

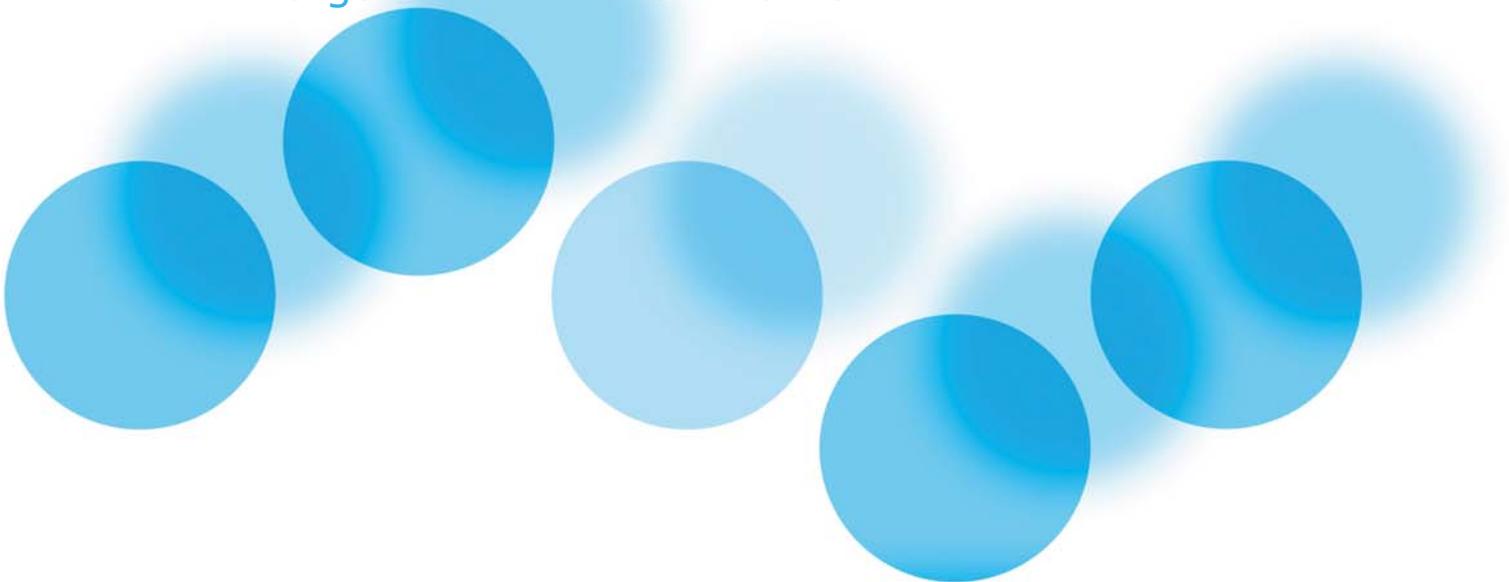


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DANUBE
REGIONAL
PROJECT

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ASSESSMENT AND DEVELOPMENT OF MUNICIPAL WATER AND WASTEWATER TARIFFS AND EFFLUENT CHARGES IN THE DANUBE RIVER BASIN.

Volume 2: Country-Specific Issues and
Proposed Tariff and Charge Reforms:
Bulgaria – National Profile



WORKING FOR THE DANUBE AND ITS PEOPLE

AUTHORS

Dr. Galia Bardarska / Institute of Water Problems at the Bulgarian Academy of Sciences

PREFACE

The Danube Regional Project (DRP) consists of several components and numerous activities, one of which was "Assessment and Development of Municipal Water and Wastewater Tariffs and Effluent Charges in the Danube River Basin" (A grouping of activities 1.6 and 1.7 of Project Component 1). This work often took the shorthand name "Tariffs and Effluent Charges Project" and Phase I of this work was undertaken by a team of country, regional, and international consultants. Phase I of the UNDP/GEF DRP ended in mid-2004 and many of the results of Phase I the Tariffs and Effluent Charges Project are reported in two volumes.

Volume 1 is entitled *An Overview of Tariff and Effluent Charge Reform Issues and Proposals*. Volume 1 builds on all other project outputs. It reviews the methodology and tools developed and applied by the Project team; introduces some of the economic theory and international experience germane to design and performance of tariffs and charges; describes general conditions, tariff regimes, and effluent charges currently applicable to municipal water and wastewater systems in the region; and describes and develops in a structured way a initial series of tariff, effluent charge and related institutional reform proposals.

Volume 2 is entitled *Country-Specific Issues and Proposed Tariff and Charge Reforms*. It consists of country reports for each of the seven countries examined most extensively by our project. Each country report, in turn, consists of three documents: a case study, a national profile, and a brief introduction and summary document. The principle author(s) of the seven country reports were the country consultants of the Project Team.

The authors of the Volume 2 components prepared these documents in 2003 and early 2004. The documents are as up to date as the authors could make them, usually including some discussion of anticipated changes or legislation under development. Still, the reader should be advised that an extended review process may have meant that new data are now available and some of the institutional detail pertaining to a specific country or case study community may now be out of date.

All documents in electronic version – Volume 1 and Volume 2 - may be read or printed from the DRP web site (www.undp-drp.org), from the page [Activities / Policies / Tariffs and Charges / Final Reports Phase 1](#).

We want to thank the authors of these country-specific documents for their professional care and personal devotion to the Tariffs and Effluent Charges Project. It has been a pleasure to work with, and learn from, them throughout the course of the Project.

One purpose of the Tariffs and Effluent Charges Project was to promote a structured discussion that would encourage further consideration, testing, and adoption of various tariff and effluent charge reform proposals. As leaders and coordinators of the Project, the interested reader is welcome to contact either of us with questions or suggestions regarding the discussion and proposals included in either volume of the Project reports. We will forward questions or issues better addressed by the authors of these country-specific documents directly to them.

Glenn Morris: glennmorris@bellsouth.net

András Kis: kis.andras@makk.zpok.hu

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Abbreviations

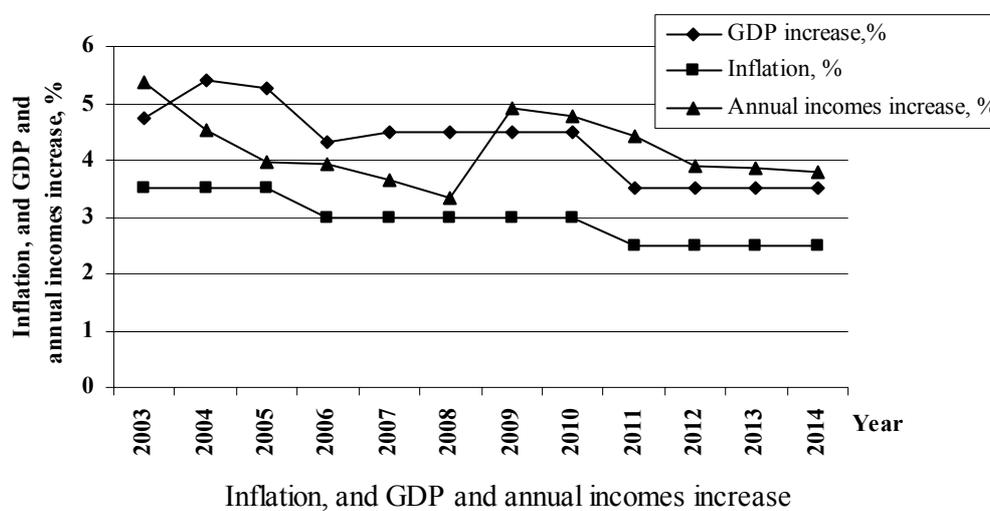
BGN	Local currency: Bulgarian leva after denomination since 1999
BOD ₅	Biological Oxygen Demand after 5 days
BOT	Build, Operate, Transfer
Budget Organizations	
COD	Chemical Oxygen Demand
CA	Commercial Act
CoM	Council of Ministers
dka	Dekar or an area of 0.1 ha
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EMEPA	Enterprise for Management of Environmental Protection Activities
EWSRC	Energy and Water State Regulatory Commission
GDP	Gross Domestic Product
IBRD	International Bank for Reconstruction and Development
ISPA	Instrument for Structural Policies for Pre-Accession
IWWTP	Industrial Wastewater Treatment Plant
LTPSMC	Law for Transformation and Privatization of State and Municipal Companies
LSGLAA	Local Self-government and Local Administration Act
MAF	Ministry of Agriculture and Forests
MoEW	Ministry of Environment and Water
MoH	Ministry of Health
MoRDPW	Ministry of Regional Development and Public Works
MU	Management Unit
NEPF	National Environmental Protection Fund
NSI	National Statistical Institute
NRW	Non Revenue Water
O&M	Operation and Maintenance
USD	US dollars
UWWTP	Urban Wastewater Treatment Plant
PE	Population Equivalent
PWTP	Potable Water Treatment Plant
SCWC	Supreme Consultative Water Council
SS	Suspended Solids
VAT	Value Added Tax

WB	World Bank
WSSC	Water Supply and Sewerage Company
WWTP	Wastewater Treatment Plant

Exchange Rates

No.		1999	2000	2001	2002
1.	GDP:				
1.1.	in BGN	2898	3274	3754	4108
1.2.	in USD	1577	1542	1718	1978
2.	Exchange rate: BGN for 1 USD	1.838	2.124	2.185	2.077
3.	Exchange rate: BGN for 1 Euro	1.95583	1.95583	1.95583	1.95583

Since July 1, 1997, Bulgaria is under a Currency Board Regime and the currency stabilized around the 1800 leva per USD till 1999 when the lev was redenominated (three zeros were dropped).



1. Introduction

1.1. Purpose of the National Profile

This report is a compilation of information and data that describe the institutions and conditions that shape and characterize the provision of drinking water and wastewater service in Bulgaria. The purpose of this compilation is to provide background and inspiration for proposals to reform both the current system of water supply and wastewater tariffs and effluent charges and proposals to adjust or modify the legal and regulatory system within which these tariffs and effluent charges function in Bulgaria. The aim of the reform proposals is to improve the water supply and sewerage management in Bulgaria generally, including protection of water resources from nutrient loading and toxic substances originating from municipal wastewater systems.¹

For most of Bulgaria the operation and management of local water and wastewater service is carried out by Water Supply and Sewerage Companies (WSSCs). The provision of water supply and sewerage services, associated investment planning, and implementation of those plans are their obligation

The trends in the organization of the water sector reflected the same divergent pressures experienced by the rest of Bulgarian society. For the last 50 years, the State invested in building water services.² Social developments since 1989 can be seen as a process of devolution both in the transfer of power from national to local (municipal) government, and, in reduction of State support for, and influence on, local budgets.

1.2. Overview

The Republic of Bulgaria is situated in the northeastern part of the Balkan Peninsula between latitudes 41°14' and 44°13' North and longitudes 22°21' and 28°36' East. Its longitudinal extent defines the climate of the country as a transitional between the typical oceanic climate of Western Europe and the typical continental climate of the Eurasian land mass. Droughts are a characteristic feature of Bulgaria's climate. Of highly varying duration and frequency, they strongly affect water run off, as well the population's way of life and activities (Raev et al., 2003).

The total area of Bulgaria is 110993.6 km² (land area – 110630.9 km², frontier river and sea islands areas – 101.3 km² and territorial waters of frontiers rivers – 261.4 km²). Administratively, the country is divided into 6 planning regions, 28 districts and 262 municipalities.

¹ A municipal water system includes those regional water systems whose service area includes multiple municipalities and often also served industrial and commercial customers in that region. As discussed below, the larger, regionally oriented systems are particularly prominent in Bulgaria.

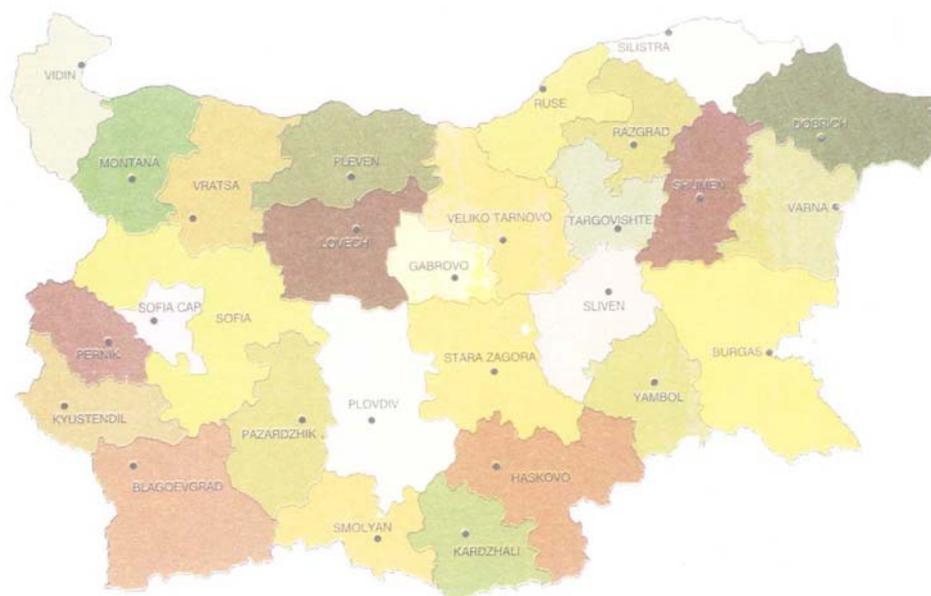


Figure 1. Administrative – Territorial Division of the Republic of Bulgaria – 28 Districts

(North – West region: district of Varna, Vratsa, Montana; North Central region: district of Veliko Tarnovo, Gabrovo, Lovech, Pleven, Ruse; North-East Region: district of Varna, Dobrich, Razgrad, Silistra, Targovishte, Shumen; South-East region: district of Burgas, Sliven, Yambol; South Central region: district of Kardzali, Pazardzhik, Plovdiv, Smolyan, Stara Zagora, Haskovo; South-West region: district of Blagoevgrad, Kyustendil, Pernik, Sofia and Sofia capital).

The population's decrease was 12.3% for the period 1985-2002 and was due mostly to emigration of young people. Most of the population is concentrated in urban areas (64.8% in 1985 and 69.7% in 2002). The average density of the population decreased from 80.6 to 70.7 persons/km² for the same period of time.

Table 1. Population at the End of the Year (December 31)

No.	Indices/year	1985	1992	2000	2001	2002
1.	Total population, thousands, of which:	8948.6	8487.3	8149.5	7891.1	7845.5
1.1.	Urban	5799.9	5704.5	5576.9	5473.0	5469.6
1.2.	Rural	3148.7	2782.7	2572.6	2418.1	2375.9
2.	Density per km ²	80.6	76.5	73.4	71.1	70.7

Source: NSI

The population's forecast is for continued decline: from 7,785,091 inhabitants in 2003 to 7,323,708 inhabitants in 2014 e.g. 6% decrease of population (MoEW, 2003).

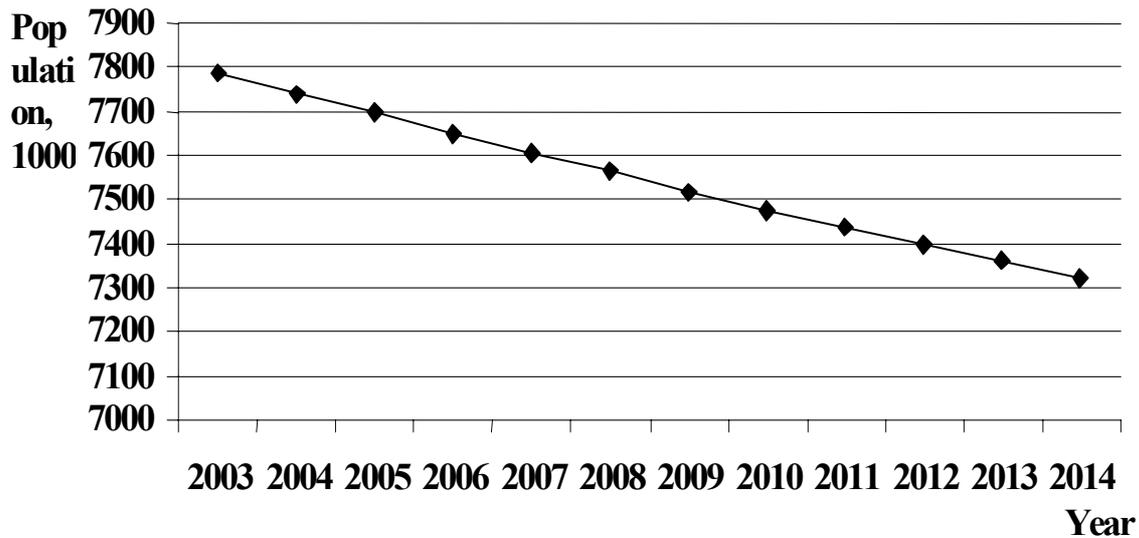


Figure 2. Population Forecast for Bulgaria (MoEW, 2003).

The most urbanized parts of the country are: Sofia, with 1,192,031 inhabitants; Plovdiv, – 713,060 inhabitants; and Varna 459,931 inhabitants (2002). Unemployment was 16.8% in 2002 and ranged from 11.8% in the South-West region to 22.8% in the North – West region.

According to art. 152, item 1 of the Water Act, the territory of Bulgaria is divided into four river basins: Danube River Basin, Black Sea River Basin, West Aegean River Basin and East Aegean River Basin. The Danube River Basin has its administrative centre in Pleven and covers the water catchment areas of the rivers Iskar, Erma, Nishava, Ogosta and; to the west of the Ogosta river, Vit, Osam, Yantra and Roussenski Lom, and the territory west of the groundwater watershed of the malm aquifer. The Danube River Basin covers about 43% of the country and most of northern Bulgaria. Bulgaria ratified the Convention on the Cooperation for the Protection and Sustainable Use of the Danube River and implemented it on April 6, 1999.



Bulgaria is a formerly socialist country striving to enter the EU. It has experienced macroeconomic stability and positive growth rates since a major economic downturn in 1996 led to the fall of the socialist government. Bulgaria has already adopted most of the basic regulations that are meant to ensure compliance with EU environmental directives.

1.3. Overview of the Origins and Status of the Municipal Water and Wastewater Industry

The national level water management is exclusively the right of the Council of Ministers, performed by the Ministry of Environment and Water (MoEW). The basin level management within one or several catchment areas is done by Basin Directorates for River Management, which are bodies to the above-mentioned Ministry and Basin Councils. The Basin Council is a state public consultative commission for supporting the activities of the Basin Directorate. The Basin Council includes representatives of the state administration, the municipal administration, the water users and the environmental organizations within the range of the basin as well as representatives of the scientific organizations connected with the water issues. For their activity the members of the Basin Council do not receive remuneration.

The Supreme Consultative Water Council (SCWC) provides expert consultation to the Ministry of Environment and Water. It was established on the basis of a Regulation issued by the MoEW. It has representatives of the Ministry of Environment and Water; Ministry of Regional Development and Public Works; Ministry of Agriculture and Forestry; Ministry of Industry, Ministry of Transport, Ministry of Health; Ministry of Finance; Civil Defense; Ministry of Power Engineering and Energy Resources; many institutes of the Bulgarian Academy of Sciences, municipalities, and NGOs directly related to waters.

State responsibilities related to the operation, construction, reconstruction and modernization of water systems and facilities owned or partially-owned by the state are presently allocated to Ministries of the National Government as follows:

1. The Ministry of Regional Development and Public Works (MoRDPW) – water supply and sewerage systems and facilities of the settlements, protection of the population from the water harmful impact within settlements;
2. The Ministry of Agriculture and Forests (MAF) – irrigation systems and facilities; protection of the population from the water harmful impact beyond the settlement boundaries;
3. The Ministry of Energy and Energy Resources – water energy systems;
4. The Ministry of Environment and Water (beside the above mentioned functions) – water abstraction facilities for mineral water, public state property.

For municipally-owned water and wastewater systems the operation, construction, reconstruction and modernization of the water supply and sewerage systems is the responsibility of the municipal mayor.

