

Municipal Services Improvement Project

Report on Completed Benchmarking Project in 28 Utilities in the Republic of Macedonia

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1. SUMMARY

One of the criteria for participation in the Municipal Services Improvement Project (MSIP), provided by the Government of the Republic of Macedonia and financed by the World Bank, aimed at supporting infrastructural projects of municipalities, is that municipal utilities are ADKOM members and they provide their contribution to the expansion of the IBNET database by completing the submitted questionnaires.

Two questionnaires (Toolkit - data and indicators questionnaire; Data Reliability Protocol- questionnaire for self-assessment of utilities in terms of reliability of input data) were filled out within the project, in which 28 utilities participated as of 12.12.2013.

This project is a continuation of the first IBNET benchmarking project implemented in 2008 by ADKOM and IBNET (the World Bank).

This Benchmarking Report presents the results of the performed analysis of delivered data and calculated indicators, and is intended for all utilities in the communal sector, such as water supply, sewerage and solid waste enterprises (utilities, municipalities, government agencies and ministries), which can use the presented data for developing and monitoring of the performance of companies in different areas, for defining development strategies and for identifying weak spots and investment requirements. The initial report was presented and discussed at the benchmarking workshop organized by ADKOM and held on 12.11.2013 in Skopje. The following are the summarized conclusions regarding certain technical and financial indicators, which were compared to the recommended values of other international projects and studies:

- The average consumption of produced water amounts to over 300 liters/person/day indicating that the evaluated utilities provide the required amounts of water to its consumers;
- The high value of Non-revenue water is one of the biggest issues and challenges for the utilities (the average level of Non-revenue water in the evaluated enterprises (28) for 2012 presented in % is 44.7%, presented in m^3/km/den - 58.9 m^3/km/den, presented in absolute value - nearly 4 million m^3;
- The average number of pipen breaks in the water supply system (over 4 pipe breaks per kilometer a year), compared to the standard benchmark (less than 0.5 pipe breaks) as well as the number of sewerage blockages (over 6 blockages per kilometer a year), compared to the standard benchmark (less than 0.1 blockages) clearly indicate that the water supply and sewer systems are in a very bad condition and urgent planning of their reconstruction and replacement is necessary;
- The average collection period of 485 days for 2012 is considerably long and brings into question the financial and operational sustainability of utilities as well as their ability to pay their matured liabilities.

2. INTRODUCTION

In order to improve the transparency, financial sustainability and performance of local services which are essential for the stimulation of the local economic growth and the improvement of the living standards in the municipalities, the Government of the Republic of Macedonia has provided the Municipal Services Improvement Project (MSIP) funded by the World Bank.

The project aim is to support infrastructural investments of municipalities in the Republic of Macedonia which participate in this project, as well as their utilities in the field of water supply, wastewater discharge and solid waste management and other activities oriented towards improvement of energy efficiency, urban transportation and other services under municipal jurisdiction.

The Ministry of Finance (MOF) is responsible for the overall implementation of the project and therefore a special Project Implementation Unit was organised within the Ministry.

One of the criteria for participation in the MSIP project is membership of municipal utilities at ADKOM and their contribution towards the expansion of the IBNET database by filling out the delivered questionnaires. Unlike the first phase when sub-loan beneficiaries were required to deliver completed questionnaires after their sub-loans had been approved, with the World Bank approval of the additional financing, applicants are required to submit completed questionnaires regarding the last two fiscal years prior to the official loan approval.

The experience from the initial project implementation indicated that public utilities encounter difficulties during the systematic collection and review of available data regarding their reliability and data application for operational performance and benchmarking with companies with similar performances. Since IBNET data collection is one of the basic criteria for participation within the MSIP project, the need for providing technical support to the PCE was identified in the process of collection, review, submission and interpretation of data and performance indicators within the project by engaging an IBNET consultant.

The technical assistance for the IBNET benchmarking system began in August 2012, by collecting data for all utilities which had participated in the project as of December 2013 and it is an ongoing process.

This report presents the findings of separate and comparative analysis of the data of utilities and is intended to inform stakeholders and providers of communal services. The draft report was presented and discussed during the benchmarking workshop organized by ADKOM which took place in Skopje on 11.12.2013.

2.1 Benchmarking project goals

The goals of the benchmarking project within the Municipal Services Improvement Project is to establish a framework for collection and analysis of data and performance indicators from utilities on annual basis, which contributes to the achievement of the following key objectives:

- Improvement of the level of provided services and efficiency of public enterprises;
- Improvement of the quality and quantity of information and decision making in the management of utilities;
- Improvement of perception and knowledge of weak points and shortcomings regarding the performance of utilities in Macedonia;
- Increase of ability and commitment of utilities in the process of gathering information and their submission to the appropriate departments and institutions in order to support the establishment of a sustainable system for benchmarking the performance of utilities over time.

