This study covers 9 countries (Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Romania, Slovak Republic, Slovenia, Yugoslavia) with different languages, legal systems, state of institutional/economic reform and different grades of recovery from war. At the national levels we

find that water and wastewater services are executed by a large number of small enterprises, public or private, or municipalities. In each of the nine countries, socio-economic conditions, water/wastewater service levels, tariffs and costs are not at all uniform between urban and rural areas, between small and large towns.
Determining future revenue/tariff requirements for capital investment and debt service would require fairly elaborated cost-time schedules with fairly detailed assumptions on financing costs (interest, term etc.). This is typically done at the level of individual feasibility studies. Determining future revenue/tariff requirements for operation & maintenance costs is a no lesser or easier task, but again requires individual case studies.
With regard to the limited resources for the study, a mixed approach was chosen, with elements of a survey for collecting aggregate and averaged data at national levels and a small number of case studies.
But what are others doing in the field of surveys and studies on water and wastewater charges or tariff systems?

a) United Kingdom

Since the early 1990s the **Office of Water Services (OFWAT)** is responsible for making sure that the water and sewerage companies in England and Wales give you a good-quality, efficient service at a fair price. OFWAT is a government department. OFWAT is the economic regulator of the water industry in England and Wales:

- limit the amount companies can charge customers;
- make sure that companies can carry out their responsibilities under the Water Industry Act 1991;
- protect the standard of services water customers receive;
- encourage companies to be more efficient; and
- work to encourage competition where appropriate.

OFWAT compares the activities of all the companies. This helps poor performers to rise to the standards of the best.
OFWAT is imposing price caps. The current directive (2002) is to annual decrease prices by 2.1%. OFWAT is annually collecting, analysing and publishing financial and technical key data. The printed version of the annual questionnaire has app. 50 pages. The complementary Regulatory Accounting Guidelines (RAGs) fills app. 200 pages, containing definitions of terminology and descriptions of methodology:

- RAG 1 Guideline for accounting for current costs 50 pages
- RAG 2 Classification of infrastructure expenditure 20 pages
- RAG 3 Guideline for the contents of regulatory accounts 53 pages
- RAG 4 Guideline for the analysis of operating costs and assets 22 pages
- RAG 5 Transfer pricing in the water industry 25 pages

b) Germany

In Germany there is no equivalent institution to OFWAT, since water and wastewater services are under different legal frames and typically under the umbrella of different municipal departments and enterprises, with water leaning more to the private/commercial side and wastewater being a government task, to be financed from taxes and fees.

Of interest for us are the regular, national surveys on wastewater charges, executed by the association of wastewater engineering (**Abwassertechnische Vereinigung, ATV** and the **Bundesverband Gas- und Wasserfach, BGW**), professional associations of individual experts, firms of consulting engineers, university departments, equipment suppliers, municipal enterprise etc.

In addition to current O&M costs, asset values (historic/replacement values) depreciation and imputed interested is asking for treatment standards, service levels and capital investment during the past couple of years. When the ATV/BGW survey is asking for costs, the municipalities (or water enterprises) can easily draw this information from their databases. But as explained above, the cost data is however not calculated with the same methodology. At least the multiple-choice questions on institutional set-up and cost calculation methodology help to put this in the right perspective.

The survey is asking for next year's planned investment and for expected increases in future costs, but generally is more status-quo oriented. In fact the initial motivation was to justify the consistently increasing wastewater fees in Germany during the past decade. Due to the fragmented institutional set-up and a limited public interest, systematic financial and cost data on the German water sector was poor before the first survey in 1994. Only the steep increases of costs prices in the 1990s

- introduction of phosphor and nitrogen removal
- progressively tighter standards on sewage sludge disposal, making reuse in agriculture more and more difficult, if not impossible
- planning errors in East-Germany

raised the attention of the general public. In 1992 a water expert from the World Bank visited Germany in order to prepare an assessment of the German Water Sector, with special emphasis on the experience right after the reunification. The overall praise of achievements in dramatically improving the water quality in rivers, service levels and quality standards was somewhat lowered by a negative comment on the sector's economic efficiency. Policy makers as well as the service providers at municipal level only look at these standards which were progressively improved and tightened.

1.3 Experience in East and South-Eastern Europe

In the relevant group of countries, there is still an economic and institutional reform in process. The former Yugoslavia in addition suffered from many years of civil war and, lately, a war with NATO.

(1) low or no volumetric charges and high per capita water use, wastewater charges well below water charges (?30%),
(2) a decay of public institutions in general, suffering from severe budget constraints (low salaries, low pensions, low liquidity),
(3) a decay of old industries (low salaries, low liquidity) only partially complemented by few booming, new industries,
(4) high official unemployment rates,
(5) very active shadow economies,
(6) transfers from relatives living and working abroad,
(7) a very uneven distribution of income, not only between rural and urban areas or between regions, but even within a city or region,
(8) periods of hyperinflation and currency reforms,
(9) lack of experience in "Western" budgeting procedures and financial reporting,
(10) lack of or at least fragmentary legislation and/or guidelines on the former,
(11) general reluctance to give presumably "confidential" data to outsiders,
(12) application of old planning guidelines,
(13) central government as predominant source of funding in the past.

According to experience from East-German after re-unification, future price increases will lead to a substantial drop of per capita water use, e.g. to well below 150 l/c/d as it is now common in Central Europe. In particular (industrial) bulk water users have a relatively great potential to economise water use. Even without price increases, we expect a reduction of industrial water use as the result of industrial reforms, moving away from traditional "heavy industries" with high water use.

The ongoing institutional and economic reform is to change from centralised, hierarchical planning towards decentralised planning. The latter requires an elaborated regulative and legislative frame which at the current stage is still under development and thus incomplete. Ask for accounting data and you get inconsistent answers. Published, financial and cost data are unreliable. The following shortfalls are common:

- Quantitative inventories are often missing (e.g. complementary maps and lists showing type, age and length of pipes). There is no uniform concept to value fixed assets in the context of high inflation or currency reforms. In worst cases, the published values of fixed assets are useless.

- The lack of production water meters, district water meters and wastewater flow meters makes leak detection and quantitative accounting difficult, if not impossible.
- There is no uniform concept for writing off bad debt (customer arrears). In the light of non-paying government and industrial water users, actual liquidity may substantially differ from reported revenue.
- Multi-utility enterprises do not separate expenditure by type of service, e.g. water, wastewater and others. Municipal sewerage bureaus are unable to isolate the complete, water and wastewater related cost from the municipal budget.

We never know whether reported costs or expenditure are adequate and represent a good, economic use of resources:

- Separating expenditure on preventative maintenance, repairs and reinvestment needs is a matter of definitions which should be uniform. A nominal, full recovery of maintenance, repair and reinvestment cost in reality may be only a partial recovery of cost. A typical indicator for this is the absence of preventative maintenance schemes, or a deterioration of physical performance indicators (no. of pipe breaks, % of water losses etc.).
- Public utilities are typically overstaffed, but on the other hand public sector salaries are too low to motivate staff or are even to low to feed families. In either case the salaries buy only part-time labour.
- Due to poor design standards, a backlog in reinvestment/repair/maintenance, poorly executed works or quality of materially physical water losses and infiltration into sewers are generally higher than in “Western“ Europe. There certainly is room for optimisation towards reducing variable production costs and, more important, in delaying future capacity extensions. But usually we don’t know how far this should go.
- Local consultants and local institutions still like to use old planning sand design standards for determining the necessary, future capacity of water or wastewater treatment facilities.

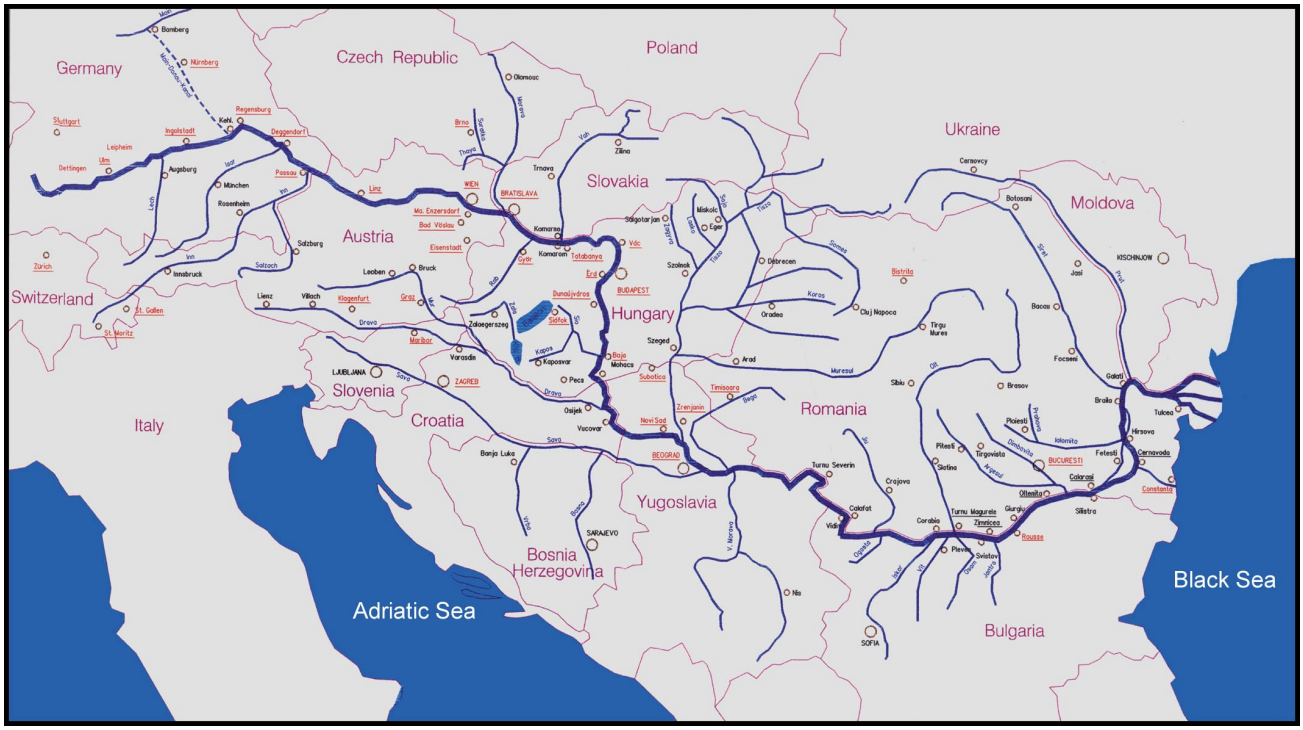
2. Results/Charts

The tables/charts on the following pages summarise the data collected from the local consultants and the local water utilities. As such they represent the essence of the tariff study in hand.