There are currently 29 Regional WSSCs responsible for providing most water and sanitation services throughout Bulgaria. The State exercises its prerogatives in the state-owned WSSCs according to a Regulation adopted by Decree of the CoM No 7/1994 and amended several times since then. According to this Regulation, the rights of the State as owner of a companies that is either wholly state-owned or where the State has a share are exercised by the Minister responsible for the economic sector in which the company is active.

The WSSCs have the status of Commercial Companies under the Commercial Act (CA). The prerogatives of the municipality as owner of WSSCs are exercised under the Local Self-government and Local Administration Act (LSGLAA). According to Art.21, p.9 of the LSGLAA, the Municipal Council takes decisions for the creation, transformation and cessation of commercial companies with municipal participation. The Municipal Council also nominates the representatives of the municipality for a place on the governing bodies (Boards of Directors) of these companies. The Boards of Directors of the WSSCs have the power to decide on choices of management or privatization for their companies. In the Limited Companies, the municipalities are shareholders and have a vote through the Boards of Directors in proportion to the percentage (%) of their ownership (according to the Commercial Law).

In the case of companies that are wholly or majority state-owned, the decision to privatize would be taken by the Minister of Regional Development and Public Works, following consultation with the municipalities served by the water companies.

Most dams and surface water reserves are exclusive state property, but WSSCs can use them based on a contract with the CoM. The water supply and wastewater services assets infrastructure are owned by the WSSCs. Though different WSSCs may own different parts of local water networks. The WSSCs may be privatized under the Law for Transformation and Privatization of State and Municipal Companies (LTPSMC) only through concession, or contracts for lease, management, or ‘build, operate, and transfer’ (BOT).

1.4. Future Directions

Bulgaria aspires to join the EU and works to harmonize the EU water-related legislation. Bulgaria has received international technical assistance to support the legislative and institutional reform related to the water sector and is in the process of transforming this sector, including its organization and tariff setting process. The future direction will be outlined in the new Water Act that will be proposed by the MoEW at the end of 2004. It is envisaged that full ownership of the WSSCs will be transferred to the municipalities and the WSSCs future will be determined by them. This includes possibly granting concession contracts to run the WSSCs.

The Government of Bulgaria has often expressed its interest in the evaluation of private sector participation (PSP) options in the operation, management and financing of their water supply and wastewater services in order to:

- increase the cost-efficiency of operations and development of the cities' water supply and sewerage systems and introduce current managerial and technical practices;
- reduce contingent liabilities for the municipal governments, by having the private sector contribute capital (if applicable) and share risks and incentives;
- increase consumer satisfaction and willingness to pay through the provision of a higher quality, more responsive service;
- better delineate the role of the municipalities as regulator and representative of the customer's interests and separate the municipalities from the day-to-day management of the WS&WW companies;
- make tariff decisions more transparent by introducing an arms-length relationship between the regulator and management.

Under the World Bank (WB) Project “Water Loan” a new study was initiated to examine private sector participation in the water sector in Bulgaria. The Dutch consulting firm ARCADIS prepared the concession bidding documents for the WSSCs of Varna and Shumen and the pre-qualification for prospective bidders was completed. The next steps would be solicitation of bids and selection of a winning concessionaire. For the time being, however, MoRDPW has stopped the process because of objections by some members of the tender committee. These members are the mayors of the affected municipalities they are presently opposed to the award of a private concession.

The Management and Development Strategy for Water Supply and Sewerage Sector in the Republic of Bulgaria, recently adopted by the Council of Ministers, aims to improve the management of the water supply and sewerage sector and increase the quality of services (MoRDPW, [Annex 1, p. 69](#) .). This strategy would:

- establish a new law on water supply and sewerage;
- introduce an integrated approach to private sector participation, taking into account public interest and identifying preferred management models for private sector participation;

- application of a structured management approach, taking into account regional planning and ensuring economies of scale;
- elaboration of a regulatory act for water pricing.

An Act for Regulation of the Water Supply and Sewerage Services has been drafted. According to the Art.5 (1) of the act a new Energy and Water State Regulatory Commission (EWSRC) will be responsible for the quality of water services and for the establishment and control of water tariffs beginning January 1, 2005 (MoRDPW, [Annex 2 p. 70](#)). Under this draft, there are many aspects of a WSSC's performance that would be regulated. Drinking water quality and discharge wastewater quality, would continue to be regulated by the relevant Ministries (MoH and MoEW), with regular consultation with the EWSRC.

In the official EC No. CONF 13/01 position of the Republic of Bulgaria the transition period for the Directive 91/271/EC is proposed as follows as:

- to 01.01.2011 - construction of sewerage systems and WWTPs for settlements with more than 10000 PE;
- to 01.01.2015 - construction of sewerage systems and WWTPs for settlements with 2000-10000 PE.

2. Legal and Institutional Setting

2.1. National Laws and Regulations Governing Provision of Municipal Water and Wastewater Service

2.1.1. Common Provisions

Legislation, relevant to levels of services and required to be respected includes the following:

1. Water Act (SG 67/1999, in force since 28.01.2000, as amended in 2000 and 2003);
2. Environment Protection Act (SG 91/25.09.2002);
3. CoM Decree No 169/2003 for Regulation Determining and Impose the Penalties for Pollution over the Permission Norms;
4. National Standardization Act (SG No. 55/1999 in force since 1999);
5. Act for Limitation of Harmful Impact of Waste on the Environment (SGNo 86/1987);
6. Norms for Designing of Water Supply Systems since 1987;
7. Technical & Building Norms to Control Outbreaks of Fire (SG No33/1994);
8. Regulation No. 11 for the Design and Use Requirements of Waste Treatment Facilities (SG No. 152/1998);
9. Regulation No. 1 on the Study, Use and Protection of Groundwater (SG No. 57/2000);
10. Regulation No. 2 of Protection of Water against Pollution Caused by Nitrates from Agriculture Sources (SG No. 87/2000);
11. Regulation No. 3 on Sanitary Protection Zones (SG No. 88/2000);
12. Regulation No. 4 on the Quality of Water for Fish and Shellfish (SG No. 88/2000);
13. Regulation No. 5 on the Operation of Water Monitoring System (SG No. 95/2000);
14. Regulation No. 6 on the Emission Limit of Substances in Wastewater Discharged into Water Bodies (SG No. 97/2000);
15. Regulation No. 7 on Wastewaters Discharged into Sewer Systems (SG No. 98/2000);
16. Regulation No. 8 on the Quality of Coastal Sea Waters (SG No. 10/2001);
17. Regulation No. 9 on the Quality of Water intended for Drinking and Domestic Purposes (SG No. 30/2001 and on the Use of Water Supply and Wastewater Systems, 16.03./2002);
18. Regulation No. 10 on Discharge Permits;
19. National Standards 17.13.02-82; 17.13.03-83; 17.13.04-84; 17.13.05-85; 17.13.06-85; 17.13.07-85; 17.13.08-86, obligatory one year after the enforcement of the National Standardization Act.

These acts and regulations are listed above in rough order of importance. All of them are in accord with the EU directives.

The Water Act, approved in 1999 by the 38th National Assembly, has undergone numerous amendments and addenda in the period 2000-2001. An Amendment of and Addendum to the Water Act was passed by the National Assembly in 2002. Analyses of 1999 legislation and its application have shown some problems:

- In general, no distinction is made between water as a common national and indivisible natural resource and the use of water for water economic activities and provision of water services;
- The rules of protection of waters and water ecosystems are not explicitly defined. Many of the imperative regulations in the by-laws on water protection in actual fact develop further the Water Act and that is inadmissible;

- Three years after the enforcement of the Water Act, the provisions regulating the depreciation of the capital stock and the requirements for submission of information by other institutions and municipalities for the purposes of setting up an information system (data base) on water management have not been fulfilled;
- The issues related to the ownership rights and joint ownership rights on water infrastructure and facilities are not adequately regulated;
- The basic public relations with respect to the provision of water supply and sewerage as a public service in human settlements and settlement clusters are not regulated;
- The criteria for use of surface waters and water facilities are not adequately regulated and their linking to public interest remains to be a matter of wishful nature;
- After the approval of the 1999 Water Act other laws have been approved, which:
 - (i) give new definition of notions, which are an integral part of the Water Act, and that in actual fact changes the sense of the notion;
 - (ii) settle in a new way issues of the ownership rights, thus blocking the application of certain dispositions of the Water Act related to water management;
 - (iii) settle in a different way the water economy activities, which are in principle an integral part of the subject matter of the Water Act.

The recent passage of the EU Water Framework Directive (WFD) required still further harmonization than was possible by The Amendment and Addendum to the 1999 Water Act. As noted above, the Ministry of Environment and Water has drafted a new Water Act in 2004. It is expected that the new legislation, including full transposition of the WFD into the national legislation, will be adopted by the end of 2005.

The responsibility for the implementation of the WFD lies with the MoEW Water Directorate, and, for the associated economic analysis, the MoEW Strategy, European Integration and International Cooperation Directorate. The economic analysis, part of each WFD-mandated river basin management plan, will most probably be performed by external consultants selected according to the procedures of the Public Procurement Law. It is envisaged that the supporting information needed for the analysis will be collected and managed by the Basin Directorates. These four directorates will also provide guidance as to the source and availability of useful information. It still has to be decided how the data provided by the directorates will be organized.

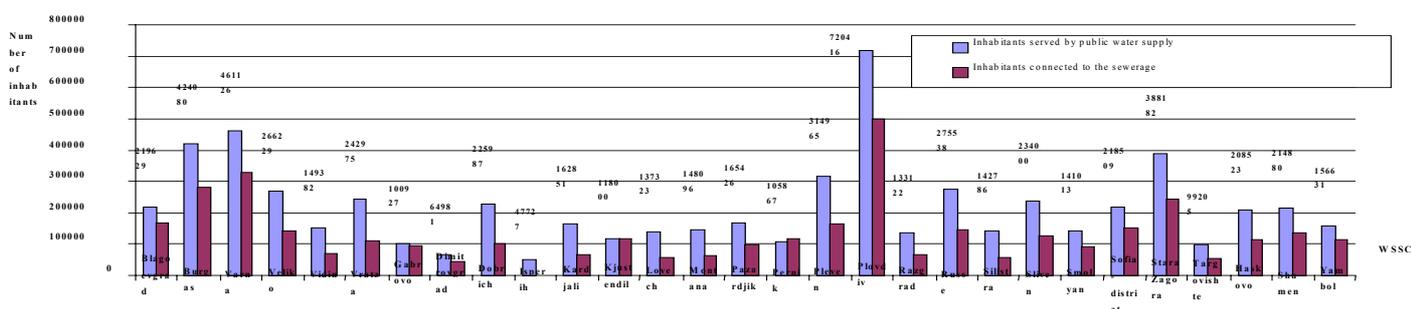
2.1.2. Service Area

The service area of WSSCs corresponds to the administrative regions in the country. As noted above, there are 29 regional WSSCs set up in Bulgaria. 13 of these companies are 100% state owned, and 16 are jointly owned (51% by the state and 49% by the municipality). Besides these 29 WSSCs, there are additional 20 municipal water companies serving only small areas and populations (Table 2.). These 20 municipal companies are not typical of Bulgaria. They were established due to the lack of investments from the state (central budget). These municipalities used local financial resources to provide basic infrastructure to their citizens.

Table 2. Water Supply and Sewerage Companies with Different Ownership in Bulgaria

№	100% state ownership	51% state and 49% municipal	100% municipal ownership
1.	Blagoevgrad	Varna	Batak
2.	Burgas	Vratza	Belovo
3.	Vidin	Gabrovo	Berkovitsa
4.	Dobrich	Dimitrovgrad	Botevgrad
5.	Pazardjik	Ispirih	Bratsigovo
6.	Pleven	Kardjali	Breznik
7.	Plovdiv	Kjustendil	Velingrad
8.	Razgrad	Lovech	Dupnitsa
9.	Smolyan	Montana	Kresna
10.	Sofia-district	Pernik	Kovachevtsi
11.	Stara Zagora	Russe	Kubrat
12.	Haskovo	Silistra	Panagyurishte
13.	Yambol	Sliven	Petrich
14.		Targovishte	Peshtera
15.		Shumen	Rakitovo
16.		Veliko Tarnovo	Sandanski
17.			Svishtov
18.			Sevlievo
19.			Sofia-city – concession
20.			Strelcha
21.			Troyan

Source: MoRDPW

**Figure 3. Inhabitants Served by Water Supply & Sewerage Companies with State Share**

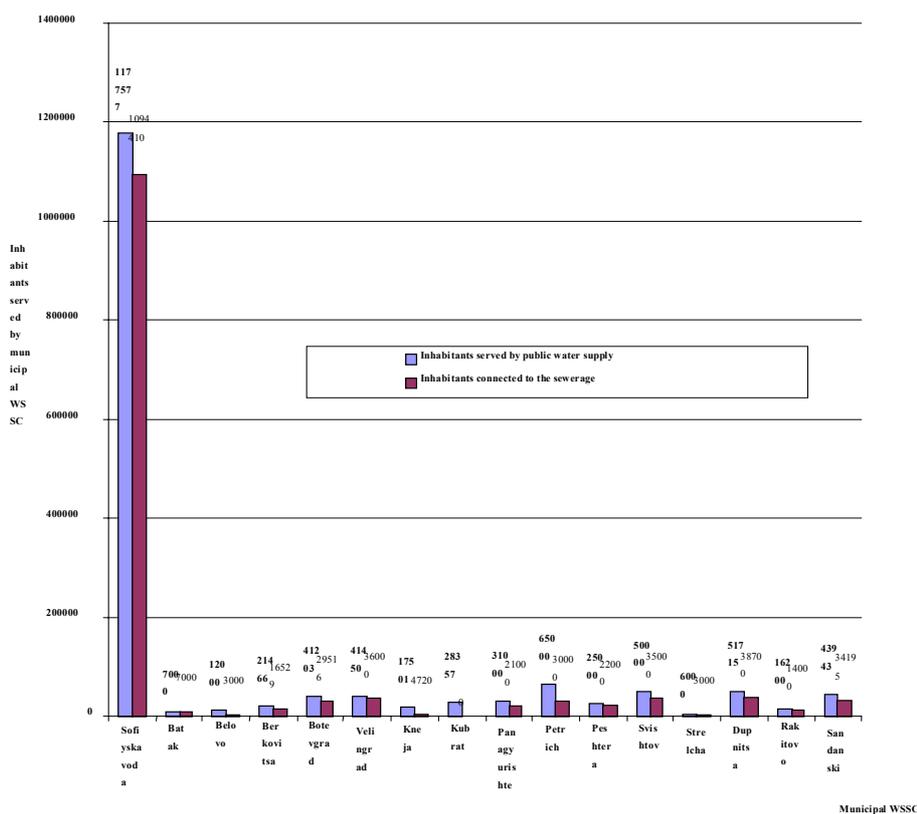


Figure 4. Inhabitants Served by Municipal Water Supply & Sewerage Companies

In a singular example of privatization, in 1999 the foreign firm “International Water” signed a 25 year concession for the water supply and sewerage services with the municipality of Sofia. In 2000 “International Water” and the municipality of Sofia registered a joint stock company, Sofiyska Voda AD, for water supply and sewerage management.

2.1.3. Conditions of Service

The regional WSSCs are responsible for producing and distributing drinking water and receiving and treatment of wastewater for all their private and public customers. Conditions of services provided by WSSCs are specified and defined in the 1999 Water Act and its implementing Regulations. All consumers shall be supplied with a minimum water pressure 2 bars in the towns and villages, measured at customers` connection at the time of maximum daily and hourly peak demand. In the areas with multi-dwelling houses, the minimum pressure shall not be less than 3.4 bars and maximum water pressure shall not exceed 6 bars.

The WSSCs are responsible for maintaining the distribution network and provide connections at the request from customers. Also, WSSCs are responsible to ensure inspection, repair, and/or replacement of consumer meters. The proper functioning of water meters is ensured by establishing an action program. As a result there is a very high percentage of connections to the drinking water supply network (98%) and the very high percentage of customers connected to the network with meters (85% to 90%). There is no "connection" charge. But the cost of monitoring a connection`s conditions is recovered by each WSSC (MoRDPW, 2004). The municipal street cleaners are responsible for maintaining the municipality`s storm sewers, but the WSSC is responsible for maintaining and cleaning the link between the storm sewer and street`s wastewater sewer.

When the user hinders the checking of the water meter the water tariff is based on the continuously water consumption with water velocity 1.5 m/s (MoRDPW, 2004). In the rare cases when there is not

possibility to install a water meter the water consumption is calculated on the basis of the number of persons served by the connection. Here are some other “rules of thumb” for calculating monthly water quantity (MoRDPW, 2004):

- 6 m³ water consumed per person in heated flat and 5 m³ for an unheated flat;
- 0.15 m³ water per m² cultivated area;
- 0.1 m³ per m³ of offices, tourist house, villa etc.;
- 0.5 m³ per m³ of buildings during construction.

In drought periods the WSSC informs the regional administration that it is putting into operation water restrictions to limit the quantity of the water consumed.

There are three tariff components: water supply, sewerage, and water treatment services. There usually are two rate schedules in regard to these tariffs: one for households and one for non-household customers. The WSSC has to announce a new water tariff in a popular newspaper for a three days period (MoRDPW, 2004).

The standards of water services are similar across Bulgaria, with little, if any, variation locally or regionally. These standards do not vary with a customers' ability to pay for service.

WSSCs are supposed to try to keep the required service levels and quality in order to comply with the regulations. WSSCs are also supposed to establish tariffs for given time periods to reflect efficient levels of operation, all with due regard to the affordability of the tariff.

Customers should receive a bill based on the metered consumption every month. If there is not regular access to the meters during the year, for example in a villa area, the billing cycle may be longer but should not be longer than a year.²

In multi-apartment buildings the meter reading is done once a month, and the payment is made on the basis of the reported figures. The difference between the amounts registered on the main (block) water meter and the sum of the individual apartment's meters is the value of water loss in the block of flats. To recover all costs, this is divided among the apartments in proportion to the number of inhabitants of the apartment and added to the amount of water registered on the meter.

For the purpose of reducing the amount of non-revenue water (NRW) produced by the WSSC, all WSSCs have to establish teams to investigate the reasons for water losses. NRW arose due to physical and administrative conditions including: illegal connections, bursts, non-metered water quantities, and lack of pressure reduction valves in the lower zones.³

There are also investigations into the water loss per km of water supply pipe above a certain diameter (Dimitrov, Trichkov, 2001).

According to the 1999 Water Act the control of water sector is made by different ministries, basin directorates and municipalities. The main assignments are as follows:

The mayor of the municipality shall control: the construction, maintenance and the proper operation of the sewerage networks and of the installations for treatment of household wastewaters; the construction, maintenance and operation of the water systems; the construction and the registration of the wells for individual water use from the ground waters on the territory of the municipality.

The Minister of Health shall control: the quality of the water, designated for drinking-communal needs; the quality of the mineral water, designated for drinking or used for prophylactic, healing and hygienic purposes, including the bottled mineral waters in the retail trade network; the quality of the water, designated for bathing.

The Minister of Regional Development and Public Works, the Minister of the Agriculture and Forests, and the Minister of Power Engineering and Energy Resources shall control the state of the water bodies, the water systems and installations in the scope of their competence.

² Villas are, in this case, usually temporary summer residences in a country setting.

³ The definition for non-revenue water percentage is: (total volume distributed water-total volume billed water)/total volume distributed water x 100 (%) per annum, or semi-annual period.

The total water loss percentage is defined as: (total volume of water loss during transport/ Total volume of produced water in distribution system) x100 (%) per annum (NSI, 2004).

The Minister of Environment and Water issues: methodologies for control of the water resources; preparation of the water balances of the water sources and the National Water Balance; distribution of the waters from the dams and for use of the water resources; determining of the operational resources of the ground waters.

The Ministry of Environment and Water shall control: the quantity and the emission status of the waters; the observance of the requirements of the permit for water use when it is issued by the MoEW; the observance of the conditions under the concession contracts for waters, which are exclusive state property; the design parameters of the water installations and systems, elements of which are the complex and important dams, the condition of their control and measuring devices, the condition of the networks for quantitative and qualitative characteristics of the waters; the observation of the prescribed regime for use of the waters of the complex and important dams.

