WATERWORKS AND SEWERAGE
VODOKANAL BEČEJ
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THE FEASIBILITY STUDY

of the medium-term programme of reconstruction and replacement of the worn-out equpment and waterworks and construction of new wells and new waterworks, together with the completion of commenced sewerage system in the period 2005 – 2010

Bečej, february 2005.

Contents

1. Contents of the justification study

The investor, Public Corporation (PC) "Vodokanal", intends to execute the reconstruction and replacement of worn-out waterworks and water shafts, as well as the replacement of the "battered" and worn-out equipment, as one of the precrequisites for normal functioning of the waterworks and the reduction of water "losses" during the transport, caused by the water pipes made of inadequate materials and their worn-out state.

Besides the replacement and reconstruction of the waterworks, as well as the replacement of the equipment that is completely worn-out and depreciated, Public Corporation "Vodokanal" intends to construct an adequate number of missing wells and therefore increase the capacities of sources, and to reduce the battering of wells caused by the overuse and to extend the term of their use.

Also, the investor plans to extend the length of the waterworks by constructing the new waterworks 15 km in length, in order to provide the water supply for the part of the population that lives in the streets that do not have the waterworks constructed.

Besides the reconstruction of waterworks and water shafts and the replacement of the worn-out and completely depreciated equipment in the system of water supply, the investor intends to round off the sewerage system completely by constructing the new sewerage system 50 km in length, and to supplement and replace worn-out equipment on the waste water treatment plant.

The investor lacks the amount of own financial resources for such a large enterprise of capital investments and therefore it requires resources in the amount of DIN 727.357.000. For this reason it has undertaken the complex preparation of all preliminary designs and this investment program, with the conviction that, from the effects of the capacities constructed up to now and new investments in the projected investments, it will be able to regularly service loans for the repayment of the approved credits and to realise profitable business operations in the long period. We are corroborating this statement by the intention of the investor and the Founder, the Municipality Assembly of Bečej, who have set and determined, as an important goal, the preservation of one of the most important and irreplaceable life resources, that is to preserve drinking water and its reserves for the future generations for as long as it is possible.

Subterranean waters in our country so far have not had the treatment adequate to their importance, because we do not care enough about their preservation and longer sustainability of their reserves, and they are the noblest gift of nature – due to soluble minerals without which this water – according to the opinion of the experts from the Faculty of Geology in Belgrade, publicized by the dean of the Faculty PhD Milivojević in the "Ekonomist" magazine, issue 235, on 22/11/2004. – would be useless for human organism. The opinions that not so far in the future we could have serious problems due to the deficiency of water are based on the fact that due to human carelessness and uncontrolled pollution, on the part of industry and citizens as well, the permanent pollution of the subterranean waters, as irreplaceable and hardly renewable resources, could happen. The reason for this is the fact that the large portion of the population pollutes subterranean water "areas" via septic pits. The erroneous strategy of most political leaders of the neighbouring countries, the strategy whose mistakes political leadership of our country are not exempted from, by which the most important life "product" and the "irreplaceable gift" of nature has been classified into a "social" category, so that in our town the selling prices of water are determined at such a low level that they cannot even meet the basic costs of its production, processing and transport, not to mention resources for its maintenance, renewal and capacities expansion.

To illustrate this, we are citing a few data about the prices of water in our town and our country, in comparison to the prices of water in the countries from our nearest surroundings.

So, for example, the selling price of water in our town is EUR 0.23 for 1 cubic meter for households. Other towns and cities have similar prices, more or less, except Belgrade, where the selling price of water is somewhat higher and it is EUR 0.32. However, in neighbouring countries and places the prices of water are much higher and they range in the following amplitudes:

- in Montenegro the prices of water range differently and in different values and they amount to EUR 1 to EUR 1.5 per one cubic meter;
- in Croatia the average prices of water amount to EUR 0.75 to EUR 1.2 per one cubic meter;
- in Macedonia the prices of water per one cubic meter amount to EUR 0.5 to EUR 1;
- in Bosnia and Hercegovina the prices of water per one cubic meter amount to EUR 0.6 to EUR 1.5;
- in the Republic of Srpska the prices of water per one cubic meter amount to EUR 0.55 to EUR 1.4;
- and in the neighbouring Hungary the prices of water per one cubic meter amount to EUR 0.8 to EUR 1.4.

Due to everything above-mentioned, the activities of PC "Vodokanal" in the following period will range in the following directions:

1. in the direction of the rationalization in all sectors of its business operations,
2. in the direction of the increase of economy of scales,
3. in the direction of greater protection of the natural environment and hydrogeological resources of water that supply the town with drinking water,
4. in the direction of larger capital investments, so that we compensate for everything that we missed and that we were incapacitated for during the previous 10 and more years after the disintegration of the state of SFRJ, civil war, hyperinflation and sanctions imposed by the Council of Security of UN and great decay of the economy and impoverishment of the citizens.

By means of rationalization measures we will endeavour by all means available to reduce the water losses in the transport from the well and the reservoir to the consumer's location. We will achieve this by reconstruction and replacement of worn-out waterworks. Thus by constructing new waterworks we will be able to reduce water losses in waterworks by at least 15-20% in relation to the total amount of losses, which, calculated into value indicators, by reducing the production costs, in our case brings the annual cost reduction in the amount of DIN 10.062.000.

By the increase of economy of scales we will provide the increase of our income in several ways:

1. By the increase of source capacities and connecting the appropriate number of households to the system, which up to now could not become our consumers due to the lack of the waterworks for their connection, which this program will provide by the construction of waterworks 15 km in length.

   According to the calculation of the undermentioned figures, the annual income increase in this way will amount to DIN 25.500.000.

   The potential annual income amounts to :

   1,500 households x 120 m3 = 180,000 m3 x DIN 16,30 = DIN 2,934,000

2. By connecting a certain number of consumers who have connected to our waterworks "illegally" or have supplied themselves with water from local "microwaterworks" whose quality has not been controlled, so that there is a danger that further use of these microwaterworks, constructed for several households, may endanger their health. According to our evaluation, the number of households that use the water from microwaterworks or that are illlegally connected to waterworks amounts to about 500. Under the assumption that they will be connected to waterworks in 2-3 years, we could realise the income increase of about DIN 1,020,000.
3. By connecting all of the households to sewerage system where there are technical potentials for their connection, because in a great number of streets the sewerage system has been constructed and the fittings placed near the pavement, but large number of households – about 30% - has not yet been connected to the constructed sewerage system. Although sewerage system was constructed 10-15 years ago, the above-mentioned households still use septic pits and in that way still contaminate the subterranean waters that our town uses for the drinking water supply. We hope that these problems will gradually decrease after the enforcement of the Law of protection of the environment, issued in "Službeni glasnik RS" 135/2004, where the authorities of the local self-government will provide us with their full support and help by their decisions and environment protection programmes.

   According to our data and appropriate evaluations, the number of households that have not been connected to previously constructed sewerage system amounts to about 2000. According to current prices of sewage treatment and transfer and the average annual water consumption per a household of 120 m3, this number provides potential income that amounts to DIN 3,741,600.

   (2,000 households x 120 m3 = 240,000 m3 x DIN 15,59 = DIN 3,741,600)
4. It is normal that by the planned building of the new sewerage system 50 km in length there will be provided the connection to constructed sewerage system for 3000 to 3500 new households. Under the assumption that after the construction, 3000 households will be connected to sewerage system, this, according to the average annual consumption and current prices of sewage treatment and transfer, means that potential annual income will amount to DIN 5,612,400. (3000 households x 120 m3 = 360,000 m3 x DIN 15,59 = DIN 5,612.400).

2. Description of the existing condition of the objects, space and location aspects

According to the carried out research activities, realised works and decisions made by the local authorities of the Municipality Assembly of Bečej, during the mid-seventies and eighties of the last century, the location of the complex for central water supply was designated, for the needs of the inhabitants, economy and institutions located to the northwest of Bečej. The decisions of the Municipality were supported by the will of all citizens, who, at four succesive referendums, have reached the decision about the introduction of the voluntary tax for financing of the construction of a certain number of wells and a water treatment plant with the objects for removal of gases surplus (methane and homologues) and iron in the objects for gassing and deferment. The final stage of the conditioning contains of disinfection by the solution of gaseous chlorine, so that with all the above-mentioned measures we have managed to get the water which met the needs stated in the rulebook from that period.

All these objects for water supply (wells and water treatment plant), as well as the other above-mentioned objects, are located on the northwest side of Bečej 6-8 km away from the centre of the town.

Alongside the above-mentioned we have constructed the corresponding number of transformer stations in order to provide the electricity for the transport of water from wells to the objects of water treatment plant and to the consumers - households, as well as business enterprises and institutions, who have connected to the constructed waterworks.

Alongside the construction of the above-mentioned waterworks objects, we have begun to construct the waterworks according to the plan, so that during the eighties of the last century we have constructed over 30 km of the main and transfer waterworks. In the previous period, before this planned construction of waterworks, 100 km have been constructed according to obsolete concepts, so that the total length of waterworks is estimated to be 130 km.

Most of the waterworks diameters is inadequate according to the fire protection requirements, materials applied are inappropriate and the biggest problem is the worn-out zinc pipes. Working pressures are below 5 bars and their physical condition is completely unsatisfactory, so that most part of this worn-out waterworks has to be replaced, since the major portion of water losses in transport is ascribed to the old waterworks.

The particular part of distribution network is the junctions and hydrants. Considering the fact that the old, inadequate waterworks are connected to the new one, there is a large number of junctions of shafts in the system, which are inadequately equiped. Within the junctions there have been placed about 600 caps, 40 fire hydrants and 5 locations for the rinsing of the waterworks. The physical condition of the junctions is unsatisfactory, and recorded water losses mostly occur at the above-mentioned junctions.

Since rather large water losses have been recorded in the system, over 40%, it is necessary to eliminate or at least reduce these losses, which inevitably occur in the waterworks system as "objective losses" and as water losses that occur as a consequence of inadequate and worn-out network (subjective losses).

In "objective losses", according to the terminology of waterpower engineering we include:

- water spent for the rinsing of waterworks for sanitary-technical reasons
- water for washing the filters, as a part of conditioning technology,
- public consumption that is not recorded, such as : water spent for washing the streets, the market, the fountain, watering the grass in the parks, watering flowers and town trees, flat payment for water without measuring.

In "subjective losses" we include:

- losses of water at the worn-out pipelines and junctions, hydrants
- losses at water gauges
- unreliable recording of the consumption and similar,
- losses during breakdowns and repairs due to late detection of the failure sites, cracks in the pipelines.

The world experiences of western countries tolerate water losses in transport of 15-20%. According to Serbia waterpower engineering basics, water losses in transport of 18% is calculated in the norm of consumption until the year 2021, which once again shows that the water losses of the present amounts cannot be tolerated anymore.

The reduction of losses is a long-term activity with the precisely set goals and means for their realisation. Considering the reasons for the occurence of "losses" in our town, it is necessary to replace large portion of the old waterworks (30 km in the first stage), execute the revision

of junctions (about 290 shafts) and construct mud drums and the necessary number of hydrants. It has to be noted here that a very substantial and long-term works of high estimated value are in question, whose effects are estimated reduction of water "losses" in transport from current 41% to about 20%.

At the end of the year 1970 and at the beginning of the year 1980, the objects for the sewage treatment and 56 km of sewerage system constructed. Together with these the main collectors anticipated by the project solutions were constructed, except for two collectors in the streets Đura Jakšić and Svetozar Marković, so that about 50% of the secondary waterworks from the nearby streets do not have the conditions to connect to the main collector network. Therefore the appropriate priority should be given to the construction of the collectors in the above-mentioned streets.

Besides above-mentioned, in order to finish the programme of the sewerage system in our town, it is necessary to construct another 50 km of the collector primary and secondary sewerage system. The importance of these capital investments in the construction of incomplete sewerage system lies in the need to stop the further pollution of the subterranean waters that our town uses for water supply.

As for the atmospheric sewerage system, it has been transferred in the river Tisa by means of reclamation canals through suction stations. Up to now, only 19,5 km has been piped, so that 60% of the total length of atmospheric sewerage system has not been piped.

Five objects for the overpumping of the sewage have been constructed in the sewerage system. The main sewage suction station as the collecting system overpumps the sewage under the DTD canal to the waste water treatment plant. In the town that lies on 4 flowing areas there are 4 suction stations constructed, but there are also 3 flowing areas where appropriate suction stations have not been constructed yet, which means that sewerage system has not been developed in these locations so far.

Waste water treatment plant

The waste water treatment plant was constructed according to the technical documentation of the Institute for the Town Planning in Novi Sad in 1974. The plant was started up in 1989. The objects of waste water treatment plant are on two locations, about 800 m away from each other.

The waste water treatment plant lacks:

- sand filter and grease filter
- primary sedimentation device
- incoming raw water and outgoing treated water flow meters
- mud dexydration
- filter press

It also lacks centrifugal pumps for transfering of mud from the aeration pool and of surplus of mud into the mud silo.

2.1 Information about the investor

The Investor according to this programme is Public Corporation "Vodokanal" from Bečej, Danilo Kiš 3, founded in 1969.

Telephone number: +38121 812-930;

Fax number: +38121 812-931

e-mail: vodokanal@stcable.co.yu

Web site: http://www.vodokanal-becej.co.yu/

Identification mumber: 08069921,

Business code for water is 41000,

for sewerage system 90000.

The Corporation has been registred in the Court of Exchequer in Novi Sad under ref. no. 2308/1998.

The basic line of business of the Investor is the production and the distribution of drinking water and treatment and transfer of sewage and other waste waters.

The Investor is the depositor of own assets in Vojvođanska banka, the Branch in Bečej.

The contact person is Galus Žolt, the director or Kasaš Šandor, the assistant director.

2.2 Organizational structure

Public Corporation "Vodokanal" is organized according to modern methods of enterprise organization, which can be seen in the folowing organization scheme:

- the water treatment plant
- the waste water treatment plant
- the facility for maintenance and repair of waterworks and sewerage system
- the department of supply nad sale
- the department of information, accountancy and financial affairs
- the department of personnel, general administration and public relations activities

Public Corporation has the Managing board, appointed by the Municipality Assembly of Bečej, as the founder of the corporationh and it has the director as the managerial body, also appointed by the Municipality Assembly.

Having in mind the expertise and long-lasting experience of the management, it can be concluded that the management of the corporation is capable of successful running and managing the work process and business operations, which can be better seen from the following description and survey of the personnel and qualification structure of the employees.