List of Charts

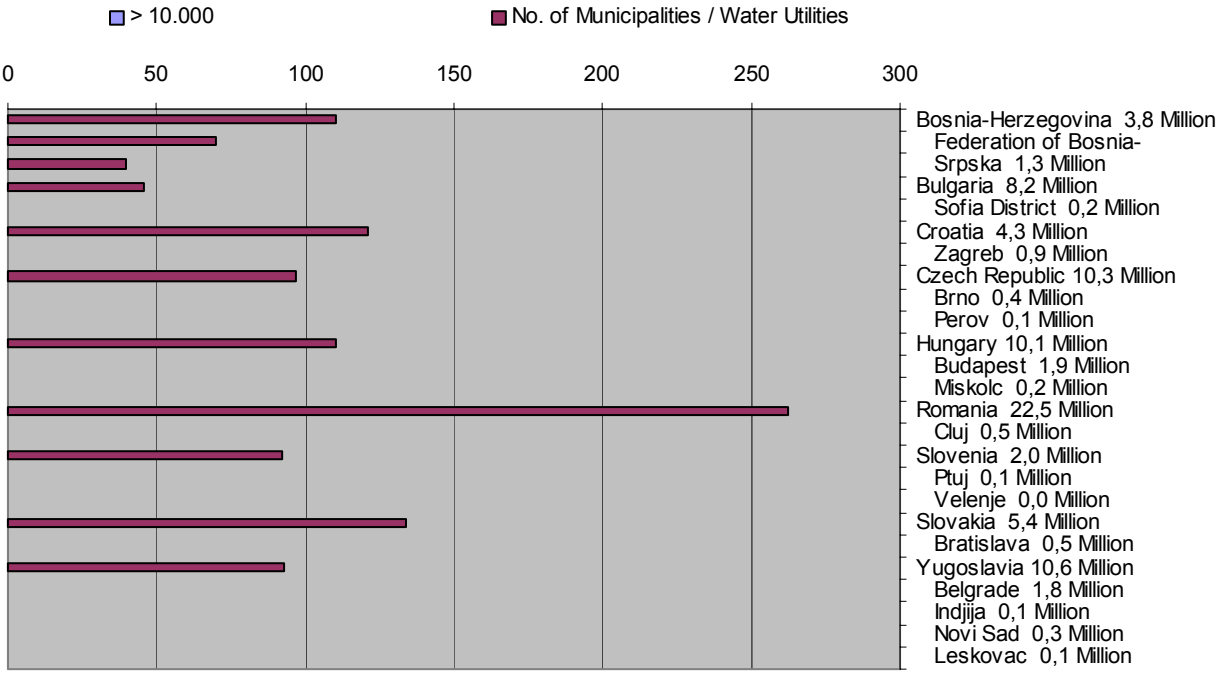
2.1 The Study Area

Chart 1 Overview Map



Generally, the Study is focussing on the Danube catchment area: Bosnia and Herzegovina (Republica Srpska, Federation), Bulgaria (Sofia district), Croatia (Zagreb), Czech Republic (Brno, Prerov), Hungary (Budapest, Miskolc), Romania (Cluj), Slovak Republic (Bratislava), Slovenia (Ptuj, Velenje), Yugoslavia (Belgrade, Indija, Novi Sad, Leskovac).

Chart 2 Population, No. of Water Utilities and Municipalities



The study area covers some 55 million inhabitants, served by at least 1,000 to 1,500 regional or municipal water and wastewater schemes. This figure may not even include village water schemes.

2.2 Service Levels

Service Level indicates the percentage of population connected to piped water supply scheme, sewers or wastewater treatment.

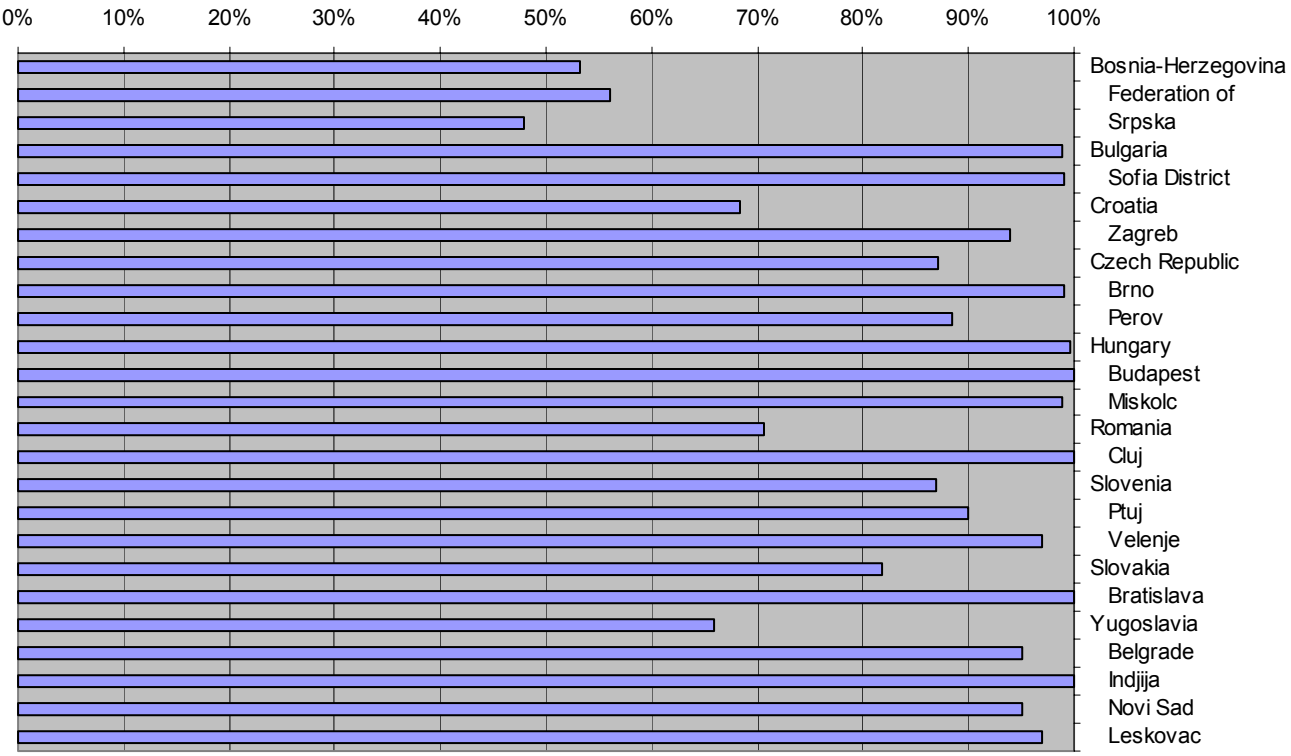
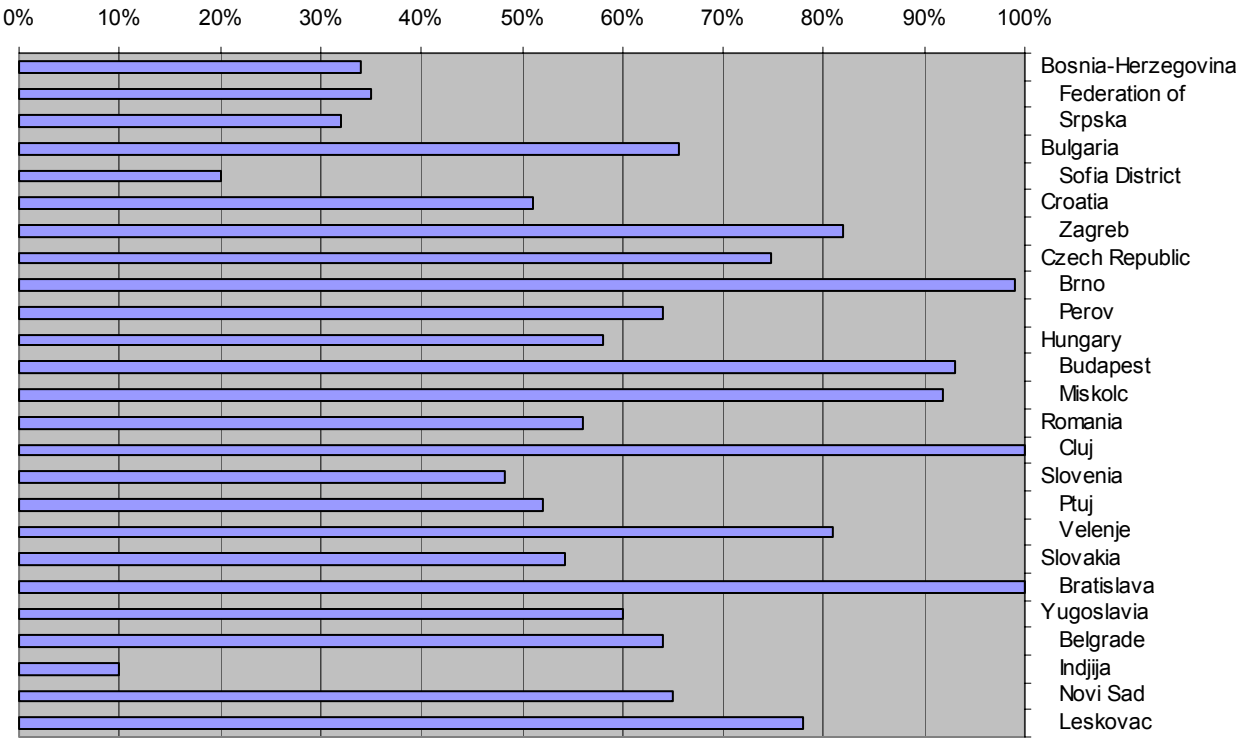