The Director of the Basin Directorate shall: establish the boundaries of the waters and the water systems which are public state property, together with the technical services cadastre services of the municipalities; organize the preparation of the management plans for the respective basin; issue the permits; realize the activity of the National Water Monitoring System at a basin level; keep and maintain the water and water infrastructure cadastre and the registers of the issued permits; collect the fees for the permits which he issues; control the observation of the conditions and the requirements of the issued permits and of the conditions of the granted concessions; carry out supervision over the control and measurement devices of the hydro-technical installations and the systems for monitoring of their safety; carry out supervision over the state of the water systems and installations, issue prescriptions and controls their observation; manage the waters which are exclusive state property and were not granted as concession; manage the installations for ground waters, which are public state property.

The Basin Directorates shall control: the condition and the flow capacity of the river beds and of the discharging installations into the water recipients; the condition and the proper operation of:

- a) the water intake installations, the installations for use of the surface and the ground waters and the facilities for measuring the water quantities;
- b) the treatment installations for wastewaters;
- c) the sewerage systems;
- d) the network for own monitoring of the waters;
- e) the control and measuring devices of the hydro-technical installations, the tailings ponds, the slag ponds, the solid waste deposits and the systems for control of their safety;
- f) the implementation of the requirements of the issued permits;
- g) the emission status of the waters in the water bodies;
- h) the maintenance of the minimum admissible run-off in the rivers;
- i) the pollution of the water recipients and the ground waters during emergency situations and volley discharges; and
- j) the wastewater treatment plants.

The Minister of Defense shall control the preparation of the emergency plans and the implementation of their requirements.

2.1.4. Reporting Requirements

All State owned MSSCs, joint State/Municipal owned MSSCs, and Sofia City have the capacity to provide regulatory data as, in most cases, the systems are already in place to provide data to the MoRDPW and/or the World Bank. Annually, the regional (national or partly nationally owned) WSSC managers report to the MoRDPW financial data including income, expenditure, cash flow, and calculation of tariffs. Technical reports must be submitted that provide data on water produced, water billed, water losses, wastewater quality, quantity of discharged wastewaters including charges and penalties paid in respective year. There is a special department in the MRDPW dealing with state owned utility companies (not only WSSCs) where these reports are submitting and checked. The State, through MoRDPW, has majority ownership and could impose new reporting requirements on

the MSSCs without resort to legislation. The public access to these annual WSSC reports is very difficult.

The smaller, municipal companies, although making up over 40% of the total number of water companies, only provide services to about 5% of the population served. They are not required to supply the same information to the MoRDPW and therefore do not necessarily have in place the systems of data gathering to provide this information.

Some data are available in a special publication “Environment”, printed by National Statistical Institute. The 2002 water data were published on January 30, 2004. All managers of WSSCs provide the annual questionnaire of the National Statistical Institute with data on produced and consumed water quantity, water quality, water tariffs etc. Information collected by the National Statistical Institute does not differentiate between expenditure by the public sector, the private sector and specialized producers according to the Eurostat definitions (NACE 90). Nor does it provide enough information on foreign financial sources, for example, if the sources are loans or grants, etc. There is a considerable discrepancy in the data published by the NSI, the Ministry of Environment and Water, regarding foreign donors.

2.1.5. Self-Service of Water and Wastewater

Self service is allowed in accordance with the relevant Acts and Regulations, such as: Water Act, Regulation No. 9 and the Territory Development Act. The self services include wells, septic tanks, and public taps. Most of the industrial plants and/or factory utilize self-water supply, from surface or groundwater sources, but for technological and process purposes only. If the quality meets the requirements for drinking purpose, then the water could be used for that purpose.

Permission by the regional authorities of the Ministry of Health (Regional Hygienic Epidemically Inspectorates) and regional authorities of the MoEW (Regional Inspectorate of Environment and Water) is required in advance of any construction of a water or wastewater service installation.

Independent provision of water and wastewater service is widely used in the villas areas, villages, in the areas with water rationing, and villages without sewerage systems that rely on septic tanks. The water quality of self service systems should meet the standard requirements in accordance with the Regulation No. 9 on the Quality of Water intended for Drinking and Domestic Purposes (SG No. 30/2001 and on the Use of Water Supply and Wastewater Systems, 16.03./2002. Households might use water from their individual wells without any limitation.

Most of the water used by industry is self-supplied – 5,098,693.10³ m³ (Table 3.). The lower bound on the quantity of self-supplied water is implied by the data for 2000, a drought year in Bulgaria. There are no limitations on water quality when used for industrial process purposes, but there may be quantity limits (see below).

Table 3. Water Used from Self-Supply, 1000 m³

No.	Water used	1998	1999	2000	2001	2002
1.	Total	6,316,688	5,169,618	3,999,534	4,282,911	5,119,585
1.1.	Agriculture, hunting and forestry (incl. fishing)	28,033	22,588	18,722	10,332	8,176
1.2.	Industry	6,269,079	5,125,240	3,963,853	4,257,629	5,098,693
1.3.	Domestic sector (other activities)	19576	21,790	16,959	14,951	12,716

Source: NSI, 2004.

According to the Art. 43. (2) of the 1999 Water Act the owner or the user of an immovable property has the right to gratuitous water use of the surface or groundwater or under the property in quantity not

more than 10 m³ per 24 hours. Apart from these cases, for the individual use of waters the user should pay a water systems fees determined by the Council of Ministers. No fee is paid for water use for anti-fire needs as well as for water use from surface waters out off the own property for irrigation of individual farms with area up to 2 dka (0.2 ha) in quantity not bigger than 300 m³ monthly (Art. 194. (2)). For industrial factories and plants there is a “water fee” for withdrawal quantity. The permission is given from the MoEW in accordance with the technological needs of the user.

2.2. Management Units

Since 1989 much reorganization of the water supply and sewerage system has been undertaken:

- 1989 : the “Vodokanalproject” was changed by “Vodokanalinvest” (responsible for investment functions) and “Vodokanalengineering” (for water supply and sewerage design). In this year the right of municipalities to establish municipal firms for water supply and sewerage was approved by the Council of the Ministers;
- 1991 : the Council of the Ministers stopped the establishment of municipal firms for water supply and sewerage but "grandfathered" the existing municipal WSSCs;
- 1995: there were 29 state regional and 14 municipal WSSCs;
- 1995 : according to the signed Water Loan with World Bank the state should transfer 49% of their shares to the municipalities that received investment financing based on the loan;
- 1995 – 1999 : 22 companies involved in the Water Loan of World Bank were scheduled for transfer from state companies to state-municipal companies with 51% state shares and 49% municipal shares. The allocation of the shares among municipalities was done according to population. The first stage finished with establishment of 16 state-municipal companies. The aim of this transition period is the penetration of the municipalities into the water management sector and all management responsibilities to be taken by the municipalities before transferring of other 51% state shares to them in the near future;
- 1999 : the foreign firm International Water signed a 25-year concession for water supply and sewerage services with the municipality of Sofia capital;
- 2000 : International Water and the municipality of Sofia registered the joint stock company “Sofiyska Voda AD” for water supply and sewerage management in the city of Sofia;
- 2000-2001 : the Council of Ministers stopped the transfer of the water shares from the state to the municipalities. The water management of three regional water supply and sewerage companies in the towns of Veliko Tarnovo, Burgas and Sliven was transferred to private companies and water associations;
- 2003 : the 2003 Amendment and Addendum to the Water Act suspended the contracts of Veliko Tarnovo, Burgas and Sliven WSSCs because their activities had been nontransparent and deemed contrary to the interests of consumers, the state and the municipalities. This unfavorable privatization, made by former directors of these three WSSCs, showed the need for a transparent privatization process.

The MoRDPW is responsible for the State owned WSSCs and acts as a majority shareholder in the jointly owned WSSCs. It is the general beneficiary of international projects, funded by EU, WB etc. and its main functions, according to the legislation, include: preparation and realization of the State policy and conduct of State property in water supply & sewerage companies, overseeing the activities of WSSCs and appointment of managers of state owned WSSCs, and assignment of concession contracts.

The executive bodies in the MoRDPW are: the Trade Enterprises Directorate (where the managers submit their reports) and Water Supply and Sewerage Department.

Finally, the MoRDPW oversees investment planning and implementation, as well as provision of water and sanitation services. Under its umbrella are all 29 WSSCs, where the managers submit the annual and semi-annual accounts and incomes and expenditure sheets and the balance of the entities. Also here, the managers are obligated to announce and defend the new tariff proposals for the WSSC.

The new tariffs need to be supported by calculations. Beginning in January 2005 a new water tariff methodology is expected to be established by the new regulatory body, EWSRC.

The 16 Ltd WSSCs are directed by Boards of Directors, and the managers are appointed by these Boards. The Minister of Regional Development and Public Works directly appoints the managers in the 13-SPLtd WSSCs. Besides appointing a manager, the Board of Directors of the Ltds has the power to appoint a controller, the owner's (minister's) representative, and an expert-accountant.

Through management contracts, the Boards of Directors and MoRDPW give a wide managerial freedom to the 29 regional WSSCs' managers. The WSSC managers can define the internal structure of their Companies, technical management, marketing and business development policy and financial management (up to a certain delegated limit). These contracts define the obligations of the managers vis a vis the MoRDPW: elaboration of a strategic development program, preparation of a program for technical upgrading, with a secure financing plan, financial reporting, profit and profitability increases. It is important to observe that in the management contracts there is a clause that sets manager remuneration as a function of the reduction of water leakages in the service area of the WSSCs. This is in accordance with their business plans and the World Bank requirements for the Sub-Loan Agreement. If the managers don't succeed in implementing and/or completing the water leakages reduction program, they will receive less salary. Such a provision also applies to the salaries of other management staff.

For the whole-owned municipal WSSCs the managers are appointed by the Municipal Councils and approved by the mayors. As noted above, they are not required to submit the annual/ semi-annual reports to the ministry.

The manager is directly responsible for the financial-economic status of the entity; its prospective running; the profit and profit abilities, receivables, or paying duties, personal salaries, the running and future investments and construction and reconstructing policy, and so on. According to the manager's order, the senior staff may organize and provide bids and conclude contracts for fulfillment of works, supply of goods, consultant services, while properly observing the laws. The implemented project should be technically feasible, financially affordable and economically viable. In addition to effective leakage management, strategic planning and operational control of the water supply and distribution network are used to measure the skills of management and staff of the WSSC.

The Administrative Units of WSSCs are: managers, senior engineers, chief accountant, departments' chiefs, cashier, and as well as the chiefs of the regions (situated on the municipal territories, served by that WSSC). All staff is appointed by the manager himself, in accordance with the Labor Code in Bulgaria.

The World Bank Loan and WSSC Reorganization

In 1995 Bulgarian Government signed a Loan Agreement with the World Bank for USD 45 million. The Bulgarian public contributions was 30% (15% by the MoRDPW and 15% by the participated WSSCs). The total amount of the investment pool was therefore USD 60 million. 21 WSSCs signed sub-loans with the MoRDPW. The first condition for the loans was that they be restructured from 100% state-owned to 51% state owned and 49% municipal own WSSCs. Municipal ownership was to be in proportion to the population served by the WSSC in each municipality. That is why 16 regional WSSCs were restructured as Ltds, in accordance with the Trade Law.

The permission for this restructuring was given by the Council of Ministers. The WB Project was successfully closed at the end of April 2003. The Implementation Competition Report (ICR) to the WB Directors was completed.

In most of the cases the WSSCs are parts of physically integrated systems, encompassing all the municipalities in the service area. The Operating Units within the WSSC are organized around specific activities, such as: pumping stations (PS), distribution network, sewerage, WWTP, PWTP, incasso system, NRW reduction program, illegal connections, water-meter reading, workshops (for calibration and test of water meters, mechanical, electrical), elimination of bursts, public services, replacement of depreciated pipes, water meters assembly and so on.

In accordance with the last amendment of the 1999 Water Act all government assets of the water distribution and wastewater collection infrastructure with the exceptions of those that serve the territory of more than one municipality will be municipal property. The state retains the right to most of the water bodies and water supply and water and flood control infrastructure (1999 Water Act, esp. Ch. 2).

At the conclusion of a concession contract for waters, water systems, water infrastructure and facilities - municipal ownership, the municipal council determines:

1. the places for common use of waters and water bodies;
2. the existing rights for use of the waters in the water reservoir.

2.3. Service Users

2.3.1. Classification of Users

The classification of water users varies from institution to institution. According to the National Statistical Institute, the classification is as follows as:

- agriculture (incl. irrigation), hunting, forestry (incl. fishing);
- industry (mining and quarrying; manufacturing industry- food processing industry, textiles, paper and paper production, chemicals, refined petroleum, basic metals, transport equipment; electricity, gas, steam and hot water supply incl. cooling, construction);
- domestic sector (households, other activities).

The Ministry of Regional Development and Public Works, classifies service users as:

- households;
- budgetary organizations,
- public sector.

According to the draft Act for Regulation of Water Supply and Sewerage Services, the users are:

- all legal and physical persons which are owners of property or flats supplied with water;
- enterprises, using the water from the public water supply network;
- enterprises which treat the water and use their own water supply system to distribute not drinkable water.

All special legal considerations by user are described in Regulation No9/ / 16.03.2002, Territory Development Act (SG1/2001and amendments: No41 and 111/ 2001; No 43/2002; No20/2003 and the last one No65/2003) and 1999 Water Act (SG No067/1999, in force since 28.01.2000, as amended in 2000 and the last in 2003).

During the drought periods the drinking water supply used for households has preference when water is rationed. There are some water quantity limits for industry supplied by a public water supply system during a drought period. This is one of the reasons for construction of wells by industry and agriculture farms; it reduces dependence on the less reliable supply of the WSSC.

2.4. Regulatory Units

2.4.1. Environmental Regulation

According to Art. 116. of the 1999 Water Act, all waters and water bodies are preserved from depletion, pollution, and damage with objective of maintaining the quantity and quality of waters necessary for a healthy environment, preservation of the ecosystems, preservation of the landscape,

and prevention of economic damages. The waters and the water bodies are preserved from pollution and damage through:

- prohibition of discharge of dangerous substances in quantities threatening the life and the health of people and biological diversity of water bodies;
- restriction the discharge of harmful substances;
- determining sanitary – protection zones around the water sources and the facilities for drinking and household water supply and around the sources of mineral waters;
- construction of water treatment stations for wastewaters;
- establishing of a regime for use and preservation of the flooded strips along the banks;
- regulating prohibitions for depositing wastes and dangerous substances at places where could happen pollution of waters;
- determining measures for not admitting artificial mixing of ground waters with different qualities.

For these purposes the programs for categorization of surface and ground waters, and programs for decrease of the pollution of the waters have been developed. The persons who produce wastewaters are obliged to construct the necessary treatment facilities in accordance with the requirements for discharge into the water body when there is no public sewerage system. The discharge of wastewater, containing hazardous substances into the ground waters is forbidden or restricted depending on the degree of danger that they create. The storage of pesticides; the depositing and treatment of wastes; the construction of cattle-breeding farms; the construction of economic and housing buildings; the washing and maintenance of transport vehicles and equipment; and the planting of perennial vegetation with shallow root system is forbidden on river banks and in coastal areas.

The national water management institutions are the Council of Ministers and the Minister of Environment and Water. The water management bodies at a basin level are the Directors of the Basin Directorates.

1. The Council of Ministers:

- approves the National Water Economic Plan;
- grants concessions for waters which are exclusive state property;
- approves national programs in the sphere of protection and sustainable use of waters;
- permits the use of waters for the purposes of the defense and the security of the country;
- determines restrictions in the use of waters, in exclusive cases, concerning different districts of the country;
- determines the quantity of mineral waters, used by public health care institutions at a grounded proposal by the Minister of Health; and
- determines the tariffs for the fees, collected on the grounds pointed out in the 1999 Water Act.

2. The Minister of Environment and Water:

- elaborates the policy of the state in the field of the use and protection of the waters and the protection from their harmful impact;
- elaborates the National Water Economic Plan;
- approves the river basin management plans;
- develops national programs in the sphere of protection and sustainable use of waters;
- prepares the water and water economic balances of the country;

- issues permits for water use and/or use within the scope of the cases provided for in the present law;
- determines the order and the way for use of the waters of the complex and important dams, determined in appendix No 1 of the 1999 Water Act;
- establishes the necessary organization, ensure the financing and make proposal for granting of concessions;
- organizes the maintenance of the water and water economic cadastre;
- organizes and manages the National Water Monitoring System;
- elaborates the state policy for bilateral and multilateral cooperation in the field of use and protection of waters;
- publishes a periodical bulletin about the status of the water resources of the Republic of Bulgaria;
- approves the design parameters and schemes for the water infrastructure and installations;
- coordinates the starting of procedures for granting of concessions for water infrastructure and installations, which are public state property; and
- approves the exploitation resources and the project obtaining of the ground waters, including the mineral waters.

2.4.2. Economic Regulation

The financial organization and economic regulation for the use, protection and restoration of the waters and water infrastructure is guided by the 1999 Water Act in Art 192 is as follows:

1. such organizations and regulations should be devoted to protection of the interests of the population in their use of water for drinking-communal purposes and mineral waters for drinking, healing - prophylactic and recreation purposes;
2. payment for water and wastewater service depending on the volume, the quantity and the quality of the used and discharged waters;
3. the offender pays for the incurred damages, disruptions, pollution and other to the waters and the water bodies;
4. economic incentives for rational use, protection and restoration of the waters and water bodies.

The implementation of this guidance is changing, however, as new legislation directed at the regulations of water and water management is, as was noted above, being developed.

The elements of economic regulation include:

- a new organization of WSSCs
- a new Energy and Water State Regulatory Commission. Its aims are to offer new measures for water sector development and restructuring in order to guarantee effectiveness of all kind of services in the field of water supply continuity of services and the services quality;
- economic instruments (tariffs, fines, charges, etc) ;
- economic analysis;
- water tariffs set up, using profitability (12% or to 30%);
- methodology for cost recovery tariffs and possibilities for capital investments to be included;
- annual adjustment of tariffs, which will be done by EWSRC;
- institutional strengthening and capacity building program in the WSSCs;
- investment planning and realization of the year program;

- NRW reduction program;
- renewing the assets.

Water and Wastewater Tariffs

Until 1991, the same water tariff applied for the domestic sector of all country. Before 1991 the tariff of drinking water for industry via public water supply system was 2-3 times higher than households' drinking water. Now, each WSSC defines the water tariff according to the methodology adopted with Decree No. 194/1995 issued by the Council of Ministers and promulgated in the SG No. 40/10.05.1996, amend. SG No. 60/ 02.07.1999. This methodology not refers to geothermal waters used for heating and greenhouses, for the water used for heating and for the water used for irrigation. There are other institutions' methodologies for calculation of these types of water supply.

The water tariff setting for different types (i.e. pure, sewage and treated) is based on the rules of: 1999 Water Act, Act for Protection of Users and for Trade Rights (Ordinance No. 85/1999 of the Bulgarian President), Accountant Act, National Accountant Standards, and Regulation for Water Supply & Sewerage Systems Use in Populated Sites. The water tariffs are meant to cover their operational expenses, depreciation, and a certain "profit".⁴ The drinking water "profit" shall not exceed 12% for the population and for the business needs and shall not exceed 30% in the cases when it has been proven that funds are needed for financing an investment program for rehabilitation of the water or wastewater distribution network and facilities. The water tariff is set on the basis of 1 m³ the three classes of billed water: water supplied, wastewater collected, and wastewater treated.

WSSCs and municipal councils set tariffs for drinking water and wastewater services. The tariffs are lower for households and cross-subsidized by other consumers. Currently, the drinking water supply tariffs vary substantially with the technology of water extraction and delivery – pumps, gravity or mixed systems and on the associated electricity and other costs incurred by the operator. The wastewater tariff is calculated on the same basis as the water supply tariff. Usually, the operator splits its wastewater charge into two parts: for taking the water away to the main city collector and the charge for wastewater treatment (if the WWTP is installed). The WSSC includes into the wastewater tariff the costs of any effluent charge. The WSSCs make individual contracts with the local factory's administration and the quantity and quality of wastewaters impact on the costs of wastewater service.

