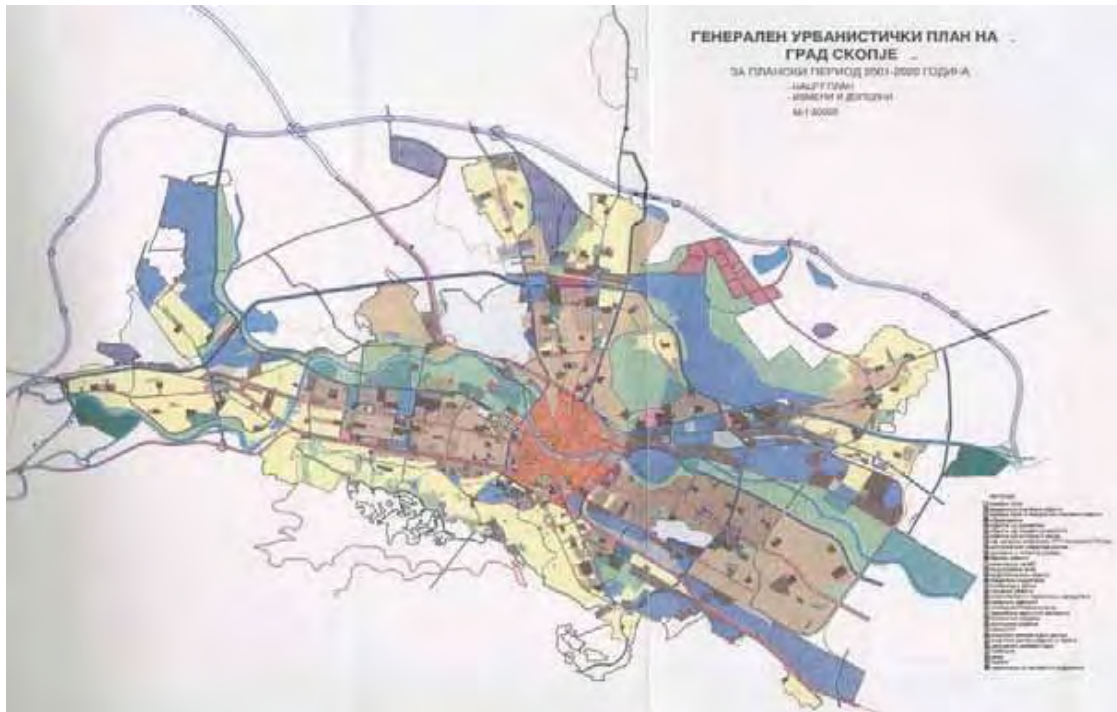


10.3 Industry Survey

**PROJECT-STUDY ON WASTE WATER MANAGEMENT IN SKOPJE,
REPUBLIC OF MACEDONIA**

FINANCED BY: Government of Japan through JICA



FINAL REPORT

COMPONENT: INDUSTRY SURVEY

**Skopje,
30 January, 2008**



Investor: JICA

Ref. No. GPH_040_11/07

**PROJECT- STUDY ON WASTE WATER MANAGEMENT IN SKOPJE,
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Manager,
DEKONS EMA

Menka Spirovska

Manager,
GEING

Zanina Dimitrievska

Final report of the industrial survey for the project Study on Waste Water Management in Skopje, Republic of Macedonia was done by:

Participants:

Senior experts:

- **Prof. d-r. Trajce Stafilov;**
- **D-r. Bosko Nikov;**

Experts:

- **Maja Georgieva, B.Sc. Environmental engineer;**
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- **Katarina Milenkovska, data base.**

Coordinator:

Menka Spirovska

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Introduction

Skopje is the Capital of the Republic of Macedonia and its political, cultural, educational and economic centre. More than 600,000 inhabitants are with permanent status of living and about 200,000 people are with temporary status of living. Skopje is also an industrial agglomeration.

The waste waters originated from both the households and the industries are discharged into the recipients/ Vardar river and some small channels and tributaries, without any treatment. The result is deterioration of the quality of the environment and pollution and degradation of the water environment as well.

Bearing in mind the current situation with the quality of waters in the main river in Macedonia, Vardar river, as an international river and the needs of the City of Skopje, Government of Japan and JICA with the responsible bodies by the beneficiary Country (Republic of Macedonia), designed the Application for the Project-Preparation of the Study on Waste water Management in Skopje.

The Study Team, Tokyo Engineering Consultants Co., Ltd will implement the Project through several phases.

The first phase – Assessment of the current situation as a prerequisite for preparation of the Study contents several activities. Some of thus are following:

- **SOCIAL SURVEY**
- **WATER QUALITY EXAMINATION**
- **INDUSTRY SURVEY**
- **ENVIRONMENTAL AND SOCIAL CONSIDERATION SURVEY**

The Study Team, through the relevant JICA procedure has chosen the local teams/consultants for implementation of the mentioned components.

For the implementation of the third component: INDUSTRY SURVEY has been chosen the Company: GEING KREBS UND KIEFER INTERNATIONAL AND OTHERS

The main aim of the Survey

To update the existing data and information stored in the Cadastre of polluters in the Environmental Information Centre in The Ministry of Environment and Physical Planning, assess the current water consumption and discharges from the industry in the Skopje as one of preconditions/baseline for preparation of the future Study for waste water management in Skopje.

The current situation

Until now some similar surveys were conducted, however, some companies stopped operation and some are newly established. Therefore, the survey will be used to update the data and information.