Chart 3 Service Levels Piped Water Supply

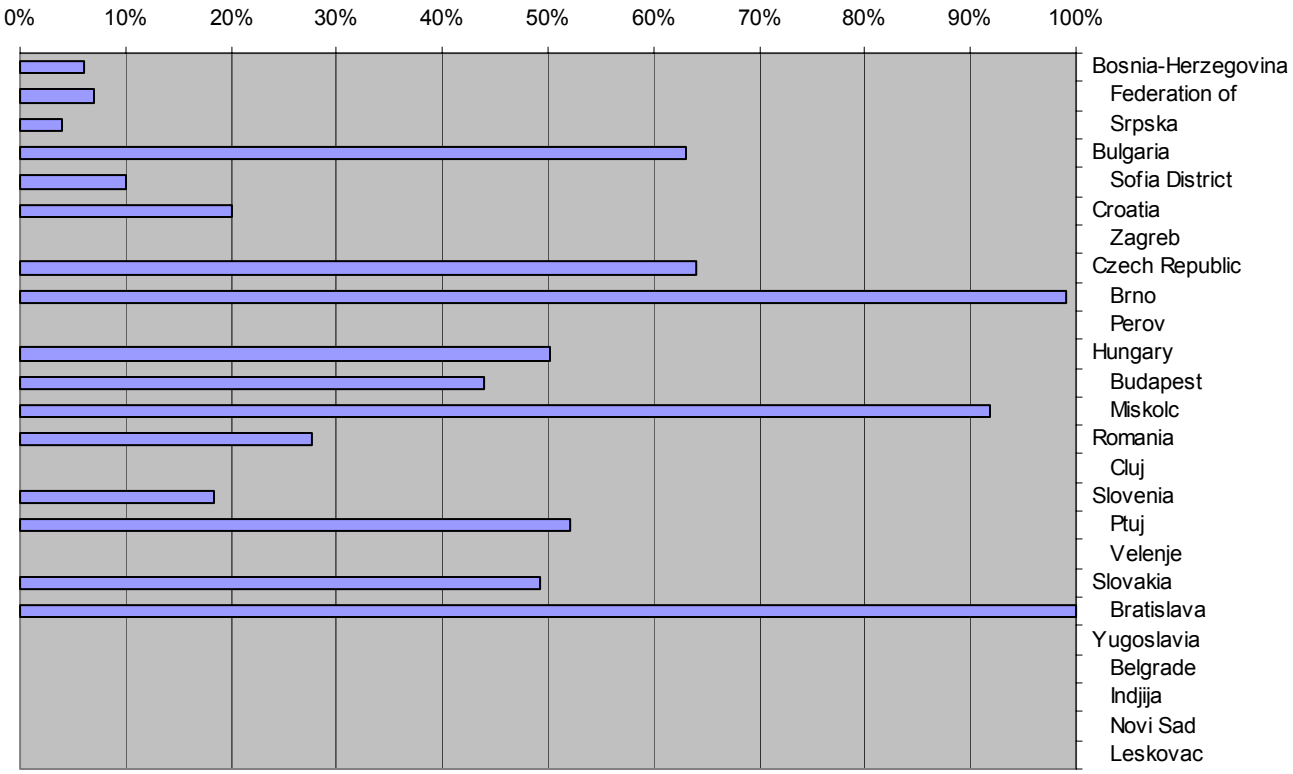
Very obviously, service levels are not uniform. Not necessarily, service levels below 70% indicate sub-standard supply levels or public health hazards. Rural areas with low population density and easy access to high quality spring- or ground water may live well, safe and cheap without piped water supply.
International donors consider water and wastewater services as complementary. Increasing connection rates to piped water supply scheme or increasing per capita consumption will immediately raise the question, whether then the complementary sewerage system will remain affordable.

Chart 4 Service Levels Piped Sewerage / Sewers



Again, having connected more than 90% of Germany's population to public sewers and treatment plants has contributed to the high cost of services and the high level of charges. Increasing current service levels in the study area should not follow uniform 90% or 100% target, but should depend on population density (required length of sewers per connected inhabitant, specific investment cost) and evident conflicts in water use (necessity to protect groundwater or surface waters from pollution).

Chart 5 Service Levels Wastewater Treatment



As matter of priorities, service levels for wastewater treatment are typically lower than for wastewater treatment. First and foremost private water users in town are interested in piped water supply. A clean urban neighbourhood requires sound on-site sanitation facilities (septic tanks) or even sewers, but is of secondary priority to the property owners and may even require some social pressure. Adequate maintenance of septic tanks (de-sludging) or even wastewater treatment requires more social pressure and ultimately binding regulations and bye-laws at municipality level.

From the data collected it was not always possible to determine whether “wastewater treatment” is mechanical, biological or more advanced treatment (phosphor precipitation, nitrification/de-nitrification). In case of non-operative or poorly performing treatment plants, it is matter of definition whether physical connection or actual function matters. Adding wastewater treatment to a piped sewerage system may require complementary investment for main collectors and/or to re-orientate a sewerage system to a central wastewater treatment plant.

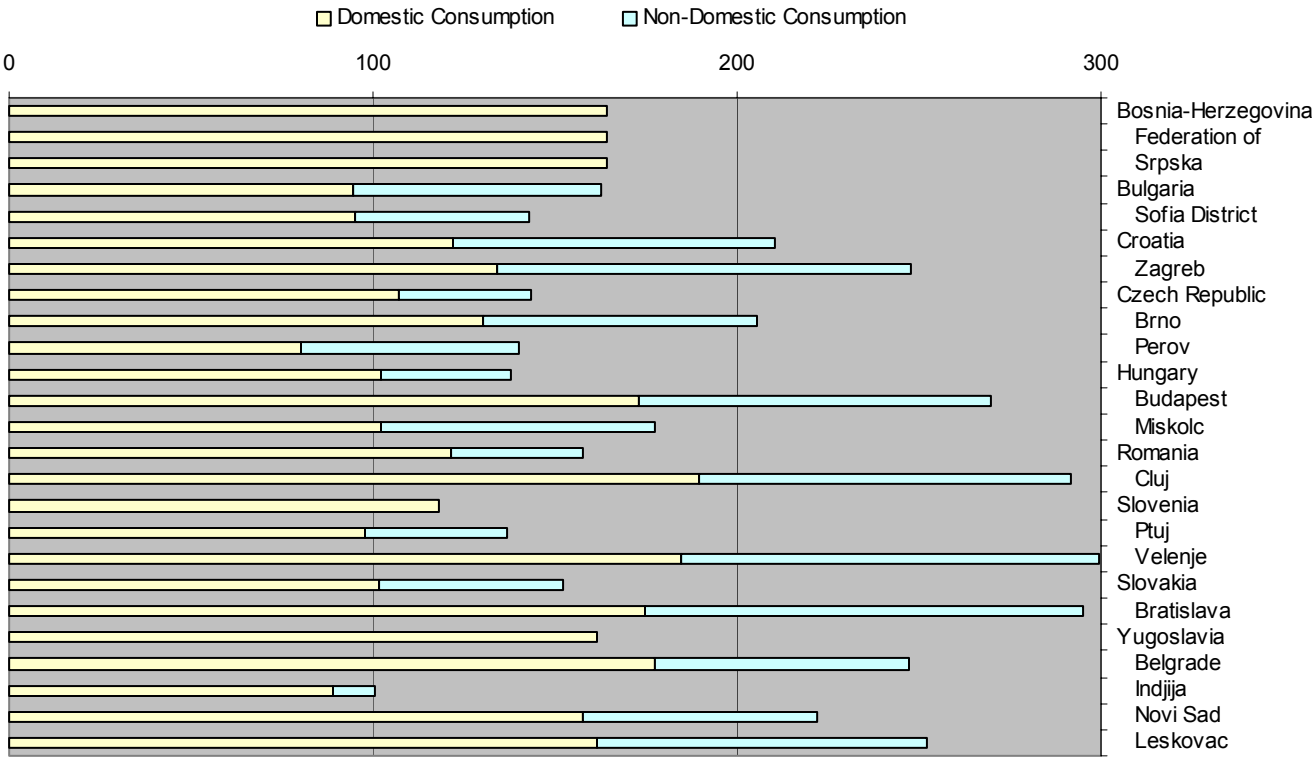
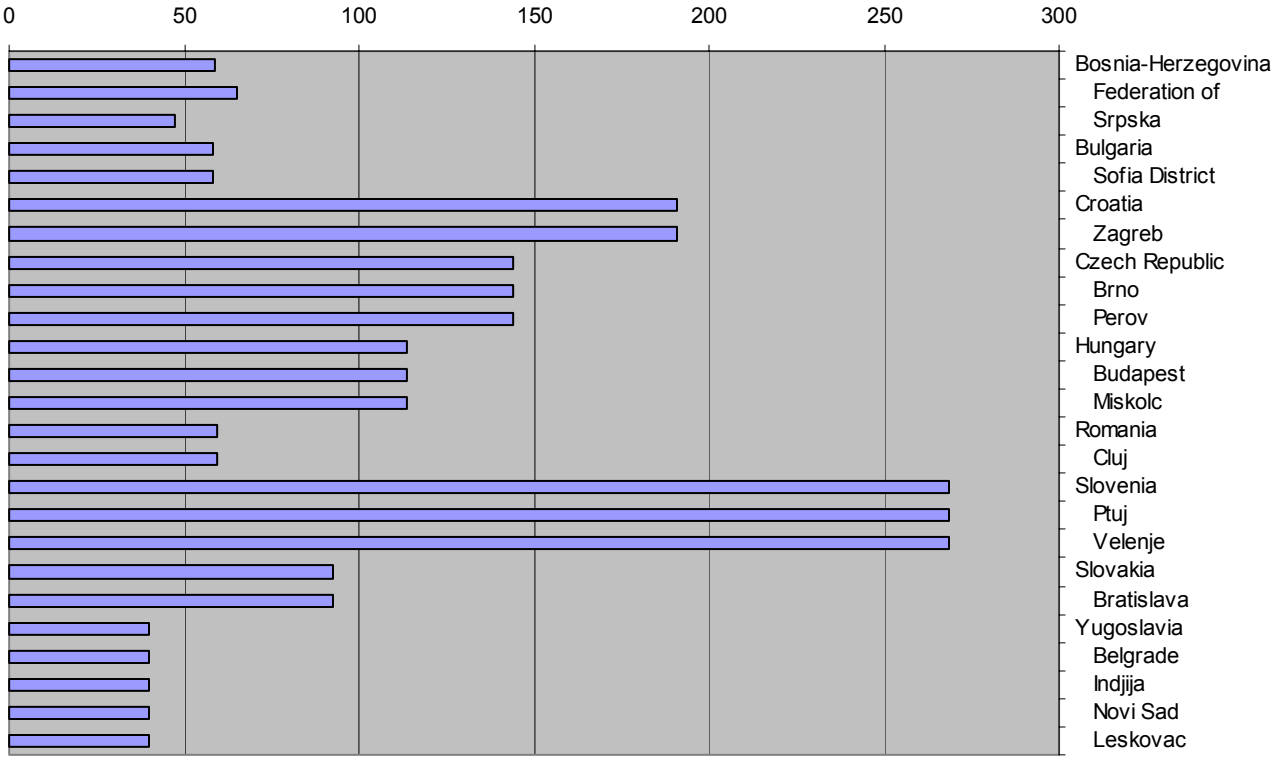