The managerial team is comprised of:

1. Galus Žolt, the director

Name	**Galus Žolt**
Address	str. Marsala Tita 144 24435 Mol Serbia and Montenegro
Telephone	JP Vodokanal Becej:(+38121)812-930, 812-931(fax) Home:(+3824) 862-134
E-mail	direktor@vodokanal-becej.co.yu galusz@ptt.yu http://www.vodokanal-becej.co.yu
Date and place of birth	11th January 1957.Becej, Serbia and Montenegro
Education	Grammar School, Becej (1975) Faculty of Sciences Novi Sad (1980)
Professions	Graduated Hydrobiologycal Engineer (BSc)
Language	Hungarian - mother tongue, Serbian - fluent, German - fluent English – reading, writing and speaking knowledge
Computer skills	Microsft Windows, Microsft Word, Internet, Email
Work experience	1981-1986 JP Vodokanal Becej - member of invest group 1986-1997 JP Vodokanal Becej - head of WTP 1997 to present JP Vodokanal Becej – managing director
Activities	Postgraduates studies in Faculty of Tehcnical Sciences – Envirovnment protection Member, Local changingi in ecosystem of river Tisa Chair, "LEAP"-Water quality Assistent and indicator, Prefeasibility Study of Water supply in Tisa river basin
Workshops:	2001 Berlins workshop: Managment and Marketing course SLGRP*- Conducting Managment in Communal Enterprise -Improving Operations and Maintenance in Communal Enterprise SLGRP–Serbian Local Government Reform Program- USAID, DAI
References	Mr.Cinkler Rudolf - Advisor for Water Works, rcinkler@ptt.yu
Marriage state	Married, two children
Hausing state	in ovn house in Mol
Notice	

2. Kasaš Šandor, the assistant director

Name	**Kasaš Šandor**
Address	str. Pionirska 72 21220 Becej Serbia and Montenegro
Telephone	JP Vodokanal Becej:(+38121)812-930, 812-931(fax) Home: (+38121)815-386
E-mail	sandor@vodokanal-becej.co.yu vodokanal@stcable.co.yu http://www.vodokanal-becej.co.yu
Date and place of birth	31th July 1943. Novi Sad, Serbia and Montenegro
Education	Grammar School, Novi Sad (1963) Faculty of Technology Novi Sad (1968)
Professions	Graduated technologics (BSc)
Language	Hungarian - mother tongue, Serbian - fluent, English – reading, writing and speaking knowledge
Computer skills	Microsft Windows, Microsft Word, Internet, Email
Work experience	1971-1980 Technical Manager in "Flora" Becej 1981-1988 JP Vodokanal Becej member of invest group 1988-1991 JP Vodokanal Becej head of WWTP 1991 to present JP Vodokanal Becej Technical manager
Workshops:	SLGRP*- Public procurement course SLGRP–Serbian Local Government Reform Program- USAID, DAI
References	Mr.Cinkler Rudolf - Advisor for water works, rcinkler@ptt.yu Gallusz Zsolt manager of JP Vodokanal Becej, Phone:(+38121)812-930, direktor@vodokanal-becej.co.yu
Marriage state	Married, two sons
Hausing state	in ovn house in Becej
Notice	

3. Bata Jožef, the manager of the Water treatment plant.

Name	**Bata Jožef**
Address	str. Stevana Doronjskog 33 21220 Becej Serbia and Montenegro
Telephone	JP Vodokanal Becej:(+38121)812-930, 812-931(fax), +381 63 536 057 (mobile)
E-mail	bata@stcable.co.yu bata@vodokanal-becej.co.yu http://www.vodokanal-becej.co.yu
Date and place of birth	21th July 1969. Becej, Serbia and Montenegro
Education	MSC Secondary School, Ada (1988) Polytechnical Engineering College, Subotica (1997)
Professions	Electrical engineer
Language	Hungarian - mother tongue, Serbian - fluent, English – reading, writing and speaking knowledge
Computer skills	Proficient in using personal computer skills in such programs as Microsoft Windows, Microsoft Word, Excel, Access, PowerPoint, Macromedia Dreamweaver, CorelDraw..
Work experience	1991 to 1997 JP Vodokanal Becej (Public Enterprise Waterworks & Sewerage) as an electrician in maintenance 1997 to present time as an electrical engineer-programmer and a manager of Water treatment plant (WTP).
Activities/ Currently working on:	- Improving the industrial automation in WTP and wells with Advantech PLC and Genie industrial software - Project of reducing electric energy on the pump stations in WTP - Web designer and administrator of JP Vodokanals site
Workshops:	SLGRP*- Improving Operations and Maintenance in Communal Enterprise SLGRP–Serbian Local Government Reform Program- USAID, DAI
References	Gallusz Zsolt manager of JP Vodokanal Becej, Phone:(+38121)812-930, direktor@vodokanal-becej.co.yu
Marriage state	Single
Hausing state	in ovn house in Becej
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4. Topalski Dragana, manager of the department of accountancy-financial activities

Name	**Topalski Dragana**
Address	str. Lenjinova 87 21220 Becej Serbia and Montenegro
Telephone	JP Vodokanal Becej:(+38121)812-930, 812-931(fax) Home: (+38121)813-149
E-mail	dragana@stcable.co.yu http://www.vodokanal-becej.co.yu
Date and place of birth	19th July 1962. Backo Petrovo Selo, Serbia and Montenegro
Education	Ekonomical School, Becej (1981) High School of Economy Novi Sad (1983)
Professions	economics
Language	Serbian - mother tongue, Hungarian – with difficult Russian – with difficult
Computer skills	Windows basic level
Work experience	1985 to present in JP Vodokanal Becej - Accounting section - Fees and other revenues section - Head of financial section (2005-)
Workshops:	SLGRP*- Financial managment course SLGRP–Serbian Local Government Reform Program- USAID, DAI
References	Gallusz Zsolt manager of JP Vodokanal Becej, Phone:(+38121)812-930, direktor@vodokanal-becej.co.yu
Marriage state	Divorced, one son
Hausing state	in ovn house in Becej
Notice	

5. Ferenc Atila,

Name	**Ferencz Attila**
Address	str. Sindjeliceva 102 21220 Becej Serbia and Montenegro
Telephone	JP Vodokanal Becej:(+38121)812-930, 812-931(fax) Home:(+3821) 818-244
E-mail	atila@vodokanal-becej.co.yu hajnalka@ptt.yu http://www.vodokanal-becej.co.yu
Date and place of birth	04th February 1954.Becej, Serbia and Montenegro
Education	Grammar School, Becej (1972) Faculty of Technical Sciences Novi Sad (2004) First Level
Professions	Civil Engineer
Language	Hungarian - mother tongue, Serbian - fluent, Franch – with difficult
Computer skills	Windows basic level
Work experience	1981-1990 Zidar Becej 1990-1991 Komunalac Becej 1997- 2002 Grammar School Becej 2002 to present JP Vodokanal Becej
Workshops/Courses:	-Managing course -Organizations and programming course -SLGRP* - Public procurement course SLGRP*–Serbian Local Government Reform Program- USAID, DAI
References	Gallusz Zsolt manager of JP Vodokanal Becej, Phone:(+38121)812-930, direktor@vodokanal-becej.co.yu
Marriage state	Married, two children
Hausing state	in ovn house in Becej
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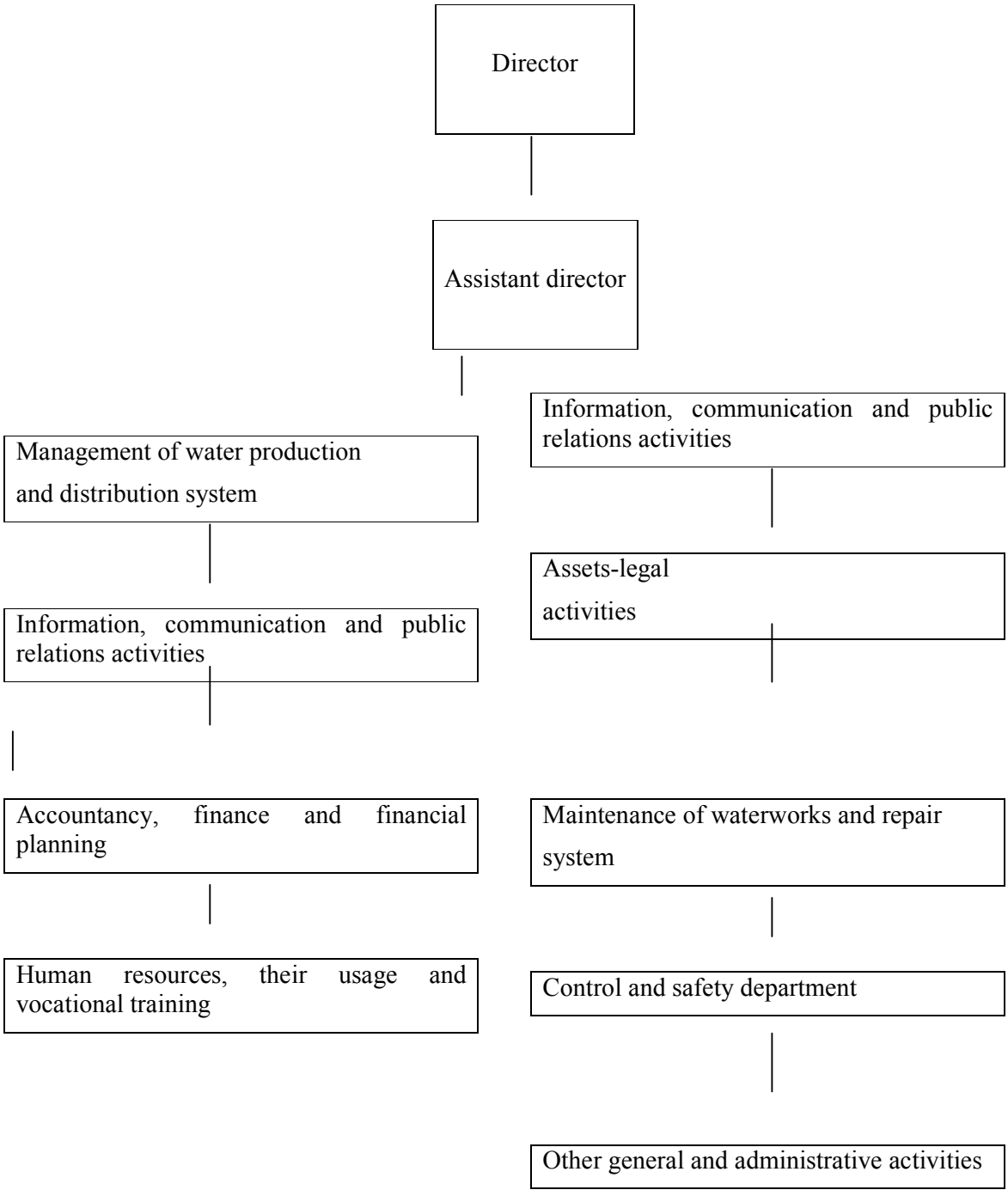
The organization scheme of Public Corporation "VODOKANAL"



The management of "Vodokanal" executed its activities by team work and quite properly directs its attention towards engagement and rational usage of the available resources.

In terms of that, their activities are directed towards engagement all the experts at the disposal of "Vodokanal", and in the case of lack of certain expert profiles, it uses experts from the consultancy institutes.

To bring their business activities closer to the users of this feasibility study of the medium-term plan of development, we will cite, as the example, several of the most important jobs:

Definition of the decision about the vocational training of all the employees, primarily their most responsible and expert personnel, so that by using this most valuable of resources: labour and intellectual capacity, contribute as much as possible to solving the development changes and acquiring of new or innovative technical-technological, economic-financial and informational developments,

1. Definition and making of planned, development and most important decisions in cooperation with the Managing Board and the Founder,
2. Definition of the development directions and acquiring of new or innovative solutions, including the use of the most up-to-date borrowed solutions, knowledge and experiences
3. Creation of the conditions for the carrying out of necessary changes and appointing of all the most complex jobs to professional and competent services, teams or individuals, behind whom there is the reliable information or the actual results.

All these and other of their activities and efforts can be best seen on the following pages of this feasibility study of the medium-term development programme:

2.3 Qualification structure of the employees with the records on 31/12/2004

Qualification	Number of employees according to their competence	The percentage ratio to the total number of employees	Gross earnings
University-level qualifications	4	6.3%	
Tertiary school qualifications	5	7,8%	
Secondary school qualifications	23	36.5%	
Lower qualifications	15	24,1%	
Higher vocational qualifications	-		
Vocational qualifications	13	20,6%	
Partial vocational qualifications	3	4,8	
Lower vocational qualifications	-		
Total	**63**	**100%**	

Due to the great complexity of jobs ang high level of responsibility for every, even the smallest mistake in the business operations of the corporation, it is necessary to improve the qualification structure by employing several people with the university-level qualifications (increase of 6%) and at the same time it is necessary to gradually reduce the number of the rest of structures,

above all those who have fulfiled the conditions for retirement. At the same time, the number of "redundant" workers can be solved by the increase of economy of scales, by increasing not only the number of repair jobs, but also the jobs of construction of new waterworks 15 in length and tertiary sewerage system, as well as the the execution of jobs that will prepare the technical conditions for the faster and more efficient connection of households to constructed waterworks and sewerage system, and similar jobs.

3. The economic status and business operations of PC "Vodokanal"

Business operations of the corporation "Vodokanal" so far can be most easily evaluated in the balance sheet and income sheet in the last three years, expressed in the syntactic indicators:

3.1 Balance sheet before the investment

Ord. no.	Balance positions	Years		
I		2002	2003	2004
I	Permanent assets	328.009	335.361	333.384
	1. Fixed assets and intangible investments	317.143	335.159	335.159
	2. Long-term financial investments	866	202	202
II	Working assets	16.133	22.130	16.533
	1. Supplies	2.048	7.251	2.850
	2. Short-term debts	7.793	14.531	13.683
	3. Short-term financial investments	-	-	665
	4. Cash and cash equivalents	272	348	
III	AVR			
IV	Loss from previous years	84.722	91.331	3.657
V	Off-business assets			
	Total assets	422.845	448.822	349.917
I	Capital stock	272.031	286.462	321.375
II	Reserves			
	1. Legal reserves			20.000
	2. Statutory reserves			
III	Retained profit	5.934	5.929	
IV	Revalorization reserves	114.613	143.234	
V	Long-term reservations	12.981	3.381	
VI	Fixed liabilities	4.757	3.532	2.477
VII	Short-term liabilities	12.032	9.694	9.722
	1. Short-term credit	1.306	-	
	2. Other short-term financial liabilities	-	-	
	3. Received advance payments	-	-	2.770
	4. Suppliers	10.002	8.231	
	5. Other business operations liabilities	-	-	6.887
	6. Liabilities for earnings	431	795	
	7. Tax and contribution liabilities	299	604	
	8. Other liabilities	-	43	65
VIII	PVR	497	590	
IX	Off-business liabilities			
	Total liabilities	422.845	448.822	349.917

From the data about the liabilities structure as the assets source, the liabilities amount only to 4,6%, so that this has enabled the corporation to have high rate of business independence. Own

capital in relation to the fixed and current liabilities amounts to 95,4%, which shows that PC "Vodokanal" is insignificantly indepted in relation to own capital, whose debt amounts only to 4,6%, which can clearly and neatly seen from the data and balance positions presented under the numbers I, VI and VII of the balance sheet for the year 2003.

3.2 Income sheet before investment

Ord. no.	Balance elements	Years		
		2002.	2003.	2004.
I	Total income	61.544	76.61	79.745
	1. Business income	41.357	60.76	61.539
	- Sale and service income	41.357	6	61.539
	- Activation income	-	60.76	-
	2. Financial income	-	6	-
	3. Extra and off-business income	-	-	18.216
	Business expenditure	56.782	73.41	79.745
	- Acquisition value of sold goods	-	1	-
	- Cost of material	3.766	-	1.900
	- Cost of other material	432	1.599	510
	- Cost of fuel and energy	5.033	489	7.200
	- Gross earnings	18.615	6.093	30.660
	- Cost of transportation services	-	27.73	185
	- Cost of production services	2.324	6	2.810
	- Cost of amortization	16.861	-	21.600
	- Intangible costs without tax	10.274	1.917	14.820
	- Taxes and contributions	635	20.58	-
	- Cost of contributions	2.868	4	-
	- Interest		11.31	
			3	
			958	
			4.324	
	Financial expenditure	1.164	1.241	1.080
	- interest expenditure	1.164	1.178	980
	- other financial expenditures	-	-	100
	Extra and off-business expenditure	19.595	15.69	9.895
			1	
	Total expenditure	61.544	76.64	79.745
			2	
	Gross profit (I-II)	19.663	15.30	9.895
			0	
	Loss (II-I)	19.663	15.30	9.895
			0	
	Profit tax	-	-	-
	Net profit	-	-	-

3.3 Structure of business assets

Ord. no.	Elements	Years	
		2003	2004
	Permanent assets - property	335.361	
	1. Material and non-material investments	335.159	
	2. Long-term financial investments	202	
I	Long-term bound business assets (1+2)	335.361	
II	Short-term bound business assets	22.130	
III	Total business assets	357.491	

3.4 Net working fund

Ord. no.	Elements	Years	
		2003	2004
1.	Long-term sources - own assets - long-term liabilities - retained profit	289.772 280.462 3.381 5.929	
2.	Imobilization	335.361	
3.	Net working fund (1-2)	45.589	
4.	Supplies and AVR	7.251	
5.	Supplies cover by long-term sources in % (3:4)	6,287%	
6.	Surplus or deficit of long-term sources (4+/-3)	-52.840	

4. Market analyses

Market analyses in market-oriented economy is considered to have multiple importance, namely:

Firstly, as the proof that the Investor is familiar with the market and capable of analyzing and following it, and

Secondly, that the Investor is capable of constant market research, gathering, sorting and processing of data, of analyzing the appearance of possible competition or the possibility of introducing some new business strategy.

The feasibility studies of the investment programme and the creditor are looking for the answers to the following questions:

1. Who are the today's buyers, and also what is their potential number that will appear after the completion of capital investments?
2. How does the price and the quality of water and sewerage system services affect the purchase, and also whether the products or services are necessary or they represent some kind of luxury?
3. What is the system and payment regularity of the agreed liabilities towards the suppliers and the creditors?

What is the system and payment regularity of the agreed liabilities towards the suppliers and the creditors?