Methodology of the Survey

The survey was basically conducted by filling out the formatted questionnaire by the local consultant and inspectors from MEPP by interview to the selected factories/enterprises. **The survey result is not opened to the public, only for the Study; however, it will be explained to the factories/enterprises that participate in the seminar after the survey.**

The companies have been chosen, basically in regard the water consumption, water discharges and the rate of pollution. In accordance with our assessment the surveyed companies represent 60-65% of water consumption and wastewater discharges from whole industry in City of Skopje.

Study area

Municipalities of: Aerodrom, Butel, Chair, Centar, Gazi Baba, Gjorche Petrov, Karposh, Kisela Voda, Saraj and Shuto Orizari.



The scope of the work

The Scope of the work and the other conditions for the implementation of the components are written in the Agreement on Industry Survey under the Study on Waste Water Management in Skopje, the Republic of Macedonia, signed on 26.11.2007 between the Study Team, represented by the Team Leader, Mr. Kazufumi Momose and Consulting Team, represented by Mrs. Zanina Dimitrievska, the General Manager of Geing Krebs und Kiefer International and Others Ltd.

The main requirements in the ToR

“At the beginning of the Work, The Local Consultant shall submit its detailed implementation schedule of the JICA Study Team. Before implementation of questionnaire survey, the Local Consultant shall: 1) Prepare pre-questionnaire items and select industries referring to the data of Environmental Information Center, IPPC listed industries etc; 2) Consult with Ministry of Environment and Physical Planning procedures and items of the survey and 3) Conduct a pre-questionnaire survey using a questionnaire sheet. Based on the result of survey, the questionnaire sheet shall be modified and finalized through discussions with the Study Team. The Local Consultants shall also prepare the implementation of the industrial survey and data input including preparing writing tools, copying questionnaire and initial training for field surveyors and data-entry operator. The Local Consultants shall then implement the industry survey, analyze the results and prepare the reports in accordance with the instructions from and under the supervision of the Study Team. The Local Consultants shall also support the Study Team to present results of the survey in a workshop if required.

Industry Survey is basically questionnaire survey using the questionnaire sheet, which shall be prepared by Study Team and the Local Consultants. The purpose is to identify the enterprise/factory's awareness of sanitation of water pollution, water usage, wastewater volume, its treatment level, preferences for future sewerage/sanitation service levels, willingness to pay for domestic water treatment or to invest in construction of treatment plant. The sampling number is 50 samples (industries) in Skopje City. Samples that represent various industries are to be selected, however including 50 factories indicated on study on sewerage development plan in Skopje conducted in 1999.



The questionnaire survey shall be carried out at the survey areas and all the samples will be taken within Skopje City. The list of enterprise/factories and the locations to be

surveyed shall be proposed by the Local Consultants referring to 'Economy Inventory' listed in the Environmental Information Center. After the Contact, the list will be decided by the Local Consultants in collaboration with the Study Team, in order to ensure all industrial categories."

Activities

This Report covers the activities related to the selection of the companies taken in the consideration, desk study, field work and analyses of the results obtained.

All activities placed in the time framework are presented in the Table 1.

	week				
	1	2	3	4	5
Activity 1: Preparation of pre-questionnaire					
Activity 2: Inventory of industries (to be covered under the survey)					
Activity 3: Consultation with the MOEPP about the questionnaire					
Activity 4: Final questionnaire					
Activity 5: Inception report					
Activity 6: Seminar, introducing the questionnaire to the industries, interim period					
Activity 7: Implementation of the industry survey					
Activity 8: Data input					
Activity 9: Draft final report					
Activity 10: Presentation of the results from the survey					
Activity 11: Final report					

Table 1: Time framework of the Industrial survey

I. Inception Phase

During the Inception phase have been undertaken the following activities:

1. The Consultant team has been chosen.
2. The meeting between the Study Team, Consultant and the representative by the Ministry of Environment has been organized.
3. Several meetings between the Study Team and the National Team and the Consultants have be organized with the purpose of defining the scope of the work, clarifying the questioner for the Industry Survey, becoming familiar with the needs of the Study team and the Current situation and the conditions, discussion on some Japanese experience in defining the polluters and waste water treatment.
4. The Questionnaire primarily prepared by the Study team expert (Mr. Izawa) has been discussed and slightly modified and on the end it was agreed and prepared for the subsequent step – the Survey. As Annex 2 is presented the Questionnaire used for the Industry survey.
5. The needed tables have been prepared by the Study Team expert, discussed with the Consultants and filled with the primary necessary information by the Consultants.
6. The Kruger Study, component A.2-Study for Waste Water Management in Skopje (1999) has been consulted in regard the list of the companies indicated as main water consumers and waste water dischargers. The Statistical Yearbook and the Cadastre of polluters have been consulted as well.
7. Based on the activities mentioned in the previous section, the list of the companies for the Industry survey has been completed and discussed with the Study Team.
8. A set of necessary meetings for the Component with the beneficiaries have been organized by the Consultant team.
9. The invitation letter and the Agenda for the introductory Seminar with the relevant industries have been designed. The questioner has been translated on Macedonian language as well.
10. The Time Schedule has been prepared.

II. Interim phase

When the content of the Questioner has been defined, the team of consultants, supported by the responsible Authorities by the Skopje Municipality, organized a seminar. The seminar has been organized on 10 December, 2007 and more than 60 companies have been invited, as well the competent authorities by the Ministry of Environment and

Physical Planning, Ministry of Transport and Communication and Ministry of Agriculture, Forestry and Water Economy.