Twenty days after the end of each annual quarter the WSSCs send their report of actual expenditures for the water services to the MoRDPW. The items that go into the calculation of the experience-based final tariff are shown in Table 4.

⁴ The term profit is put in quotations here because it is very doubtful that these rules are guided by the concept of economic profit. The concept of "profit" here is more likely some net-revenue concept but without a clear understanding of prevailing accounting rules we can't say more precisely what this net revenue represents despite the elaboration of some accounting elements below.

Table 4. Calculation of Water Tariff According to the Adopted Methodology

No.	Item	Report for the current year	Proposal for the next year	% of increase
1.	Expenditures, thousands BGN of which for:			
1.1.	Materials (right for withdrawal water, buying of water, raw materials and materials for production, spare parts of long-term assets)			
1.2.	Electricity and fuels			
1.3.	Outside services incl. repairs			
1.4.	Depreciation (depreciation of physical and non physical long-term assets according to the Accountant Act and to the Guideline for applying of Decree No. 56 for business activity)			
1.5.	Salaries			
1.6.	Social insurances			
1.7.	Others (business trips, capacity building courses, exhibitions and fairs participations etc.)			
1.8.	Subsidiary activity (workshop for repairs, water meters workshop, water quality laboratories, protection of sanitary zones around water withdrawal sources etc.)			
1.9.	Organization and management			
1.10.	Incasso (collection of the water bills)			
1.11.	Payment of loans interests and insurances			
2.	Water consumed, thousands m ³			
3.	Total expenditures for production and realization (cost), BGN/m ³			
4.	Profit, %			
5.	Water tariff, BGN/m ³			

Source: 1999 water tariff methodology

Present tariffs levels are inadequate to cover the full cost of service provision, including maintenance and capital costs e.g. the Art. 193 (1) of the 1999 Water Act “the tariff of water supply, collection and treatment services includes coverage of expenditures for construction, operation, maintenance and reconstruction of the installations and the systems, necessary for the provision of the respective services” doesn’t work. This is a main reason for economic and regulatory overhaul of the water services sector that is currently underway.

Water Fees

The fee for the right of use of water and water body, named “water fee”, was adopted in 2000 and implemented in 2001. The user of water and water body shall pay a fee for the use of the natural resource. Access to water in exchange for the fee is guaranteed whether for both natural and legal persons. A differentiation of fees with respect to the purposes for which the water or water body is used. The possible fee categories for water use are: for drinking and household needs; for irrigation; for cooling; for recreation and water sports; for industrial needs, for the production of electric power by a hydroelectric power plant; for other needs. The fees for the use of mineral water are classified separately, as follows: for medical treatment, rehabilitation, prophylactics and for drinking; for sports, recreation, household and hygiene necessities.

Possible fee categories for water bodies are: for recreation and water sports; for fish-breeding, production and reproduction of aquacultures and other biological recourses (duckweed, shell organisms etc.); for the production of sand, ballast and other activities disturbing the regime of the water body.

A specific “water fee” may be determined for each of the purposes in levs (BGN) per cubic meter of consumed water or in levs (BGN) per square meter of the area of the used water system. There may also be a correction coefficient. The correction coefficient indicates the category of the water in the water body, the correspondence between the category and the purpose for which the water body is used, and the suitability of the water for reuse. The coefficient is “penal” when water of a “higher” category is used for a “lower category” purpose. The correction coefficient provides an economic incentive to use water of lower quality for purposes that need water of higher quality.

The administering of the water use fees is connected to the license regime stipulated by the 1999 Water Act. Permit for use is required in all cases except when water is used not more than 10 m³ per 24 hours for own needs. All information necessary for the calculation of the fee is contained within the license for water use and use of a water body.

Before 2002 the holders of licenses transferred the fees to a special account of the National Environmental Protection Fund (NEPF) – Ministry of Environment and Water.

The Enterprise for Management of Environmental Protection Activities

The Enterprise for Management of Environmental Protection Activities (EMEPA) is proposed as the full successor to the NEPF. EMEPA is a legal and state-owned entity. It is not a commercial venture; it is a not-profit organization and does not pay out dividends. EMEPA collects:

- the fees for water use and/or use of the water bodies;
- the fees for issuing of permits under the 1999 Water Act;
- the fees for services; the receipts from the repayment of expenditures;
- the fines, imposed for violating the provisions of the present act; funds, provided under international agreements and programs;
- donations by local and foreign individuals and corporate bodies;
- receipts from interest;
- indemnifications, received by individuals and corporate bodies for damages caused by them; and
- other receivables on the basis of a normative act.

The collected funds have to be spent by EMEPA for:

- the construction, maintenance and operation of the National Water Monitoring System;
- the elaboration and the updating of the National Water Economic Plan and of the river basin management plans;
- the activities for control over the waters, water bodies, water infrastructure and installations;

- studies and applied scientific investigations according to themes within the scope of the effect of the 1999 Water Act;
- direct financing or co-financing of capital costs for acquiring of material long-term assets and for non tangible long term assets and for major repair, related to activities and measures within the scope of the effect of the 1999 Water Act;
- direct financing or co-financing of activities or measures within the scope of the effect of the 1999 Water Act, which are not capital costs;
- construction of installations for improving the drinking-communal water supply to the population, for collection and treatment of the communal wastewaters;
- payment for services of scientific and technical character, expert statements and assessments, assigned by the competent bodies;
- supporting of the operational costs of the Basin Directorates, as well as the costs, related to the material-technical ensuring and the current activities of the Basin Councils.

Effluent Charges

The effluent charges are set by the Regional Inspectorates of Environment and Water at the MoEW on wastewater discharged into the river body. The effluent charges apply when the water quality is over the permissible degree of pollution of Categories I, II and III of surface flowing waters. The fines depend on the exceedance of concentration limits, wastewater quantity and duration of pollution.

An amendment to the Environment Protection Act in September 2002 stimulates the protection activities of commercial and legal persons. There is a 10% effluent charge reduction after implementation of protection measures in accord with the MoEW investment programs.

3. Production Quantity and Quality

Water quality monitoring is done by the National Ecological Monitoring System at the Ministry of Environment and Water (253 monitoring stations for surface water and 203 monitoring stations for groundwater). The main groundwater pollutants are: nitrates, sulphates, chlorides, iron, manganese and some heavy metals. Generally, the industrial restructuring has improved the quality of surface waters and surface water quality problems are mainly confined to drought periods (Raev et al., 2003).

3.1. Water Production, Distribution and Consumption

16% of the fresh water abstracted was used for public water supply in 2002 (Table 5.). 65% of the public water supply is produced by pumps (groundwater abstraction).

Table 5. Fresh Water Abstraction by Source, thousand m³

No.	Fresh water abstraction	1998	1999	2000	2001	2002
1.	Total fresh water abstraction:	7,905,216	6,818,096	6,132,242	5,832,947	6,588,684
1.1.	by fresh surface water	7,112,105	6,232,965	5,558,249	5,307,572	6,095,939
1.2.	by fresh groundwater	793,111	585,131	573,993	525,375	492,745
2.	Public water system abstraction:	1,186,349	1,204,136	1,177,971	1,075,444	1,057,107
2.1.	by fresh surface water	609,320	794,065	768,025	695,603	691,822
2.2.	by fresh groundwater	577,029	410,071	409,946	379,841	365,285

Source: NSI, 2004

392,700 thousand m³ of water was consumed by customers from the public distribution network in 2002 from 10,200 different water sources (Figure 5). The water distribution loss is about 68% (Table 6.).

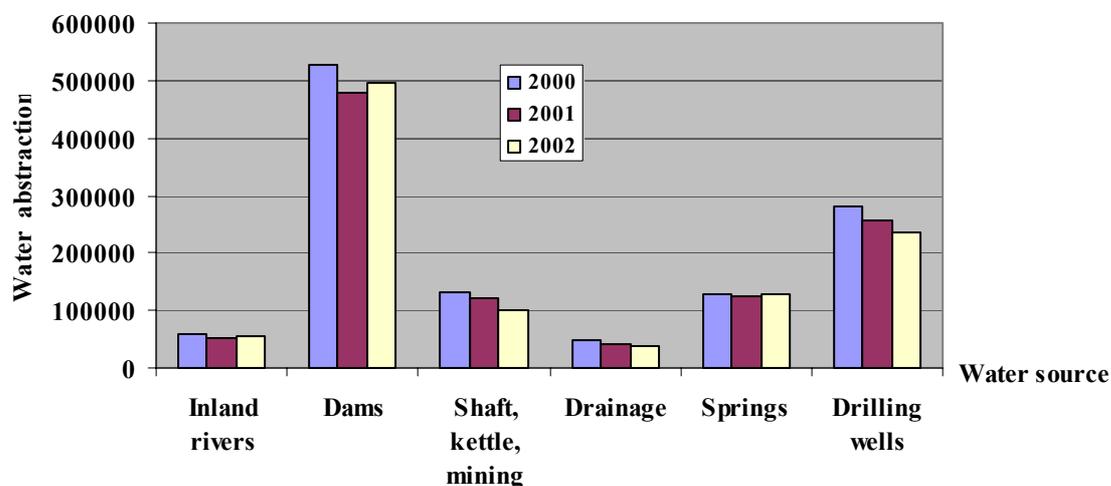


Figure 5. Water Abstraction (1000 m³/year) for Public Water Supply by Surface and Groundwater Sources in Bulgaria.

Table 6. Public Water Supply in Bulgaria, 1000 m³/year

No.	Water / year	2000	2001	2002
1.	Total water abstraction for public water supply	1,177,971	1,075,444	1,057,107
2.	Water in distribution network	1,118,543	1,028,210	1,009,651
3.	Water consumed	468,000	424,114	392,700
	of which: was drinking water quality	446,183	407,949	376,864
3.1.	For households	294,053	273,042	255,411
	of which : was drinking water quality	293,952	273,042	255,411
3.2.	For industry	83,990	69,982	70,183
	of which : was drinking water quality	62,569	55,900	54,496
3.3.	For agriculture	1,819	1,656	1,786
	of which : was drinking water quality	1,699	1,541	1,684
3.4.	For other consumers	88,138	79,434	65,320
	of which : was drinking water quality	87963	77466	65273
4.	Total water loss during transport	731508	668112	684715
5.	Water treatment before using:			
5.1.	By disinfection	674,009	628,909	611,664
5.2.	By mechanical treatment and disinfection	13,841	10,817	9,900
5.3.	By drinking water treatment plants	487,322	437,654	436,736

Source: NSI, 2004

The part of population served by public water supply works is 98.8 %, lived in 5031 settlements. The population receiving centrally supplied drinking water in the cities and towns is 100%. The population served in the villages is lower – 83.5%. There isn't any clear definition of a town and village. The part of population served by public drinking water treatment plants is 38.3%. The number of drinking water treatment plants is 42. Table 7. shows the public water supply consumption by different users.

Table 7. Water Used from Public Distribution Network by Supplied Category, 1000 m³/year

No.	Water use by supply category	1998	1999	2000	2001	2002
1.	Agriculture, hunting and forestry (incl. fishing)	4,889	4,188	1,819	1,656	1,786
2.	Industry	120,721	108,575	83,990	69,982	70,183
3.	Domestic sector, of which:	390,045	371,492	382,191	352,476	320,731
3.1.	Households	301,962	282,788	294,053	273,042	255,411
3.2.	Other activities	88,083	88,704	88,138	79,434	65,320
4.	Total	515,655	484,255	468,000	424,114	392,700

Source: NSI, 2004

Table 8. Water Consumed by Population per Capita (l/cap/day)

1998	1999	2000	2001	2002
101	95	99	95	90

Source: NSI, 2004

In 2002 the water consumed in some towns is higher than country average value – Kresna 180 l/cap/d; Black Sea towns (Primorsko 193 l/cap/d; Sozopol 154 l/cap/d; Nessebar 153 l/cap/d etc.); Sandanski 139 l/cap/d; Sofia 128 l/cap/d etc (Table 9.).

Table 9. Public Water Supply by Regions and Towns in 2002

Region	Average water consumed, l/cap/d	Maximum water consumed, l/cap/d	Minimum water consumed, l/cap/d	Part of population served by public water supply, %	Part of population on water supply restrictions, %
North - West region	84	120 (Chiprovci)	39 (Yakimovo)	97.8	36.9
North Central region	90	126 (Ivanovo)	61 (Gabrovo)	99.5	6.5
North-East Region	75	107 (Vetrino)	39 (Omurtag)	99.6	13.6
South-East region	88	193 (Primorsko)	46 (Kotel)	99.7	9.9
South Central region	80	126 (Strelcha)	43 (Ardino, Chernoochene)	97.6	16.5
South-West region	111	180 (Kresna)	52 (Petrich)	98.8	10.1
Total	90	193	39	98.8	13.4

Source: NSI, 2004.

The continuity of water supply during the day is one of the most important consumer rights. The part of the Bulgarian population on water restrictions (lack of water quantity) was 13.4% in 2002. This percentage is 100% for the population of the towns of Kneja, Dobrich, Rakitovo, Madan, Nedelino, Zemen and Chavdar. These communities were totally dependent on surface water sources for the public water supply.

3.2. Wastewater Production, Collection and Discharge

The discharged wastewater is shown in Table 10.

Table 10. Discharged Wastewater in 2002

No.	Discharged wastewater	1000 m ³	%
1.	Total discharged wastewater, of which:	746,446	100% total
	- untreated wastewater	229,612	31% of total
	- primary treatment (mechanical stage of treatment)	101,368	13.5% of total
	- secondary treatment (biological stage of treatment)	415,466	55.5% of total
1.1.	Discharged wastewater from economic units*, of which:	182,119	24.4% of total
	- untreated	57,459	31.6% of 1.1.
	- primary treatment	88,905	48.8% of 1.1.
	- secondary treatment	35,755	19.6% of 1.1.
1.2.	Discharged wastewater from public sewerage, of which:	500,697	67.1% of total
	- untreated	108,523	21.7% of 1.2.
	- primary treatment	12,462	2.5% of 1.2.
	- secondary treatment	379,712	75.8% of 1.2.
2.	Discharged wastewater from households not connected to urban wastewater collecting system	63,631	8.5% of total

Source: Estimation on the base of NSI information.

*Economic unit is an enterprise with more than 36000 m³ water consumed per year.

The part of population served by public sewerage collection systems is 68.4% and by WWTPs is 38.6%. Of the 38.6 percent of the population whose sewerage is treated by WWTPs, 37.7% of them are served by WWTPs that have biological treatment technology. The number of active UWWTPs is 55 for 67 settlements of which 43 plants have biological treatment. The design capacity of UWWTPs with biological treatment is 1893.10³ m³/d but the actual utilization is 1056.10³ m³/d e.g. the WWTPs work at about 56% of their capacity (Table 11.). The WSSCs have to meet the requirements for discharges as defined in the permit issued by the Ministry of Environment and Water (MoEW).

Table 11. Number of Wastewater Treatment Plants and Part of Served Population

No.	Indices	1998	1999	2000	2001	2002
1.	Active WWTPs, number	51	50	51	55	55
1.1.	Mechanical treatment, number	14	10	10	11	12
1.2.	Biological treatment, number	37	40	41	44	43
2.	Part of population served by wastewater treatment plants,%	36.7	36.9	37	38.2	38.7
2.1.	By WWTP, %	35.9	36.2	36.5	38.1	38.6
2.1.1.	with mechanical treatment, %	0.9	0.7	0.7	0.9	0.9
2.1.2.	with biological treatment, %	35.0	35.5	35.8	37.3	37.7
2.2.	By industrial wastewater treatment plants (IWWTP), %	0.8	0.7	0.5	0.1	0.1
3.	Design capacity of existing WWTPs, 1000 m ³ /d	1,886	1,919	1,904	1,933	1,933
4.	Capacity utilization of WWTPs, 1000 m ³ /d	1,174	1,158	1,113	1,045	1,079
5.	Number of settlements served by WWTP	59	60	63	67	67

Source: NSI, 2004

Danube River Basin

The Danube watersheds have 22% of the WWTPs, 45.5% of total wastewater collected by public sewerage systems, and 50% of collected wastewater connected to WWTPs (Table 12.).

Table 12. Wastewater (1000 m³), Connected to Public Sewerage in 2002

No.	Total or by watershed	Number of UWWTP	Wastewater connected to public sewerage	Wastewater connected to UWWTP	Mechanical treatment in UWWTP	Biological treatment in UWWTP	Discharges of treated wastewater
1.	Total for the country	55	502,205	394,626	13,311	380,371	393,118
2.	Danube watersheds	12	228,537	197,412	6771	189,717	196,428
2.1.	Iskur	6	146,805	142,453	1814	139,991	141,805
2.2.	Osum	-	6605	-	-	-	-
2.3.	Yantra	2	19,078	12,983	4090	8893	12,963
2.4.	Rusenski Lom	1	17,839	6751	0	6751	6751
2.5.	Vit	1	22,451	22,410	0	22,410	22,410
2.6.	Ogosta	2	15,759	12,815	867	11,672	1,2499

Source: NSI, 2004

The surface water quality of the Danube tributaries in 2002 is shown in Table 13. On the base of expert estimation the Danube basin nutrient load (N and P) is 7030 t/year. This is 39% of the country's estimated total nutrient load to waters of 18000 t/year (2002).

Table 13. Surface Water Quality in 2002, mg/l

No.	Danube tributaries	BOD ₅	COD	SS	NH ₄ - N	NO ₂ -N	NO ₃ -N	PO ₄
1.	Ogosta River							
1.1.	Max value	3.8	4.1	49	0.17	0.060	3.30	1.21
1.2.	Average Value	1.8	2.7	22	0.04	0.025	1.98	0.47
2.	Iskur River							
2.1.	Max value	6.5	15.3	40	2.93	0.140	4.00	1.81
2.2.	Average Value	2.5	5.9	22	0.46	0.047	1.80	1.09
3.	Vit River							
3.1.	Max value	4.7	57.0	30	0.60	0.160	5.94	2.64
3.2.	Average Value	2.9	10.5	21	0.17	0.082	1.54	1.05
4.	Osum River							
4.1.	Max value	5.7	13.3	50	1.56	0.070	2.40	1.16
4.2.	Average Value	2.7	5.3	24	0.20	0.040	1.25	0.54
5.	Yantra River							
5.1.	Max value	6.1	12.3	104	0.37	0.080	2.72	0.69
5.2.	Average Value	3.8	6.7	43	0.09	0.037	1.61	0.40
6.	Rusenski Lom River							
6.1.	Max value	87.8	73.7	2854	1.48	3.580	8.00	1.15
6.2.	Average Value	29.5	22.9	336	0.38	0.575	3.21	0.60

Source: Executive Agency for Environment, www.moew.government.bg

According to the Draft National Program for Some Dangerous Substances the total annual load of dangerous substance emissions in the Danube River Basin is as follows as:

- Zn : 102011 kg discharged to the receiving waters, and 624.9 kg discharged to the sewerage network;
- Cu : 1275.5 kg discharged to the receiving waters and 420.3 kg discharged to the sewerage network;
- Ni : 119.9 kg discharged to the receiving waters and 109.2 kg discharged to the sewerage network;
- Cr : 202.1 kg discharged to the receiving waters and 301.2 kg discharged to the sewerage network;
- Pb : 313.1 kg discharged to the receiving waters and 22.2 kg discharged to the sewerage network;
- As : 8374.8 kg discharged to the receiving waters.

Table 14. Permitted Concentration of Dangerous Substances in the Wastewaters Discharged to the Sewerage Network, mg/l (Regulation No. 7/1986)

Zn	Cu	Pb	Ni	As	Cr ^{VI} / Cr ^{III}
5.0	1.0	1.0	1.0	0.5	0.5 / 2.5

Table 15. Permitted Concentrations of Dangerous Substances Discharged to the Three Categories of Flowing Surface Waters, mg/l (Regulation No. 7/1986)

Flowing Surface Water Category	Zn	Cu	Pb	Ni	As	Cr ^{VI} /Cr ^{III}
I	1	0.05	0.02	0.05	0.02	0.02
II	5	0.1	0.05	0.2	0.05	0.05
III	10	0.5	0.2	0.5	0.2	0.1

The last categorization of the surface flowing waters into the three categories has been done by Order 272/23.05.2001 of the Minister of Environment and Water. The existing water quality monitoring is more oriented to mechanical and chemical parameters of water quality. There are many finance and capacity building problems to implement the ecological monitoring of water bodies according to the Annex V of the EU WFD.