By adopting these creditors' demands, in continuation of buyers analyses and their number, as well as their purchasing needs for the certain quantities of water and services, including here their solvency for the regular settlement of their agreed needs, we will, in the following paragraph in continuation, present the previously required data.

The Investor has to pay special attention to the profile of the current and potential buyers and their solvency. According to "Vodokanal"'s official records, the number of households which use water and other services amounts to 8,350 households. The potential number of the water users amounts to 1,150. The number of large and medium enterprises that use the water from "Vodokanal" amounts to 26 consumers, and the number of small enterprises and trading, catering and craftsman shops and other institutions that use water and other services amounts to 238 consumers, while the number of schools, health centres, health and veterinary institutions, sports organizations, state and political organizations and institutions, amounts to 62 consumers.

The number of consumers who regularly settle their obligations and the rate of debt collecting is within about 80-85%, which, considering the reduced solvency of our economy and citizens, can be assessed as satisfactory.

4.1 Market strategy

Market strategy comprises the programme of measures that the Investor undertakes in order to satisfy the needs of its buyers and potential consumers, which is shown by this medium-term investment programme and plan, presented in this feasibility study.

4.2 Prices strategy

Considering that the Investor does not determine the prices on its own, but with the previously given consent of the local self-government as its founder, and as here the specific product and services are in question (drinking water and treatment and transfer of sewage and other waste waters), the prices strategy has to comprise the following elements:

1. The calculation has to comprise all costs, so that the adjustment of selling prices according to payability and business operations in the range of successful business operations can be enabled.
2. The policy of the investor's prices wil be determined also from the aspect of the capital investment cost and interest cost of borrowed credit resources.
3. When determining the prices policy the investor has to start with the quality of drinking water, treatment and sewage transfer services, as well as the activities "Vodokanal" undertakes in order to protect the environment and hydrogeological resources. For "Vodokanal" and the citizens of Bečej it is not all the same whether the further pollution of natural water resources will continue, or the subterranean water willl be polluted first and only then subjected to various forms of "treatment", that is to search for the new sources which have not been polluted. When we analyse these questions, we have to have in mind that we do not have clean drinking water in abundance and in order to acquire drinking water by previous treatment, much larger financial resources are required than the cost of its protection from various polluters. The recently passed law of the protection of environment and the sanctions that it imposes on the unscrupulous and irresponsible polluters will contribute to this to great extent.
4. Prices strategy, among other things, should also comprise the analysis of the conditions of business operations in relation to the prices and services from our surroundings, that is how much the price of the unit of water production participates in the total expenditure of a household or in an average salary.

Water should not be treated as social but as economic category, which, because of its priceless importance for people's life and its irreplaceability, should have appropriate, much higher price. The new prices strategy should enable better preservation and more rational exploitation of the subterranean water resources, as well as the more equal participation of the hydrogeological profession in the strategy of harmonius management and complementary subterranean water resources development.

4.3 The plan of promotional activities

The metodology of the feasibility study of the investment programme demands the survey of the promotional activities of the investor for the sale of its products and services, which can be placed in several groups:

1. Public relations belong to a group of very important issues that the investor has to pay apppropriate attention to. Here firstly the target public groups, such as consumers, current and potential, as well as other business partners, such as suppliers, banks, state and other bodies, which have to be informed about our investment intentions, have to be identified. On that occasion the techniques, mode and forms of public relations, such as newspapers, magazines, catalogues, TV, boards and other means of contacts with the public, have to be carefully selected.
2. The forms of promotion of the capital investments in the expanding of the capacity of waterworks and sewerage system should be corroborated from the point of safety of the supply of the citizens and economy with the necessary quantities of healthy drinking water, the preservation of hydrogeological resources and the environment protection, via sewage treatment and their drainage from the "septic" pits into the sewerage system, which the investor has been doing via press and other media of local informing. Considering that the deficiency of good quality water can clearly be anticipated, our best experts from the field of hydrogeology consider that our social community should develop the approach of more systematic informing and education of our citizens how to protect the subterranean waters from further pollution, and by that protect the health of our citizens better, because due to the lack of information of citizens, 50% of all sources of subterranean waters in Serbia have been polluted by sewage and effluent.
3. For the measuring equipment, such as the acquisition of the gauges for measuring of water flow to the raw water feeder and on the entrance of water treatment plant towards the consumers, as well as the equipment for the frequent regulation of electromotors work, in order to reduce electricity cost during the drinking water production, it is important to point out the advantages of such equipment and the rationality and usefulness of their use.

Considering that up to now our social community has had the attitude and the strategy that water is a social category, the prices of water were low and in the range which hardly covered the production cost, and in some earlier periods even below the cost price. However, now after important steps foreward in the transition process, slow but nevertheless some improvement of life standard of the citizens and the adoption of the development programme by the United Nations, announced under the title "Global partnership for water", with the goal to help the preservation of the water quality and promote international concern about the preservation and exploitation of the water reserves, where special emphasis has been given to subterranean waters, we can hope that our state and our society in general will join these efforts of UN in the field of practical realisation of the adopted project.

5. The survey of the preliminary designs of PC "Vodokanal"

Based on the previously prepared preliminary designs, pre-measurements and calculations necessary for the placement of orders and acquisitin of required equipment and the construction of required construction objects, in continuation of this part of the feasibility study, we will present the list of preliminary designs necessary for the realisation of the medium-term plan of capital investments, in the following order:

1. Project for the construction of wells and equipment
2. Project for the connection of the transformer stations by underground electrocable 1,600 m in length

3. Project for replacement of the underground power cable 1,900 m in length
4. Project for the fiting out of the existing wells
   - with sinking pumps
   - with ultrasonic flow gauges - 1 piece Ø 50 – Ø 400
   - with overvoltage protection
5. Project for the water treatment plant(replacement of the equipment for chlorine station, replacement of centrifugal pumps, electromotor valves and slide rule valves)
6. Project of the stainless steel equipment on waste water treatment plant
7. Projects for the construction of waterworks:
   - diameter 200mm, 1,330 m in length
   - diameter 150mm, 2,550 m in length
   - diameter 100mm, 12,000 m in length
8. Project for the replacement of worn-out waterworks made of non-profiled and inadequate material, zinc pipes and asbestos-concrete pipes, diameter Ø 150 mm, 2000 m in length
9. Project for the replacement of the worn-out pipes of waterworks, diameter 100 mm,

   2,000 m in length
10. Project for the replacement of waterworks made of non-profiled and inadequate material diameter 100 mm, 28,000 m in length
11. Project for the acquisition of 2 piecess of ultrasonic flowmeters diameter Ø 50 mm to Ø 400 mm
12. Projects for the construction of sewerage system collector :
    - diameter 700mm, 1,140 m in length
    - diameter 500mm, 650 m in length
    - diameter 400mm, 240 m in length

      2,030 m
13. Project for the construction of sewerage system collector:
    - diameter 500mm, 1,170 m in length
    - diameter 400mm, 840 m in length

      2,010 m
14. Project for the construction of sewage collector:
    - diameter 300mm, 900 m in length
    - diameter 400mm, 890 m in length

      1,790 m
15. Project for the construction of sewerage system:
    - diameter 250mm, length 22,000 m
    - diameter 00mm, length 22,170 m

      44,170 m
16. The project for the acquisition and replacement of the ultrasonic, electromagnetic and other water gauges, according to enclosed specification.

The analysis of the development potentials and investor's activities

Since the feasibility analysis, that is the time plan of realisation of the projected capital investments is one of the very important sections of the investment programme, it is required to pay particular attention to it, so that the reality of all the assumptions during the viewing of the

ways, volume, organisation, realisation and timetable of particular activities for the realisation of the above-mentioned projects, has been carefully checked.

The reality of the projected start and finish of construction of the investment in question needs to be checked, as well as the time of the production start after the acquisition of the permit of use.

The reality of the time plan is checked in relation to the completeness of the investment documentation and the possibility of the acquisition of appropriate permits and consents.

Particular attention has to be paid to the evaluation of the anticipated works dynamics, considering the volume, complexity, structure and mutual relations of all the planned activities. Having in mind that construction works of the waterworks as well as sewerage system cannot be realised in the "dead season", in the period from December 1st of the previous and March 15th of the next year, it could be said that the construction works of the mentioned investments will be mostly realised in the period from March 15th to December 1st of the mentioned time works, stated on the folllowing pages of this medium-term programme.

The dynamic term plan of the realisation of the capital investments, for the period 2005 – 2010

I Time plan for 2005

(in DIN 000)

Ordinal no.	The name and type of investment	Estimated/ acquisition value	Amortization rate	Amortization amount
1.	Construction of 1 well with equipment	7,200	15%	1,080
2.	Replacement of electromotive valves	2,400	10%	240
3.	Replacement of slide rule valves	350	10%	35
4.	Replacement and construction of worn-out waterworks 10 km in length	44,460	5%	2,223
5.	Acquisition of ultrasonic water flow meter	2,400	10%	240
6.	Construction of waterworks 8,355 m in length	37,146	5%	1,857
7.	Electromagnetic water gauges 12 pieces	2,215	10%	221
	Σ	96,171		5,886

II Time plan for 2006

(in DIN 000)

Ordinal no.	The name and type of investment	Estimated/ acquisition value	Amortization rate	Amortization amount
1.	Construction of 1 well with equipment	7,200	15%	1,080
2.	Construction of main waterworks Ø 150 mm, 2,555 m in length	26,506	5%	1,325

3.	Construction of main waterworks Ø 200 mm, 1,330 m in length	17,636	5%	881
4.	Replacement of worn-out waterworks made of non-profiled and inadequate materials Ø 150 mm, 2,000 m in length	20,748	5%	1,037
5.	Replacement of waterworks Ø 100 mm, 8 km in length	35,568	5%	1,778
6.	Replacement of water gauges, for the accurate measurement and reduction of water losses in transport	2,795	10%	279
	Σ	110,453		6,380

III Time plan for 2007

(in DIN 000)

Ordinal no.	The name and type of investment	Estimated/ acquisition value	Amortization rate	Amortization amount
1.	Construction of 1 well with equipment	7,200	15%	1,080
2.	Replacement of waterworks Ø 100 mm, 20,000 m in length	88,920	5%	4,446
3.	Reconstruction and adaptation of catchment and reservoire, for building of business premises of 300 m2	12,000	2%	240
4.	Replacement of water gauges	1,000	10%	100
	Σ	109,120		5,866

IV Time plan for 2008

(in DIN 000)

Ordinal no	The name and type of investment	Estimated / acquisition value	Amortization rate	Amortization amount
1.	Acquisition of equipment and mechanisation for requirements of maintenance and repair of construction objects and waterworks	3,340	14%	468
2.	Replacement of equipment for chlorine station and for neutralisation of chlorine in air	5,000	20%	1,000
3.	Replacement of centrifugal pumps	4,100	20%	820
4.	Acquisition of equipment for waste water treatment plant -automatic snail grid	4,550	10%	455

	-replacement of 3 pump generating units	6,250	20%	1,250
	-high pressure autocistern for cleaning and unclogging of sewerage system	9,000	10%	900
5.	Construction of objects for aeration of sand filter			
	-construction part	8,000	2%	160
	-equipment	4,000	20%	800
6.	Construction of construction objects with sanitary and hygienic facilities (100 m3)	6,000	2.5%	150
7.	Construction of objects, acquisition and assembly of equipment	2,500	2%	50
8.	Construction of 1 well with equipment	7,200	15%	1,080
9.	Connecting of TS-I and TS-II with underground cable 1600 in length	3,200	5%	160
10.	Replacement of power cable (1900 m)	3,800	5%	190
11.	Equiping of existing wells with underwater pumps	3,050	20%	610
12.	Construction of main sewage collector			
	-diameter 700 mm, 1140 m in length	26,676	5%	1,334
	-diameter 500 mm, 690 m in length	10,172	5%	508
	-diameter 400 mm, 2400 m in length	27,144	5%	1,357
13.	Construction of sewage water collector			
	-diameter 300 mm, 900 m in length	6,880	3.3%	227
	-diameter 200 mm, 810 m in length	4,298	3.3%	141
	Σ	145,160		11,632

V Time plan for 2009

(in DIN 000)

Ordinal no	The name and type of investment	Estimated / acquisition value	Amortization rate	Amortization amount
	Construction of 1 well with equipment	7,200	15%	1,080
	Construction of primary sewage collector			
	-500 mm in diameter, 1170 m in length	18,897	3.3%	623
	-400 mm in diameter, 890 m in length	9,540	3.3%	315

	Construction of sewerage system 250 mm in diameter, 12000 m in length (5,304 din/m)	63,648	3.3%	2,100
	Σ	99,285		4,118

VI Time plan for 2010

(in DIN 000)

Ordinal no	The name and type of investment	Estimated / acquisition value	Amortization rate	Amortization amount
1.	Construction of 1 well with equipment	7,200	15%	1,080
2.	Construction of sewerage system 250 mm in diameter, 10 km in length	53,040	3.3%	1,762
3.	Construction of sewerage system 200 mm in diameter, 12 km in length	48,906	3.3%	1,614
4.	Construction of 1 well with equipment	7,200	15%	1,080
5.	Construction of sewerage system 200 mm in diameter, 11170 m in length	49,662	3.3%	1,638
6.	Acquisition and assembly 2 pieces of water flow gauges, 300 mm in diameter (electromagnetic and ultrasonic)	900	10%	90
	Σ	167,168		7,268

Recapitulation

Ord.no	Description	Value in DIN	Value in EUR
1.	Estimated acqusition value according to 2005 dynamic plan	96,171,000	1,202,137
2.	Estimated acqusition value according to 2006 dynamic plan	110,453,000	1,380,662
3.	Estimated acqusition value according to 2007 dynamic plan	109,120,000	1,364,000
4.	Estimated acqusition value according to 2008 dynamic plan	145,160,000	1,814,500
5.	Estimated acqusition value according to 2009 dynamic plan	99,285,000	1,241,062
6.	Estimated acqusition value according to 2010 dynamic plan	167,168,000	2,089,600
	TOTAL	**727,357,000**	**9,091,961**

The account of the fixed assets amortization prior to new investments

(in DIN 000)

Ord. no	Description of fixed assets	Value of accounted amortization
1.	Waterworks	554,941.48
2.	Main water pipeline	873,906.84
3.	Wells	5,292,513.80
4.	Transformer stations	350,086.26
5.	Constructions	184,751.62
6.	Construction object of water supply - construction 60% - equipment 40%	 4,569,432.00 3,046,289.36
7.	Roads	30,948.96
8.	Prefabricated office – container	15,109.52
9.	Computers	69,159.26
10.	Furniture	6,737.50
11.	Equipment	627,082.98
12.	Mechanization	457,388.18
13.	Vehicle	56,007.02
14.	Sewerage system	3,751,617.78
15.	Waste water treatment plant - construction 60% - equipment 40%	 754,221.44 502,814.32
16.	Atmospheric sewerage system	85,072.94
	TOTAL:	**21,228,081.26**

The account of the amortization for the new capital investments according to the dynamic plan

Ord. no	Acquisition value of fixed assets	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	Total (2005-2010)
1.	96,171	5,896						5,896
2.	110,453		6,380					6,380
3.	109,120			5,866				5,866
4.	145,160				11,632			11,632
5.	99,285					4,118		4,118
6.	167,108						7,268	7,268
	727,357	5,896	6,380	5,866	11,632	4,118	7,268	41,160

The sum of amortization for the period 2005-2010 amounts to DIN 41,160.