More than 25 Companies have been participated the Seminar (see the list of participants Annex 1). The National Environmental inspectors also have been attended the Seminar, as well the nominated inspectors by the municipality of the Skopje City. The representative by JICA Team has been presented on the Seminar, as well.

The consultants have prepared appropriate Power Point presentations:

- Presentation of the Project,
- Presentation of the Industry Survey Component
- Presentation of the content of the Questioner

After the Seminar, the team of consultants has contacted the chosen companies and prepared very precise plan for Survey.

III. Industry Survey

Three groups of consultants, accompanied by State environmental inspectors, have performed the Industry Survey:

The industry survey was conducted in interview style. During the questionnaire survey, the Local Consultants tried to take a few digital photographs that show the surrounding environment at each sampling area on maps or at site, but it was not aloud to the team in all visited companies. That why some are taken but not all. During sampling, the sampling day, sampling time, sampling location, name of sampling personnel, etc. were recorded in the questionnaires sheets and maps. The base map, on which the exact location of sampling is recorded, was provided by the Study Team prior to the implementation of the field work. The Local team also entered the sampling location data on the digital base

map provided by the Study Team.

Content of the Questionnaire:

1. Basic Profile

- Name, category/type of industry, address/location, contact person;
- Products, number of employees;

2. Water usage and water supply source

- Water supply source;
- Water consumption/wastewater generation: average and peak, hourly, daily, yearly;
- Wastewater quality: average and peak, hourly, daily, yearly;

3. Wastewater treatment

- Existence of treatment plant, construction period, capacity, target parameters, treatment process, working or non-working, trouble of the plant;
- Number of discharging point (outputs) and where to discharge;
- Segregation of discharge pipe according to kinds of wastewater;
- Which is preferable for discharging wastewater to sewerage or body like river directly;

4. Wastewater monitoring

- Flow and water quality and quantity analyses equipment;
- Monitoring parameters with equipment, frequency;
- If no equipment, which organization checks the wastewater quality;
- Operation and maintenance organization;

5. Demand for wastewater treatment facility

- Willingness to pay for treatment service for domestic water treatment in case of discharging waste water to sewerage or willing to invest construction of treatment plant;

6. Demand of seminars

- Industrial category and pollutants;
- Treatment process of pollutants;
- Remark in planning and designing of treatment process and operation and maintenance of treatment plant;

- Cleaner production;
- The meaning of construction and appropriate O/M of wastewater treatment plant;
- For the above, establishment of QC committee;
- Others;

The Questionnaire which was used for the industry survey is given in Annex 2. In addition all filled questionnaires with relevant data from the industrial survey are given in Annex 2.1 on Macedonian language (together with locations map, bills for water supply from some installations and maps/photos) and in Annex 2.2 are the English versions of the same questionnaires.

IV. The results of the Survey

50 companies have been visited, the data base in the Ministry of Environment and Physical Planning has been consulted and Cadastre of polluters, data base for water consumption in the Public Enterprise Vodovod has been consulted, as well as Kruger Study for waste water Management-Skopje Component-A-2 (1999/2000).

All visited companies are presented bellow, together with dates of visit, surveyors, contact persons by the industry and basic information from the companies, as well marked all companies on the Map presented in Annex 3.



Nr.	Company	Contact person/time of visit	info/phone contact	team	date
1	Ading AD; TGS Tehnicki gasovi	Ljiljana Drvosanova 9:00 Kristina Kolovska 11:00	INFO E-MAIL 2034-800, 2034-866 tel: INFO FAKS 2031-411; faks: 2041-472 tel:	TEAM 1	
3	MITTAL STEEL	Zvonko Hristov 9:00	INFO E-MAIL tel: 3243-900; mob: 070/358-461		
4	Makstil	Elena Ivanovska - Vidinova 11:00	INFO E-MAIL tel: 3287-054; mob: 070/423-554	TEAM 1	
5	Rz Uslugi	Dimitar Hristov 13:00	INFO E-MAIL tel: 3288-091		
6	Replek Farm	Tina Cacanaska i Zaklina Ristovska Cane Talevski 11:30	INFO E-MAIL tel: 3085-554; Tina: 070/361-916; zaklina: 071/296-207 Cane 070/390-602	TEAM 2	14.12.2007
7	Zito Luks - Sufo Orizari	Biljana Bajdevska 10:00	INFO E-MAIL tel: 2654-165		
8	Fitofarm	Biljana Taskovska 12:00	INFO FAKS tel i faks: 2632-121; mob: 075/393-575	TEAM 1	17.12.2007
9	Klinicki centar	Stojan Cvetkov 9:00	INFO FAKS tel i faks: 3226-927; mob: 070/387-027		
10	Gradaska bolnica	Sestra Suzana 11:00	INFO FAKS 3235-053; faks: 3130-234 tel:		
11	Voena bolnica	Potpulkovnik Stojce Kukovski 13:00 vo Golemata zgrada	INFO E-MAIL tel: 3283-000; mob: 070/340-279	TEAM 2	20.12.2007