Chart 6 Specific Water Consumption [l/c/d]

The above data was obtained from (partially estimated) sales figures rather than from outdated design criteria which in some cases were within the range of 400 l/c/d. The observed levels of domestic water consumption already show a reaction to the substantial price increases in the study area. Again, donors and IFIs will hardly accept to fund projects with design criteria in excess of 150 l/c/d. For comparison, domestic water use in Germany has dropped to below 130 l/c/d.
Still, there is a high percentage of non-domestic water usage. It is expected that this will go down furthermore, in the course of the ongoing industrial restructuring (less heavy industry with high water usage) and in economising water industrial water usage (partial switch to private wells, closed loop systems, industrial wastewater treatment plants).

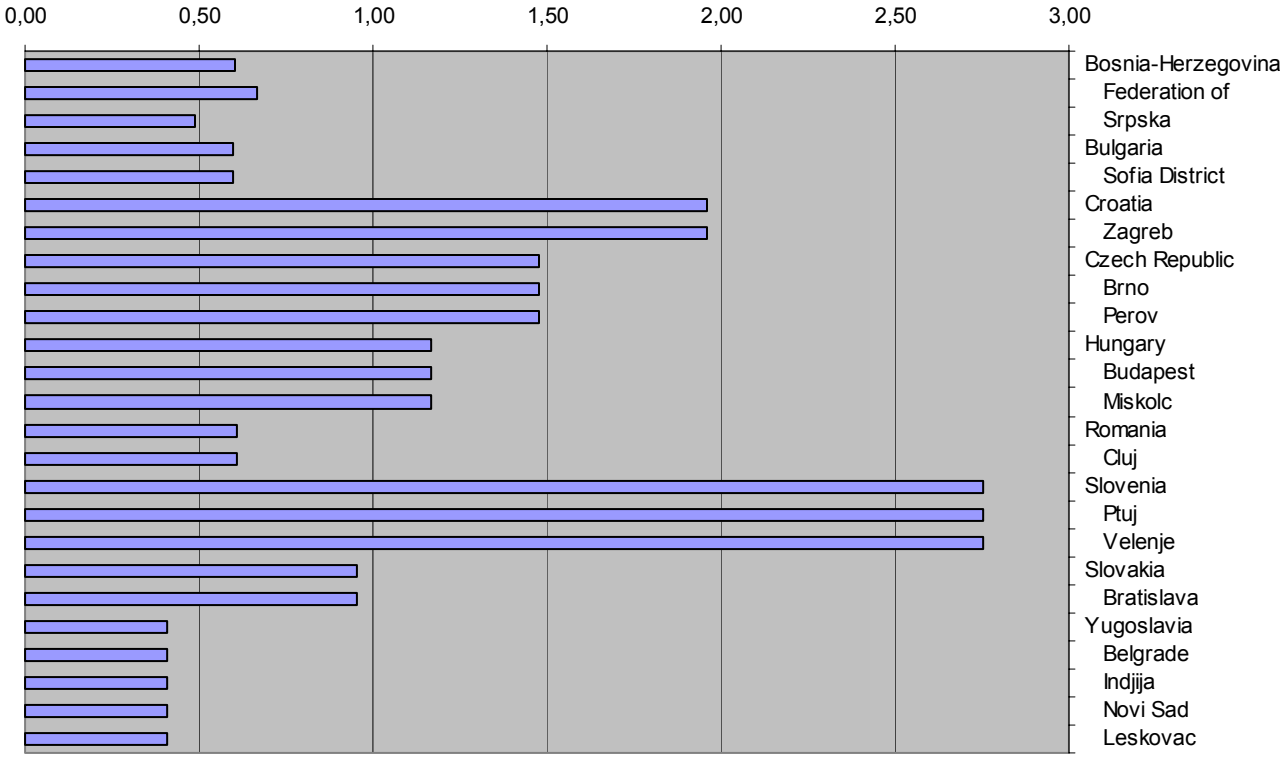
2.3 Household Income and Tariffs

Chart 7 Level of Household Income [U$ /Capita/ Month]



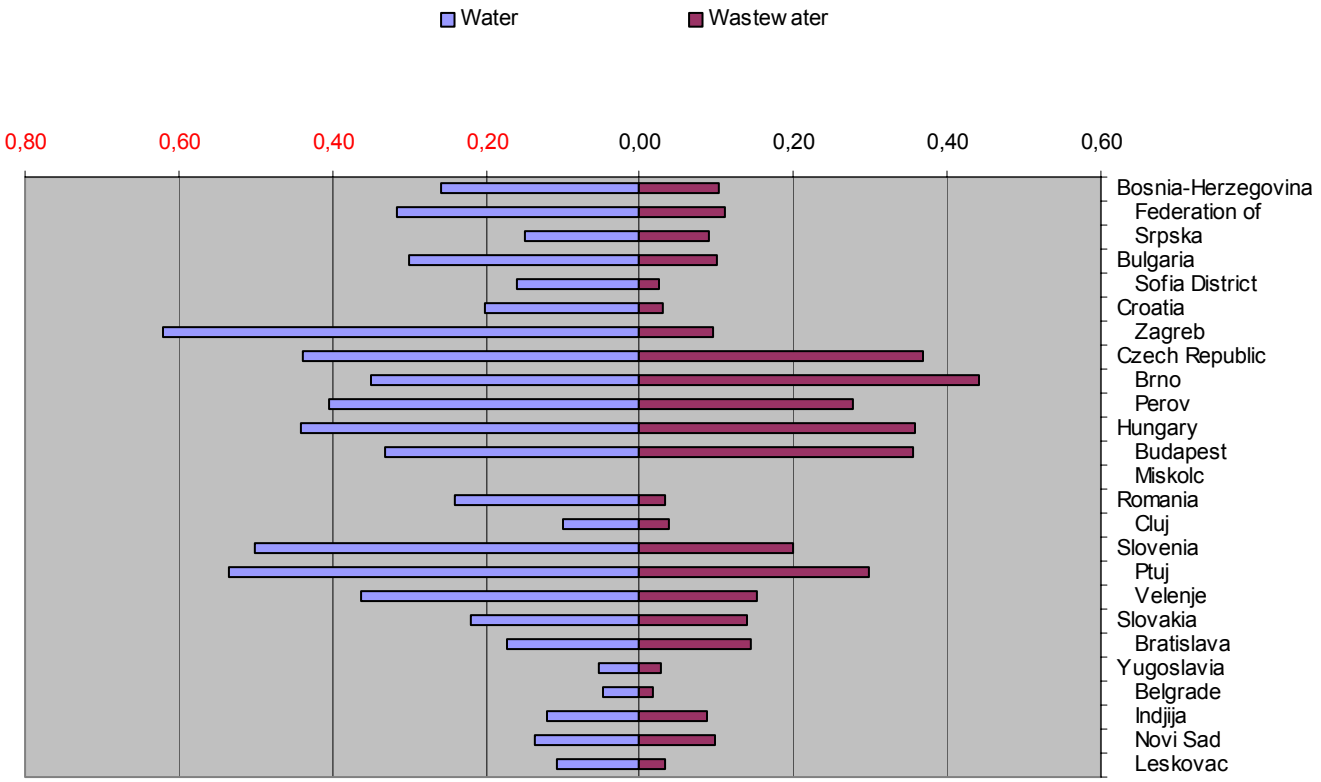
Water and wastewater tariffs have to remain affordable in relation to the water users disposable income. Data on average household income was obtained from official statistics which however may not draw an exact and adequate image of actual income levels and distribution. Pensioners, the unemployed and even public sector or “old industry” employees may earn well below the average. On the other hand, official statistics do not include income from shadow economy.
Therefore a good feasibility and tariff study should preferably include a household survey to investigate the water users’ presumed ability and willingness to pay.
Since this tariff survey has to work with limited resources and public available, it was agreed to utilise official statistics. As such, this may include reserves regarding actual average income (incl. shadow economy), but on the other hand is not able to deliver income distribution or income by city or sub-region.