The estimate of the interest costs and installments of credit repayment

Amount of credit = 727,357,000

Interest = 2% annualy

Term of payment = 20 years

Grace period = 5 years

Interest account for grace period (2% x 5) = 72,735,000

Total amount of debt 0 800,092,000

(in DIN 000)

Ord. no.	Year of repayment	Interest	Repayment	Annuity	Rest of debt
1.	Grace period				
2.	Grace period				
3.	Grace period				
4.	Grace period				
5.	Grace period				
6.	2010	16,002	53,339	69,341	800,092
7.	2011	14,935	53,339	68,274	746,753
8.	2012	13,862	53,339	67,201	693,414
9.	2013	12,801	53,339	66,140	640,075
10.	2014	11,735	53,339	65,074	586,736
11.	2015	10,668	53,339	64,007	533,397
12.	2016	9,609	53,339	62,940	480,058
13.	2017	8,534	53,339	61,873	426,719
14.	2018	7,468	53,339	60,807	373,380
15.	2019	6,400	53,339	59,739	320,004
16.	2020	5,333	53,339	58,672	266,665
17.	2021	4,267	53,339	57,606	213,326
18.	2022	3,200	53,339	56,539	159,987
19.	2023	2,133	53,339	55,472	106,648
20.	2024	1,067		54,406	53,339
	Total:	**127,006**	**800,092**	**927,092**	/

Average annual interest amounts to DIN 8,520,000 (127,806,000 : 15)

Average installment of repayment of debt principal = 800,092,000 : 15 = 53,339

The plan of realisation activities in the period from the project preparation to the start of exploitation of constructed investments

Ord. no.	Activities	Term
	Preparation of technical-technological projects	2004 and 2005 from 1 to 6 months
	Preparation of feasibility study of medium-term plan	2005 from 1 to 4 months
	Closing of financial construction	2005 from 3 to 6 months
	Construction of objects and acquisition of equipment	2005 from 6 to 11 months
	Construction of objects in 2006	According to time plan from 03-12 moths
	Construction of objects in 2007	According to time plan from 03-12 moths
	Construction of objects in 2008	According to time plan from 03-12 moths
	Construction of objects in 2009	According to time plan from 03-12 moths
	Construction of objects in 2010	According to time plan from 03-12 moths

NB: see the dynamic plan of the construction of investment objects on pages 23 – 25 of this economic elaboration.

The strategy of business policy

Business policy of corporation "Vodokanal" wil, in the period of realisation of the medium-term plan, as integral and inseparable part of the financial policy, endeavour to, by its strategy conception, provide rational managment of corporation an finding of the best solutions in order to achieve maximal economic and financial results, and alongside that to provide optimal structure of assets and their sources, as optimal relations between the part of assets and liabilities, as the principle of financial decision making for the achivement of financial, and with that, business goals. Considering that the problems of business and financial policy are identical, it could be said that the financial policy is just the money manifestation of the business policy of corporation.

From the above mentioned views, it can be concluded that business policy of corporation cannot be run in isolation from but in the close cooperation with the financial policy and other business policies and vice versa, because one without the other cannot function successfully.

Alongside capital investments in reconstruction and replacement of worn-out equipment and waterworks, the management of corporation "Vodokanal" has paid particular attention to the issues of rationalization of water consumption usage, by reducing water losses in the waterworks.

Alongside above-mentioned, "Vodokanal" in its medium-term plan has projected reconstruction and completely new replacement of main and distributional waterworks, which due to long working life and inadequate materials have become almost useless.

At the same time, "Vodokanal" in its medium-term plan has anticipated the completion of main network 10 km in length and distributional waterworks 12 km in length in the streets and parts of the estates where there have not yet existed constructed waterworks. In this way, "Vodokanal" will, in future, via appropriate inovations and rationalizations, use previously constructed capacities more completely. Also by expanding and construction of above- mentioned waterworks and sewerage system 50 km in length, it will increase the scales of its economy and

its business operations and provide the citizens with clean and healthy drinking water. This will be achieved by connecting all the households via construction of sewerage system to the constructed network, and not to septic pits, as it has been the case up to on.

Also, by construction of incomplete sewerage system 50 km in length more rational use of sewage treatment will be increased. In this way the complete construction of sewerage system will be finished and further pollution of the environment and particularly subterranean hydrogeological water resources, which the town uses for water supply, will be prevented.

By these investment operations appropriate water gauges on each entrance and exit will be provided, so that electromagnetic and modular regulators and devices will provide dynamic balance in waterworks and greater flexibility towards the consumers requirements.

By more rational usage of constructed capacities of waterworks and sewerage system, economic-financial results will increase in the amount of DIN 73,710,000. Alongside above- mentioned by acquisition of equipment for frequent regulation of pump elelctromotor work, expenditure of electricity will be reduced during drinking water production, namely: annual saving of electricity will amount to DIN 2,874,000 which for the period of medium-term plan amounts to saving of DIN 17,244,000.00.

Besides above mentioned measures of rationalization and inovations, the management of corporation will undertake other measures and activities in the field of saving as well, and among other things will endevour to reduce all unnecessary costs, in the first place cost of insurance and other intangible costs, so that on the part of expert consultants it is considered that that these costs can be reduced by one to two million dinars very quickly., and in the period of medium-term plan, they could from the current DIN 12,400,000 be reduced by at least two more million, which all together enables the saving of four million dinars.

Certain economic-financial effects could be achived with capital investments too, particularly with reconstruction of waterworks, and here particularly with main network of greater diameters, where we would reduce certain costs of this kind even for 10%, especially if we would, during the replacement of waterworks, apply experiences and inovations of other countries, which are comprised in the fact that new PE pipes, somewhat narrower in diameter, are pulled through old damaged pipes. In tis way we would avoid huge excavations, and alongside them we would provide capital investment cost reduction during reconstruction of worn-out waterworks greater in diameter.

Since a bigger part of waterworks, previously built by the citizens' resources in organization of community centres, and later by means of voluntary tax, did not enter the books of "Vodokanal", because it was not known who would get the management over waterworks. During last year an expert institution - Institute of Economics and Finance from Belgrade was engaged to evaluate the waterworks, after which the same will enter the books of "Vodokanal". Due to above-mentioned reasons, there was no prescribed amortization accounted for this waterworks constructed in this way, which inflicted great damage to water supply system.

Having all these problems in mind, we hope that our Municipality, as the founder of "Vodokanal", will find the way to inlude all costs, therefore costs of regularly accounted amortization of distributional system of waterworks, in the price of water.

When we present these problems we will also say that unreal and uneconomic price of water is neither in interest of our citizens, neither our economy, nor it is "protection of their standard" of any kind. Because their interest is to have regular water supply and existing subterranean resources preserved and not "squandered", due to lack of financial resources.

And it is clear to every citizen that 1 cubic metre of water or 1000 litres of this necessary and irreplaceable natural fluid, cannot endanger their life standard if the selling price of water for 1 m3 in 2005 amounted only to 18,36 dinars.

By including of complete previously constructed waterworks in water supply system we will provide regular additional sources of finances in the form of accounted amortization, which was left out so far. In this way enough assets for regular maintenance of watereworks, as well as other objects and equipment of water supply system, will be provided.

The survey of the water production and consumption in the previous five years, with the particular emphasis on the importance of saving and losses reduction

According to measerement and calculation of "Vodokanal" in the previous period there has been realised total production of water that amonted to 16,648,587 m3 out of which 9,657,000 m3 was invoiced to households and economy and realised losses amounted to 6,992,000 m3, which means that realised water losses are very high and amount to 42% in relation to realised volume of production.

The average annual production in the observed period amounts to 3,329,717 m3 of water, out of which 1,018,000 m3 was invoced to households requirements and 913,000 m3 for the economy requirements, while average annual loss in previous period amounted to 1,398,000 m3 of water or percentage of 41,98%, which is close to average five-year losses which amounted to 42% in relation to produced water quantity.

Most common water losses causes in system of "Vodokanl" comprise of inadequate materials for water pipes (asbestos and zinc pipes) whose lifespan is from 7 years for zinc pipes and 20 years for asbestos-concrete pipes, and in our case waterworks has not been changed for 30 years, which brought to their cracking and depreciation so that those were the reasons for water losses in waterworks that cost us very much. We have to view this finding from at least two aspects:

- firstly, from the aspect of lost incomes for losses in main and distributional waterworks, which annualy amount to approximately 22,236,000 dinars and
- secondly, from the aspect of expenditures for production of mentioned quantites of produced water, which ended up in waterworks losses.

In whatever way we view such great losses in waterworks, we consider that we cannot reconcile with such high losses, nor justify them, from the economic-financial point of view, as well as from the point of uncontrolled depreciation and overexpenditure of subterranean waters, which we do not have in abundance and which are hardly renewable.

In order to get insight into real damages inflicted by above-mentioned losses we will assume that construction measures and replacement of worn-out equipment will reduce water losses in waterworks from current 42% to 20%, provide cost reduction of annual production and increase of so far unrealised income that amounts to DIN 12,833,640. Besides increase in income in above-mentioned amount, other economic-financial effects will be realised in form of reduction of costs of electricity, chlorine, maintenance costs, labour, amortization and similar costs.

As we have stated on page 30, average annual water losses amount to 1,398,000 m3, which, calculated in dinars, according to average selling proces from 2005, amount to losses value of DIN 42,625,000.

Besides above-mentioned economic losses, other indirect damages should be included here, such as negative effects on sector of subterranean water resources reduction, due to water losses in waterworks transport, because of its worn-out and depreciated state.

In indirect negative effects of water losses, here we will also cite their influence on increase of subterranean waters in period of autumn and spring, whose influnce cause subsiding of

dwellings, cracking of ceilings and walls, even their collapsing, especially of old houses built of weaker materials such as adobe, without hydro-insulation and similar.

6. The description of objects, space and location aspects

Facilities of public corporation "Vodokanal" are located on several sites. Waterscoop field with wells, water treatment plant with reservoir and facilities for gassing and deferment, are located to the northwest, 6 km away from Bečej.

Reservoirs and sewage and effluent treatment plants with laboratory facilities and equipment are located to the south side of Bečej, on the right side of Dunav-Tisa-Dunav canal 3 km away.

Suction stations, main and distributional waterworks are located on the territory of all three community centres and in almost all streets of Bečej, 136 km in length.

Collecting, secondary and tertiary sewerage system is spread on location of all thrree community centres and comprises of the length of 60 km. Additional construction and completion of complete sewerage system has been planned to be finished in medium-term plan in the length of 50 km. The connection of all households to sewerage and sewage treatment system has been planned by medium-term, and alongside that closing and disinfection of all existing septic pits, in order to protect the environment and subterranean waters from whose resources citizens and economy supply with drinking water.

On the location of waste water treatment plant there has been located a workshop and the equipment with devices for repair and maintenance of objects and waterworks.

By means of the programme of connection of all households to existing and planned sewerage system we will achieve rational use of sewerage system capacity and waste water treatment plant and alongside that the increase of economy of scales and above-mentioned, economical as well as ecological effects and effects of saving of existing water resources by means of reduction of water losses in distributional network.

7. The analysis of the investors' development potentials

For assessment of development potentials of "Vodokanal" projected demand for water and services is relevant as th proof of reproductive potential for repayment of existing and planned liabilities in the amount of approved credits, as well as the credits which will be subsequently approved in order for this investment programme to be realised.

The next relevant parameter for evaluation of investor's development potentials is comprised in the possibility of finding favourable credit line - creditor that would agree to approve investment credit to Public Corporation "Vodokanal", under favourable terms, in the amount of estimated value of planned investments that amounts to CSD 727,357,000,00, which converted to euros amounts to EUR 9,091,961.

By means of analyzing of the problems of financing of corporation in periods of its intensive and necessary development activities, the most logical would be that it, as the source of finances of its development, uses its reproductive capacities, that is sum of realised accumulation and assets of accounted amortization, and that means that corporation enters new investment enterprises in accordance to its real capacities, without relying on borrowed financial funds.

The problem is, however, in the fact that pace of development requirements is much faster than the realisation of our own accumulation and accounted amortization. The disproportion between our own development capacities on one side and available own financial potentials on the other side, has as a consequence the use of alternative financial potentials.

Precisely because of that PC "Vodokanal" is faced with the situation that, instead of own reproductive resources (of accumulation and amortization), it uses borrowed funds, so that in that way necessary gradual recovery is provided, and after that own development. Since the requirements and demands for such capital investments are very great and emphasized, PC "Vodokanal" is in position that demands the use of greater mass of borrowed credit funds, and that means that the share of borrowed credit funds in financing of investments, projected by this medium-term investment plan, will be greater in the sources of borrowed funds than the sources of our own.

It is logical that corporation "Vodokanal", while acquiring financial sources from creditors, will act in economical and homely way, and that means that it will endeavour to provide such structure of additional financial sources by means of which it will provide the lowest cost for the realisation of planned capital investments.

Alternative financial sources for financing of the development requirements of the corporation

In our economy system so far, own sources were considered to be free of charge, because the interest on them, or any other liabilities, have not been paid. Such thinking is basically naive and it has cost us the loss of pace with the developed world. Here it should be also said that there is no free capital in this world, and the only question is whether the price is determined on the basis of results from past or on "future sacrifice". If own capital is used without compensation it means that corporation does not realise accumulation on that basis, which has as a consequence just the maintaining of simple reproduction. And own capital has its price and that is the amount of normal accumulation which has to be realised in order to survive on the market.

A social community which wants to go forward, has to be aware of the fact that each capital, even the one of its own, has its price which is as big as the need for accumulation in order to maintain the development pace. In the capital of its own, from the standpoint of corporation, the shareholders capital is also classified, because it is permanently bound to corporation, without possibilities for shareholders to demand its withdrawal before selling of shares on the stock market. It is different from credit sources in the fact that shareholders entrust their capital with the risk of not gaining profit, but with a "chance" for the appropriate share of enterprising profit in the form of dividends. Contrary to shareholders, creditors are satisfied with getting only the interest with much higher degree of certainty than that of shareholders. The fact that shareholdres undertake greater risk is in question, but with greater chances for share of profit by means of dividend system. Since "Vodokanal" as a public corporation does not have shares, it cannot, in accordance with current regulations, gain increase of its own capital by means of, perchance, selling of shares according to the system of so called recapitalization. Likewise, in past 10-12 years, "Vodokanal" has not realised almost any accumulation, due to low selling prices of water and other services, by means of which it could not even cover its own business operations expenditures, and this is the reason it could not realise even the smalllest amount of accumulation. This corporation of ours which is of the highest importance, since there would not be our survival without water, has fallen into such difficult and highly unfavourable economic-financial situation after long standing years of very successful development in the period 1972-1992, when it was aided by all citizens of Bečej and our complete local economy, which had highly remarkable results economic results in the same period. This support of citizens and economy could be seen in financing of construction of water treatment plant and waterworks 30

km in length, as well as the construction of waste water treatment and the construction of primary and secondary collector sewerage system 56 km in length, as well as the acquisition of up-to-date working equipment and maintenance of waterworks and sewerage system in working condition.

In this development period of "Vodokanal", from the voluntary tax resources, it was receiving financial donations from our citizens which amounted to DM 2,5 million annualy, which converted in euros amounted to 1,25 million euros, that is in dinars (acording to current exchange rate) 97,5 million dinars annualy, which means that during 20 years in that period over 25 million euros was invested in the development of system of "Vodokanal". 14,500 workers, 4,500 pensioners and several thousand agricultural workers voluntarily participated in this development activity, who, for the total of 20 years gave up their incomes in the amount of 4% monthly.

All development activities of public corporation "Vodokanal" stopped with the disintegration of our mutual state SFRY in 1991, imposing of sanctions on our country and economic blockade by Security Council, and one of biggest and longest hyperinflations in the XX century, as well as the bombing of our country by NATO. Above-mentioned events have had such a devastating influence on our economy and our citizens that even 4 years after October the 5th 2000 changes have not been enough for their recovery, and certainly would not be enough for the recovery of a society of most capable individuals.

The main reason why "Vodokanal" lacks financial resources to sustain its waterworks and water network, as well as waste water treatment plant and sewerage system, together with the construction of new waterworks capacities and incomplete sewerage system, is also low and "social" prices of water and other services that can hardly cover cost price, without even thinking about anything to remain for the development and accumulation.

The exit from such a situation is comprised in the stopping of strategy of low, social and unreal prices that do not even cover all cost prices and a gradual transition to the strategy of real value and determining of selling prices of water and other services according to the rules of market and cover of all its business operations costs.

If Municipalirty Assembly, as the founder of PC "Vodokanal" accepts the proposition of management and Managing Board to increase current prices for 20% for cover of all input costs and 10% of usual profit for research and development needs, I consider that together with receiving of favourable credits from Foreign Bank of Reconstruction and Development, we can overcome the current period of crisis.

According to our preliminary calculations, "Vodokanal" could secure the regular repayment of annual annuities, that is repayment together with interests, if it receives the demanded long-term credit with the term of payment lasting for 15-20 years, grace period of 5 years and interest of 2% annualy with account of interest on debit balance and annual annuities after the expiry of the grace period.

According to projected calculations of necessary investments and capital investments, presented in medium-term plan for the period 2005 to 2024, by comparing this data with the data from the calculation of reproductive potential of "Vodokanal" , that is of its own sources by means of accounted amortization and accumulation in the period 2005-2024 it can be concluded, within a high degree of certainty, that "Vodokanal" will be able to repay its credit and contractual liabilities regularly and in time.

We will present the calculation and more complete documentation about the reproductive potential of "Vodokanal" for repayment of credits in the part of the feasibility study under entry 8 in the part Economic-financial analysis.