12	Alkaloid AD-Lafoma					
13	Alkaloid AD-pharmaceutical					
14	Alkaloid AD-Herbs					
15	ALKALOID PREMAZI DOOEL	Lidija Dimitrovska od 9:00 pa natamu	INFO E-MAIL tel: 3104-317; mob: 071/341-557	TEAM 1		
16	Kanar 92	8:30	INFO tel i faks: 2550-141	FAKS		
17	MZT energetika	Ilija 12:30	INFO FAKS tel: 2549-500; mob: 070/338-664 Ilija			
18	MZT Hepos	Zunka Spasovska 10:30	INFO E-MAIL tel: 2549-852			
19	MZT Learnica	Vasko Petkovski 070/761-488, 09:30	INFO FAKS tel: 2520-407; faks: 2549-771	TEAM 2		18.12.2007
20	Sanos Bus FAS 11 Oktomvri	Raspaskovski 070/230 000 Saso Terzioski 9:00	raspaskovski@mt.net.mk INFO E-MAIL tel: 3109-100			
21	Evropa A.D.	Lazo Camovski 11:00	info faks tel: 3115-395; faks: 3114-066			
22	JSP - Gjorce Petrov	Vasil Tolevski 13:00	INFO E-MAIL tel: 3174-264; mob: 071/211-365	TEAM 1		
23	JSP - Gazi Baba					
24	Energetika - ELEM	Violeta Sontevska i Spresa Durputi 9:00	INFO E-MAIL tel: 3287-709-Spresa i 3287-705 Violeta			
25	Skopski Leguri	Irena Srbinska 11:30	INFO E-MAIL tel: 2603-434; mob: 071/684-525	TEAM 2		19.12.2007

26	Komuna AD - Istok	Velibor Alojz - 08:30	INFO E-MAIL tel: 3230-361 INFO E-MAIL tel: 2611-314 lok. 172	TEAM 1	
27	Pivara	Hrisanti Angelovska 10:00			
28	Rade Koncar-Kontaktori i relei	Pavlina Dimitrovska 08:15	INFO FAKS tel: 2463-509; faks: 2461-106; mob: 070/350-083		
29	Ohis AD	9:30	INFO FAKS tel: 2728-202; faks: 2728-644; 076/404-750		
30	Cementarnica Usje	Filip Ivanov 11:00	INFO E-MAIL tel: 2782-500; 2786-240; mob: 075/200-101		
31	Mlekarnica Masko	Vlado Spasovski 12:30	INFO FAKS tel: 2763-225; faks: 2700-942	TEAM 2	20.12.2007
32	Skovin	10:30	INFO FAKS tel: 3175-107; faks: 3175-149		
33	M&A beveridzis	Mimi Temelkoska 11:30	INFO FAKS tel: 2780-425 faks: 2786-725	TEAM 1	21.12.2007
34	Beton AD Skopje	Slavica sef na priprema 11:00	INFO FAKS tel: 3080-888; faks: 3080-207		
35	Globus	12:30 posledna 4 hrom velurflok stara	INFO FAKS tel: 20 45 301;02;03;04; faks: 2031-364		
36	Klanica "Vilan"	14h	INFO FAKS tel: i faks: 2056-222	TEAM 2	24.12.2007
37	"Rimes"	Aleksandra Bogdanoska 08:30	INFO E-MAIL tel: 2533-032	TEAM 2	24.12.2007
38	Lek Skopje	Krste Nikolov - 09:30	INFO FAKS tel: 2550-800; faks: 2551-484		



39	Drisla	10:30	INFO 2722-400; faks: 2722-560		
40	AD Toplifkacija - Zapad				
41	AD Toplifkacija - Istok		INFO FAKS 3097-615; 3097-600; 3133-107; 3229-619; faks: 3076-057 tel: 3133-107; 3229-619; faks: 3076-057	Bosko; Jule	27.12.2007
42	AD Toplifkacija - 11 Oktomvri	NADICA Lokvenec 09:30			
43	MIDA	Marian 13:00	3073 103; 3067 262; b.markovska@ford.com.mk	Maja	27.12.2007
44	Rade Koncar TEP	Goran Antevski 26,12,2007 11:30	070/205 gantevski@koncar.com.mk 159;	Maja, Elena	26.12.2007
45	"Promes"	Saso Kosev 09:00	INFO FAKS 2550-880;888;2520-840; faks: 2550-881	TEAM 2	27.12.2007
46	Carwash TONI	Antonio Sekulovski	70244545	Jule, Elena	08.01.2008
47	Carwash Brane	Branislav Zdravkovik	3117863	Jule, Elena	08.01.2008
48	Carwash Medzik Kisel	Zoran Kiselicki	75340727	Jule, Elena	08.01.2008
49	AD Toplifkacija - Sever	Emil (11h)	02/2636 emil@toplif.com.mk	Maja, Elena	09.01.2008
50	Swiss-Ion	Frosina frosinam@swission.com.mk	2600-423; 070 344 813	Maja, Elena	09.01.2008

Team 1: Bosko Nikov, Sandra Andovska, Maja Georgjeva, Inspector

Team 2: Prof Trajce Stafilov, Elena Jankova, Julijana Nikova, Inspector

Basic Findings

Water consumption

According to the results obtained during the field survey, the overall water consumption in the interviewed installations amounts 17878505 m³/year (Annex 4: Information of industries). Although taken onsite, this figure should be considered as with a high uncertainty because no accurate data on water consumption have been found for probably the bigger consumer, the former integrated steel plant (companies' No. 3, 4, 5, 24 and 25 in the tables).

Most of the water supply comes from City's water supply source, the spring of Rasche. Most of the companies receive their water from the City's water supply system. Some companies are supplied with water directly from the spring (companies' No. 3, 4, 5, 24 and 25).