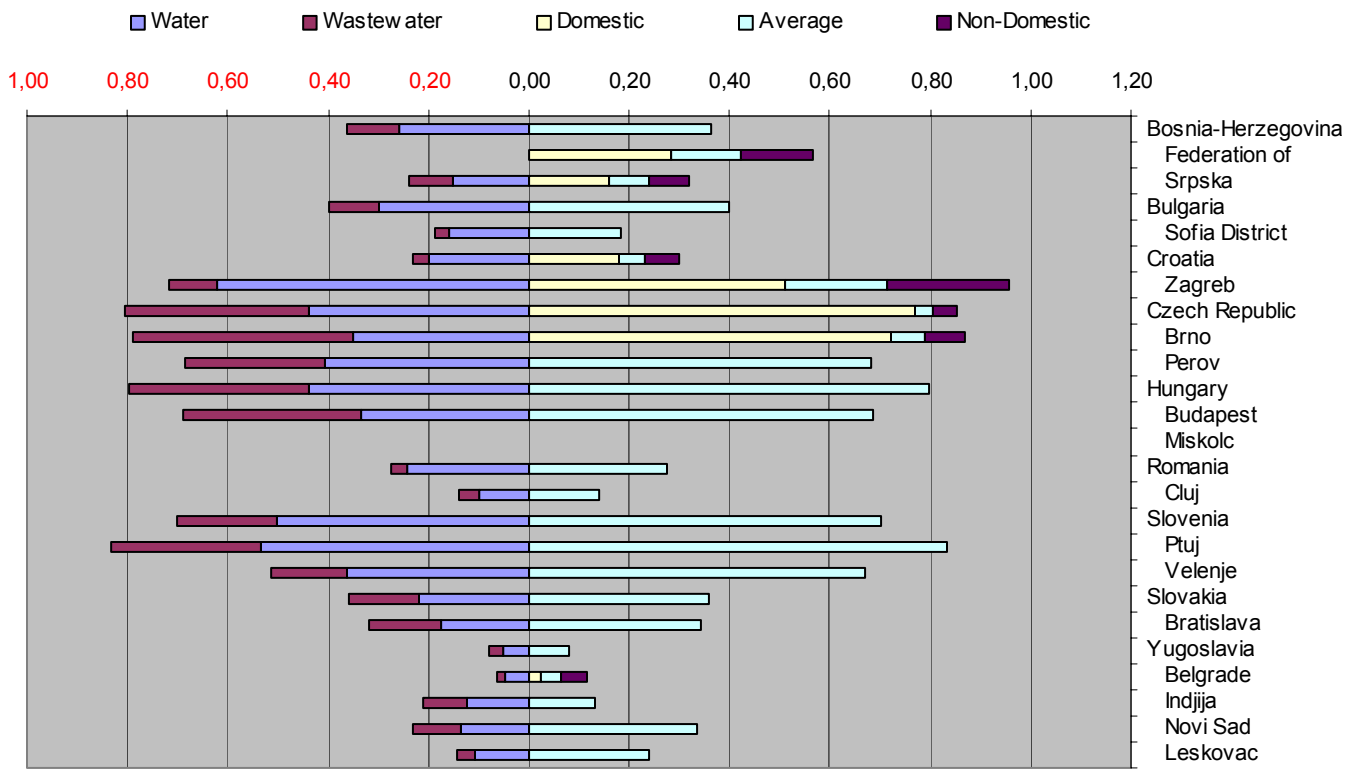
Chart 8 Affordable Water & WastewaterTariff -- > 4% of Income and 130 l/c/d [U$ / m³]



A commonly accepted guideline is that expenditure on water and sanitation charges shall not exceed 4% of a household's disposable income. Whilst the (expensive) water and wastewater tariffs in Austria and German still remain well below these limits, there are cases in developing countries where water users pay much more to private water vendors, for lesser water quantity and quality. As such the 4% should be taken as it is, as a simplified guideline, but not as solid law. Because the 4% and 130 l/c/d are uniformly applied for all countries of the study area, the resulting chart has the same visual appearance as the chart on household income.

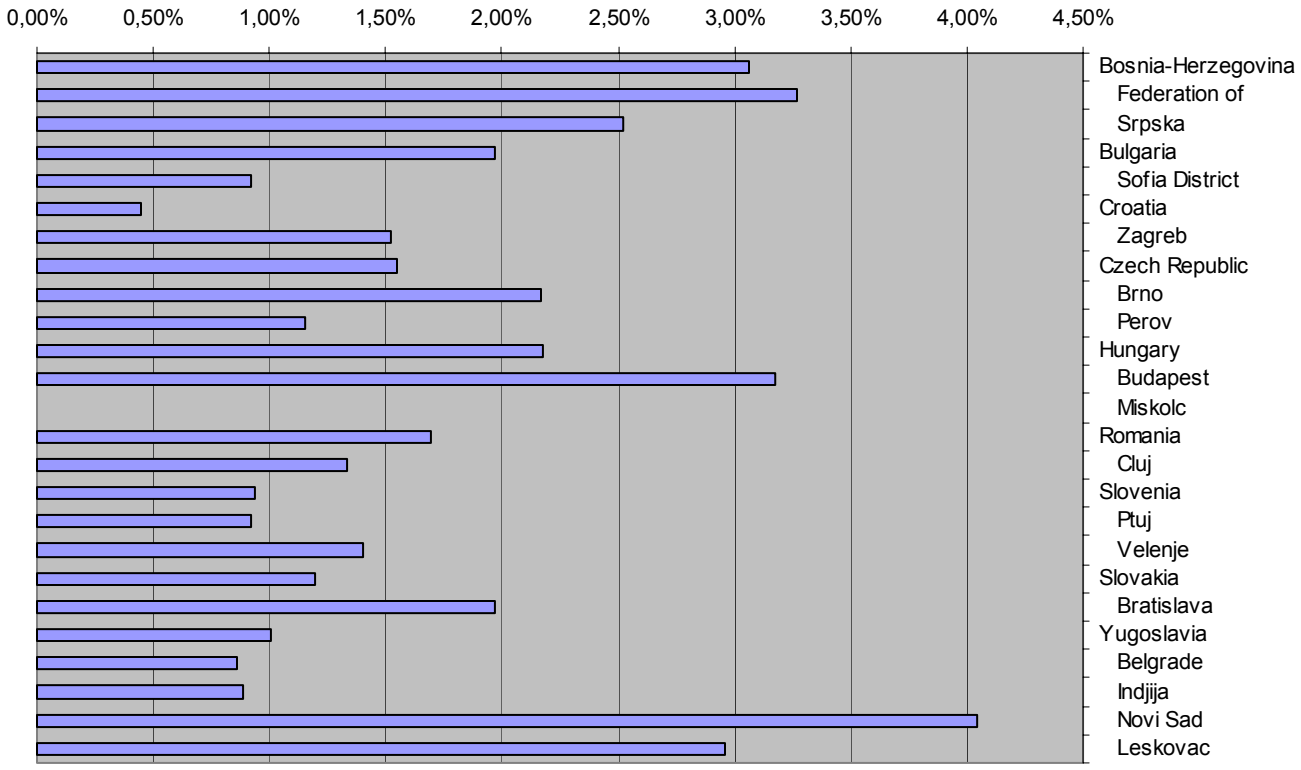
Chart 9 Present (2001) Average Water and Wastewater Tariffs [U$ / m³]


Water
Wastew ater
0,80
0,60
0,40
0,20
0,00
0,20
0,40
0,60
Bosnia-Herzegovina
Federation of
Srpska
Bulgaria
Sofia District
Croatia
Zagreb
Czech Republic
Brno
Perov
Hungary
Budapest
Miskolc
Romania
Cluj
Slovenia
Ptuj
Velenje
Slovakia
Bratislava
Yugoslavia
Belgrade
Indjija
Novi Sad
Leskovac



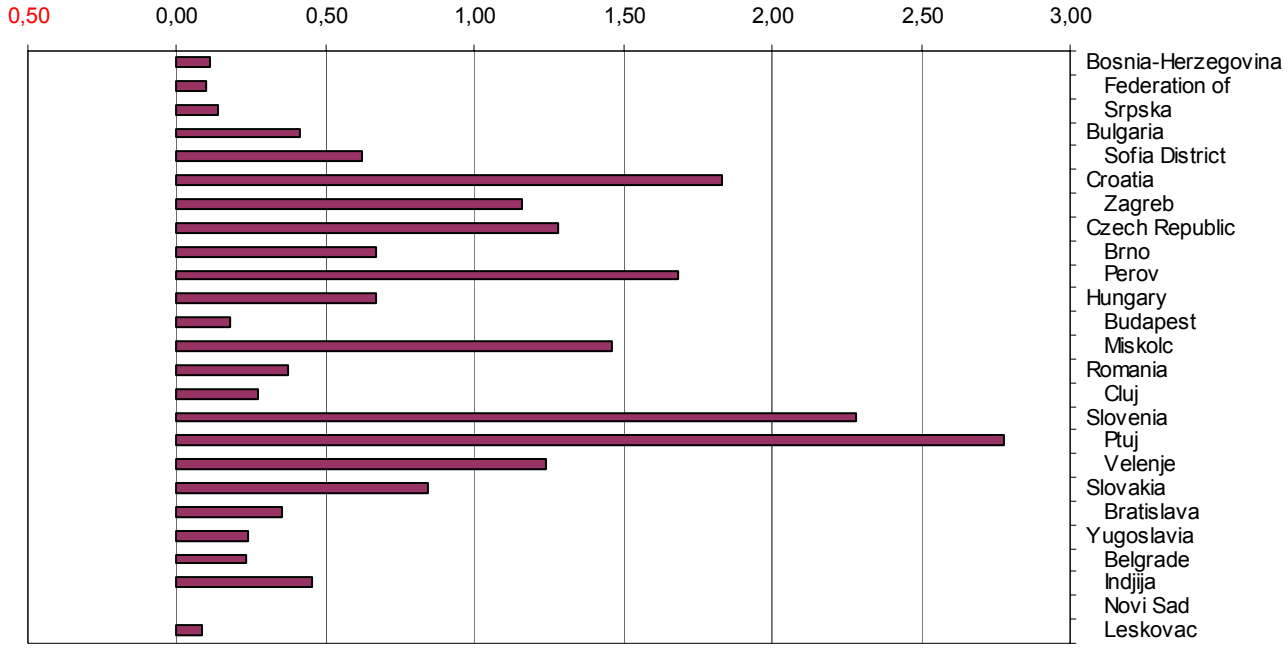
Whilst there are comprehensive statistical data on average tariff rates from Croatia and from the Czech Republic, average tariff rates for the remaining countries had to be estimated. In fact, there are no uniform tariff systems or tariff rates in the study area, but these vary between municipalities. Consequently the shown average rates by country should be seen with a grain of salt, because the estimated averages are not always based on sound statistical methodology.
Croatia represents a special case, because there is an elaborated system of special taxes and fees in addition to those going straight to the regional or municipal water enterprise.