8. Economic-financial analysis

By means of economic-financial analysis the corporation provides all necessary indicators about business operations results, as well as the factors that caused the volume of positive results and the degree of performance. On the basis of these and similar indicators, the management of corporation can perform realistical evaluation of the results achieved in the previous period and on the basis of that make appropriate decisions about its future activities. The role of economic-financial analysis of business operations becomes more and more important due to more and more complex conditions of economic activity.

The basis for the realisation of set goals and planned tasks, necessary for demands of economic-financial analysis, are comprised of the evidence of elements of realised results too, based on its own as well as borrowed resources, invested in reconstruction or construction of new waterworks or sewerage system, or in replacement or acquisition of necessary equipment and electric installations.

Due to regularly kept evidence of volume and structure of achieved results, conditioned by investments during reproduction process, it is possible to note the activities of corporation during certain period of time. In that sense operational evidence of production, realization and achieved financial effects have particular importance for the function of analysis.

We will perform economic-financial analysis of investments, presented in the feasibility study, in the easiest way by comparison of data from balance sheet and income sheet, before and after capital investments, anticipated by this programme.

While performing this analysis, among other things , we took graeat care about reality and rationality of above-mentioned capital investments, presented as a list in the project-technical documentation.

We have determined the amounts of economic-financial results by the estimate of total incomes and expenditures, by method of extrapolation, during the preparatin of income sheet, for each year separateeely, as well as their complete sum in the duration of the investment period of above-mentioned investments. The volume of economic-financial results besides above-mentioned results, depends on the amount of borrowed sources on which the interest, that is compensation, is paid which is related to the amount of own capital, on which the interest, as a rule, is not paid. The lower is own capital and sources that interest is not paid on, the higher are borrowed sources on which interest is paid, and thus the higher will be expenditures on the basis of financing and investments. The volume of economic-financial results will depend on the interest rates on the volume of borrowed resources on which interest is paid, the expenditures of financing will be higher the higher interest rate is and vice versa.

Financial result will depend on resources invested in assets, which is related to the price of equipment and construction objects, suplies of materials, the cost of supplies, incomplete produciton and final products, the method of accounted amortization, the coefficient of working assets turnover, with own capital and other sources given, because more invested means in assets demand larger sources of borrowed resources for which interest is paid, which means that expenditures of financing will be larger in that case.

When the structure of total income is in question, it has to be had in mind that regular incomes are the most certain form of income and that it is understandable that in total income of corporation they should be predominant. Contrary to that, extra incomes do not have permanent character in realisation of total income, they appear from time to time, and they are also often the consequence of irregular material-financial business operations of corporation.

We will complete all necessary information, by means of which we can make a plan of monetary flow with the data about calculated profit and reproductive potential and planned credit loans.

Besides the plan of accumulated profit, it is necessary to perform the analysis of the term of repayment of borrowed resources for investments, where the term of payment of investments is understood to be the period needed for capital investments in investment project to be compensated from net monetary flow or from the plan of reproductive potential, which comprises of the sum of realised profit and accounted amortization for certain period of time. Besides the plan of accumulated profir it is necessary to perform risk analysis, because each investment project is followed by certain risk which is mainly caused by uncertainty of future net monetary flows.

We can perform the measurement of the risk of making investment decisions in several ways. One of the best known methods of risk measurement before planning of investment is analysis of sensitivity which starts from the projection of a few different options for each investment project. Projection of real, optimistic and pessimistic net monetary flow is usually performed. Sensitivity analysis is usually followed by the assesment of probability of the occurrence of different projections and influences on net monetary flows.

By assesment of probability, the stablishing of probability that certain net monetary flow from the exploitation of investment project will actually happen, is understood.

Measurement of this risk is performed by means of the distribution of probability of standard deviation or the coefficient of variation.

We will complete economic-financial analysis with following figures, presented on pages 36-49 where we have presented the data about the formation of total income, expenditures, income sheets during investments, economic and financial flows of calculation of required working assets, the calculation of probability of repayment of borrowed investment credits and other necessary data.

FORMATION OF TOTAL INCOME

	2005	2006	2007	2008	2009
1. Water production from new wells	311.040x30,49 = 9.483.610	622,080x30,49 =18.967.219	933.120x30,49 = 28.450,829	1.244. 160x30,49 = 37.934.438	1.555.200x30,49 = 47.418.048
2. Connection of new consumers to waterworks	-	144.000x30,49 4.390.560	144.000x30,49 = 4.390.560	*144.000x30,49* = 4.390.560	144.000x30,49 = 4.390.560
3. Connection to sewerage system	-	700x 120=84.000 x12,06 = 1.013.040	1.900x 120 m3 =228.000 x 12,06 = 2.749,680	3.700x120 = 440.000 x 12,06 = 5.306.400	5.620x 120=674.400 xI2,06=8.133.264
4. Connection of newly connected consumers to sewerage system	-	700x 120 m3 = 84.000 x 16,26 = 1.365.840	1.900x120 = 228.000 x16,26 = 3.707.280	3.700x120 = 440.000 x16,26 =7.154.400	5.620x 120=674.400 x 16,26=10.965.744
I Total income on the basis of increased production and services (1+2+3+4)	9.483.610	25.736.659	39.298.349	54.785.798	70.907.616
II Water saving effects	-	(82.500x30,49) = 2.515.425	(165.000x30,49) = 5.030.850	*(217.506x30,49)* = 7.546.275	(330.000x30,49) = 10,061.700
III Total (I + II)	9.483.610	28.252.084	44.329.199	62.332.073	80.969.316

	2010	2011	2012	2013	2014
1. Water production from new wells	2. *177.280x30.49* = 66.385.267	2.177 .280x30.49 = 66.385.267	2.177 .*280x30.49* = 66.385.267	2.177.280x30.49 = 66.385.267	2. I *77.280x30.49* = 66.385.267
2. Connection of new consumers to waterworks	144.000x30,49 = 4.390.560	144,OOOx30,49 = 4390.560	144,OOOx30,49 = 4.390.56Q	144.000x30,49 = 4.390,560	144.000x30,49 = 4.390.560
3. Connection to sewerage system	8.220x 120=986.400 xI2.06=11.895.984	8.220x 120=986.400 xI2.06=11.895.984	8.220x 120=986.400 x 12.06=11.895.984	8.220x 120=986.400 x 12.06=11.895.984	*8.220x* 120=986.400 x 12.06=11.895.984
4. Connection of newly connected consumers to sewerage system	8.220x 120=986.400 xI6.26=16.038.864	8.220x 120=986.400 x 16.26=16.038.864.,	8.220x 120=986.400 x 16.26=16.038.864	8.220x 120='986.400 x 16.26=16.038.864	*8.220x* 120=986.400 xI6.26=16.038.864
I Total income on the basis of increased production and services (1+2+3+4)	. 98.710.675	98.710.675	98.710.675	98.710.675	98.710.675
II Water saving effects	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700	(330.000x3g.49) = 10.061.700	(330.000x30.49) = 10.061.700
III Total (I + II)	108.772.375	108.772.375	108.772.375	108,772.375	108.772.375

	2015	2016	2017	2018	2019
1. Water production from new wells	2.177.280x30.49 = 66.385.267	2. 177.280x30.49 = 66.385.267	2. 177.280x30.49 = 66.385.267	2. 177.280x30.49 = 66.385.267	2. 177.280x30.49 = 66.385.267
2. Connection of new consumers to waterworks	144.000x30,49 = 4.390.560	144.000x30,49 = 4.390.560	144.000x30,49 = 4.390.560	144.000x30,49 = 4.390.560	144.000x30,49 = 4.390.560
3. Connection to sewerage system	8.220x 120=986.400 xI2.06=11.895.984	8.220x 120=986.400 x 12.06=11.895.984	8.220x 120=986.400 x 12.06=11.895.984	8.220x 120=986.400 xI2.06=11.895.984	8.220x 120=986.400 xI2.06=11.895.984
4. Connection of newly connected consumers to sewerage system	8.220x 120=986.400 x 16.26=16.038.864	8.220x 120=986.400 xI6.26=16.038.864	8.220x 120=986.400 x 16.26=16.038.864	8.220x 120=986.400 x 16.26=16.038.864	8.220x 120=986.400 x 16.26=16.038.864
I Total income on the basis of increased production and services (1+2+3+4)	98.710.675	98.710.675	98.710.675	98.710.675	98.710.675
II Water saving effects	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700
III Total (I + II)	108.772.375	108.772.375	108.772.375	108.772.375	108.772.375

	2020	2021	2022	2023	2024
1. Water production from new wells	2.177.280x30.49 = 66.385.267	2.177.280x30.49 = 66.385.267	2. 177.280x30.49 = 66.385.267	2.177 .280x30.49 = 66.385.267	2.177.280x30.49 = 66.385.267
2. Connection of new consumers to waterworks	144.000x30,49 = 4.390.560	144.000x30,49 = 4.390.560	144.000x30,49 = 4.390.560	144.000x30,49 = 4.390.560	144.000x30,49 = 4.390.560
3. Connection to sewerage system	8.220x 120=986.400 xI2.06=11.895.984	8.220x 120=986.400 xI2.06=11.895.984	8.220x 120=986.400 x 12.06=11.895.984	8.220x 120=986.400 xI2.06=11.895.984	8.220x 120=986.400 xI2.06=11.895.984
4. Connection of newly connected consumers to sewerage system	8.220x 120=986.400 xI6.26=16.038.864	8.220x 120=986.400 x 16.26=16.038.864	8.220x 120=986.400 x 16.26=16.038.864	8.220x 120=986.400 xI6.26=16.038.864	8.220x 120=986.400 x 16.26= 16.03 8.864
I Total income on the basis of increased production and services (1+2+3+4)	-98.710.675	98.710.675	98.710.675	98.710.675	98.710.675
II Water saving effects	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700	(330.000x30.49) = 10.061.700
III Total (I + II)	108.772.375	108.772.375	108.772.375	108.772.375	108.772.375

Direct cost of materials (2005-2024)

(In DIN 000)

Ord.no	Description	Lifespan of project duration									
		2005	*2006.*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012.g*	*2013.*	*2014.*
1	Gaseous chlorine quantity x 0.00147 kg x DIN 73.00	33.377	82.208	115.586	148.963	182.341	249.097	245.057	249.097	249.097	249.097
2	Liquid chlorine	11.126	27.403	38.529	49.654	*60.780*	83.032	83.032	83.032	83.032	83.032
	Total	47.503	*109.611*	154.115	198.617	243.121	332.129	332.129	332.129	332.129	332.129
Ord.no	Description	*2015.*	*2016.*	*2017*	*2018.*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024.*
1	Gaseous chlorine quantity x 0,00147 kg x DIN 73.00	249.097	249.097	249.097	249.097	249.097	249.097	249.097	249.097	249.097	249.097
2	Liquid chlorine	83.032	83.032	83.032	83.032	83.032	83.032	83.032	83.032	83.032	83.032
	Total	332.129	332.129	332. f29	332.129	332.129	332.129	332.129	332.129	332.129	332.129

Plan of amortization account 2005-2024

(In DIN 000)

2005	2006	2007	2008	2009	201	2011	2012.	2013	2014
5.886	5.886	5.886	5.886	5.886	5.886	5.536	4.816	4.816	4.816
	6.380	6.380	6.380	6.380	6.380	6.380	6.020	*5.300*	5.300
		5.866	5.866	5.866	5.866	5.866	5.866	5.506	5.506
			11.632	11.632	11.632	11.632	11.632	6.834	5.632
				4.118	4.118	4.118	4.118	4.118	4.118
				7.268	7.268	7.268	7.268	7.268	7.268
5.886	12.266	18.132	29.764	33.882	41.150	40.800	39.720	33.842	32.640
2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
4.080	4.080	4.080	4.080	4.080	4.080	4.080	4.080	4.080	4.080
5.300	5.021	5.021	5.021	5.021	5.021	5.021	5.021	5.021	5.021
5.506	4.786	4.686	4.686	4.686	4.686	4.686	4.686	4.686	4.686
5.632	5.632	5.632	4.277	4.277	4.277	4.277	4.277	4.277	4.277
3.758	3.758	3.758	3.758	3.758	3.758	3.758	3.758	3.758	3.758
7.268	6.544	6.544	6.544	6.544	5.014	5.014	5.014	5.014	5.014
31.544	29.821	29.721	28.366	28.366	26.836	26.836	26.836	26.836	26.836

ENERGY PLAN

Ord.no.	Title	Measurement unit	Annual quantity	Price per measurement unit	Project years				
					1	2	3	4	5
O	1	2	3	4	5(3x4)	6(3x4)	7(3x4)	8(3x4)	9(3 x4)
1.	Electricity	KW	360	300	108.000	108.000	108.000	108.000	108.000
2.	- VT	KWh	200.000	1.97	394.000	394.000	394.000	394.000	394.000
3.	- NT	KWh	110.000	0.62	68.200	68.200	68.200	68.200	68.200
	Total:				570.200	570.200	570.200	570.200	570.200

INCOME SHEET DURING CAPITAL INVESTMENTS

(In DIN 000)

Ord.no.	Description	Lifespan of project duration									
		1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11	12
1	Total income	9.484	28.252	44.329	62.332	80.969	108.772	108.772	108.772	108.772	108.772
2	Total expenditure	7.751	15.696	23.106	36.282	41.445	66.812	65.377	63.224	56.285	54.017
	-Amortization	5.886	12.266	17.132	29.764	33.882	41.150	40.800	39.720	33.842	32.540
	-Interest	-	-	-	-	-	16.020	14.935	13.862	12.801	11. 735
	-Gross earnings	-	500	1.000	1.500	1.500	1.500	1.500	1.500	1.500	,1.500
	-Water analysis	250	250	250	250	250	250	250	250	250	250
	-Cost of material	45	110	154	198	243	322	322	322	322	322
	-Cost of energy	570	570	570	570	570	570	570	570	570	570
	-Overheads	1.000	2.000	3.000	4.000	5.000	7.000	7.000	7.000	7.000	7.000
					.						
3	Gross profit	1.733	12.556	21.223	26.050	39.524	41. 960	43.395	45.548	52.487	54.755
4	Income tax	173	1.256	2.122	2.605	3.952	4.196	4.340	4.555	5.249	5.476
5	Net profit (3-4)	1.560	11.300	19.101	23.445	35.572	37.764	39.055	40.993	47.238	49.279

(In DIN 000)

Ord.no	Description	Lifespan of project duration									
		11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10	11	12
1	Total income	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772
2	Total expenditure	51.854	49.072	47.897	45.476	44.408	41.811	40.745	39.678	38.611	37.545
	-Amortization	31.544	29.821	29.721	28.366	28.366	26.836	26.836	26.836	26.836	26.836
	-Interest	10.668	9.609	8.534	7.468	6.400	5.333	4.267	8.200	2.133	1.067
	-Gross earnings	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500 ,	1.500	1.500 --
	-Water analysis	250	250	250	250	250	250	250	250	250	250
	-Cost of material	322	322	322	322	322	322	322	322	322	322
	-Cost of energy	570	570	570	570	570	570	570	570	570	570
	-Overheads	7.000	7.000	7.000	7.000	7.000	7.000	7.000	7.000	7.000	7.000
3	Gross profit -	56.918	59.700	60.875	63'296	64.364	66.961	68.027	69.094	70.161	71.227
4	Tax 10%	5.692	5.970	6.088	6.330	6.436	6.696	6.803	6.909	7.016	7.123
5	Net profit (3-4)	51.226	53.730	54.787	56.966	57.928	60.265	61.224	62.185	63.145	64.1 04

Ord. No.	Elements	Investment year "O"	Lifespan of project duration									
			1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Total receiption		9.484	28.252	44.329	62.332	80.969	108.772	108.772	108.772	108.772	108.772
I.	Total income		9.484	28.252	44.329	62.332	80.969	108.772	108.772	108.772	108.772	108.772
2	Financing sources	747.362										
	- Own assets	20.005										
	- Borrowed assets	727.357										
3	Rest of project value											
	- fixed assets											
	- working assets											
II.	Total expenditure	747.362	2.038	4.686	7.096	9.123	12.085	83.179	82.256	81.398	81.031	80.192
4	Investments											
	- fixed assets	727.357										
	- working assets	20.005										
5	Business expenditures (without amortization)		1.865	2.93	3.974	5.018	6.633	8.142	8.142	8.142	8.142	8.142
6	Gross earnings		-	500	1.000	1.500	1.500	1.500	1.500	1.500	1.500	1.500
7	Taxes and profit		173	1.256	2.122	2.605	3.952	4.196	4.34	4.555	5.249	5.476
8	Liabilities to sources of incomes		-	-	-	-	-	69.341	68.274	67.201	66.14	65.074
III	Net reception	0	7.446	23.566	37.233	53.209	68.884	25.593	26.516	27.374	27.741	28.580