Data on water supply to industries are shown in Annex 5 (Detailed water consumption and wastewater discharges) and the share of water sources are shown in Figure 1.

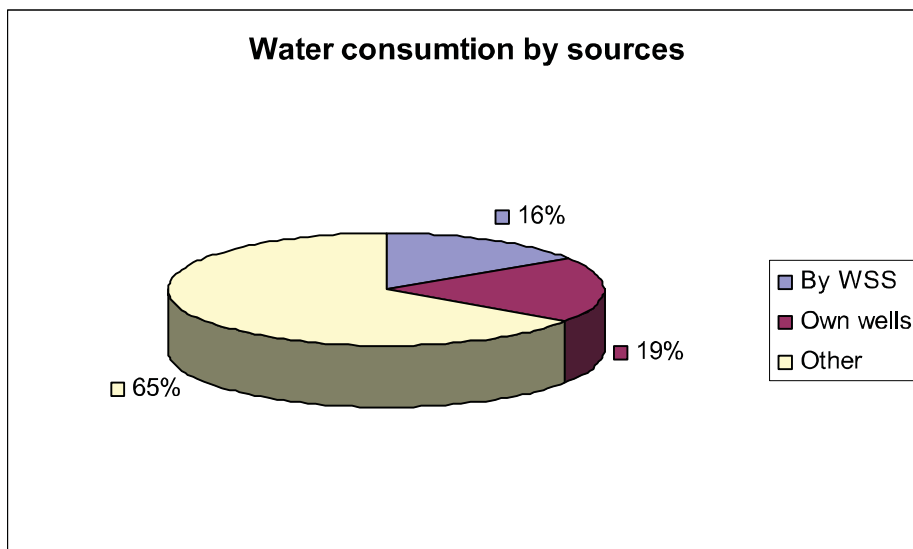


Figure 1. Water consumption by sources

Data on water supply to industries which is connected with the questionnaire and presented in (%) are shown in Annex 6 (Detailed water consumption by purpose) and the

share of water sources are shown in Figure 2. The biggest amount of the used water for the surveyed installations is used for the process or production (55%) and cooling (30%).

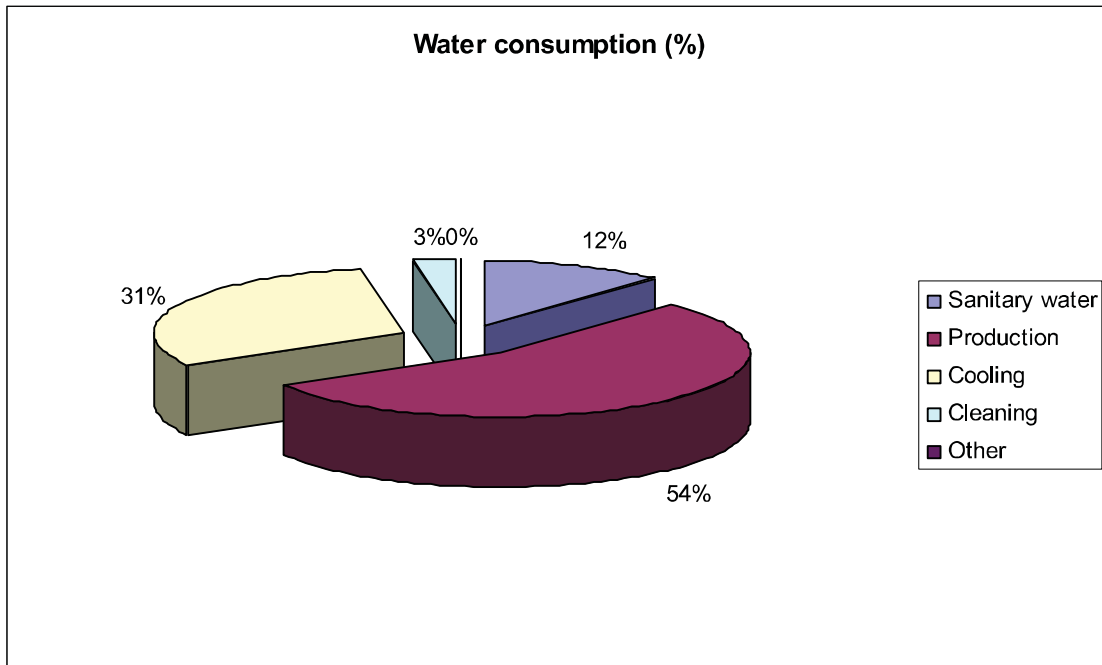


Figure 2: Water consumption from different uses

Water consumption of the companies supplied by the City's water supply system is regularly measured and quite accurate data are available. Few of the industries supplied from proprietary sources measure their real water consumption and data for these companies are based on assessment of either pump capacities or discharged wastewater. Water consumption differs from one industry to another (Annex 7: Information of industries by sectors). Production and processing of metals are most water consuming industries in Skopje. Only seven metal producing and processing plants use over 65% of the water supplied to all 50 installations covered by this survey. Table 2 shows annual water consumption by different industries while the shares of water consumption are presented in Figure 3.