4. Economic Data

4.1. Tariffs

The water tariffs of municipal WSSCs are lower than the tariffs of WSSCs with over of 50% state ownership (Table 16.).

Table 16. Water Tariffs of Different WSSCs (31 December)

No.	Indices	1998	1999	2000	2001
1.	Tariff of treated drinking water (without VAT), BGN/m ³				
1.1.	in WSSCs with state participation	0.4	0.54	0.65	0.74
1.2.	in municipal WSSCs, of which:	0.29	0.35	0.43	0.52
1.2.1.	Sofiyska Voda	0.31	0.38	0.4	0.5
2.	Tariff of treated wastewater (without VAT), BGN/m ³				
2.1.	in WSSCs with state participation	0.11	0.13	0.14	0.17
2.2.	in municipal WSSCs, of which:	0.03	0.04	0.05	0.07
2.2.1.	Sofiyska Voda	0.07	0.09	0.09	0.10
3.	Investments, thousand BGN				
3.1.	in WSSCs with state participation	16034	22328	32466	54549
3.2.	in municipal WSSCs, of which:	351	419	793	28147
3.2.1.	Sofiyska Voda	0	0	0	27300

Source: Estimation on the base of MoRDPW information.

The average tariffs for public drinking water by Bulgarian districts in 2002 are between 0.36-1.33 or average BGN 0.68 /m³ (Euro 0.35/m³) without VAT (Table 4.1.2). The price of public drinking water for households with VAT is between 0.42-1.61 or average BGN 0.78 /m³ (in Euro: between 0.21-0.82 or average Euro 0.40 /m³). The public water supply by surface water (City of Sofia by Iskur dam) is cheaper than pumping groundwater (Razgrad, Dobrich, Haskovo) (Table 17.).

Table 17. Average Tariff of 1 m³ Drinking Water, Supplied by Public Water Supply in 2002

No.	Price	Industry with VAT, BGN	Industry with VAT, Euro	Households with VAT, BGN	Households with VAT, Euro
1.	Maximum	1.63 (Haskovo) 1.56 (Dobrich) 1.44 (Razgrad)	0.83 (Haskovo) 0.8 (Dobrich) 0.74 (Razgrad)	1.61 (Razgrad) 1.44 (Dobrich) 1.38 (Haskovo)	0.82 (Razgrad) 0.74 (Dobrich) 0.71 (Haskovo)
2.	Minimum	0.47 (Sofia cap.)	0.24 (Sofia cap.)	0.42 (Sofia cap.)	0.21 (Sofia cap.)
3.	Average for country	0.83	0.42	0.78	0.40

Source: NSI, 2004.

Some drinking and wastewater tariffs in 2003 are shown in [Annex 3 \(p.71\)](#) and Table 18.

Table 18. Tariffs for Drinking Water and for Water of Non-Drinkable Quality (BGN/m³), Distributed by WSSCs in Bulgaria, (31 December 2003) (without VAT)

No.	Item	Gravity water from Surface Source	Pumping water from a Groundwater Source	Mixed (Surface and Groundwater with Gravity and Pumped Sources)
1.	Drinking water			
1.1.	Households	0.22 (Kardjali)- 0.95 (Bobov dol)	0.55 (Pazardjik, Blagoevgrad)- 1.47 (Isperih)	0.58 (Montana)- 1.05 (Gabrovo)
1.2.	Budgetary organizations	0.22 (Kardjali)- 1.02 (V.Tarnovo)	0.55 (Pazardjik, Blagoevgrad)- 1.47 (Isperih)	0.65 (Pernik, Smolyan)- 0.96 (Montana)
1.3.	Public sector	0.22 (Kardjali)- 1.02 (V.Tarnovo)	0.55 (Pazardjik)- 1.60 (Haskovo)	0.65 (Smolyan)- 1.18 (Dimitrovgrad)
2.	Water with non-drinkable quality	0.22 (Kardjali)	0.54 (Razgard)	0.60 (Montana)

Source: Estimation on the base of MoRDPW information.

In 2003 the average tariff (without VAT) for wastewater collection for the households was BGN 0.059/m³ and for the public service users BGN 0.09 /m³. Tariffs for wastewater collection and treatment in 2003 were:

- households BGN 0.17 (from 0.07 to 0.47) /m³;
- industry:
 - BGN 0.35 (0.13-0.70) /m³ for BOD₅ < 200 mg O₂/l;
 - BGN 0.45 (0.22-0.9) /m³ for BOD₅ from 200 to 600 mg O₂/l;
 - BGN 0.7 (0.3-1.35) /m³ for BOD₅ > 600 mg O₂/l, and
 - BGN 1.70 /m³ for BOD₅ > 1000 mg O₂/l.

4.2. Sales

More than 90% of customers have water meters measuring of their water consumption. Thus, in principle, the basis for pricing and invoicing based on actual water consumption is in place. However, there are many types of water meters and variations in accuracy and reliability across these types is one of the reasons that the accuracy of water quantity measurements is suspect at the level of both individual accounts and in the aggregate. The amount of sales by WSSCs with state shares is shown in Table 19. and Table 20.

Table 19. Sales by WSSCs for the Period 1998-2001

No.	Indices	1998	1999	2000	2001
12.	Volume of water billed, 1000 m ³	420099	389065	367993	326682
13.	Sales (total WSSC's services billed), 1000 BGN	19676	28706	45333	55747
13.1.	of which :water sales	16298	25573	35510	44438
14.	Profitability ratio, %	4.92	5.36	4.45	2.01
15.	Collection efficiency, %	89.03 (98.23 V.Tarnovo; 65.2 Stara Zagora)	86.68 (100 Vratza; 63.5 Stara Zagora)	82.9 (98.24 V.Tarnovo; 57.4 Stara Zagora)	79.7 (98 Kyustendil; 42.72 Haskovo)

Source: MoRDPW

Table 20. Water Services Billed by WSSCs with State Ownership Participation in 2002 (1000 BGN)

No.	Item	2002
1.	Total water services billed:	72,543
1.1.	households	41,040
1.2.	budget entities	15,851
1.3.	others	15,652

Source: Pleven Case Study

4.3. Costs and Purchased Inputs

Cost of water services differs based upon the source of water produced and type of wastewater treatment facility. The water cost for industry charged by the Pchelina dam in 2000 was 0.110 BGN/m³ (Euro 0.056/m³). This comprised 90% of the resulting water tariff (Table 21.).

Table 21. Costs of Water Production for Industry by the Pchelina Dam in 2000

No.	Item	
1.	Expenditures in BGN for:	
1.1.	Depreciation	25,920.00
1.2.	Materials	7,836.00
1.3.	Fuels	1,200.00
1.4.	Electricity	4,5000.00
1.5.	Outside services	12,000.00
1.6.	Salaries	14,400.00
1.7.	Insurances	8,400.00
1.8.	Others	15,000.00
1.9.	Reconstructions	94,476.00
1.10.	Organization	13,368.00
2.	Cost, BGN	237,600.00
3.	Invoiced water volume, m³	2,160,000.00
4.	Cost per m³, BGN/m³	0.110
5.	Water tariff, BGN/m³	0.122

Source: WSSC of Pernik town

Generally, the estimations are based on the cost data for the invoiced water volumes in a calendar year and the projected expenses and revenues for the next year. The O&M cost appears to be very low (Halcrow, 2002).

In addition to production costs the WSSC must pay: withdrawal fee and effluent charge. The withdrawal fee (named “water fee”) depends on the method of abstraction, specifically groundwater, dams, surface water (Table 22.).

$$T = E \times W \times K$$

where:

T- annual fee, BGN;

E – fee in BGN for 1 m³, according to the usage;

W – the annual volume of withdrawal water, m³;

K – correction coefficient, according to the category of surface flowing waters.

Table 22. Withdrawal Fee

No.	Type of usage	E, BGN/m ³	K for I Category	K for II Category	K for III Category
1.	Drinking water	0.02	1	0.5	0.3
2.	Irrigation				
2.1.	surface waters	0.001	5	1.5	1
2.2.	groundwater	0.005	5	1.5	1
3.	Waters for cooling	0.0001	4	2	1
4.	For recreation and sports	0.4	1	0.5	0.3
5.	Industry	0.008	5	1.5	1
6.	Others	0.01	5	3	2

Source: Regulation No. 154/28.07.2000 in State Gazette No. 65/2000. The categorization of the surface flowing waters is done by Regulation No. 7/ 1986 (State Gazette No. 96/1986).

Every user is required to have a permit from the MoEW for withdrawing for different uses.

As noted in Chapter 2 (2. Legal and Institutional Setting), the effluent charges are triggered by effluent levels in excess of permitted levels for at least one pollutant. According to the regulation for determination of fines for exceeding the effluent limits (SG No. 69/05.08.2003), the fine for 1 kg pollutant in BGN/Euro is shown in Table 23.

Table 23. Fine for 1 kg Pollutant in Excess of Permitted Level

No.	Pollutant	BGN	Euro
1.	BOD ₅ , COD	0.45	0.23
2.	NH ₃ -N	1.50	0.77
3.	NO ₃ -N	0.15	0.08
4.	NO ₂ -N	34	17.4
5.	Total nitrogen	0.5	0.26
6.	PO ₄	1.40	0.72
7.	H ₂ S	20	10.2
8.	Suspended solids	0.15	0.08
9.	Hydrocarbons	52	26.6
10.	pH (for one unit)	0.05	0.03
11.	CN	27	13.8
12.	Hg	2000	1022
13.	Cd	200	102
14.	Pb	41	21
15.	Cu	4.5	2.3
16.	Ni	10	5.1
17.	Zn	0.6	0.31
18.	Mn	7	3.6
19.	Fe	1.4	0.7
20.	Cr ⁶⁺	41	21
21.	Cr ³⁺	4.5	2.3
22.	As	41	21
23.	Phenols	27	13.8
24.	Detergents	1.40	0.7
25.	Extractible compounds	0.60	0.31
26.	Formaldehyde	2.80	1.43
27.	Caprolactam	1.40	0.72
28.	Phtalic acid	1.40	0.72

The effluent charges are paid mainly by the industry. In 2002, the collected amount of fines is BGN 455,000 or Euro 232,737 by 267 factories.

The total planned income to EMEPA in 2004 is BGN 81 million (Euro 41.4 million) of which BGN 20 million (Euro 10.2 million) is expected to be from water charges and fines.

Some WSSCs purchase water from a neighboring WSSC. The quantity is different and depends on the needs and the available water and the water demand. For example, for 2002 the total purchased amount is 74,602,000 m³. This is less than 10 % of total drinking water production. The purchase price is a matter of negotiation.

Table 24. Purchased Water Quantity by WSSC

WSSC	Purchased water, 1000 m ³
Varna	31,991
Lovech	75
Gabrovo	2700
Pleven	3059
Vratza	18,322
Vidin	165
Plovdiv	1155
Targovishte	7500
Isperih	6
Razgrad	56
Russe	11
Pernik	507
Stara Zagora	3773
Sofia-region	5055
Dimitrovgrad	295
Total	74,602

4.4. Grants, Subsidies and Transfers

Grants to water systems have come from Japan, EC, EBRD (through the ISPA and PHARE programs), WB, and Swiss Trust Eco Fund (Debt against the Environment). The funds are designated for use in paying for consultant services, technical assistance, projects design, preliminary studies, and administration.

As introduced above, the Bulgarian Government recently used a USD 45 million loan from the World Bank for the Water Companies Restructuring and Modernization Project. This included 30% co-financing by the country: 15% by the MoRDPW and 15% by the 21 WSSCs. The Loan is guaranteed by the Government. The loan was completed on 31.05.2003 and the Project's Implementation Completion Report has been submitted to the WB Board of Directors.

Pre-accession funds are distributed by EU through EBRD, European Investment Bank, UNDP and so on. These require Bulgaria to co-finance part of each supported project. The percent of co-financing is from 25-50%. The projects cover rehabilitation of infrastructure and construction of new WWTPs.

More recently, the EC has been a source of water sector grants by PHARE and ISPA programs (Table 25.). These are meant to ease the costs of conforming to EU water sector directives. A major administrative problem has been the inability to co-design projects that meet ISPA grant criteria.

Table 25. List of ISPA Projects in Bulgaria, Approved by ISPA Management Committee

Project	Total budget, million Euro	ISPA grant, million Euro	Signed in	Expire date	First disbursement, million Euro
2000/BG/16/P/PE/003 WWTPs StaraZagora & Dimitrovgrad	43	32.5	December 2000	31 December 2005	3.25
2001/BG/16/P/PE/005 WWTP Gorna Oriahovitsa	16.6	12.4	December 2001	31 December 2006	
2001/BG/16/P/PE/006 WWTP Pazardjik	19.1	12.4	December 2001	31 December 2006	
2001/BG/16/P/PE/008 WWTP Blagoevgrad	12.6	8.8	November 2001	31 December 2006	
2002/BG/16/P/PE/009 Waster Collection and Treatment in Bourgas-Meden Rudnik	10.2	7.7	December 2002		
2002/BG/16/P/PE/010 Wastewater Collection and Treatment in Targovishte	15.2	11.4	December 2002		
2002/BG/16/P/PE/011 Wastewater Collection and Treatment in Lovech	18.4	13.8	December 2002		
2002/BG/16/P/PE/012 Wastewater Collection and Treatment in Montana	16.74	12.6	December 2002		
2002/BG/16/P/PE/014 Wastewater Collection and Treatment in Sevlievo	14	10.5	December 2002		
2002/BG/16/P/PE/015 Wastewater Collection and Treatment in Popovo	11.9	8.9	December 2002		

Project	Total budget, million Euro	ISPA grant, million Euro	Signed in	Expire date	First disbursement, million Euro
Total	177.74 million Euro	131 million Euro			3.25 million Euro

Source: European Union, Delegation of the European Commission to Bulgaria, ISPA-Bulgaria, 5.02.2003.

There are currently funds provided by the state through MoRDPW for rehabilitation of water system infrastructure. These rehabilitation projects include replacement of water supply pipes, completion of sewers, rehabilitation and upgrading of WWTPs. There is currently no state or municipal policy for directly subsidizing current O&M cost of the WSSCs. However, subsidies for investment by the public water supply and sewerage sector during 1998-2001 were considerable. These include subsidies from the State Budget and favorable financing backed with sovereign guarantees such as the World Bank's Water Companies Restructuring and Modernization Project (Table 26.).

Table 26. Subsidies and Credit for Water Supply & Sewerage Sector in 1998-2001, BGN

No.	Indices	1998	1999	2000	2001
1.	Total	15,858,470	18,621,882	40,606,037	148,785,769
1.1.	Subsidy from the State Budget	15,858,470	18,621,882	23,534,495	131,785,175
1.2.	Credit with sovereign guarantees			17,071,542	17,000,594

Source: MoRDPW

The only form of operating subsidy currently affecting WSSCs is the cross-subsidy between industry and domestic sectors. Some plan that future domestic tariffs should cover both expenses and a reasonable profitability element. Cross subsidies among customers may continue to be one of the features of the tariff structure.

A policy of cross subsidizing water services for poor customers was discussed by Halcrow (2002). The criteria for defining the poor is given in the Social Assistance Act, and there are existing Regulations for using that Act. According to the Social Assistance Act, there are different income groups and different levels of Social Assistance. The Ministry of Labor and Social Policy may manage the subsidy process as part of other Social assistance.

5. Infrastructure of Municipal Water and Wastewater Services

5.1. Production and Processing of Municipal Water

The most relevant element in the water demand and supply study is the renewable freshwater resource. Due to the lack of melting glaciers in Bulgaria, precipitation is the main source of raw freshwater both for the surface and the groundwater (Figure 6).

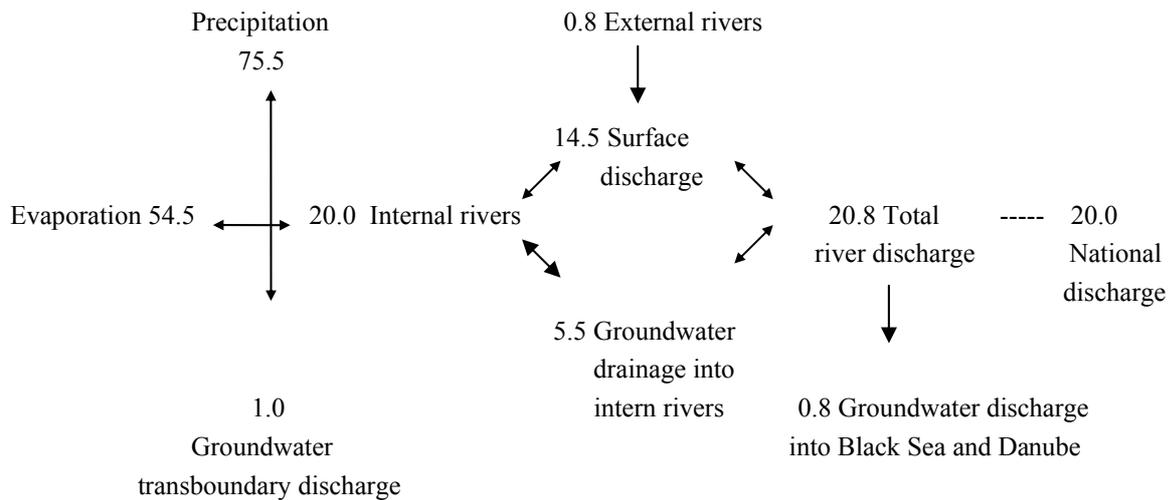


Figure 6. Water Resource Distribution for a Long - Term Annual Mean Situation (50 years) in km³/year

The available water resources are 2430 m³ per inhabitant. From 6 billion m³ per year fresh groundwater only 4.9 billion m³ per year is useable. The annual distributed water is 10-12 billion m³: drinking water supply 8-10%; irrigation 5-35%, industry 20-26% and production of energy 15-35% (MoRDPW).

The water supply and consumption balance estimated for the year 2020 is shown in Table 27.

Table 27. Future Fresh Water Supply and Demand in km³ – 2020 [reference situation - average dry year, excl. Hydro Power Plant (HPP) and Nuclear Power Plant (NPP)]

No.	Water supply according to the sources	Self supply	Supplied public water supply	Water irrigation systems**	Total excl. HPP and NPP
1.	Surface water	1.707	0.969	2.625	5.301
1.1	Danube	0.116	-	-	0.116
1.2	Inland rivers	0.298	0.404	0.745	1.447
1.3	Dams	0.813	0.565	1.880	3.258
1.4	Lakes and other	0.480	-	-	0.480
2.	Groundwater	0.982	0.640	-	1.622
3.	Other (marine)	0.007	-	-	0.007
4.	TOTAL SUPPLY	2.696	1.609	2.625	6.930
5.	Water demand				
5.1	Households	-	0.504	-	0.504
5.2	Services	-	0.599	-	0.599
5.3	Losses	-	0.415	-	0.415
5.4	Agriculture	0.269	-	2.271	2.540
5.4.1	Irrigation	0.152	-	2.271	2.423
5.4.2	Livestock	0.117	-	-	0.117
5.5	Industry*	2.427	0.091	0.354	2.872
5.5.1	Potable	0.347	0.091	-	0.438
5.5.2	Non potable	2.080	-	0.354	2.434
6.	TOTAL DEMAND (excl. HPP and NPP)	2.696	1.609	2.625	6.930

Source: Experts investigation

* Industry includes fresh water demand for Thermal Power Plant (TPP), including for cooling

** Possible future privatization of Irrigation Systems Company (ISC)

The total amount of drinking water produced in 2001 is 1,141,162.10³ m³ of which 80,096.10³ m³ (7.02%) was from flowing surface water, 543,516.10³ m³ (47.63%) from groundwater and 517,550.10³ m³ from impoundments behind dams (MoRDPW). A list of the dams is shown in Table 28.