Red. br.	Elements	Lifespan of project duration									
		11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10	11	12
1	Total receiption	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	286.054
1.	Total income	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	286.054
2	Financing sources										
	- Own assets										
	- Borrowed assets										177.282
3	Rest of project value					.					157.277
	- -fixed assets										20.005
	- -working assets										
II.	Total expenditure	79.341	78.552	77.603	76.779	75.817	75.010	74.051	73.090	72.130	71.171
4	Investments										
	- -fixed assets									-.	
	- -working assets										
5	Business expenditures (without amortization)	8.142	8.142	8.142	8.142	8.142	8.142	8.142	8.142	8.142	8.142
6	Gross earnings	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500
7	Taxes and profit	5.692	5.970	6.088	6.33	6.436	6.696	6.803	6.909	7.016	7.123
8	Liabilities to sources of incomes	64.007	62.940	61.813	60.807	59.739	58.572	57.606	56.539	55.472	54.405
III	Net reception	29.431	30.220	31.169	31.993	32.995	33.762	34.721	35.682	36.642	214.883

ECONOMIC FLOW

Ord.no.	Elements	Investment vear "O"	Lifespan of project duration									
			1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11	12	13
I	Total receiption		9.484	28.252	44.329	62.332	80.969	108.772	108.772	108.772	108.772	108.772
	Total income		9.484	28.252	44.329	62.332	80.969	108.772	108.772	108.772	108.772	108.772
2	Rest of project value											
	-fixed assets											
	-working assets											
II	Total expenditure		*2.038*	4.686	*7.096*	9.123	12.085	13.838	13.982	14.197	14.891	15.118
3	Investments	747 36										
	-fixed assets	727.357										
	-working assets	20.*005*										
4	Business expenditures (without amortization)		1.865	2.930	3.974	*5.018*	6.633	8.142	8.142	8.142	8.14	8.142
5	Gross eamings		-	500	*1.000*	1.500	1.500	*1.500*	*1.500*	*1.500*	*1.500*	*1.500*
6	Liabilities from profit		173	1.256	2.122	2.605	3.952	.4.196	4.340	4.555	5.249	5.476
111	Net receiption (I-II)	-747.362	7.446	23.566	37.233	53.209	68.884	94.934	94.790	94.575	93.881	93.654

Ord. no.	Elements	Lifespan of project duration									
		11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10	11	12
I	Total receiption	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	286.054
1	Total income	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	108.772	286.054
2	Rest ofproject value										177 .282
	- fixed assets										157.277
	-working assets										20.005
II.	Total expenditure	15.334	15.612	15.73	15.B72	16.078	16.338	16.445	16.551	16.65S	16.765
3	Investments										
	-fixed assets										
	-working assets										
4	Business expenditures (with out amortization)	8.142	8142	8.142	8.142	8.142	8.142	8.142	8.142	8.142	8.142
5	Gross earnings	*1.50C*	*1.500*	1.500	1.500	*1.500*	*1.500*	*1.500*	*1.500*	*1.500*	*1.500*
6	Liabilities from profit	5.692	5.970	6.088	6.330	6.436	6.696	6.803	6.909	*7.016*	7.123
TIT	Net receiption (I-II)	93.438	93.160	93.042	92.80C	92.594	92.434	92.327	92.221	92.114	269.289

NET CURRENT V ALUE OF INVESTMENT PROJECT

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Ord.no.	Elements	Investment year "O"	Lifespan of project duration									
			1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	II	12	13
1	Net receiption &om economic flow	-747.362	7.446	23.566	37.233	53.209	68.884	94.934	94.790	94.575	93.881	93.654
2	Discount rate	3.5										
3	Discount factor	1	0,966184	0,933512	0,901944	0,871444	0,841975	0,813503	0,785994	0,759415	0,733735	0,708923
4	Current value of net receiption	-747.362	7.194	21. 999	33.582	46.369	57.999	77 .229	74.504	71.822	68.884	66.393
5	Net current value (cumulative 2-6)											
6	Relative net current value cumulative Column (3-6) columnn 2											

Ord.no.	Elements	Lifespan of project duration										Sum (2-6)
		11	12	13	14	15	16	17	18	19	20	
1	2	1	4	5	6	7	8	9	10	11	12	13
1	Net receiption &om economic flow	93.438	93.160	93.142	92.80O	92.694	92.434	92.327	92.221	92.114	269.289	1.018.429
2	Discount rate											
1	Discount factor	0.684950	0,661988	0,639409	0,617787	0,596896	0,576712	0,55721	0,538638	0,520163	0,502573	
4	Current value of net receiption	64.000	61.652	59.556	57.331	55.329	53.308	51.446	49.649	47.914	135.337	414.135
5	Net current value (cumulative 2-22)			414.135								
6	Relative net current value cumulative Column (3-22) columnn 2		$\frac{1.765.791}{747.362} = 2,363$									

INTERNAL RATE OF PROFITABILITY

Ord. no.	Discount rate	Current project value
1	20%	-465.573
2	10%	-145.883
3	8%	-20.418
4	7%	53.171

$$Pr = 7 + \frac{53.171 \times l}{21.418 + 53.171} = 7 + \frac{53.171}{73.589} = 7 + 0.73 = 7.73$$

Term of repayment of capital investments

(in DIN 000)

Year in project lifespan	Investments		Net receiption in business operations		Uncovered part of investment (5-3)
	Annual amount	Cumulative	Annual amount	Cumulative	
1	2	3	4	5	6
1	747,362	747,362	7,446	7,446	-739,916
2		747,362	23,566	31,012	-716,350
3		747,632	37,233	68,245	-679,117
4		747,362	53,209	121,454	-625,908
5		747,362	68,884	190,338	-557,024
6		747,362	94,934	285,272	-462,090
7		747,362	94,790	380,062	-367,300
8		747,362	94,575	474,637	-272,725
9		747,362	93,881	568,518	-178,844
10		747,362	93,654	662,172	-85,190
11		747,362	93,438	755,610	8,248
12		747,362	93,160	848,770	101,408
13		747,362	93,142	941,912	194,550
14		747,362	92,800	1,034,712	287,380
15		747,362	92,694	1,127,406	380,044
16		747,362	92,434	1,219,840	472,478
17		747,362	92,327	1,312,167	564,805
18		747,362	92,221	1,404,388	657,026
19		747,362	92,114	1,496,502	749,140
20		747,362	269,289	1,765,791	1,018,409

Account of working assets

(in DIN 000)

Ord.no.	Type of working assets	Annual requirements	Number of binding days	Turnover coefficient	Required permanent working assets
1.	Suppplies of raw materials and materials (value of raw materials and materials)	322	90	1	81
2.	Supplies of unfinished production (UR)				
3.	Supplies of final products UR				

4.	Claims (UP)	108,772	70	5	21,754
5.	Current account assets (UP)	108,772	5	72	1,511
(A)	Required permanent working assets (1-5)				23,346
6.	Suppliers(how much raw materials and materials)	322	45	8	40
7.	Amortization (how much)	32,640	30	12	2,720
8.	Gross earnings (how much)	1,500	30	12	125
9.	Liabilities from income (how much)	5,476	31	12	456
(B)	Sources from current business operations (6 to 9)				3,341
(C)	Investments in working assets				20,005

9. Financial evaluation of the project

Basic purpose of investments of financial resources in construction of objects projected by this medium-term plan is comprised in the realisation of set goals, and alongside the realisation of set goals of appropriate values of economic and non-economic effects we want to achieve. These investments in their real essence represent the construction of new and replacement of worn-out and depreciated production and service capacities.

As fixed assets during their work and exploitation lose portion of their value it is necessary to continually provide, by means of investments, via amortization, lost portion of value and to keep capacities of "Vodokanal" on the existing level, required for the realisation of necessary water production volume and services of sewage treatment and fulfiling of above-mentioned requirements of citizens and economy.

According to above-mentioned, the investment process begins with the extraction of portion of social product for investment needs. First and foremost it is amortization, and then a larger or smaller portion from realised and accumulated profit, that is the accumulation required for the requirements of expanded reproduction.

In case that corporation which begins with investment enterprises, in order to expand existing capacities or replace worn-out equipment, does not have own assets for planned and necessary investments, it can require favourable credits from our domestic or foreign banks, development funds or other financial organizations and institutions.

In order for corporation that does not have enough of its own assets to get appropriate amount of required credit funds, it has to fulfil certain conditions, first and foremost to prove the potential for repayment of borrowed investment resources and to secure the guarantee of state authorities of the Republic, as well as the authorities of local self-governing community.

According to above-mentioned, we will present acquisition values of capital investments in this table:

Ord.no.	Type of fixed assets	Year of investment construction						
		2005.	2006.	2007.	2008.	2009.	2010.	Σ
	construction objects	88,806	107,658	108,120	105,870	99,285	166,268	676,007
	equipment	2,750			39,290			42,040
	water flow meters	2,400					900	3,300
	water gauges	2,215	2,795	1,000				6,010
	Σ	96,171	110,453	109,120	145,160	99,285	167,168	727,357

We will achieve the realisation of economic effects by analysing of achieved results data, water production volume and services for sewage treatment and transfer of the same from consumer to treatment plant during and after realised investments.

These data can be viewed in the easiest way from calculation of total incomes and expenditures and income sheet, presented on pages 36,37,38,39 and 40 of this feasibility study.

Considering that each investment is a sum of assets benefits and expenditures, evaluation of investment project is performed in two steps:

- in assumed conditions and determinants
- in conditions of uncertainty that future brings

We have planned the account of incomes and expenditures via method of extrapolation based on statistic data for the period programme is made for. Since corporation "Vodokanal" is doing business in relatively stable conditions, because the production volume is the same or similar from year to yeart, has the same number of consumers, prices rarely change, because water is considered to be "social category" and corporation is doing business in unchanged environment. Changes will occcur when we reconstruct old and worn-out waterworks and construct partial expansion of waterworks, as well as construction of new severage system 50 km in length. When we realise above-mentioned investments and above-mentioned changes take place, we will carry out required correction by means of contingent, multioptional planning, which enables the corporation to plan corrections when it is required by concrete above-mentioned needs.

Income is considered to be the difference between gross total income on one side and expenditures and amortization on the other.

When we substract earnings from income we will get the rest in form of gross profit. All this has been comprised in detail in sections of economic-financial analysis, and partly in this section, underthe entry of financial evaluation of the project.

On the basis of discount rate, the line of dynamic methods for evaluation of eficiency, effectiveness and rentability have been developed, out of which we cite:

1. method of net current value
2. method of internal profitability rate
3. method of period of investment repayment
4. formula for annuity account

Method of net current value determines the current value in some period where it defines value as the difference between income and expenditure of the project adjusted to the same period of time. Justified forthe realization is the project whose net current value is bigger or marginally equal to zero.

Internal profitability rate as a criterion for evaluation of investment enterprises does not require discount rates and investor provides data by amount of its volume, which as maximum interest rate on credits can be accepted for repayment of project financing.

Method of the period of investment repayment shows the period of time in years for which, by means of net effect, investments can repay invested funds: borrowed funds or borrowed resources.

Method of annuity can be very appropriately used when investments stick to lump sum investment and it is not interesting for investment enterprise in question.

Uncertainty and risk in project is evaluated by static and dynamic methods. Out of static methods we name thrashold of rentability which shows minimally acceptable production volume, minimal selling price while out of dynamic we name sensititivity analysis and risk analysis.

Corporation "Vodokanal" by partial investing of its own and borrowed financial resources, should assess the future effects of investments in realistic and qualified way. Most often the effects of investments are measured by economic standards, although sometimes effects are determined by non-economic standards, as in our case, when one part of investments is asssed from the aspect of environment protection.

To the question how effects of investments can be measured, we can give a simple answer – when it is compared to something and determines its quality in relation to some landmark to be compared with. In order not to prolong further description, we will explain all these problems of the determining of effects of projected investment on our concrete example.

During the realisation of planned investment project there will be no substantial changes in prices of investment goods in relation to programmed prices, so we will not change them, because thay are taken according to approved prices at the beginning of 2005 and they are expressed in the currency of EUR (euro), whose value changes are negligible.

Basic reason of our current, rather unfavourable status in the field of waters consists of huge differences between financial resources and real investments in this field. These reasons have led to significant disharmony and disorganization in the field of waters, among which in first place we cite uncontroled pollution of ground and subterranean waters and water losses in waterworks distribution system, due to its worn-out state and lack of financial resources for their maintenance and replacement.

Because of everything above-mentioned, significant changes in the field of waters have to follow, and firstly waters, as basic strategic resource, will have to be protected by all means available, and that is for two reasons: as a prerequisite for high-quality functioning and development of a society, and secondly, as a prerequisite for the survival of the whole human community as our natural environment. For these reasons the strategy so far will have to be changed, the strategy which began from the standpoint that water is inexhaustible source which is abundant, so for those reasons its price has been determined as social category., which brought to its "squandering" and huge and very harmful pollution.

In order to stop the current way of concern reduction and unrealistic and inadequate management of available water resources, it is required to change to strategy of economic and market management of water resources, while paying strict attention to sustainable development, solvency of citizens as water consumers, as well as other resources, necessary for maintenance and development of waterworks objects and sewerage system in all populated community centres of Bečej. We will present more detailed expositions of this analysis on the practical

example of "Vodokanal", that is from the data of the feasibility of medium-term plan of development.

In order not to waste time on the description of significance of above-mentioned methods for financial evaluation of the project, we will, after the preparation of all parts of the feasibility study, present all of the above-mentioned methods, in tabular and numerical form, and in this way prove their economic and social justification. We will complete all this, partly in required form, with cost-benefit analysis.

10. Cost-benefit analysis

The starting point for the cost-benefit analysis is "method of analysis of social benefit and cost" (or social cost-benefit approach). Since modern economic-technical development unavoidably posed a problem of ecological risk in front of modern industrial development, careful approach assumes implementation of programme of pollution prevention, that is ecologically more polluted environment.

For these reasons it is important to, while planning capital investments and development, anticipate costs of poluttion protection of the environment (water, land and air) in order to achieve the ecological optimum. By means of pollution prevention the cost of health risks is reduced or eliminated and the quality of life and economic values of business or investment programme developed.

Therefore, capital investments in ecological programmes have multiple benefits, firstly the following:

- economic-financial benefits for firm
- benefit for the environment
- benefit for the health and safety of citizens and social community on the whole

Cost-benefit analysis is the method of analysis applied in evaluation of efficiency, effectiveness and rationality of certain capital investments. The efficiency of capital investments is evaluated on the basis of total social benefit and total social cost of individual alternatives.

Cost-benefit analysis is based not only on direct but also on multiplicity and external output of project. The value quantification of the project input and output factors with ecological contents is comprised of:

Positive output:

- direct benefits
- indirect benefits
- immeasurable benefits

Negative output:

- direct costs
- indirect costs
- immeasurable costs

The word efficiency originates from French word efficace and in our language it means efficient, successful and fruitful. Thus, for example, efficiency of means and other factors of production is measured by achievement of the output as large as possible, and the volume of output is brought down to the used resources unit.

While effficiency represents degree of effects realisation, that is output, which in the case of capitalk investments represents a sum of economic, social and social-political benefits. Those can be direct economic benefits, indirect benefits, saving in costs of insurance and obligations of improvement of health care and the environment protection, minimization of the environment

pollution, which in our case means reduction of subterranean waters pollution, by means of construction of sewerage system and investing of capital investments in new purposes from which our town is supplied with drinking water.

And that, besides above-mentioned, has immeasurable benefits for our citizens, business enterprises, especially food industry and agricultural enterprises.