Table 2: Annual water consumption and wastewater discharge

Summary of information from industry by sectors

No.	Sector	Water consumption (m ³ /year)	Wastewater generation (m ³ /year)
1	Energy industries	665,491	100,841
2	Production an processing of metals	11,654,602	5,856,897
3	Mineral industry	395,000	368,000
4	Chemical industry	2,552,601	1,295,777
5	Waste management	9,025	34,254
6	Other activities under IPPC*	1,466,817	1,280,821
7	Other**	1,134,969	1,037,429

*-Companies under the IPPC regulation (IPPC Decree, chapter 6)

**- Companies out of the IPPC regulation

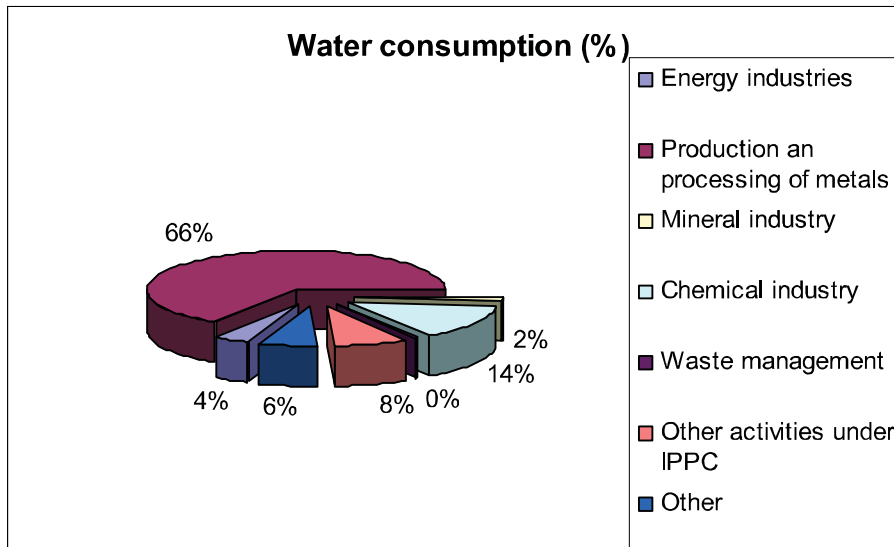


Figure 3: Water consumption by sectors

Wastewater Generation and Discharge

Data on wastewater generation and discharge are given in Annex 3 - 7. Total wastewater discharged from the installations covered by this survey amounts 9974019 m³/year. Major part of the losses is due to metal production and processing operations as well as cooling towers operation in several installations. The steelwork complex is by far the area of

biggest water sink. Almost 8 million cubic meters per year are regularly reported lost.

Figure 4 shows annual quantities of discharged wastewater from different uses (process, cooling, cleaning etc.). More than half of discharged wastewater (60%) is generated from production processes. Wastewater discharged from cleaning and cooling operations are almost equal (20 and 18% respectively). Quantities used for other uses are negligible.

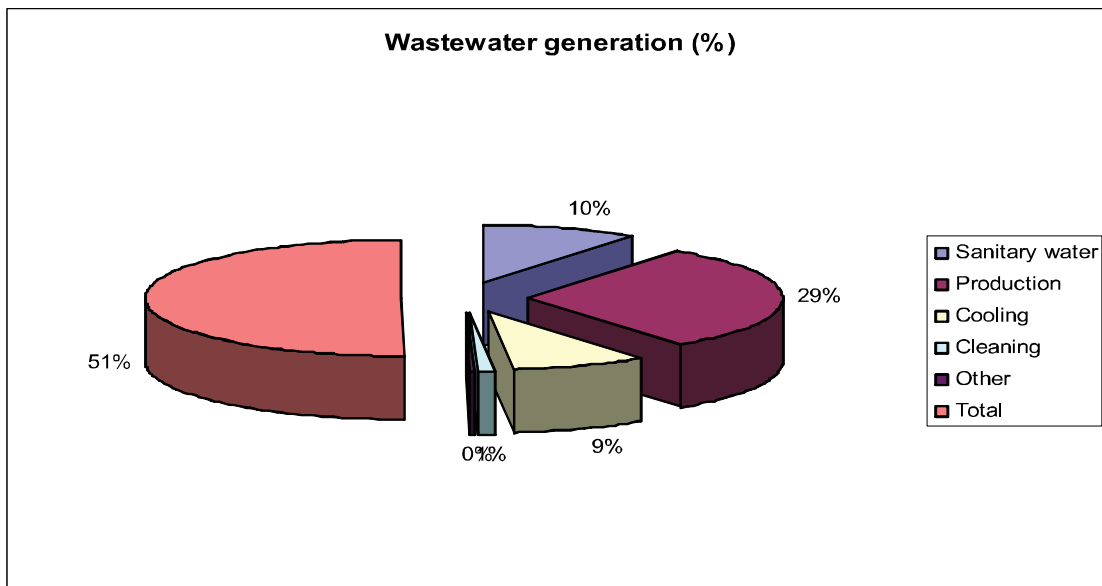


Figure 4: Wastewater generation from different uses

Wastewater generation varies from industry to industry. Metal production and processing industry generates vast of the discharged wastewater (58.7%) from the companies dealt with in this report. The distribution of wastewater by industry sectors is given in Annex 7 and Figure 5.