Table 28. Dams for Water Supply in Bulgaria

№	Dam	Water supplied settlement	Volume, million m³
1.	Christo Smirnenki	Gabrovo	18.7
2.	Yovkovci	Veliko Tarnovo	92.2
3.	Borovitsa	Kardjali	27.3
4.	Assenovec	Sliven	28.2
5.	Kamchya	Burgas and Varna	228.5
6.	Srecehska bara	Montana and Vratza	16.5
7.	Yasna polyana	South Black Sea	34.7
8.	Novo Panicharevo	South Black Sea	1.8
9.	Studena	Pernik	25.2
10.	Iskur	Sofia	670
11.	Bely Iskur	Sofia city	15.3

Source: MoRDPW

The ecological NGOs and many academician experts oppose building new dams without further careful consideration of future water demand. The dam experts and some decision makers are very supportive of further dam construction. They don't support alternative water supply or conservation strategies (reduction of water losses, development of other potential water sources, establishment of water saving programs etc.). Development of deep groundwater is not very attractive because of the costs of pumps and energy to run them. The situation calls for a more any formal and complete analysis for the different water development and water saving alternatives.

The water supply system is 70,620 km long of which: 51,771 km (73.3%) asbestos-cement pipes, 10,271 km (14.5%) steel pipes, 1800 km (2.5%) cast iron pipes, 1464 km (2.1%) PVC pipes and 5314 km (7.5%) other pipes. Most asbestos cement pipes are more than 25-30 years old.

Investigations of water losses during distribution in recent years showed them to be considerable, totaling 30% (small settlements) to 70% (big settlements) of the average daily water use. The total water loss during transport is 68% in 2002 e.g. the total produced water in distribution network is $1,009,651.10^3 \text{ m}^3$ and the total water loss during transport is $684,715.10^3 \text{ m}^3$ of which: external water loss $67,764.10^3 \text{ m}^3$ (main pipes) and internal water loss (in buildings) $616,951.10^3 \text{ m}^3$ (NSI, 2004). The amount of water loss estimated to be $225 \text{ m}^3/\text{km}/\text{day}$ shows that the quantity of distributed water is 2-3 times higher than quantity of water consumed (Dimitrov, Trichkov, 2001).

The average NRW value of regional WSSCs with WB Sub-loan is 54.05% in 2002 (Table 29.).

Table 29. Percentage of Non Revenue Water

WSSC	Date of WB Sub-loan	2000		2001		2002	
		Goal	Actual	Goal	Actual	Goal	Actual
Gabrovo	27.11.96	49.00%	45.34%	48.00%	45.34%	47.00%	
Dobrich	20.11.96	76.00%	76.00%	75.00%	78.83%	74.00%	80.41%
Kjustendil	29.11.96	64.50%	64.45%	64.00%	67.87%	63.00%	66.87%
Lovech	03.12.96	25.00%	25.89%	24.00%	24.88%	23.00%	24.57%
Varna	23.12.97	60.00%	59.81%	60.00%	65.50%	60.00%	68.78%

WSSC	Date of	2000		2001		2002	
		WB Sub-loan	Goal	Actual	Goal	Actual	Goal
Ispereh	09.01.98	60.00%	59.49%	59.00%	58.31%	58.00%	61.00%
Vratca	16.02.99	72.00%	69.19%	70.00%	69.37%	68.00%	71.27%
Dimitrovgrad	18.02.99	68.00%	64.95%	61.00%	73.07%	59.00%	59.16%
Kardjali	18.02.99	41.00%	40.74%	40.00%	39.97%	39.00%	39.10%
Sliven	18.02.99	49.00%	46.12%	48.00%	48.35%	47.00%	21.00%
St.Zagora	18.02.99	63.50%	63.37%	62.00%	65.78%	60.00%	67.53%
Shumen	22.03.99	49.50%	49.51%	49.20%	49.56%	49.00%	48.65%
Vidin	08.10.99	58.00%	49.99%	57.00%	46.93%	56.00%	47.44%
Montana	14.10.99	26.00%	23.83%	25.00%	24.48%	24.00%	27.93%
Pernik	12.10.99	53.00%	52.88%	51.00%	48.10%	50.00%	53.00%
Pleven	13.10.99	50.00%	49.66%	49.00%	51.80%	48.00%	51.36%
Russe	20.10.99	51.50%	52.34%	50.50%	50.99%	49.50%	47.06%
Silistra	20.10.99	61.00%	61.50%	60.00%	61.50%	58.00%	61.00%
Smolyan	14.10.99	49.50%	49.16%	48.00%	49.87%	46.00%	50.03%
Targovishte	13.10.99	72.00%	67.88%	71.50%	69.77%	70.00%	70.62%
Yambol	08.10.99	65.50%	70.37%	64.00%	66.84%	63.00%	64.31%
Average		55.43%	54.40%	54.10%	55.10%	52.93%	54.05%

Source: WB

The large difference between the amount of drinking water produced and consumed reflects not only leakage. Some of the difference is due to the lack of reliable method and equipment for measuring water before distribution. There are no water meters for water mains. For example, surface water production is estimated based on depth of water, and for groundwater production is estimated based on the capacity of the pumps. In addition, because of the lack of measured control of water distribution, some water is distributed to unknown users and is not covered by consumption statistics.

There are 6087 wells, 3560 pumping stations with capacity $768,219.10^3 \text{ m}^3$ and 6087 water supply reservoirs with total volume $2,613,735 \text{ m}^3$. The annual used energy for drinking water treatment is $30,584.10^3 \text{ kWh}$. There are 42 potable water treatment plants with annual capacity of $480,505.10^3 \text{ m}^3$ or 42.1% of total distributed water. The total capacity of the existing drinking water plants is not fully utilized because they have been designed to handle consumption over than 200 l/cap/day.

The recent decline in water consumption by public water supply service users is due to the higher water tariffs, installation of water meters by customers, and restructuring of industrial production. The expert opinion is that an increase in the number of self-service water supplies by households, agriculture and, mainly, industry using groundwater wells has also reduced consumption of public water supply services.

5.2. Collection, Processing and Discharge of Municipal Wastewater

Collection and treatment of urban and industrial wastewaters defined according to Art. 13 of Directive 91/271/EC is as follows (MoEW, 2003):

- annual discharged wastewaters to water bodies are $878,555.10^3 \text{ m}^3$ or $2,407,000 \text{ m}^3/\text{d}$.
- $1,478,000 \text{ m}^3/\text{d}$ are collected by public sewerage systems of which
 - 76% are treated by WWTPs and the volume of untreated wastewaters discharged by public sewers is $355,367 \text{ m}^3/\text{d}$;
- $1,122,663 \text{ m}^3/\text{d}$ are treated wastewaters,
 - of which $31,315 \text{ m}^3/\text{d}$ mechanically treated wastewaters and $1,081,838 \text{ m}^3/\text{d}$ biologically treated;
- 66.8% of population is connected to the sewerage systems;

Wastewater Treatment Plants

There are 61 WWTPs for 40% of population which is equal at 5,282,360 PE. Only 21 of are in good condition and don't need any reconstruction and modernization. 40 WWTPs work but some of them are due for reconstruction and others need both reconstruction and modernization.

12 new WWTPs have been constructed to serve 2% of the population. At the same time there is a need for finishing the 35% sewerage system that would supply the WWTPs.

19 settlements with 1,782,887 PE have been involved in the National Program for WWTPs Construction. The Program plans to use ISPA, Phare and national funds for construction of these WWTPs. 80% of their feeder sewerage systems are ready.

For settlements with population > 10000 PE some 55 WWTPs serving 1,730,960 PE need further planning. 40% of the sewerage system for these WWTPs has to be finished;

For 283 settlements (1,107,757 PE) with population from 2000 PE to 10000 PE WWTPs would be needed under the mandates of Directive 91/271/EC. Also, the percentage of existing sewerage systems for these settlements is very small - 25%.

The percentage of population equivalent (PE) with different stage of WWTPs execution is shown in Figure 7

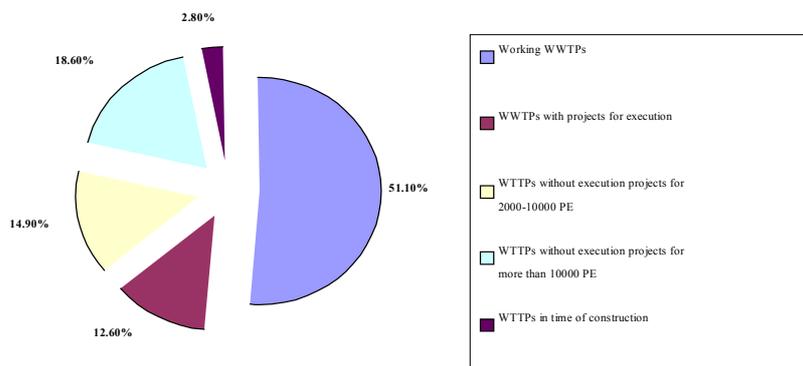


Figure 7. Percentage of Population Equivalent (PE) with Different WWTPs

The Black Sea region has many WWTPs: Varna district – 16 and Burgas district 11. There aren't any WWTPs in the districts of Blagoevgrad, Vidin, Kardjali, Lovech, Russe, Pazardjik, Haskovo and Yambol.

Twenty three industrial enterprises would be covered by Art. 13 of the Directive 91/271/EC. Twelve of these don't have permits for discharge of wastewaters to water bodies.

Urban Sewerage Systems

The number of the towns with a public sewerage network is 167 or 70.2 % of the total. Only 2.1% of the villages have public sewerage network.

There aren't any choices about the separation of sewerage for rainwater and for urban wastewater.

The length of the sewers is 9013 km. The total number of sewer connections is 321,983

The sewers are mostly of a gravity type, being constructed with combinations of concrete and steel/concrete pipes. Bulgarian experts estimated that 20% of the sewerage collection networks need urgent rehabilitation. Over 40% of them were constructed in the period of 1960-65 (ISPA Strategy, MoEW, 2002).

The amount of industrial wastewater initially collected, lost in collection, treated, and/or discharged by WSSCs is not known accurately because these flows are rarely metered or measured with accuracy.

The sewerage system of Sofia was originally constructed around 1897 and has been extended at intervals, corresponding to the town development to its present state. There are 1550 km of sewers with total length of the main collector sewers of 423 km, which service approximately 85% of the city's population.

6. Management Units

6.1. Types and Numbers of Management Units

The institutional organization of the water supply and sewerage sector was shown above in Chapter 2 (2. Legal and Institutional Setting.)

The WSSCs are purely water supply and sewerage service providers, and do not undertake any other business activities. The main institution responsible for WSSCs with state shares in Bulgaria is the MoRDPW but each WSSC has an independent budget.

Distribution by size			Comments
Large (> 100 000 inhabitants)	Medium (25 000 – 100 000 inhabitants)	Small (< 25 000 inhabitants)	
- 27	- 12	- 11	<ul style="list-style-type: none"> - 29 regional Water Supply & Sewerage Companies : 13 of these companies are 100% state owned, and 16 are jointly owned (51% by the state and 49% by the municipality) - 20 municipal water companies serving only small area and population - in 2000 the concessionaire “International Water” and the municipality of Sofia registered the shareholder company Sofiyska Voda AD for the water supply and sewerage services of Sofia capital.

Source: MoRDPW

A matrix of water supply and sewerage problems is shown in [Annex 4 \(p.75.\)](#) The main problems are as follows as:

- the water supply networks are obsolete and dilapidated resulting in high levels of water loss during distribution;
- 67% of the towns are provided with sewerage networks. Around 20% need reconstruction and modernization;
- the current water resources are sufficient for normal water supply if they are properly managed and effectively utilized;
- the number of population (about 1.4 million inhabitants) which are not supplied with water 24 h per day in drought periods is too high;
- lack of enough in reservoirs to cover drought periods;
- there is a need of construction of a great number of sewerage networks and wastewater treatment plants.

Demand for water and wastewater services in WSSCs is often overestimated (demand adjusted to increased tariffs) and capacity designs are too big. The WSSCs haven't shown serious interest to saving water e.g. their interest seems to be to sell much more water. The new projects frequently do not produce revenues or reduce other costs enough to cover their costs. Under current conditions, reducing water loss to 25% according to 1999 Water Act is not realistic until 2010 or later.

Trends in Formation and Consolidation of the MUs

The transposition of the EU WFD, the new water supply and sewerage strategy and the new act for water supply and sewerage services is designed to better coordinate all water management units. The

short- and long-term responsibility of each institution and enterprise is clear (see the Action plan for the period 2003-2015 in [Annex 5 \(p.77\)](#)). The linkage between different institutions has to be improved.

6.2. Financial Conditions of the MUs

Contracts are established between MUs – WSSCs and wholly owned municipal water systems - and suppliers of raw materials, oil, pipes, water-meters adjustment, with post-offices for payment of the bills, maintenance of hard/software, in accordance with the Law of Public Commissions.

Service contracts between MUs and households are not currently used. It is supposed that such contracts will be established when the new water law establishing EWSRC is promulgated. There are proper contracts with WSSCs and industrial consumers - factories, plants and budget organizations. All kind of obligations are placed in these contracts, including the water discharged volume, water quality limits, water tariffs, effluent charges etc..

The key financial outcomes of WSSCs with over of 50% state shares (state participation) are shown in the Table 30. These state or state/municipal WSSCs supplied 249 municipalities with 6,422,041 inhabitants.

Table 30. Economic Status of WSSCs with State Participation for the Period 1998-2002

No.	Indices	1998	1999	2000	2001	2002
1.	Income, thousand BGN	182016	210500	231734	254848	242042
2.	Expenditure, thousand BGN	173423	199369	221575	249872	238404
2.1.	of which: depreciation	14043	19379	21466	25231	31238
3.	Accounting profit (+) Loss (-), thousand BGN	8593	11131	10159	4976	3638
4.	Balance of "profit" (+) Loss (-), thousand BGN	5342	7269	6342	2135	1486
5.	Fixed assets, thousand BGN	318918	332622	356454	409481	396537
6.	Long term assets, thousand BGN	318804	331623	352722	397121	
7.	Received long term loans, thousand BGN	10084	18490	34160	49151	
8.	Received short term loans, thousand BGN	438	312	870	776	
9.	Average tariff of treated drinking water (without VAT), BGN/m ³	0.43	0.54	0.65	0.74 (0.5-1.41)	0.68* (0.41-1.33)
10.	Average tariff of treated wastewater (without VAT),	Households 0.11	Households 0.13	Households 0.14	Households 0.17	Households 0.17

No.	Indices	1998	1999	2000	2001	2002
	BGN/m ³					
11.	Water losses, %	56.8 (29.57 Blagoevgrad; 77 Dobrich)	57.89 (29.33 Blagoevgrad; 79 Dobrich)	57.53 (41 Kardjali; 76 Dobrich)	57.37(39.98 Kardjali; 79 Dobrich)	67.8*
12.	Liabilities (debts), thousand BGN	20233	22788	32165	48149	56076
13.	WSSCs with profit, number	28	29	28	24	27
14.	WSSCs with loss, number	1	0	1	5	2
15.	Average monthly salary, BGN	215	229	286	303	325
16.	Staff, number	15335	15314	14849	14208	13551
17.	Investment, thousand BGN	16034	22328	32465	54549	23244

Source: MoRDPW for 1998, 1999, 2000, 2001, 2002; *NSI.

27 Regional WSSCs reported positive net revenue and 2 (Dobrich and Haskovo) reported loss in their activities in 2002. The investments in municipal WSSCs (with 1,616,925 water supplied inhabitants and 1,389,070 inhabitants connected to the sewerage network) are very small.

No.	Indices	1998	1999	2000	2001
1.	Investments in municipal WSSCs, thousand BGN; of which:	351	419	793	28147
1.1.	Sofiyska Voda*	0	0	0	27300

Source: MoRDPW; *1,150,000 water supplied inhabitants and 1,094,410 inhabitants connected to the sewerage network of Sofiyska Voda.

Planned investments for the water supply and sewerage sector are shown in Table 31. and [Annex 5 p. 77](#). Main financing sources are expected to be EC accessions grants, concessions, national budget etc.

Table 31. Investments Needed for Water Supply & Sewerage

Purpose of investments	Investments needed	Responsible institutions	Implementation terms	Possible investment sources
	(million BGN /Euro)			
Rehabilitation of water supply networks and decrease of water loses	3376 / 1726	MoRDPW and municipalities	2002-2015	Concessions, accession funds (ISPA), National budget
Construction of new and completion of already started facilities	1676 / 857	MoRDPW and municipalities	2002-2015	BOT, concessions, National Budget
Construction of sewerage networks	1100 / 562	MOEW, MRDPW and municipalities	In compliance with the National Program on Sewerage Networks	ISPA, National Budget
Construction of Wastewater Treatment Plans – I phase	636 / 325	MOEW and municipalities	In compliance with the National Program on Wastewater Treatment Plants	ISPA, National Budget

Source: MoRDPW

Collection of Debt Owed to WSSCs.

During the period of economic collapse many factories as well as some residential customers were debtors of the WSSCs. The WSSCs were forced to use lawsuits to collect these debts. Since March 2004, 3 years prison or tax of BGN 15000 is possible for misappropriated actions of water users (water theft, water meters decreased data etc.).

7. Regulatory Units

7.1. National, Basin and Local Planning and Permitting

National Investment Planning

The Action plan in [Annex 5 \(p.77\)](#) estimates the high cost of meeting EU water -related directives and funding sources to finance investments needed in the water sector. The capacity building at the ministries is not sufficient to respond to the actions planned. Also, the managers of WSSCs are political appointees, often without a proper background for determining or executing needed investments.

Municipal Investment Planning and Regulation

Besides national planning, municipalities themselves establish development plans that include all public infrastructures. Many representatives of municipalities may not yet have sufficient experience with issues related to the operation and financing of public services or facilities. This makes it difficult for them to agree on and execute a common policy. In addition, local officials and private operators of water companies have a natural tendency to try to retain the most profitable parts of water systems. Water bureaucracies, on the other hand, encourage large investments that involve high costs even of they also generate low revenues.

Many water management plans and regulations are unknown to most of water decision makers as well as many WSSCs administrations. The level of administration and water system management quality control is not very effective. Some WSSCs and enterprises have various financial links to the regulatory institutions. Sometimes, for example, permits are issued that don't effectively assure reduction in water pollution. There are many economic incentives (tariffs, fees and charges etc.) but their implementation often depends on the water service provider.

Public-Private Partnerships to Improve Management and Financing

There are alternative management models of the water supply and sewerage with private sector participation. Service contracts, management contracts, concession contracts and BOT, and joint management companies are summarized below (Table 32.).

Table 32. Management Options for Water Supply & Sewerage Sector

Option	Advantages	Disadvantages
Service contract	<ul style="list-style-type: none"> a. It is applied to solve specific problems when: a good management is already achieved; decrease of loses; billing; management of Wastewater Treatment Plants , etc. 	<ul style="list-style-type: none"> a. It can not solve the problems of the non-effective management b. It can not improve the bad repayment of expenditures c. It is concluded for a short term
Management contract	<ul style="list-style-type: none"> a. They can quickly improve the technical capacity and financial indicators b. A good effectiveness is achieved for specific tasks c. The responsibility for operation and maintenance is transferred to the operator 	<ul style="list-style-type: none"> a. Short term of effect b. It does not ensure capital investments
Lease	<ul style="list-style-type: none"> a. Via it a good profit is achieved if the management is improved b. The operator is responsible for the effectiveness of operation c. Longer operational period 	<ul style="list-style-type: none"> a. It does not ensure investments b. For planning of capital costs responsible remains the owner

Option	Advantages	Disadvantages
Concession and BOT	<ul style="list-style-type: none"> a. The whole activity is transferred to the operator b. Improved is the effectiveness of the management c. Improved are the qualities of services d. Long-run contracts - over 25 years e. It Ensures investments for long-run development f. The new facilities under construction and the improved existing facilities remain for the owner of the infrastructure 	<ul style="list-style-type: none"> a. If the management during the contract period if not good, then the risk is higher.
Joint companies	<ul style="list-style-type: none"> a. Private sector participation is restricted to the extent as identified in the contract . b. If there is a good public-private partnership, an increase of the effectiveness and improvement of the management could be achieved. c. They are of long standing nature d. Capital investments are ensured for the development of infrastructure 	<ul style="list-style-type: none"> a. A part of the responsibilities and risks are retained by the owner b. In some cases the owner and the regulatory body are the same state body which make the management more complicated
Privatization	<ul style="list-style-type: none"> a. All responsibilities are transferred to the operator b. Effectiveness and management are improved 	<ul style="list-style-type: none"> a. The sell of assets is carried out. b. A very high extent of regulation is required c. Risk for the protection of public interests

Source: MoRDPW

7.2. Economic Instruments and Regulations

Tariff Setting

WSSCs face significant levels of non-payment. This results in concern for the financial viability of the WSSCs and pressure by WSSCs and their management to introduce higher drinking water and wastewater tariffs. There is a need for a new approach to setting and collecting waste and wastewater tariffs. The establishment of new water tariff methodology will be the first obligation of the Energy and Water State Regulatory Commission.