Chart 10 Current Household Expenditure on Water and Wastewater as % of Income



Based on the before mentioned tariff and water consumption data, households' current expenditure on water and wastewater tariffs are calculated in relation to household income. Since the service levels for wastewater are in many cases below water supply, not all water users in these particular countries pay water and wastewater tariffs.
Keeping in mind the 4% threshold, this chart indirectly indicates the potential to increase current tariff levels within conventionally assumed affordability constraints.

Chart 11 Possible Increase of Tariffs [U$ / m³]



Vice versa, this chart shows the possible scope for increasing tariffs, starting from current water consumption, household income and tariff levels. When comparing for instance Brno and Perov, it should be considered that Brno is starting with a high current tariff and a relatively high per-capita water use.

2.4 Cost Recovery

Chart 12 Current Level of Operation & Maintenance Cost [U$ / m³]

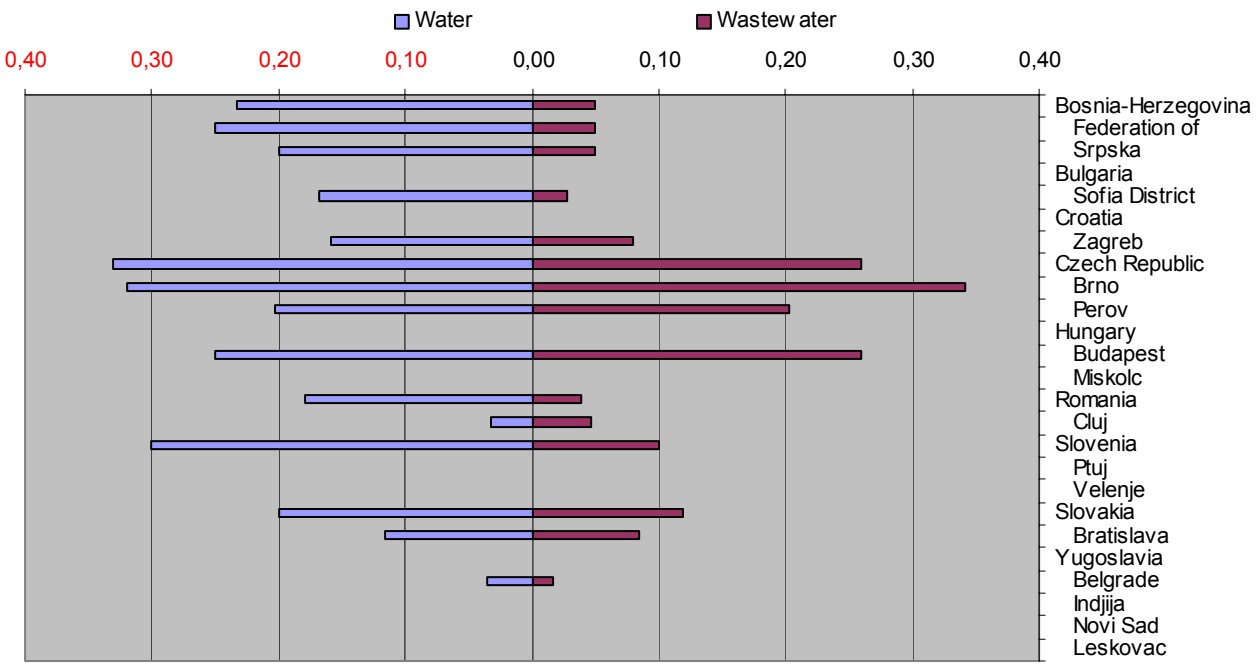
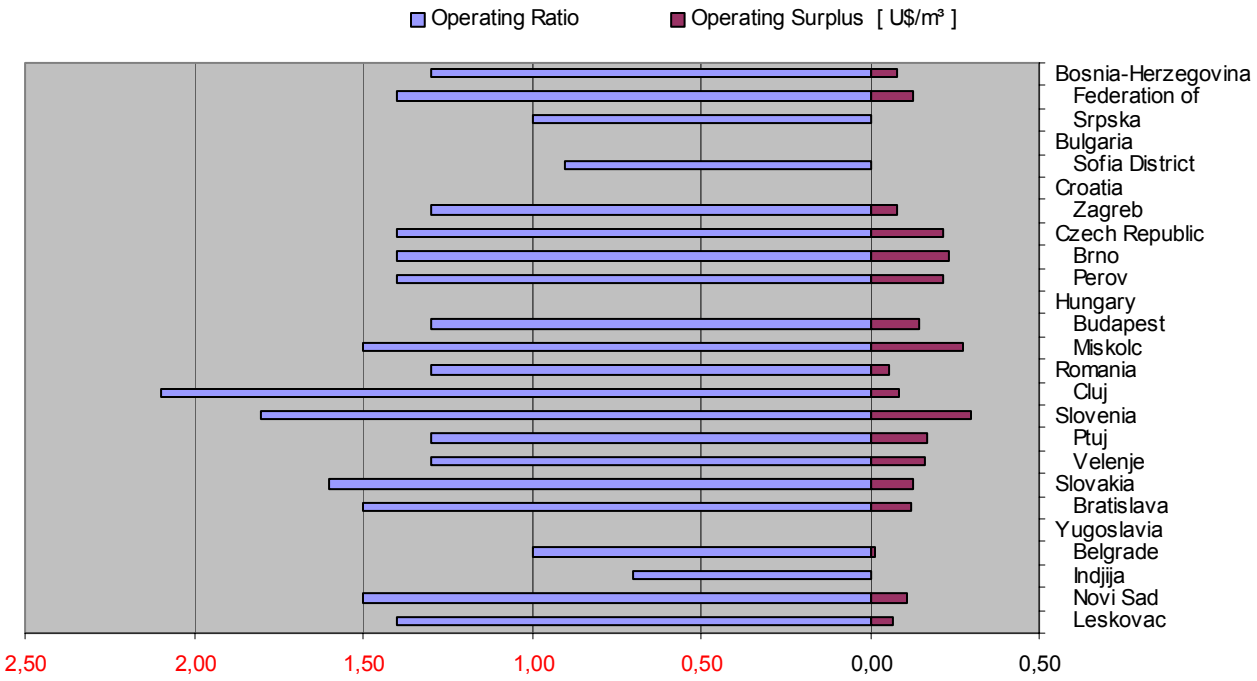


Chart 13 Nominal Cost Recovery [U$ / m³]

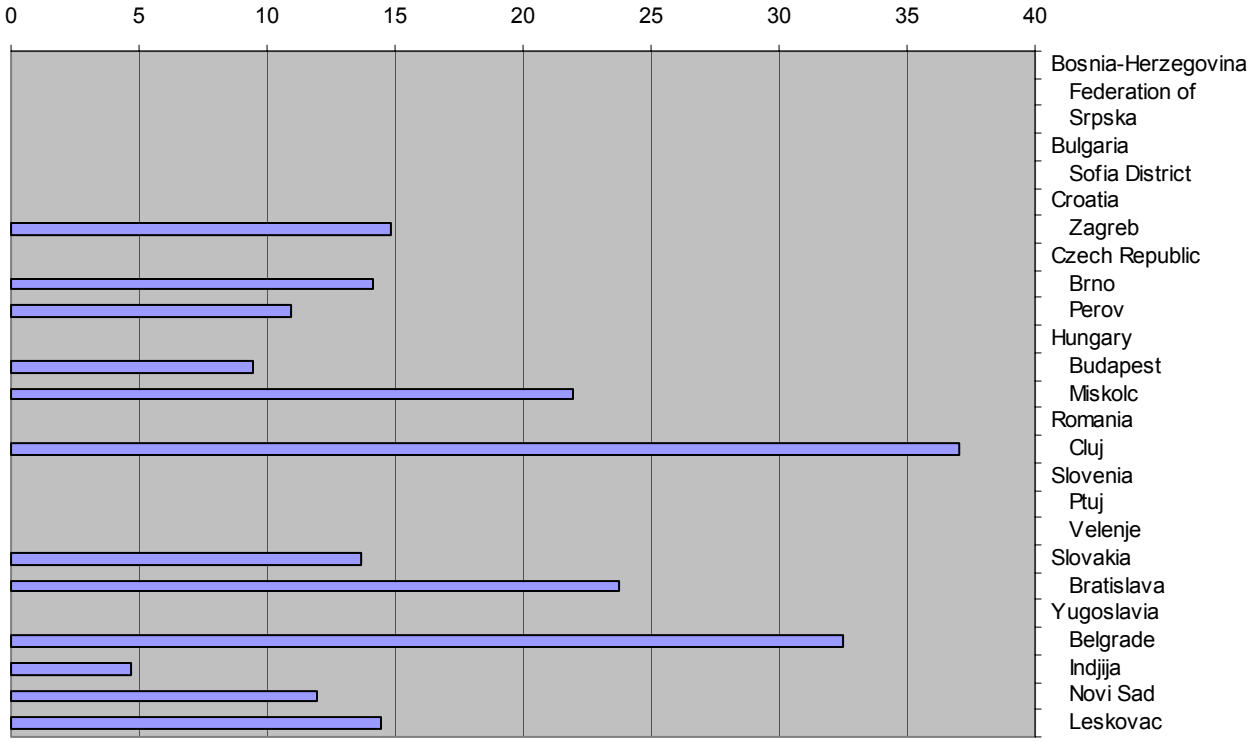


Operating ratio is relating average revenue per m³ of water/wastewater sold to average operation & maintenance costs per m³ of water/wastewater sold. The resulting operation ratio is factor without dimension. An operating ratio below 1.00 or 100% indicates that revenue do not cover operation & maintenance costs. An operating ratio above 1.00 or 100% indicates at least full recovery of operation & maintenance costs. Anything earned beyond contributes to the recovery of capital costs.