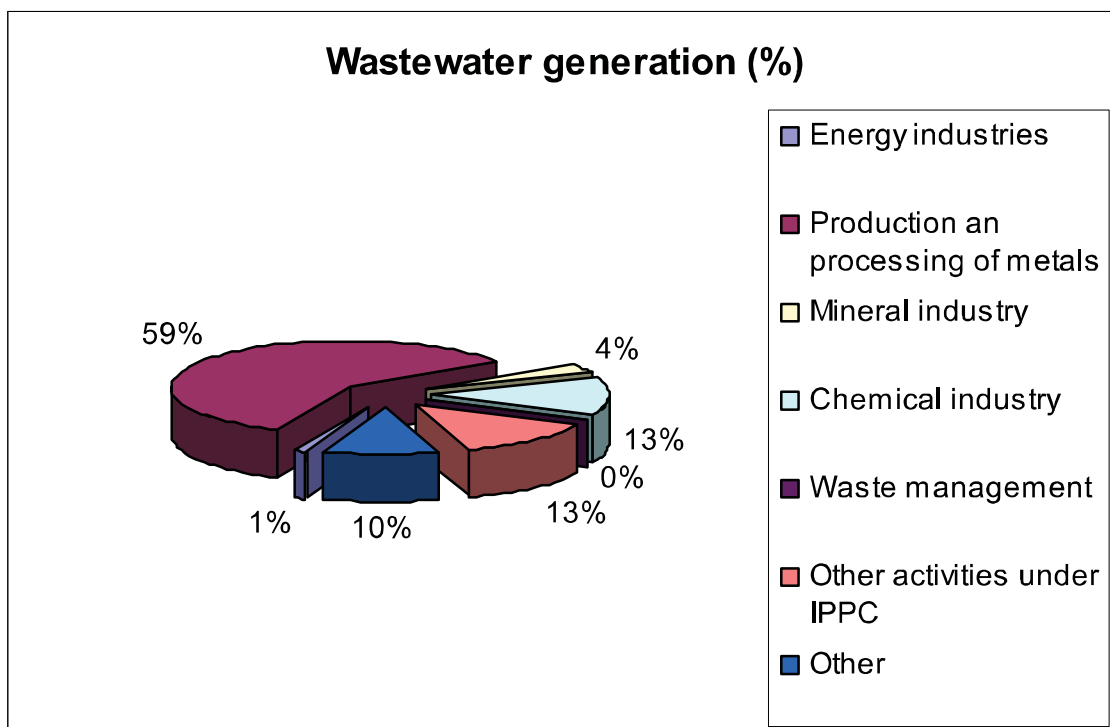


Figure 5: Wastewater by industry sectors

There is no separate sewer system for industrial wastewater on the territory of the City of Skopje. There are, however, industries discharging their wastewater directly into a surface water recipient (most often the Vardar River). Such industries are: Ohis, Drisla, most of the ready mix concrete plants (Beton has been interviewed).

Some companies have been discharging their wastewater into open channels collecting communal wastewater as well. Examples of this kind are Cementarnica Usje, MZT group of factories, the former integrated Iron and steel industry through RZ Uslugi, Konuna etc.

Major part of the industrial facilities discharge wastewater into the underground City sewer system.

Wastewater quality

No continuous wastewater quality monitoring has been encountered during the field survey.

Few of the companies have their own laboratories and make analyses of wastewater in



these laboratories.

Chemical analyses of discharged wastewater are carried out only occasionally, mainly on request or order of regulatory bodies (MoEPP, MAFW and MoH), mainly by MoEPP, but also by MAFW and MoH in the following cases:

- regarding the possible impact on the water quality for irrigation;
- regarding the possible impact on human health.

Scope of wastewater analyses performed is rather poor. Only limited number of parameters is determined. These include: pH, temperature, COD, SS, NO_3^- , NO_2^- , BOD and selected heavy metals. In Annex 8 is presented detailed information of wastewater quality for each of the interviewed company.

ANNEXES

Annex 1
List of participants
(Workshop 10.12.2007)

ИМЕ И ПРЕЗИМЕ	ПРЕТСТАВНИК НА ...	ТЕЛЕФОН	E-MAIL
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Annex 2
Questionnaire

Industrial Wastewater Survey 1/

Date of the Survey _____

Surveyor _____

1 General Information of Industry

(1) Name of the Company _____

(2) Industry Classification (IPPC) _____

(3) (Company ID No.) _____

(4) Address _____

(5) Telephone _____

(6) Responsible person for questionnaire _____

 1) Name _____

 2) Department, section _____

 3) Telephone _____

 4) E-mail _____

(7) Established Year _____ year

(8) Number of employees

	1 shift	2 shift	3 shift
Administration			
Production			

Total number of employees _____

(9) Working days per year _____ days

(10) Working hours per day _____ hours

Yes	NO

(11) Are there shower or bathrooms

(12) Is there a restaurant?

(13) Annual Production Rate

Final Production		By-Products	
Name	ton/year	Name	ton/year

(14) Consumption of Raw Materials including chemicals, oils, etc. (Provide additional detailed information)

Raw materials			Chemicals, oils		
Name	ton/year	Purpose	Name	ton/year	Purpose

Industrial Wastewater Survey 2/

(15) Operating Time

Average months _____

Minimum months _____

Maximum months _____

2 Water Supply System

(1) Water supply sources, average water consumption by purpose

Water supply source	Average Consumption	Purpose					Total
		Sanitary	Production and cooling	Cleaning	Cooling	Others	
Public	m ³ /min						0
	m ³ /day						0
	m ³ /year						0
Proprietary well	m ³ /min						0
	m ³ /day						0
	m ³ /year						0
Other (RZ Uslugi)	m ³ /min						
	m ³ /day						
	m ³ /year						

(2) Is there any water supply or consumption measurement facility/equipment?