Basic goals we anticipated by this miedium-term investment programme are comprised in the following:

1. To perform reconstruction and replacement of worn-out waterworks in the shortest term possible, 30 km in length with simultaneous replacement of completely depreciated shafts, junctions and hydrants with the goal to stop water losses in worn-out waterworks and shafts. By reducing of water losses in waterworks we would reduce water production costs, and at the same time reduce financial expenditures for construction of new wells because of their overuse and use over their capacities, and thus their reduced abundance and increase their lifespan, which in quite significant volume occurs as a consequence of water losses in distributional waterworks, due to their worn-out state and irregular and unplanned maintenance.
2. to perform replacement of the equipment at water treatment plantas well as the equipment for chlorine station and neutralization of chlorine from air, as well as acquisition of centrifugal underwater pumps. The goals of this replacement of equipment at water treatment plant are comprised in maintaining and improvement of water quality and prolonging of their lifespan. The aquisition of this equipment and its assemblying at the water treatment plantdoes not only prolong its lifespan and water quality but also citizens' health which achives social benefits of great importance, which sometimes exceed those, and even in this example of ours, all other direct and indirect benefits.
3. The next goal of our capital investments anticipated by middle-term project is comprised in the construction of distributional waterworks 15 km in length, by means of which those households and citizens, who live on the territory and estates in which waterworks have not been constructed so far, could connect to waterworks of "Vodokanal". Besides overall social benefit for the portion of our citizens that has not been able to supply themselves with healthy drinking water so far, by construction of above-mentioned waterworks the direct economic-financial effects will be achieved, because with the connection of increased number of citizens to waterworks the exploitation of existing capacities will increase, and with that very fact, the economy of scales, as well as more rational utilization of constructed system. Besides above-mentioned economic effects and direct benefits, this will improve living conditions of this portion of citizens and their health, because in the future they will be able to use healthy and controlled quality of water, instead of water from their own "micro waterworks" of suspicious quality an at their own risk, because this water, from previously constructed micro waterworks is almost never controlled and its content is not analysed.
4. By means of regular annual construction of one well with appropriate equipment and underwater pumps, the management of "Vodokanal" wants to provide required amounts of healthy water, for needs of citizens and economy, and, besides above-mentioned, by this decision, management of "Vodokanal" endeavours to gradually reduce overuse and depreciation of well capacities, and in this way increase their abundance and lifespan, which could not have been realised earlier with insufficient number of wells amd unsatisfactory capacities, which brough about constant and 24-hour exploitation of their capacities. Above-mentioned reasons brought about their overuse, which led to their depreciation, reduced abundancy and reduction of their

lifespan.

5. Construction of main waterworks, of larger diameters, has as a goal rounding off of the whole system completely and its uninterrupted functioning by means of this kind of waterworks.
6. By construction of main sewage colllectors of different diameters, from 700-200 mm, 5010 m in length, as well as by construction of secondary sewerage system with diameters 200 and 250 mm, 50 km in length, the goal to completely finish and round off the construction of sewerage system has been set, and by means of that to provide stopping of the further environment pollution, especially of subterranean water resources.
7. In accordance with above-mentioned development goals which have been earlier adopted by management of "Vodokanal", the decision has been made to, in cooperation with the founder, the management of Municipality of Bečej, make pre-investment analysis or the feasibility study od medium-term programme of renewal, reconstruction and construction of waterworks and sewerage system, as we have stated above.

From the above-mentioned suggestions and adopted decisions it can be concluded that by means of the feasibility study of medium-term programme, we will be able to provide the abundance of documentation material about the economic and social justification of above-mentioned capital investments that we have anticipated to realise in the medium-term programme of development from 2005 to 2011.

On the basis of the results of current researches it has been concluded, on the basis of the data of pre-investment analysis, that is feasibility study, which should provide the complete answer whether the estimated amount of capital investments in reconstruction and further development of waterworks and sewerage system enables the satisfying of economy and citizens' needs, and whether it provides successful economic and business stability, estimating here firstly whether the corporation will be able to regularly settle the repayment of its commitments to the credit bank for the approved credit loan.

Cost-benefit analysis has been made by means of engagement of management of "Vodokanal" with certain help of expert consultants and comprises the period from 2005 to 2011, that is to the year 2024.

Cosidering that we do not possess certain data about the projected incomes and costs, we have taken the year 2004 as the basic year, and as the selling prices of our products and services we have taken the prices approved by Managing Board and approved by the founder, local self-government.

Since 2005 to the end of the investment period in 2024, all incomes and costs from above-mentioned and realised capital investments we will include as economic-financial effects of "Vodokanal". If realised incomes and costs are larger than projected, they will be included in income sheet for which we assume that will appear as the result of economic effects of above-mentioned capital investments.

We will perceive, in the easiest and clearest way, the justification of above- mentioned capital investments from table of income sheet, presented on pages 41 and 42 of this medium-term feasibility study, from which it can be seen that realised value of net profit amounts to DIN 952,992,000. Since credit liabilities to the creditor together with interest amount to DIN 927,898,000 (see page 27), it can be seen that after the deduction of credit liabilities, there remains the surplus of unspent profit that amonts to DIN 25,094,000. This can be even more clearly seen from the table of economic flow, on pages 45 and 46 of this economic-financial elaboration.

11. Socio-economic evaluation of the medium-term programme of capital investments

By the social-economic evaluation of efficiency the influence of investments on social-economic developmnt in total is measured and according to that the justification of project from the standpoint of broder social-economic inteerst is determined. Social-economic justification of the projected capital investments is comprised in the foollowing benefits:

- by acquisition of th equipment for measurement of water flow in waterworks, in accordance with the law of waters of the Republic of Serbia, it will be possible to locate the most critical spots, where losses in waterworks are the biggest, so that by the timely location of the critical spots further waste of water can be prevented, by means of replacement of worn-out and depreciated pipes, new pipes, so that in this waythe losses of water in transport can be gradually reduced from current 42% and more to 19% in relation to total realised production of raw water
- construction of new waterworks has health and general humane and social importance, so that from above-mentioned reasons these investments are beneficial and justified from the social point of view
- reconstruction of waste water treatment plant will enable the significant reduction of pollution, of subterranean waters whose sources our citizens use for drinking water suply, as well as the river Tisa and Danube-Tisa-Danube canal. We use the river and canal watercourses not only for the development of the river traffic as the cheapest means of transport, but also for the development of fishing trade and tourism, and more importantly, the watercourses of Tisa and and DTD canal and other subsidiary canals are used for watering of agricultural cultures, especially in the periods of drought years, so that our primary task is to provide sustainable development of these ecosystems.

Besides above-mentioned capital investments, projected by medium-term programme nad feasibility study, we will also present here other parts of investments such as construction and completion of previously commenced sewerage system 50 km in length, as well as the construction of tertiary network necessary for connection of all households to already constructed sewerage system, as well as to the sewer that will be constructed in the following period of time, as anticipated by this investment programme.

Constructed social-economic courses are the basis for calculation of explicit indicators of social efficiency and justification of medium-term investment programme, such as:

- volume of calculated internal profitability rate which in our case amounts to 7,73%
- social net current value , which as relative indicator of efficiency shows how much accumulation units are realised by one investment unit
- project profitability
- socialy relative net current value
- output on employment rate, on current number of employees, as well as on the number of personnel that will be gradually fulfiled during and after the realisation of the capital investments

From above-mentioned list of indicators of the social-economic efficiency of theinvestment project the first three are related to the basic- the elimination criterion of efficiency, while others are related to additional efficiency criteria.

Sum total of the efficiency evaluation of the investment project is derived according to the statistical and dynamic approach. The method of the rentability threshold is applied in the

statistical approach, while minimally acceptable rate of utilization of capacities is determined, which is projected also on the basis of the expression:

$$\text{minim. accept. rate of capacities utiliz.} = \frac{\text{Sum total of fixed production costs}}{\text{Total income}} = \frac{157{,}277{,}000}{286{,}054{,}000} = 0.5498$$

In the dynamic apporach via sensitivity analysis we determine the critical parameters in the feasibility study.

The following fact should be pointed out here: while with some important investments projects there occurs a need for the use of other, quantitatively immesaurable indicators of social-economic efficiency, such as the impact on increase of technical-technological level of society, the impact of project on working and living environment etc., these additional impacts of the project on social-economic efficiency are of qualitative character, but they should not be neglected, especially with those projects, where such additional impacts are particularly emphasized.

12. Sensitivity analysis of the projected capital investments

The critical parameters are those whose smallest change can cause a large change of business results and influences on the justification of analysed investments. In that direction we will rely on the evaluation of profitability, the calculation of internal rate of yield and on the calculation of reproductive potential of resources necessary for the return of invested resources.

Usually, as most critical parameters of investments, appear:

- volume of investment costs
- dynamics, that is term of construction, term of receiving of the permit of use and term of smooth running of production or appropriate services
- raw materials costs, production materials and electricity
- selling price (realisation)
- volume of production and sale

For example, if the investment costs increase during construction, financial rate of rentability will decrease. Likewise, internal rate of rentability falls down, if the time of construction of investments in question is prolonged or if term of smooth running is longer, because in that way the positive effects are distanced from production, which due to discounting loose their value even more. Production costs often increase faster than the selling prices of our products and services can follow.

Impact of the increase of production costs on the reduction of financial rate of profitability can also be very sensitive. For example, if we increse these costs in sensitivity analysis by 5, 10 or 15%. Out of all parameters the selling price is usually the most critical,, that is volume and scope of realisation of our products and services. If it is reduced (whether due to prices reduction or unrealised production) the calculated internal rate of profitability will decrease.

Acoording to sthe pecificity of each individual investment, the critical parameters can also be specific.

Thus it is possible that for some investment the volume of investment costs is not so important, that is crirtical (so that increase of these costs by 20% will not reduce internal rate of profitability to unacceptable range) and for other types of investments even 5% of the incraese of these costs can be of crucial importance for its justification. Or, for energetically intensive expenditures of electricity, which is in our case the activities of suction stations of "Vodokanal" in the periods of

great atmospheric precipitations and high level of subterranean waters, where from the 24-hour transfer of this water surplus into Danube-Tisa-Danube canal is executed, the electricity cost is crucial, while for some other projects it is not.

In order to mitigate the negative effects of great electricitry expenditure in such situations, because of the high prices during "performing" burden of electricity, "Vodokanal" has undertaken to acquire the equipment for frequent regulation of electromotor work, which will significantly reduce the expenditure of electricity, by as much as about 50% of current expenditure.

Thanks to the equipment for frequent regulation of electromotor work, we will reduce the impact of costs that could influence on the profitability rate. As for the term of return of invested resources – the return of the capital investments provided via resources borrowed from creditors, their return will be provided via resources from the calculation formula of reproductive potential, as follows:

$$\text{Acumulative potential} = \frac{\text{Acumulation}}{\text{Amount of capital investments}} = \frac{884{,}000{,}000}{727{,}357{,}000} = 1{,}2153$$

On the basis of everything above-mentioned, we will carry out the sensitivity analysis for all projects whose construction has been anticipated by this medium-term plan. The data in our illustrated example show that the projects are acceptable for further analysis, having in mind that the internal rate of profitability of invested resources is bigger than the average of the group of corporations for water supply.

Based on everything above-mentioned, we will corroborate this sensitivity analysis with several more substantiated calculations:

- increase of prices of material costs of chlorine and electricity lead to the reduction of internal profitability rate from 47,4% to just 43,7%
- increase of selling price of water and services, that is their insufficient increase in accordance with input prices, lead to reduction of internal profitability rate from 47,3% to 31,02%, that is by whole of 16%.
- However, the increase of material costs, considering their negligible and small participation in total costs, does not lead to bigger, especially noticeable change of internal profitability rate.

From everything above-mentioned it can be concluded that there are real market and other potentials for versatile development of "Vodokanal". In that context we have analysed the strengths and weaknesses of "Vodokanal", as well as the strengths and weaknesses of its immediate surroundings.

13. SWOT Analysis

Strengths of Corporation	-Very good market position in the sector of water supply of citizens and economy, as well as in the sector of sewage treatment and sewerage system -Has at its disposal expert and very experienced personnel, especially with solid and ambitious management -Has the perspective of market expanding in nearby villages
Weaknesses of Corporation	-lack of financial resources, for reconstruction and replacement of worn-out waterworks, as well as for construction of sewerage system -lack of water gauges in collective buildings and tower blocks, which makes collecting of debts difficult -great water losses due to worn-out state of waterworks -insuffficient construction of sewerage system, insuffficient utilization of capacities of existing waste water treatment plant
Opportunities from environment	-Citizens have contributed to the development of corporation by means of introduction of voluntary tax at the beginning of 1970 all the time to 1992, when large number of building objects was constructed, such as the water treatment plant with plants for gassing and deferment as well as waste water treatment plants. By means of citizens' resources, main and distributional waterworks 30 km in length has been built, as well as primary and secondary sewerage system 54 km in length. In above-mentioned period the financial resources of 80 and 100 million dinars were invested anually in the system of water supply and sewage and sewer treatment plants, which converted in euros amounts to 1-1,25 million euros. This means that over 20 million euros was invested in the system of water supply in above-mentioned 20 years. By investment of such significant financial resources in the system of water supply and sewage and sewer treatment plants, solid foundations for further and sustainable development of system of water supply were laid. -Besides existing market, Corporation has solid potential and opportunities for market development in nearby settlements -Besides market potential for water sale, there is a solid sale in the sector of services of transfer and treatment of sewage and effluent. -To the threats from surroundings belongs the poor dissemination of information and insufficient coordination and education of citizens for constant strenghtening of the living environment protection.
Weaknesses of environment	-In the weak spots of surroundings also belong unfavourable hydrogeological conditions of water sources, which demand proceses of removal of gas surplus and iron, by means of gassing and deferment, which make processes of getting clean, healthy drinking water more expensive to some extent. Our citizens should be correctly, truthfully and more often informed about all this, in order to stop the further pollution of existing subterranean water resources and their "squandering" and losses of water in transport from "source" to place of consumption. Wrong strategy of low nad "social" prices of water and services has contributed to all this, since with too low prices of water and other services "Vodokanal" could not provide even the smallest accumulation, required for the regular maintenance of existing equipment and waterworks 136 km in length, whose consequences manifest in above-mentioned water losses in transport, which was brought about due to worn-out state of waterworks, and lack of financial resources for its regular maintenance.

Based on everything above-mentioned, we can conclude that all our enterprises should have innovative dimension and open completely to their surroundings and changes that stem from them, as well as to use every opportunity for own development and to always quickly and timely react to all the weak spots and so timely prevent their negative impacts.

14. The survey of the economic-financial indicators for the economic justification of the investments in the medium-term program of the sustainable development of the water supply system

1. *Pofitability of capital investment* $= \frac{\text{Capital}}{\text{Total income}} = \frac{1{,}082{,}741}{286{,}054} = 3.71$

2. *Reprodctie potencial of investments* $= \frac{\text{Accumulation} + \text{Amortization}}{\text{Capital investments}} = \frac{952{,}899 + 548{,}510}{727{,}357} = 2.06$

3. Short-term liquidity $= \frac{\text{Cash in bank} + \text{short - term claims}}{\text{Short - term commitments}} = \frac{348 + 14{,}513}{9.722} = \frac{14.879}{9.722} = 1{,}40$

4. Thrift of capital investments $= \frac{\text{Average total income}}{\text{Spent resources}} = \frac{286.054}{71.171} = 4{,}02$

5. Qualitative structure of employees $= \frac{\text{No. of employees with university - level}}{\text{Total no. of employees}} = \frac{12}{62} = 19{,}3\%$

6. Income on no. of employees $= \frac{Income}{\text{No. of employees}} = \frac{99.085.000}{62} = 1{,}598.145$

7. Accumulation for the period 2005-2010 $= \frac{\text{Net income}}{\text{Capital investments}} = \frac{874.275}{727.377} = 1{,}20$

8. Term of return of borrowed resources $= \frac{\text{Average value of net income}}{\text{Total value of invested resources.}} = \frac{827.357}{286.171} = 2{,}89$

9. Internal rentability rate = 7,73

(more detailed information can be seen on page 48)

15. Closing evaluation

Based on above-mentioned indicators and results we have come to by the application of familiar methods and calculation formulas, which we have used while evaluating certain economic results and financial and other effects of economic and social justification of above-mentioned capital investments, it can be concluded that:

1. nvestment project is liquid in total and in all individual time periods and there are no critical years in the settlement of commitments undertaken by it. We have got short-term liquidity by putting short-term claims and short-term commitments in relation and thus we have got the quotient 1,40, which shows that each dinar of short-term commitments is covered by 1,40 dinars from short-term claims structure.
2. investment project is not sensitive to increase of production material costs, because they are negligible and if costs increase even by 10%, a quite satisfactory internal profitability rate is still achieved.
3. profitability, thrift, and acumulation indicators in the observed period of 20 years and from year to year show the tendency of stability, rationality and gradual advancement of complete water supply system, including here also complete sewerage system and sewage, effluent and other wastewaters treatment system.
4. Accordingly, all applied methods that we presented in the evaluation of the justification of these capital investments have given positive answer to all basic questions presented in this medium-term investment programme.
5. Besides economic, infrastructural and urbanization effects that will be achieved by realisation of capital investments anticipated by this medium-term programme, of the same or even larger importance are the ecological effects and te effects of protection of resources of hydrogeological reserves of healthy drinking water, which this project will protect from further unnecessary and excessive "squandering" and pollution, by means of the abolishnent of the current system of "septic pits" and connection of all households, business enterprises and institutions to sewerage system and waste water treatment system.