It can be seen that in the all cases the nominal “profitability” is below 30%, including those companies receiving loans from the World Bank Project described above. In accordance with the international practice and the suggestions made by the consulting firm Halcrow in 2002, it is necessary that debt service and a normal return on the long-term assets be included in the water service provider accounting calculations. It is necessary that international experts be involved because the question of pricing the water services is directly linked with the repayment of the capital invested in the WSSCs under the World Bank loan.

Operating Subsidies

Direct O&M Subsidies are not offered in Bulgaria. There is no consistent information at hand related to the extent of cross-subsidy between agriculture, industry, and households.

Investment Subsidies

The Bulgarian Government and European Union allocate investment subsidies. Unfortunately, the absorption of the ISPA funds has proven to be a problem. For example, in 2003 about Euro 40 million preliminarily allocated for 2 WWTPs – Stara Zagora and Dimitrovgrad – has been “lost” due to failure to reach agreement on project terms and conditions. The managers of WSSCs are not involved in the process of firm selection for distribution of these investment subsidies. Sometimes the urgent need of one settlement is a drinking water treatment plant, not a WWTP. A more balanced and integrated approach has to be implement in the water supply and sewerage sector, starting by source of water to the end – discharge to water bodies.

Water Use Fees

The payers of the fees are only holders of licenses for water use and/or use of water bodies, in accordance with the 1999 Water Act. The income of the water fees in 2002 to NEPF is BGN 21,664,400 or USD 10,430,621 (Euro 11,076,831). The absolute amount of the fees at present is low. The main cause for the limitation is the economic sensitivity of the residential and commercial customers. The revenues from fees that will be received by the NEPF (later EMEPA) from the fees for the right of water use and/or use of water bodies are to be used in accordance with the provisions of the Water Act.

Effluent Charges

Industry as well as some WSSCs have had effluent charges levied by the Regional Inspectorates of Environment and Water when wastewater treatment plants don't work well. The design of these effluent charges and associated fines is described in detail in the next section.

Effluent charges are paid mainly by the industry. In 2002, the collected amount of fines is BGN 455,000 or Euro 232,737 by 267 factories.

The income from the fines, collected by the Regional Inspectorates of Environment and Water, is split as follows: 80% for the respective municipal budget and 20% for the Enterprise for Management of Environmental Protection Activities (EMEPA).

Managers of WSSCs frequently argue that a part of fees and of effluent charges should go directly to the water sector for renovation.

Direct Regulation

There is an expectation that the new Energy and Water State Regulation Commission will effectively manage all economic issues as well as water tariffs of WSSCs.

7.3. Environmental Regulations and Restrictions

Under the 1999 Water Act the Minister of Environment and Water is able to order compulsory administrative measures, in the cases of:

1. emergency or disaster situations, caused by the action or inaction of water users and/or users in the process of water use and/or use of the water body and the operation of the water infrastructure and installations;
2. arising of immediate danger from pollution, damage or destruction of the environment, of people or property of the state, the municipalities, individuals or corporate bodies as a result of the action or inaction of water users and/or users of water bodies (Art. 199. (1)).

This power has been used when WWTPs didn't work well.

Effluent Charges and Associated Fines for Non-compliance

The effluent charge schedule for individual, corporate body, WSSCs etc. which effluents in excess of permitted levels is as follows (Art. 200. (1) of 1999 Water Law):

1. uses waters without the necessary justification or in detraction from the provided conditions and requirements in the permit or the contract: a) for quantity up to 1 l/s - from 150 to 1000 BGN; b) for quantity from 1 l/s to 10 l/s - from 500 to 5000000 BGN; c) for quantity from 10 l/s to 100 l/s - from 1000 to 10000 BGN; d) for quantity over 100 l/s - from 10000 to 25000 BGN;
2. use of water infrastructure and systems or constructs such without the necessary justification, or in violation of the provided conditions and requirements in the permit - from 1000 to 10000 BGN;

3. pollutes the waters, destroys the water beds or the river banks in violation of the bans- from 5000 to 15000 BGN;
4. violates the rules for declaring, accounting and control during the implementation of the water use - from 150 to 1000 BGN;
5. breaks water and hydro-metric installations and devices or violates the proper operation and the regulated regimes of their operation - from 500 to 5000 BGN;
6. discharges wastewaters into the water bodies and the sewerage system violating the emission and/or the emission standards and requirements - from 1000 to 5000 BGN;
7. uses the lands adjacent to the water bodies or the lands of the flooded coastal or river bank areas not for their designation - from 2000 to 10000 BGN;
8. misrepresents information about emergency situations in the water bodies - from 500 to 5000 BGN;
9. misrepresents design documentation about the facilities which can affect the natural state of the waters - from 5000 to 10000 BGN;
10. does not provide access of the control bodies for carrying out measurements and analyses - from 150 to 500 BGN;
11. destroys or counterfeits data and information - from 1000 to 10000 BGN;
12. does not execute an obligation to inform the control bodies about circumstances being important for the water protection - from 200 to 2000 BGN;
13. damages or destroys points or stations from the national monitoring networks - from 10000 to 25000 BGN;
14. does not execute the obligation for announcing the restrictions and the bans - from 200 to 2000 BGN;
15. does not execute the prescriptions - from 500 to 5000 BGN;
16. for all remaining cases of violation of bans or non-execution of obligations under the present law - from 150 to 1500 BGN.

With the penalty of para 1 also is punished the individual or the representative of the corporate body ordered or assigned the carrying out of activities of para 1 when the activities themselves represent an administrative violation. When the violation of para 1, items 2,3, 7 and 13 is construction, the fine or the sanction is from 10000 to 25000 BGN. For a second violation of para 1 and 2 the fine or the sanction is from 1000 to 50000 BGN.

Many enterprises prefer to pay the penalties rather than renovate or built the wastewater treatment plants. Sometimes the control institutions are not so strong.

Drinking Water Quality Standards

The Ministry of Health is responsible for setting and enforcing hygienic limits of drinking water. The same pollutants levels as required by the EU Drinking Water Directive are regulated by Regulation No. 9/16.03.2003. There is transition period for certain chemical indicators, and the standards should be achieved by the latest January 2005 and January 2007, respectively.

8. Service Users

8.1. Water System Customers

It is evident that the difference in the water tariffs between different customers is not big. The difference of the water tariff depends mainly on the type of water source and water quality. The high water tariff doesn't correspond to the high level of water services. pumping groundwater is more costly for all users.

There are some possibilities for different water tariffs based on the volume of water consumed and linked to the socio-economic status of the people. For example, wealthy households have swimming pools, gardens etc. and their water consumption is often relatively high.

8.2. Self-Service Users

There isn't any effective control for the real amount of industrial and agricultural self supply by wells. This fact decreases the number of public supply users and finally increases the water tariff per consumer as existing fixed costs must be covered by fewer customers

Households that are not connected to the public sewers use individual septic systems. This kind of self-service is typical in rural and tourist areas, and small towns. These septic systems are a source of groundwater pollution by nutrients and bacteria. The water quality monitoring of private wells is not on-going. There aren't any plans for wastewater treatment for small populated areas with less than 2000 PE.

9. Reform Proposals connected to Tariffs and Charges

9.1. State Reform Proposals

The EU accession goal provides a strong motivation and context for reform of Bulgarian water policy. The initial milestone was reached by the adoption of the Water Act in 1999. Some of the short term measures mentioned in the Action Plan for the period of 2003-2015 will, depending on implementation, have an impact the level, design, and setting of tariffs and, perhaps, on effluent charges as well. Some measures are listed in Table 33. and an elaborated listing by MoRDPW is provided in [Annex 5 \(p.77\)](#).

Table 33. Main Short-Term Measures Planned for Water Supply and Sewerage Sector

No.	Measure	Funding source	Initiation
1.	Development of business plans for water and sewerage companies in compliance with the new WSSCs strategy	Water Supply & Sewerage Companies	31.03.2004
2.	Development of Act for Regulation of the Water Supply and Sewerage Services	National financing	30.09.2005
3.	Taking out the infrastructure assets of the water and sewerage companies and their conversion into public property	Water Supply & Sewerage Companies	31.12.2004
4.	Development of pricing methodology	National financing within MoRDPW	30.06.2004
5.	Development of standards for the levels of services	National financing within MoRDPW	31.12.2004
6.	Establishment of Water Supply Fund	National financing within MoRDPW	31.12.2004

Source: MoRDPW

Energy and Water State Regulatory Commission

The financial support for the new EWRSC will raise the tariff for one cubic meter of public supply water by BGN 0.001 (Euro 0.0019). This new annual “Water Supply & Sewerage Regulation” charge will start in January 2005 and will be paid by all water operators (WSSCs).

The Council of the Ministers is expected to approve an ordinance for “Regulation of the Tariffs of Water Supply & Sewerage Services”, including establishment of the EWRSC. This ordinance will include support for the cost recovery principle and will discourage cross-subsidies across different water and sewer users. The EWRSC will be given responsibility to set the maximum water tariffs and determine proper levels of revenue. Water tariffs actually charged would not be higher than the maximum tariffs. WSSCs that set non-approved water tariffs will pay a fine of BGN 20,000-50,000 (Euro 10,226-25,564).

Under this ordinance it would be the duty of each WSSC to send to the EWRSC an annual business plan and financial and audit reports. If this duty is performed in time the imposed fine is BGN 10,000-30,000 (Euro 5113-15,339). Monitoring will be done by EWRSC’s employees or by selected experts.

A special web page on the “National Information System” of the EWRSC will provide the public with all data collected from WSSCs.

Investment Targets

Generally, infrastructure requirements will put pressure on WSSCs to raise the level of water tariffs to support investment over the period 2004-2014. The financial forecast of investment for development of water supply and sewerage activities in Bulgaria is 6931 million Euros (Table 34.).

Table 34. Financial Forecast for Development of Water Supply & Sewerage Sector in Bulgaria, million Euro

Year	Bulgarian sources of investment financing				Foreign sources of investment financing			Total per year
	Water Supply & Sewerage Companies	State budget	State enterprise for infrastructural projects	Total	EC (ISPA, Phare, Cohesion funds)	Int. banks (EBRD, EIB, WB)	Total	
1	2	3	4	5	6	7	8	9
2004	30	5	20	55	5		5	60
2005	30	8	50	88	12	10	22	110
2006	80	10	70	160	65	30	95	255
2007	100	12	80	192	427	55	482	674
2008	200	15	80	295	506	70	576	871
2009	250	20	80	350	560	70	630	980
2010	300	20	80	400	670	80	750	1150
2011	300	25	90	415	445	90	535	950
2012	300	25	90	415	420	50	520	935
2013	250	20	90	360	281	50	381	741
2014	200	15	90	305	-	-	-	305
Total	2040	175	820	3035	3391	505	3896	6931

Source: MORDPW.

Foreign finances:

- EBRD: Euro 60 million for WSSCs;
- EIB: Euro 23.5 million for Haskovo UWWTP and Euro 150 million for WSSCs;
- Other sources: Euro 20 million;
- ISPA: Euro 32.5 million for Stara Zagora and Dimitrovgrad UWWTPs and Euro 320 million for WSSCs;
- Cohesion fund: Euro 154.3 million (2007), Euro 177.4 million (2008), Euro 204 million (2009), Euro 234.6 million (2010), Euro 222.8 million (2011) , Euro 211.7 million (2012), Euro 190.5 million (2013).

The investment needed for construction of WWTP with biological treatment was estimated by MoEW as follows as (MoEW, 2003):

- for the settlement with population equivalent from 2000 to 10000 PE – 335 Euro/PE;
- from 10000 to 15,000 PE – 231 Euro/PE;

- from 15,000 to 150,000 PE– 137 Euro/PE;
- > 150,000 PE – 79 Euro/PE.

The investment needed for 100% connection of population to the sewerage system is calculated on the basis of multiplication of three parameters: number of inhabitants, 9.2 m sewerage per inhabitant for small settlement and fewer meters than 9.2 m per inhabitant for bigger settlement, and 150,000 Euro per km (MoEW, 2003).

The total financial expenditures for construction of WWTPs and sewerage systems to meet Directive 91/271/EC is estimated to be Euro 2218 million (MoEW, 2003). The needed national financial support is from 0.15% to 0.42% of GDP. The biggest of this expenditure is in 2009, 2010 and 2012 – 0.42% of GDP (MoEW, 2003).

The time schedule of the WWTPs construction by different kind of settlements is shown in Table 35. (MoEW, 2003).

Table 35. WWTPs Forecast for the Period 2003-2014

No.	Number of projects started in the shown year incl. the fulfillment of the projects started in the previous years	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1.	determination of the projects	10	14	19	18	13	7	0	0	0	0	0	0
2.	New WWTPs > 10000 PE	1	2	7	22	43	53	48	33	0	0	0	0
3.	New WWTPs for 2000-10000 PE	0	0	0	0	0	19	87	129	177	196	154	87
4.	WWTPs for completion	6	8	7	9	8	5	2	2	0	0	0	0
5.	WWTPs for reconstruction and modernization	6	16	18	29	30	32	20	23	4	2	0	0
6.	Sewerage projects in build up WWTPs	2	2	3	4	6	8	8	7	6	3	0	0
7.	Total	25	42	54	82	100	124	165	194	187	201	154	87

9.2. Reform Proposals

Management improved and capacity building

The strategy for improving the quality and scope of Bulgarian water and wastewater services to European levels and standards are as follows as:

- good conditions for efficient management of the sector by introduction of economic acceptable integrated approach;
- private sector participation while taking into account public interests.

There is a need of a change in the incentive structure so that WSSCs are managed to control costs and keep service levels and water tariffs compatible with the demands of their customers. The concept of integrated water management has to be introduced. The EU principles for economic analysis and public participation would be translated and disseminated. Water tariffs decisions and investments needs have to be taken from both the bottom up (from local places to ministries levels) and from the top down. Key stakeholders should be involved in the investment and water pricing process from the beginning.

Less Costly Alternatives

Full implementation of the national investment programs for sewerage and wastewater treatment is not realistic. The wastewater treatment plants for 430 settlements are planned, of which 121 are for plants serving more than 10000 PE. Bulgarian experts are concerned about finding the best way to make investments. Demand is often overestimated (demand adjusts to increased tariffs) and this can result in designs whose capacity is too big. Such projects frequently do not achieve cost recovery at the originally projected tariffs. For small towns and villages in particular, cost recovery is not feasible for the lower income groups. Our main conclusion is that low income limits the level of water and wastewater tariffs and any increase in the current tariffs should be very gradual and investments must be well-planned and consistent with these tariff limitations.

Costs can be lowered (and tariff increases avoided) by using cheaper alternatives for drinking water and wastewater treatment - implementation of affordable, lowest cost systems. The secondary/tertiary wastewater treatment is not affordable for villages and small towns in Bulgaria. As incomes rise affordability increases, so more costly schemes can be introduced later. By combining tariffs on water and wastewater users and charges on beneficiaries we can achieve cost recovery in a more equitable way.

Construction of new dams will raise the water tariff. Other alternatives could be investigated before starting of each new project.

Affordability

Affordability is missing in water legislation. There is a possibility to adopt two part or more generally, multipart tariffs. For example, one affordable tariff for 3 m³ per capita per month and two/three times higher tariff for over than 3 m³/cap./month. Such social protection is needed to ensure adequate water availability to poor households.

Information

There is a need to standardize information to meet NACE 90. The sources of environmental finance including water finance should be set in three groups: own funds, loans and grants. *Columns of "Expenditure by Source"* could be as follows:

1. Expenditure/ code of expenditure
2. Total
3. Entity's own funds
4. Loans
 - 4.1. bank loans
 - 4.2. bonds
 - 4.3. national environmental funds
 - Enterprise for Environmental Activities Management
 - National Trust Eco Fund
 - others ("Agriculture", etc.)
 - 4.4. pre-accession funds
 - ISPA
 - PHARE
 - SAPARD
 - 4.5. other loans from residents
 - 4.6. other loans from non-residents

5. Grants
 - 5.1. state budget
 - 5.2. municipal budgets
 - 5.3. national environmental funds
 - EMEPA
 - National Trust Eco Fund
 - others ("Agriculture", etc.)
 - 5.4. pre-accession funds
 - ISPA
 - PHARE
 - SAPARD
 - 5.5. other grants from residents
 - 5.6. other grants from non-residents

The annual information for "Fines and Sanctions" should be expanded with information on environmental charges paid by legal entities and could have the following columns:

1. Code
2. Product charges
3. Consumer charges
 - 3.1. solid municipal waste
 - 3.2. water supply, sewerage, wastewater treatment
4. Natural resource charges
 - 4.1. the right for water use and/ or using water body
 - 4.2. according to the Medicinal Herbs Act
 - 4.3. concessions
 - forests
 - mineral water
 - mineral wealth
 - others
5. Fines and sanctions paid off according to Environmental Protection Act, article 3
 - for water, for air, for soil, for waste, for noise, others
6. Other fines and sanctions paid off
 - for water, for air, for soil, for waste, for noise, others

Classification of expenditure by economic activity units. Information published by the NSI does not differentiate between expenditure by the public sector, the private sector and specialized producers (NACE 90), as well as between the central and local authorities. The tables should have separate columns/ rows for the special producers (NACE 90) and for the public sector with sub-columns for central authorities and local authorities.

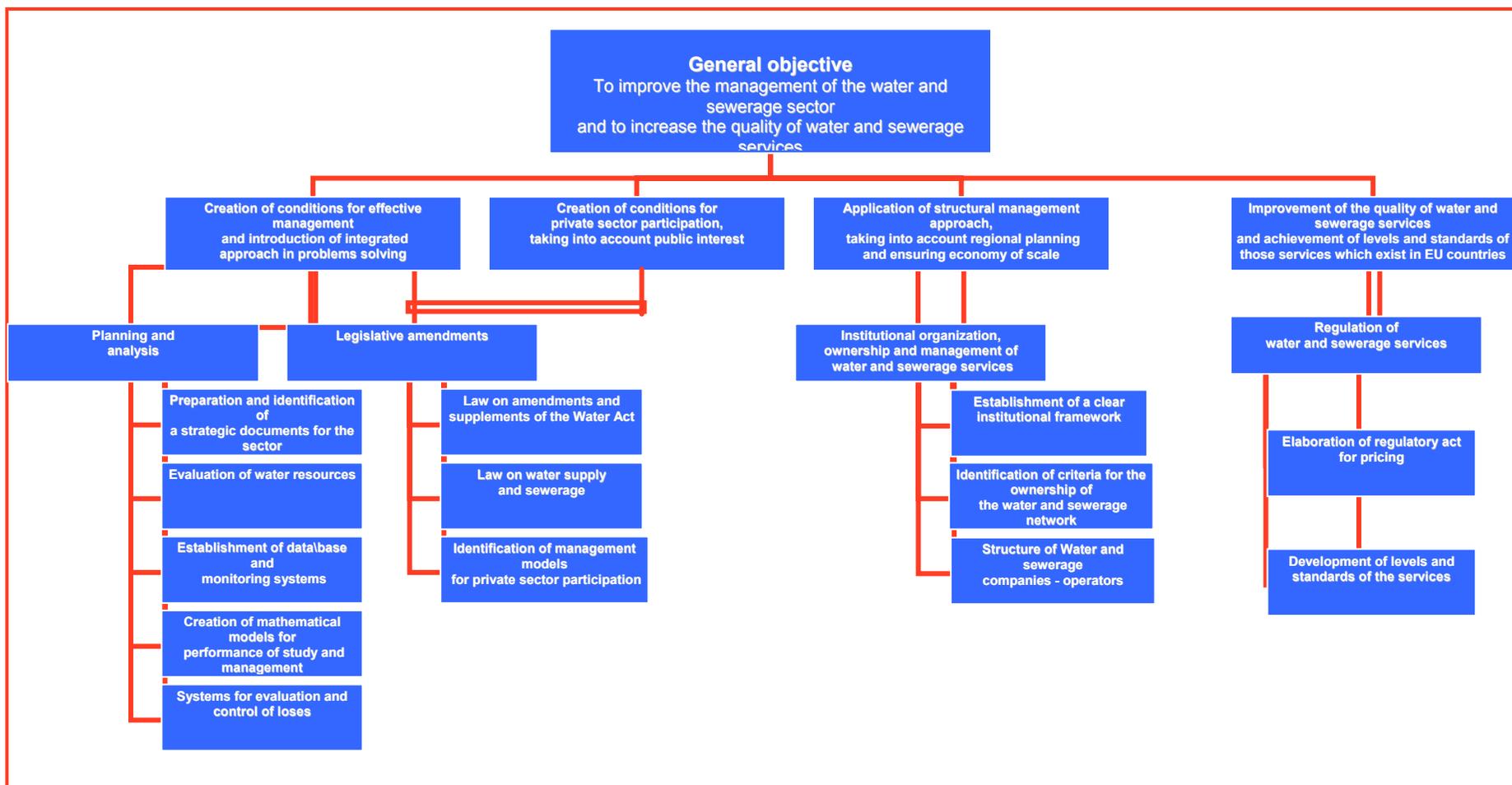
Water glossary and Tool Box

There is a need of extend water glossary, including the socio-economic terminology and of a "tool box" with good practices for water supply & sewerage companies management.