Yes	NO

1) If yes, what kind of measurement facility/equipment does your company have?

Meter	Bill	Others

2) If no, how your company knows the water consumption?

(4) Does the present water supply meet your company's demand?

Yes	NO

(5) Does the present water supply satisfy your company's future demand?

Yes	NO

3 Wastewater Management

(1) Is the wastewater collected separately before discharging public water body or sewer system? (Yes/No)

Industrial wastewater by process	Storm water	Sanitary	Cooling water

(2) Where is the wastewater discharged at present?

Discharge point	Public sewer	Name of the public water body

(3) Wastewater generation

Average generation	Source					Total
	Sanitary	Production and cooling	Cleaning	Cooling	Others	
m ³ /min						
m ³ /day						
m ³ /year						

Industrial Wastewater Survey 3/

(4) Is there any discharge point to measure wastewater quantity and to take a sample to analyze water quality?

Yes	NO

(5) Is there any facility/equipment to measure wastewater generation?

Flow meter	Weir	Others	NO

1) If no, how your company knows the water water generation?

(6) Quantity of recirculation

Average	Purpose					Total
	Sanitary	Production and cooling	Cleaning	Cooling	Others	
m ³ /min						
m ³ /day						
m ³ /year						

1) For recirculation, is there any treatment facility?

Yes				NO
Nothing	Filtration	Others		

(7) Wastewater Quality

1) How your company knows the wastewater quality?

By own laboratory	by other laboratories	by own and other laboratories

2) In case by own laboratory, what are the parameters the laboratory can measure?

pH	μ S/cm ¹⁾	SS ²⁾	BOD ₅	COD _{Cr}	KMnO ₄ ³⁾	N ⁴⁾	P ⁵⁾	Oil and fat	Others ⁶⁾

(Note)

- 1) Electricity conductivity 2) Suspended solid 3) KMnO₄ consumption
 4) NH₄-N, NO₂-N, NO₃-N, Org.-N, T-N 5) PO₄, T-P
 6) TDS, evaporated total residue(ETR), metals (Fe,Mn, Cu, Zn, Pb, Cd, Hg,), Cr⁶⁺, phenol, CN, F, As

3) How many times is the sample taken per year? _____ times

4) Typical wastewater quality at discharge point before sewer system or public water body (in mg/l)

pH	μ S/cm	SS	BOD ₅	COD _{Cr}
KMnO ₄	T-N	T-P	Oil and fat	TDS
ETR	Fe	Mn	Cu	Zn
Pb	Cd	T-Hg	Cr ⁶⁺	Phenol
CN	F	As		
Others from Priority List				

Industrial wastewater survey-3

Industrial Wastewater Survey 4/

(8) Industrial wastewater treatment plant

1) Is there any industrial wastewater treatment plant?

Yes	NO

2) If yes, is the plant to treat the industrial wastewater from specified process or combined industrial wastewater?

Specified	Combined

3) Treatment Process, target parameters, production process

Target parameters	Production Process	Treatment process	Capacity (m3/day)
BOD ₅		Biological treatment	
		Cogulation-sedimentaion	
SS	hot rolling mill and cold rolling m	Sedimentation, Filtration	
		Coagulation-sedimentation	
		Filtration	
CN		Oxidation-decomposition	
		Biological Treatment	
Phenol		Biological treatment	
Metals (Fe)	pickling	Neutralization	
		Ion-exchange	
		Reduction-sedimentation with metal coagulant (Fe, Al)	
Oil and fat	hot rolling mill and cold rolling mill	Oil separator,	
		Biological treatment	
NH ₄ -N		Stripping	
		Biological treatment	
		Zeolite absorption	
F		Coagulation with Fe or Al solution	
Others			

4) Treatment and Disposal of Waste from Wastewater Treatment Plant

How is the waste from wastewater treatment plant treated and disposed?

Mechanical dehydration→Drying bed→Outside disposal site	
Mechanical dehydration→Drying bed Inside disposal site (Storage within the site)	
Drying bed→Outside disposal site	
Drying bed→Inside disposal site (Storage within the site)	
Directly to the water body nearby or sewer	

5) Is there an organization of pollution controller, industrial wastewater management, including O/M of industrial water treatment plant and monitoring?

Yes	NO

6) In case there is no industrial wastewater treatment, what are the difficulties?

There is not a discharge criteria.	
Lack of fund to investment to construct treatment process	
Lack of well trained staff	
Lack of guideline of plan, design, treatment process	
Not interesting	
Others	

If choosing others: _____

7) Is there an association of among the similar or different categories of industries for preservation of pollution?

Yes	NO

8) Does your company or factory have **ISO9000** or ISO14000?

Yes	NO

9) If no, does your company/factory want to get ISO9000 or **14000**?

Yes	NO

10) Which is preferable for discharging wastewater to sewerage or water body like river directly in the future?

Sewer	Water body

11) In case choosing sewer, is your company wiling to pay for treatment service by domestic water treatment or willing to invest construction of pre-treatment plant

Yes	NO

12) Which seminars does your company wants to be given?

Industrial category and pollutants	
Treatment process of pollutants	
Remarks in planning and designing of treatment process and operation and maintenance of treatment plant	
Reuse of treated wastewater and cleaner production	
The meanings of construction and appropriate O/M of wastewater treatment plant	
Pollution controller system in Japan and establishment of QC committee	
Others	

Others _____

Coordinates

N

E