Operating surplus is the operating revenue minus operation & maintenance costs. Operating surplus can be used for internal funding of investment and/or for paying debt service. To make the figures comparable, operating surplus is not shown in absolute terms, but per m³ of water sold.

What we see in the comparative chart is that operating revenue in the District of Sofia and the City of Belgrade cover only 95% operating costs. Only few candidates achieve operating ratios in excess of 150%. Due to a lack of aggregate cost data at national levels, no statements on Bulgaria, Croatia, Hungary and Yugoslavia can be made. The cost data from Bosnia-Herzegovina is based on very bold estimates.

Chart 14 No. of Staff per 1000 Connections



This is a standard parameter to assess the overall efficiency of water utilities that is found in most statistical evaluations and benchmarking exercises. The resulting quotient is however highly sensitive to the definition of numerator (no. of staff) and denominator (nbo. of connections).

Chart 15 No. of Staff per 1000 Inhabitants

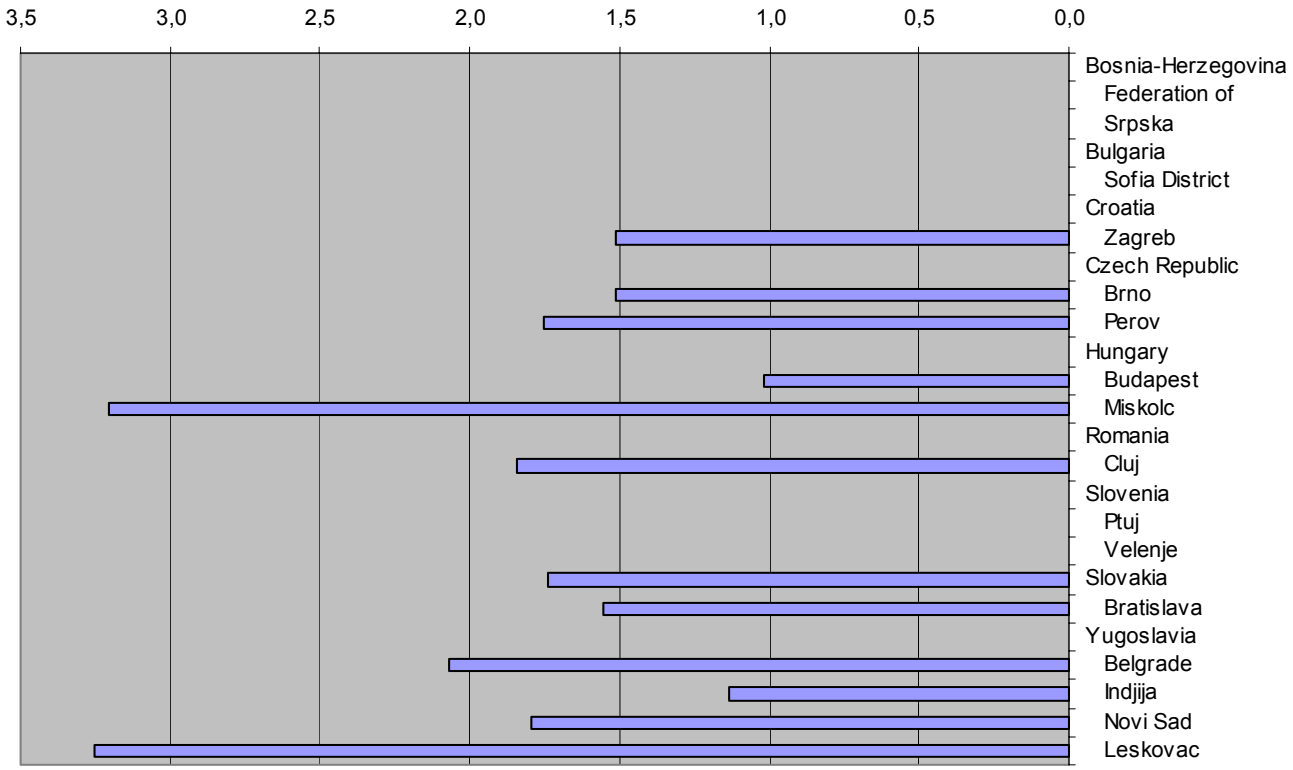
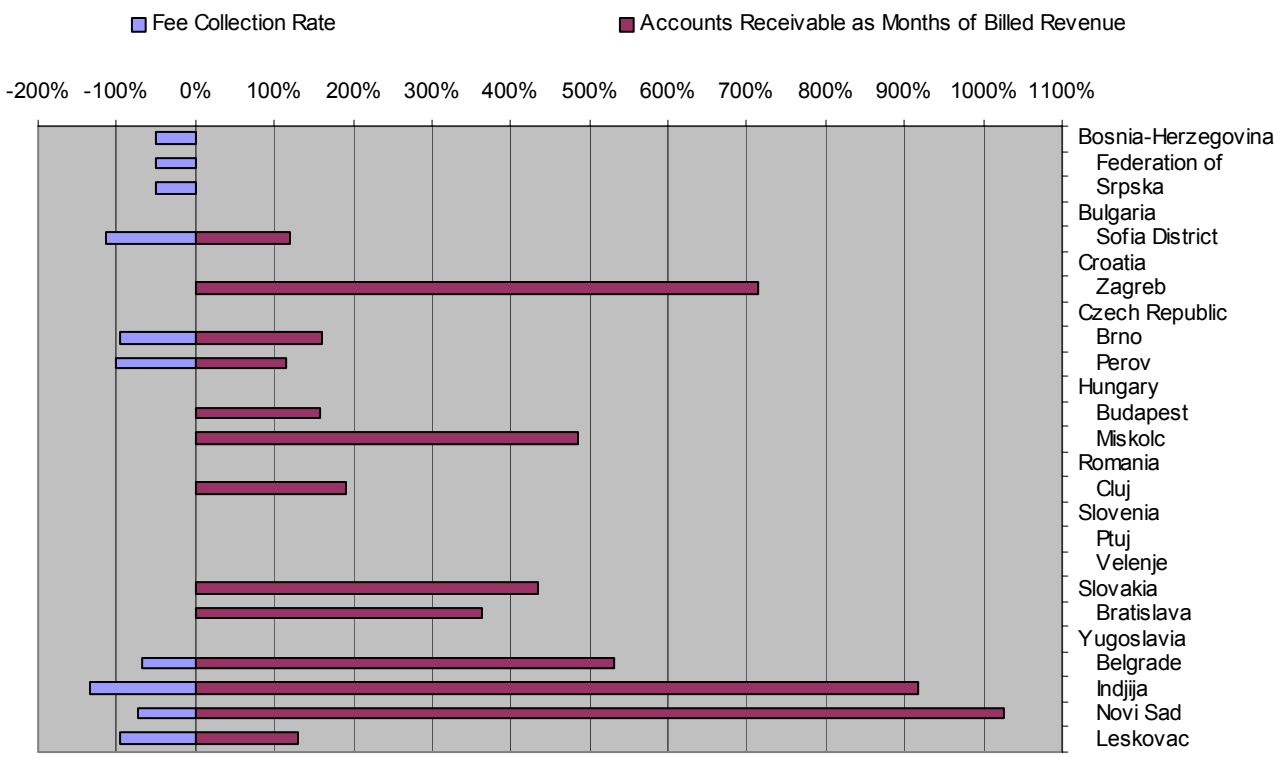


Chart 16 Fee Collection Rate [%] and Accounts Receivable [No. of Months of Billed Revenue]



The fee collection rate relates actually collected fees against billed water and wastewater charges. If all water users are paying their bills, the fee collection should amount to 100%. There could be however problems with allocating collected fees to financial years. This data could only be retrieved from few water enterprises (Sofia District, Brno, Perov and Belgrade). Fee collection rates above 100% are possible, if accounts receivables from previous financial years are collected in the current financial year.

Another relevant parameter is accounts receivable (=unpaid bills as shown in the enterprise's balance sheet). To make figures comparable and intuitive, the amounts are not shown in absolute terms, but as month of billed revenue. The 5,3 indicated for Belgrade means that accounts receivable are equivalent to 5,3 months of billed revenue. One month would be adequate, allowing for ample time to settle water bills. More than one month is an indicator for problems.

When looking at the raw data as supplied from the water enterprises, Belgrade is the exception from this general rule. In Belgrade, the accounts receivable from all water users are uniformly high.

2.5 Future Investment Budgets and Impact on Tariffs

One stated objective of this tariff study is to show the impact of future investments in the water sector on tariffs. The country reports show bold estimates on published investment budgets for the water and wastewater until the year 2010.