APPENDIXES

SPECIFICATION AND STRUCTURE OF PLANNED CAPITAL INVESTMENTS IN THE MEDIUM-TERM PLAN FOR THE PERIOD 2005-2011

Premeasurement and precalculation of preliminary designs whose construction is planned to be realised in the medium-term plan from 2005-2011

I

1. Premeasurement and precalculation of

WELLS CONSTRUCTION WORKS

for construction and equiping of 7 wells whose construction will be realised according to dynamic plan, and whose construction price amounts to DIN 7,200,000 per one well, which in total (7,200,000 x 7) amounts to DIN 50,400,000

Specification of wells construction works

-	wells drilling	DIN	3,600,000
-	equiping of wells with appropriate equipment	DIN	1,100,000
-	equiping of wells – buildings	DIN	400,000
-	transit duct – installations	DIN	1,200,000
-	electrical equipment	DIN	500,000
-	electrical installations	DIN	400,00
	Σ	DIN	7,200,000
	x7=	DIN	50,400,000
2.	Connecting with TS I-1 and TS III-2 by underground power cable (1600 m)		3,200,000
3.	Replacement of power cable (1,900 m)	DIN	3,800,000
4.	Equiping of existing wells	DIN	3,050,000
-	- underwater pumps 3 pieces		
	- underwater pumps 2 pieces		
	Total:	**DIN**	**60,450,000**

or if we convert this value in euros we will get the amount of EUR 755,625.

II Reconstruction of water conditioning station

1.	Replacement of equipment for chlorine station (4) and chlorine neutralization from air, the capacity of 210 l/s whose precalculated value amounts to	DIN	5,000,000
2.	Replacement of centrifugal pumps		
	(11) Q = 100 l/s, H= 65 m 3 pieces		
	(12) Q = 60 l/s H= 65 m 2 pieces		
	whose precalculated value amounts to	DIN	4,100,000
3.	Replacement of electromotive valves		
	(13) Ø150 mm 4 pieces		

(14) Ø 250 mm	4 pieces		
(19) Ø 300 mm	4 pieces		
(20) Ø 400 mm	4 pieces		
(21) Ø 500 mm	4 pieces		
whose precalculated value amounts to		DIN	2,400,000
4. Replacement of slide rule walves			
(15) Ø 200 mm	2 pieces		
(16) Ø 250 mm	3 pieces		
whose value amounts to		DIN	350,000
	Total:	**DIN**	**11,850,000**

This value converted in EUR amounts to 148,125.

III Acquisition of stainless steel equipment for waste water treatment plant

1.	Automatic snail grid for solid waste removal on main sewage suction station whose precalculated value amounts to	DIN	4,550,000
2.	Replacement of 3 pieces of pump generating units of main suction station whose value amounts to	DIN	6,250,000
3.	High pressure autocistern for washing and unclogging of sewerage system whose value amounts to	DIN	9,000,000
4.	Acquisition and assembly of flow gauge		
	Ø 300 mm (electromagnetic or ultrasonic) 2 pieces each for DIN 450,000, whose value together amounts to	DIN	900,000
5.	Construction of aerated sand filter object 1 piece		
	- construction part	DIN	8,000,000
	- equipment	DIN	4,000,000
6.	Construction of building objects with sanitary and xygiene facilities (100 m2)	DIN	6,000,000
7.	Construction of objects and acqusition and assembly of equipment		
	For transfered sewage		2,500,000
	Total:	**DIN**	**41,200,000**

If we convert above-mentioned value in euros acccording to average exchange rate on 07/02/2005 we will get the amount of EUR 515,000.

IV Investments in construction of waterworks

1.	Waterworks 200 mm in diameter on board with water duct armature, mould pieces, hydrants and mud drums for rinsing1330 m in length for DIN 13,260	DIN17,635,800
2.	Waterworks 150 mm in diameter 2,555 m in length for DIN 10,374 on board with water duct armature, mould pieces, hydrants and mud drums for rinsing	DIN26,505,570
3.	Waterworks 100 mm in diameter 8,355 m in length for DIN 4,446	DIN37,146,330
	Total: (1,330+2,555+8,355=12,240 m)	DIN81,287,700
4.	Replacement of worn-out waterworks of unprofiled inadequate materials (zinc and asbestos pipes) 2,000m in length Ø = 150 mm for DIN 10,374 whose precalculated value amounts to	DIN20,748,000
5.	Replacement of waterworks Ø = 100 mm 28,000 m in length for DIN 4,446 whose precalculated value amounts to	DIN124,488,000
6.	Ultrasonic water flow meter Ø 50 – Ø 400 mm 2 pieces for DIN 1,200,000, which amounts to	DIN 2,400,000
		Total: DIN 228,923,700

If we convert above-mentioned value in euros
Acccording to average exchange rate on 07/02/2005
we will get the amount of EUR 2,861,546.

V Replacement of waterworks

1.	Replacement of worn-out waterworks Ø 100 mm	DIN 20,748,000
2.	Acquisition of electromagnetic flow meter Ø 100 mm	DIN 278,708
3.	Acquisition of new water gauges	DIN 6,040,342
		Total:DIN 50,779,050

which converted in EUR amounts to 634,738.

VI Investment in sewage and effluent collector of sewerage system

1. Construction of main sewage collector

Ø 700 mm, 1,140 m in length for DIN 23,400 which amounts to		DIN 26,676,000
Ø 500 mm, 630 m in length for DIN 16,146 which amounts to		DIN 10,171,980
Ø 400 mm, 2,400 m in length for DIN 11,310 which amounts to		DIN 27,144,000
Total length of collector 4,170 m in length	Total	DIN 63,991,980

2. Construction of sewage collector

Ø 500 mm, 1,170 m in length for DIN 16,146 which amounts to		DIN 18,890,820
Ø 400 mm, 840 m in length for DIN 11,130 which amounts to		DIN 9,500,400
Total: 2,010 m in length	Total	DIN 28,391,220

3. Construction of sewage collector

Ø 300 mm, 900 m in length for DIN 7,644 which amounts to		DIN 6,879,600
Ø 200 mm, 810 m in length for DIN 5,304 which amounts to		DIN 4,296,240
Total: 1,710 m in length	Total	DIN11,175,840

Total (1+2+3):DIN 103,559,040

which converted in EUR amounts to1,294,488.

VII Construction of sewerage system – 4,000x5,304

Ø 250 mm, 22,000 m in length for DIN 5,304 which amounts to	DIN 116,688,000
Ø 200 mm, 22,170 m in length for DIN 4,446 which amounts to	DIN 98,567,820

TOTAL (1-4):DIN 215,255,820

which converted in EUR amounts to 2,690,694.

VIII Premeasurement and precalculation of equipment and mechanization for repair and maintenance

Ord.no.	Description	MU	Quantity	Individual price	Total value
1.	Acquisition of Compressor	piece	1	900,000	900,000
2.	Acquisition of Freight vehicle load-bearing 2400 kg	piece	1	140,000	140,000
3.	Acquisition of Tractor 75 HP	piece	1	1,000,000	1,000,000
4.	Acquisition of Tractor trailer	piece	1	100,000	100,000
5.	Acquisition of Mobile diesel electro generating units power 60 kVA power 30 kVA	piece piece	1 1	690,000 510,000	690,000 510,000
					3,340,000

which converted in EUR amounts to 41,750.

IX Reconstruction and adaptation of catchmenmt and reservoirs and other additional facilities

from their content and reconstruction and annexing of these objects into business premises 300 m2, whose precalculated value amounts to DIN 39,450, which in total amounts to DIN12,000,000. If we convert above-mentioned value in euros we will get the amount of EUR150,000.

Recapitulation

Of above-mentioned capital investments

1.	Construction and equiping of wells	DIN 60,450,000 that is EUR 755,625
2.	Reconstruction of water conditioning station	DIN 11,850,000 that is EUR 148,125
3.	Acquisition of equipment and assembly	DIN 41,200,000 that is EUR 515,000
4.	Investments in construction of waterworks	DIN 228,923,700 that is EUR 2,861,546
5.	Replacement of worn-out waterworks	DIN 50,779,050 that is EUR 634,738
6.	Investment in collector of sewerage system	DIN 103,559,040 that is EUR 1,294,488
7.	Construction of sewerage system	DIN 215,255,820 that is EUR 2,690,697
8.	Investment in equipment and mechanization for maintenance	DIN 3,340,000 that is EUR 41,750
9.	Reconstruction and adaptation of catchmenmt and reservoirs into business premises	DIN 12,000,000 that is EUR 150,000
	TOTAL:	**DIN 727,357,610 that is EUR 9,091,969**

Pre-calculation of the acquisition of new water gauges for the year 2005

Converted into € on 07/02/2005 at exchange rate DIN 80 din for 1 EUR.

1. Electromagnetic water meters			pieces	
- 80mm in diameter	140.000,00			
VAT included	165.200,00		5	826.000
- 100mm in diameter	155.000,00			
VAT included	182.900,00		3	548.700
- 125mm in diameter	165.000,00			
VAT included	194.700,00		1	194.700
- 150mm in diameter	171.000,00			
VAT included	201.780,00		1	201.780
- 200mm in diameter	188.000,00			
VAT included	221.840,00		2	443.680
		Σ	12	2.214.860
2. Water gauges				
- ½'' (13mm)	2.298		300	689.400
- 3/4" (20mm)	2.694		570	1.535.800
- 1" (25mm)	3.632		30	108.960
- 5/4" (30mm)	3.963		30	118.890
- 6/4" (40mm)	6.816		40	272.640
- 2" (50mm)	19.986		5	99.930
		Σ	1005	2.795.620
3. Combined water gauge				
- 50/20 mm	37.889,00		20	757.780
- 80/20 mm	78.211,00		2	156.422
		Σ	22	914.202
4. Water gauges with pulse output				
- ½'' (13mm)	4.189		10	41.890
- 3/4" (20mm)	4.383		10	43.830
		Σ	20	85.660
		Σ		DIN 6.040.342

which converted in EUR amounts to EUR 75.504

The importance of capital investments in acquisition and replacement of water flow meters and water gauges

The importance of capital investments in acquisition and replacement of water flow meters and water gauges

Besides measures of replacement of the old and worn-out waterworks, "Vodokanal" will, in this and the following years, apply the activities in the sector of detection of water losses on the devices for measurement of water flow in ultrasonic and electromagnetic gauges and measurement of water consumption by gauges with propeller and water gauges with ordinary or Voltman turbine, 13-20 mm in diameter and planned calibration or their regular replacement. Since we already have at our disposal a large number of devices and equipment for water losses detection, by medium-term investment programme we have anticipated investments in technical devices and equipment for timely detection of water losses.

Here, by the way, we will cite only some of the most important, where we include:

1. Acoustic devices as a simple method, which is based on the listening of the sounds that water leakage produces. However, although they are simple, these devices demand skilfull and experienced operators, who are capable to discern the sounds originated from water leakage from other sounds.
2. Another method of radar measurement consists of the detection of water leakage and losses based on ground humidity that can be in direct relation correlation to pipeline leakage in case the pipe is close to humid ground. Radar measurement and detection of losses can be executed by movable vehicle, as well as a small plane in order to carry out the control of waterworks.
   The locating of leakage spots should be performed during night, when surrounding sounds are minimal. A certain work team should have continuous night work, one to two nights.
3. Qiuck and efficient repairs represent an important factor in losses reduction.
   Losses through cracks with small pressures are unjustifiably assessed as small. The most often causes of leakage are on the cap shafts, faulty valves, leaking hydrants and similar. If these leakages are continuous, without timely repair, the cubic capacity of leaked water can be very large. Contrary to this, continuous, well and systematic maintenance can reduce most of these leakages and keep them under control.

   The biggest problem occurs with leakages that do not manifest on the surface. The best indicator that pipes leak is the depression in the asphalt or by the road that gets bigger and bigger every day. There are examples where even the houses sank and leant due to constant water leakage from faulty or cracked pipes. Whatever repair technique is used, it is important that it is noted in the book of repairs, or in data bases, where the place and date of repair, causes of leakage, time of repair finish, estimated quantity of leaked water and the work team that carried out the repair, should be noted.
4. By managing of lower working pressure in waterworks it is possible to achieve:

- water losses reduction, which saves water resources and alonsgside this the costs of water processing and pumping are reduced
- water consumption reduction, which also saves water resources
- reduction of frequent occurence of cracks, which reduces the damage and repair cost.

In order to achieve rationalization as big as possible while managing theatwater supply system, besides above-mentioned measures in the sector of reduction of water losses in transport it is necessary to pay appropriate attention to relations with consumers, firstly the folowing:

- how and in which way we inform our consumers and how much resources we invest in contacts with consumers
- what is the number of consumer complaints about our services
- which means of communication we use for the contacts with consumers
- what is the debt collection rate of delivered water

- based on which data we collect debts for delivered waters and other services and how reliable they are.

In order to develop our relations with consumers and awake their awareness of the need for water saving and reduction of subterranean waters pollution which our town uses for drinking water supply, we will in future invest necessary resiources in marketing purposes, by means of television, radio, newspapers, internet and other means of communication.

We will invest particular effort in marketing means and activities with pre-school and school children, by means of appropriate brochures and prepared lectures in schools, with the help and cooperation with educational and school institutions and individuals from teaching personnel ranks.

Each report of failure by consumer is regularly recorde that creates the geneasl impression among citizens-consumers tht their opinion is esteemed and respected.

For this purpose it is favourable that "Vodokanal" possesses the gata gathering softver. Of course, the decision about the type of data gathering should be made by each water corporation in the accordance with local conditions, size of waterworks and financial potentials.

Measurement in waterworks and water producton and consumpotion data

Flow measurement in waterworks, can conditionally be divided in three groups:

- measurement of scooped water quantities at the sources
- control measurements at the characteristic points of watwerworks, which establish the control over certain parts of waterworks or consumption areas
- measurement of consumption at the waterworks of end consumers

Measurement equipment

For the measurement of cubic capacity of water flow as legal gauges the following types of flow gauges are prescribed:

- electromagnetic flowmeters
- ultrasonic flowmeters
- whirling water flow meters

In the Rulebook about the conditions for water gauges the folowing types of gauges are classified:

1. Water gauges with propeller
2. Water gauges with turbine (ordinary or Voltman turbine)
3. Water gauges with pistons
4. Water gauges with ring piston
5. Water gauges with discus and
6. Other combined types of water gauges.

All above-mentioned types of water gauges (with a propeller or turbine) belong to a group of so called speed gauges of flown cubic capacity of fluid.

In our country (Serbia and Montenegro) for the measurement of the cubic capacity of consumed water multi-blast water gauges with propeller are solely used, of the denominated diameter from 1 m3/h to 2,5 m3/h, that is of denominated flow from 13 mm (1/2 inch) to 20 mm (3/4 inch). For measurement in collective residing (tower blocks), water gauges with Voltman or ordinary turbine of denominated flow up to 15 m3/h and denominated diameter to 50 mm are used.

The accuracy of water gauge can be influenced by, for example, upstream interruptions, caused by the presence of pipe curve, pipe narrowing, valves or pumps. Water gauges has to be

assembleed on the straight part of a pipe in order to rectify any negative effect. The pipe has to have the same denominated opening as the water gauge.

Having in mind that "Vodokanal" did not have financial resources to replace pipelines and equipment for more than 20-30 years, calculating from the moment of their construction, now it is high time we completely replaced worn-out waterworks and equipment and saved waterworks from its further decay. Also, in order to provide the control and accuracy of production, consumption and water losses in transport, it is necessary that all water flow meters are acquired and assembled urgently, as well as faulty water gauges and those which were not timely and regularly calibrated, so that they have losses due to this also, because a large portion of water flow meters and water gauges is not working properly and we should not rely on them, without the control of their calibration or replacement and, as we have anticipated by the medium-term plan of reconstruction, partial renewal or complete replacement. Necessary explanations and acquisition value of water flow meters and water gauges can be seen in the table of the acquisition of water flow meters and appropriate types of water gauges on page 6 of these appendixes.