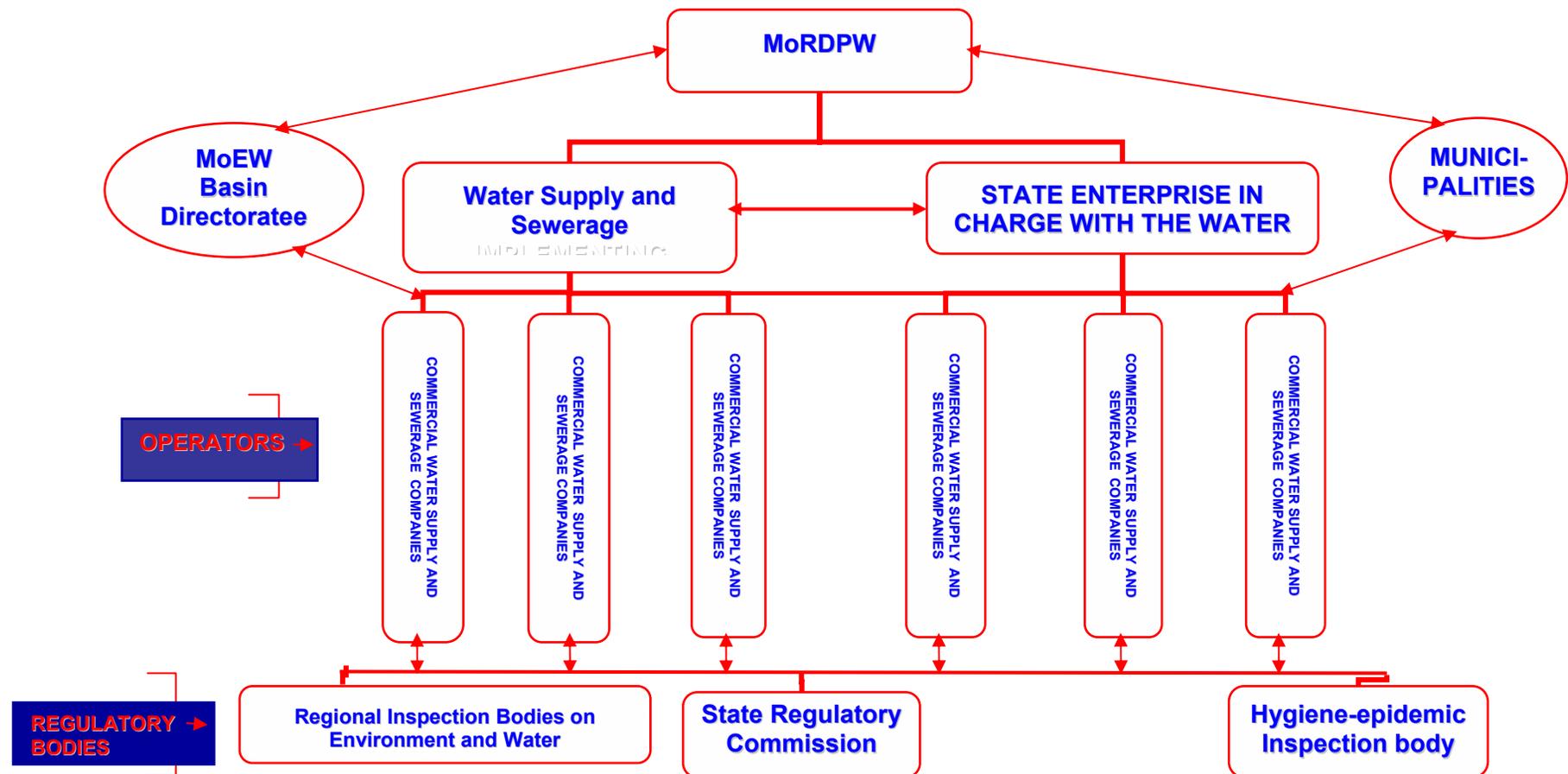
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Annex 1: Objectives of The Strategy and Implementation Measures



Annex 2 Institutional Organization of the Water Supply and Sewerage Sector



Annex 3: Water Tariffs of Water Supply & Sewerage Companies in 2003

(without VAT)

BGN/m³

No.	Water Supply & Sewerage Company	Drinking water			Not clean water	Sewerage		Treated Wastewater				
		Households	Budget organizations	Public sector		Households	Public sector	Households	BOD < 200 mg O ₂ /l	BOD ₅ from 200 to 600 mg O ₂ /l	BOD ₅ > 600 mg O ₂ /l	
1		3	4	5	6	7	8	9	10	11		
1. Blagoevgrad												
	Blagoevgrad region – gravitary water	0.45	0.45	0.50	-	0.05	0.05	-	-	-	-	
	Gotze Delchev region – gravitary water	0.42	0.42	0.55	-			-	-	-	-	-
	Razlog region- gravitary water	0.38	0.38	0.50	-			-	-	-	-	-
	Pumping water	0.55	0.55	0.75	-			-	-	-	-	-
2. Burgas												
	Pumping water	0.72	0.78	0.78	-	0.10	0.14	0.30	0.37	0.43	0.58	
3. Varna												
	Gravitary water	0.70	0.78	0.78	-	0.14	0.14	0.23	0.23	0.40	0.76	
4. Veliko Tarnovo												
	Gravitary water	0.90	1.02	1.02	-	0.08 0.13 (for V. Tarnovo town)	0.08		0.46	0.59	0.80	
5. Vidin												
	Pumping water	0.94	0.94	0.94	-	0.14	0.21/0.25	-	-	-	-	
	Gravitary water	0.66	0.66	0.66	-	0.11	0.11	-	-	-	-	
6. Vratza												
	Pumping water	0.85	0.98	0.98	0.40	0.10	0.10	0.12	0.49	0.55	0.66	
	Gravitary water	0.40	0.58	0.58								
No.	Water Supply & Sewerage Company	Drinking water			water	Sewerage		Treated Wastewater				
			Budget organizations	Public sector		Households	Public sector	Households	BOD ₅ < 200 mg/l	BOD from	> 600 mg/l	
1	2	3		5	6	7	8	9	10	11	12	

No.	Water Supply&Sewerage Company	Drinking water			Not clean water	Sewerage		Treated Wastewater			
		Households	Budget organizations	Public sector		Households	Public sector	Households	BOD < 200 mg O ₂ /l	BOD ₅ from 200 to 600 mg O ₂ /l	BOD ₅ > 600 mg O ₂ /l
1		3	4	5	6	7	8	9	10	11	
7. Gabrovo											
	Mixed water (pumping and gravitary)	1.05	1.05	1.30	1.10	0.13	0.13	0.20	0.70	0.90	1.35 1.70 (> 1000 mg/l)
8. Dimitrovgrad											
	Mixed water	0.93	0.93	1.18	-	0.11	0.11	-	-	-	-
9. Dobrich											
	Pumping water	1.22	1.30	1.30	-	0.07	0.07	0.07	0.15	0.25	0.30
	Gravitary water	0.50									
10. Ispereh											
	Pumping water	1.47	1.47	1.47	-	-	-	-	-	-	-
11. Kardjali											
	Pumping water and by Borovitza dam	0.85	0.85	0.85	0.22	0.04	0.04	-	-	-	-
	Gravitary water	0.22	0.22	0.22							
12. Kjustendil											
	Kjustendil	0.85	1.25						0.40		
	Bobov dol	0.95	0.95	0.95	-	0.10	0.10	-	-	-	-
	Trekliono	0.85	1.25	1.25							
	Nevestino	0.85	0.85	0.85							
	Bobochevo	0.80	0.80	0.80							
	Rila	0.62	0.62	0.62							
	Kocherinovo	0.80	0.80	0.80							
	Sapareva bania	0.55									
13. Lovech											
	Mixed water	0.80	0.80	0.90	-	0.08	0.08	-	-	-	-
14. Montana											
	Mixed water (pumping and gravitary)	0.58	0.96	0.96	0.60	0.16	0.16				
	Pumping	0.88	0.96	0.96							
	Gravitary	0.42	0.45	0.45							

1	Water Supply&Sewerage Company	Drinking water			water	Sewerage		Treated Wastewater			
		Households	Budget organizations	Public sector			Public sector	Households	BOD < 200 mg/l	BOD ₅ from	BOD ₅ > 600 mg/l
2	3	4	5	6	7	8	9	10	11	12	
15. Pazardjik											
	For municipality Pazardjik										
	Pumping water	0.55	0.55	0.55	-			-	-	-	-
	Gravitary water for water supply group "Debrachica"	0.30	0.30	0.30							
	For Septemvri and Lesichovo municipality				-	0.10	0.10	-	-	-	-
	High pumping	1.00	1.00	1.00							
	Low pumping	0.60	0.60	0.60							
	Water supply "Dinkata-Charkovo-Pamidovo"	0.80	0.80	0.80							
16. Pernik											
	Gravitary water	0.45									
	Pernik region										
	Pumping and mixed water	0.65	0.65	0.70				0.20	0.35		
	Radomir and Tran region					0.07	0.07				
	Mixed and pumping water	0.70	0.70	0.75							
17. Pleven											
	Mixed water	0.93	0.93	0.93	-	0.07	0.07	0.07	0.47	0.57	0.68
	Gravitary water	0.40	0.40	0.40				0.47			
	Pumping water	0.60	0.60	0.60	-	0.05	0.05		0.60 0.40 (<25 mg/l)	0.80	1.00
	Gravitary water	0.48									
19. Razgrad											
	Pumping water	1.40	1.40	1.40	0.54	0.062	0.062	0.07	0.13	0.22	0.4
	Gravitary water	0.79	0.79	0.79							

No.	Water Supply&Sewerage Company	Drinking water			Not clean water	Sewerage		Treated Wastewater			
		Households	Budget organizations	Public sector		Households	Public sector	Households	BOD ₅ < 200 mg/l	BOD ₅ from 200 to 600 mg/l	BOD ₅ > 600 mg/l
1	2	3	4	5	6	7	8	9	10	11	12
20. Russe											
	Pumping water	0.70	0.70	0.80	-	0.04	0.06	-	-	-	-
21. Silistra											
	Pumping water	1.25	1.25	1.25	-	0.06	0.06	-	-	-	-
22. Sliven											
	Pumping water	0.92	0.92	0.92	-	0.08	0.08	0.31	0.30	0.32	0.34
	Gravitary water	0.45	0.45								
	Chervenakovo water supply system for Stara Zagora	0.144									
23. Smolyan											
	Pumping water	0.95	0.95	0.95	-	0.05	0.05	0.45			
	Mixed water	0.65	0.65	0.65	-						
	Gravitary water	0.65	0.65								
24. Sofia district											
	I group /gravitary/	0.45	0.45	0.65	-	0.15	0.15	0.40			
	II group /mixed/	0.65	0.65	0.90	-						
	III group /pumping/	0.80	0.80	1.10	-						
25. Stara Zagora											
	Pumping and mixed water	1.02	1.02	1.05	-	0.05	0.05	0.15	0.50		
	Gravitary water	0.57	0.57	0.71							
26. Targovishte											
	Pumping water	1.25	1.25	1.36	-	0.08	0.08	-	-	-	-
	Gravitary water	0.60	0.60	0.60	-						
27. Haskovo											
	Pumping water	1.25	1.25	1.60	-	0.5	0.5	-	-	-	-
	Gravitary water	0.25	0.25	0.25	-						
28. Shumen											
	Pumping water	1.13	1.13	1.13	-	0.10	0.10	0.12	0.20	0.35	0.55
	Gravitary water	0.42	0.42	0.42	-						
	Mixed puping water	0.84	0.84	0.84	-						
29. Yambol											
	Pumping water	1.00	1.00	1.00	-	0.083	0.083	-	-	-	-

Source: Ministry of Regional Development and Public Works

Annex 4: Matrix of the Water Supply&Sewerage Problems in Bulgaria

Matrix of the Water Supply&Sewerage Problems in Bulgaria	Consequences	Reasons				Level of significance
		Management	Technical	Legislative	Financial	
1. Non-effective functioning of the water supply networks	High % of water losses	Lack of a system for registration of emergency situations and of a system for management of water losses; Lack of a digital cadastre map of the constructed networks; Bad planning; Not covered consumers; Water theft; Frequent change of a management staff; The management staff is not trained at a sufficient level.	Emergency cases and leakage due to depreciated networks, to buildings with deviations and to facilities; Not precise measurement.	Contradictory and not completed legislation Lack of a regulator for water supply and sewerage services, including imperfect methodology for pricing and lack of standards for the definition of the levels of services. Lack of sanctions for the operators	Lack of enough funds	3
	Non scheduled interruptions of the water supply	Lack of digital models of the networks	Emergency cases and leakage	Lack of sanctions for the consumers		
	Regime of water supply	Non-effective management of the water resources	High % of water losses; Not sufficient volumes for water accumulation;			
	Low level of tariff's collection by Water and Sewerage Companies	Bad organized billing				
2. Uncompleted construction of water supply networks	Public water supply system does not meet the quality requirements of Regulation №9/ 16.03.2001	Bad planning		Lack of legislation aimed at promotion of private investments	Lack of enough funds	2
3. Lack of Waste Water Treatment Plants	Wastewater does not meet the requirements of Regulation №7/ 1986 for quality of flowing surface waters			Lack of legislation aimed at promotion of private investments	Lack of enough funds	2

4. Non-effective operation of the sewerage networks	Contamination of groundwater and groundwater sources and of river valleys. High infiltration and ex-filtration	Frequent change and not sufficient level of the management staff. Bad planning.	Bad construction; Hard sewerage links.	Lack of legislation aimed at promotion of private investments	Lack of enough funds	2
5. Uncompleted construction of sewerage networks	Contamination of groundwater and groundwater sources and of river valleys.			Lack of legislation aimed at promotion of private investments	Lack of enough funds	2
6. Not enough number of Urban Waste Water Treatment Plants according to the requirements of Regulation №6/2000	Contamination of groundwater and groundwater sources and river valleys			Lack of legislation aimed at promotion of private investments; Lack of models for construction and operation of Urban Waste Water Treatment Plants for big and small settlements.	Lack of enough funds	2
7. Lack of coordination of the investment process in water and sewerage sector	Not enough effectiveness of the investments that have been done	The investments are concentrated in various institutions and there isn't any coordination between them.				1

Ranging of the problems according to their importance

- 1 – could be overcome, it requires improvement of the management and fairly small amount of investments
- 2 – difficult to be overcome, it requires improvement of the management, average amount of investments and
- 3 – very difficult to be overcome, it requires a lot of time, funds and amendments in legislation

Source: MoRDPW

Annex 5: Water Supply&Sewerage Action Plan for the period 2003 – 2015 in Bulgaria

No.	Measure	Required funds, thousand BGN/ thousand Euro	Fund source	Term	Responsible institution
A.	<i>Short term measures</i>				
1.	Planning and analyses				
1.1.	Development of methodology for evaluation and management of water losses	10 / 5.11	MoRDPW	31.12.2003	MoRDPW
1.2.	Development of business plans for water and sewerage companies in compliance with the new WSSCs strategy		Water Supply&Sewerage Companies	31.03.2004	MoRDPW
1.3.	Establishment of a digital cadastre of water supply and sewerage networks	150 / 76.7	Water Supply&Sewerage Companies	31.12.2004	MoRDPW
2.	Legislation				
2.1.	Adoption of Water Act amendments and supplements by the Parliament		National financing	31.12.2003	MoEW/ MoRDPW
2.2.	Development of act for the water regulatory body		World bank	30.09.2003	MoRDPW
2.3.	Development of Act for Regulation of the Water Supply and Sewerage Services		National financing	30.09.2005	MoRDPW
2.4.	Approximation of the state and municipality property act with the water legislation		National financing	30.09.2005	MoRDPW
2.5.	Approximation of the accounting and corporate withholding tax act with the water legislation		National financing	30.09.2005	MoRDPW
2.6.	Approximation of the regulation on design, construction and operation of water supply and sewerage networks and facilities with the EU standards			30.09.2004	MoRDPW
3.	Institutional				
3.1.	Taking out the infrastructure assets of the water and sewerage companies and their conversion into public property		Water Supply&Sewerage Companies	31.12.2004	MoRDPW
4.	Economic				
4.1.	Development of pricing methodology		National financing within MoRDPW	30.06.2004	MoRDPW/ Regulatory body

No.	Measure	Required funds, thousand BGN/ thousand Euro	Fund source	Term	Responsible institution
4.2.	Development of standards for the levels of services		National financing within MoRDPW	31.12.2004	MoRDPW/ Regulatory body
4.3.	Establishment of Water Supply Fund		National financing within MoRDPW	31.12.2004	MoRDPW
B.	<i>Long term measures</i>				
1.	Planning and analyses				
1.1.	Development of hydraulic models of water supply and sewerage networks for settlements with over 10000 inhabitants	1000 / 511	Water Supply&Sewerage Companies	31.12.2015	MoRDPW
2.	Programs and projects				
2.1.	Completion and construction of new dams for water supply	500000 / 255646		31.12.2015	MoRDPW
2.2.	Construction of Waste Water Treatment Plants	350000 / 178952		31.12.2015	MoRDPW
2.3.	Reconstruction of water supply networks	1700000 / 869196		31.12.2015	MoRDPW
2.4.	Completion and construction of new sewerage networks for settlements with population:				
2.4.1.	over 10000 inhabitants	402486 / 205788	ISPA, Cohesion Fund, National Financing	31.12.2010	MoRDPW/MoEW
2.4.2.	from 2000 to 10000 inhabitants	879705 / 449786	ISPA, Cohesion Fund, National Financing	31.12.2015	MoRDPW/MoEW
2.5.	Completion, reconstruction and construction of new Urban Waste Water Treatment Plants for settlements with population:				
2.4.1.	over 10000 inhabitants	550383 / 281406	ISPA, Cohesion Fund, National Financing	31.12.2010	MoRDPW/MoEW
2.4.2.	from 2000 to 10000 inhabitants	375583 / 192032	ISPA, Cohesion Fund, National Financing	31.12.2015	MoRDPW/MoEW
2.6.	Development of a program and model for public awareness campaign		National financing within MoRDPW		MoRDPW
	Total required investments	4759317 / 2433400			

Source: Ministry of Regional Development and Public Works