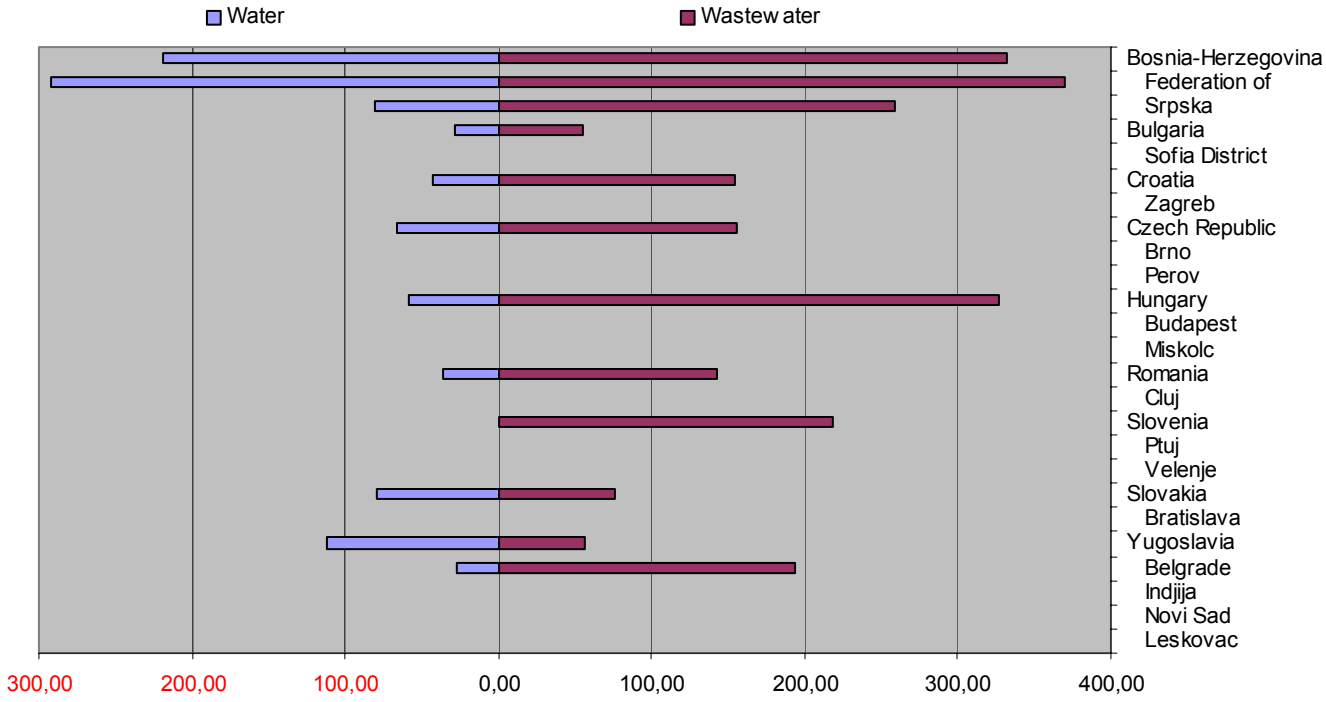


Chart 17 Future Investment Budgets [U$] per Capita until 2010

To make the investment budgets comparable, the above chart is showing bold estimates on published investment budgets for the water sector. Evidently, the priority is in the field of wastewater. It however was neither possible to prepare a comparative chart on other priorities, e.g. rural versus urban investments, nor to allocate the above, national investment budgets to individual water enterprises.

Consequently, a much simpler approach had to be employed to generate at least some indicative data on future, additional unit costs for the water sector:

(1) utilise the published data on national investment budget for water and wastewater;

(2) calculate depreciation charges from the above by assuming an average economic life of 30 years;

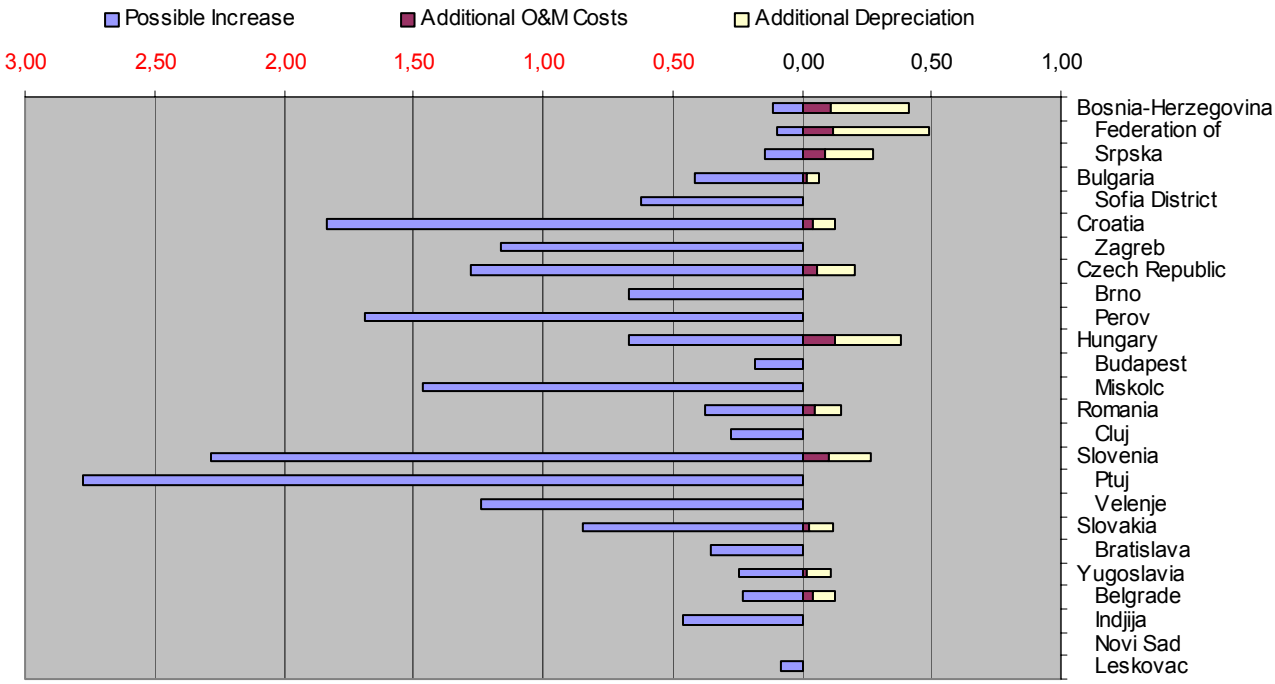
(3) calculate additional operation & maintenance costs

(4) divide the total capital and operation & maintenance costs by the total volume of water sold in the country

Chart 18 Additional Operation & Maintenance Costs and Depreciation [U$ / m³]

The left side of the chart shows the additional unit costs for water concerning the depreciation. In line with the above described assumptions, there are only depreciation charges shown. The right side of the chart shows operation & maintenance unit costs and, on top of that, depreciation unit costs concerning wastewater

Chart 19 Additional Unit Costs versus Affordable Tariff Increase [U$ / m³]



This chart is comparing the affordable tariff increase on the left side, see Chart 10, with the additional unit costs from planned, future investment on the right side. The unit costs are taken from Chart 17, but no longer separate between water and wastewater.
In principle, this chart should show in which countries or cities the investment budgets are affordable or not. **In other words, this should be the essence of the tariff study**. However, in the light of the above described concerns regarding current level of unit costs and the methodology of calculating future unit costs, this chart should be treated with great care. It is more an exemplary, arithmetic exercise than the result of a solid and reliable analysis.
What we see is that the published investment budgets would be affordable in all countries of the study area, except Bosnia-Herzegovina. But this by no means is a valid statement for individual water or wastewater projects at municipality level:

- Economic reform and commercial development typically starts in the capital cities, with secondary cities following. Consequently, income levels in these cities will be above national average, with higher ability and willingness to pay for infrastructure and environmental improvements. But on the other hand, the income levels of the urban poor may remain stagnant which then would require tariff systems with a social bias or direct government support to the poor.
- Increasing prices will usually result in a drop of demand (price elasticity of demand). Thus increasing the price of water by e.g. 100% (double) may result in a drop of demand by e.g. 10%. The resulting, overall increase of revenue therefore would not amount to 100% (double), but only 90%. The actual customer reaction to price increases may vary from city to city.
- Besides industrial pollution, water and sanitation related health hazards or nuisances first occur in high density, urban areas.
- The specific investment costs for network development, water and even more sewerage, depend on population density or, better, connections per length of network.
- The specific investment costs for wastewater treatment depend on the capacity of the treatment facility.

- Current levels of expenditure on preventative maintenance or reinvestment might be insuffiicent.

Therefore, the question to ask is not whether piped water supply, pipeborne sewerage systems and wastewater treatment plants are necessary and affordable to the target population of a particular country of the study area. The question is which cities should have and could afford piped water supply, pipeborne sewerage systems and wastewater treatment plants. In a more simple way, the question should be which size of city requires and could afford piped water supply, pipeborne sewerage systems and wastewater treatment plants. When looking at network development at municipality level, the question is for which city districts piped water supply and/or pipeborne sewerage systems could be justified.

2.6 Alternative Approach towards Future Unit Costs

Since the planned investment in water supply are most likely in the fields of water loss reduction, increase or rural service levels, network and process optimisation rather than large scale green field projects, a simplified approach with experienced based unit prices or specific investment costs is not possible.
On the other hand, the larger portion of published, national investment budgets in the study area is in increasing connection rates to pipeborne sewerage systems, the rehabilitation, upgrade and construction of wastewater treatment plants.

2.7 Outlook on Future Activities

The presented tariff study describes the tariff structure in the countries in the Danube catchment area and in several water supply and wastewater disposal companies. Due to the high diversity of the presented data, a detailed comparison and a strict evaluation of the economic and technical performance capacity is very difficult. Moreover, the specific economic and social situation in distinct regions cannot be sufficiently included in the comparison. Still, such regional comparisons are
extremely important for investment decisions. It is therefore recommended to conclude a separate, regionally balanced tariff study based on the presented results. In this regional study, about 50 regional water supply companies should take part in order to be able to consider the specific regional problems. The preparation of such a regional study on the basis of the existing findings will take at least 3 years.

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