The goal of this Benchmarking report is to present the results of the evaluation of the performance of utilities in Macedonia through the usage of many widely accepted key performance indicators.

2.2 Scope and limitations

The participation of utilities in this Benchmarking project is limited to those which service the municipalities that are beneficiaries of the credit line for improvement of municipal services, financed by the Ministry of Finance through the World Bank. This means that a total of 28 utilities participated in the project as of 11/12/2013. In the case of the City of Skopje, although there were several municipalities which were beneficiaries of the credit line, the only enterprise with the obligation to deliver questionnaires was the utility for distribution of potable water and disposal of wastewaters.

The assessment and benchmarking of the utilities presented in this report should not be interpreted as a detailed assessment regarding the successfulness of these utilities, but as a tool used to identify trends in the overall sector and to provide guidelines for more systematic reporting and analysis of the data and performance indicators by all utilities in Macedonia.

Each utility could review the data and indicators through the questionnaires provided in an Excel format and those submitted in hard copy on the day of the workshop.

The assessment and analysis was based on the data submitted by the utilities, with considerable effort and care invested in checking the accuracy of these data by comparing financial statements, year-end account and other reports within possible limits.

2.3 Report structure

This Report consists of 4 chapters:

Chapter 1 is actually an introduction to the project, defining project objective, scope and limitations.

Chapter 2 contains the importance of benchmarking, the history of the benchmarking project in Macedonia, presentation of the Municipal Services Improvement Project, project participants, as well as the approach and methodology used in the process of collection, verification and data analysis.

Chapter 3 contains the results of the performance evaluation and benchmarking of utilities in terms of technical and financial indicators, as well as reasons for the current situation and recommendations for improvement.

Chapter 4 contains general conclusions and recommendations.

Detailed information regarding specific technical and financial indicators for the utilities involved in the project is provided in the report appendix, including blank copies of the questionnaires.

3. BENCHMARKING APPROACH AND METODOLOGY

3.1 Definitions, aims and benefits

Benchmarking is the process of identification, understanding and acceptance of the world's best practices and processes of other organizations that would help improve utilities' performance. Benchmarking provides information to utilities that will help improve their management and operation. It enables the comparison of the performance of utilities of the local and central government and provides information to the key institutions that create the policy regarding water supply and disposal of waste water and refuse which help define problems and weak spots within this sector and organize support and assistance. Additionally, benchmarking contributes to the increase of transparency by publishing the results of the performance of water supply utilities as well as the actions taken towards the improvement of the quality of services and to the increase of the awareness and interest in this activity and the increase of the dialogue among water supply utilities, civil society, local government, central government and donors community.

The benchmarking process requires from the participants:

- willingness to accept that there may be utilities with better performance, operating in the same socio-economic environment;
- wisdom to learn that in the process of comparison certain changes may appear;
- ambition to introduce necessary actions;
- effectiveness towards achieving the set goals.

3.2 History of IBNET benchmarking project in Macedonia

The need to introduce the benchmarking process in Macedonia arose from the limited publicly available and reliable data that can be used by utilities, the fact that very little data is integrated into the standard statistical publications of utilities as well as the state standard statistical reports and the urgent need for optimization of the business processes and reduction of costs.The first benchmarking project was initiated by the World Bank (IBNET) and implemented during the period from August 2008 to January 2009, based on the agreement signed by ADKOM and the World Bank - IBNET (International Benchmarking Network for Water and Sanitation Utilities). 15 utilities in the area of water supply and sewer network participated in this project on a voluntary basis (Berovo Bitola, Debar, Gostivar, Kavadarci, Kochani, Kumanovo, Negotino, Struga Radovish, Resen, Shtip, Skopje, Strumica, Veles).This project is considered to be the initial step towards the development of benchmarking in Macedonia. The positive experience resulting from this project was expected to motivate utilities which were involved in the first project to collect data for future years and to continue with the calculation of performance indicators according to the IBNET benchmarking format and it was expected to expand the benchmarking process to other utilities which had not participated in the first project. However, only few utilities have submitted new data and indicators to ADKOM, and there were no new utilities interested in starting with the benchmarking project. This is mainly due to the enormous changes in the management of public utilities in Macedonia after the local elections in 2008, which led to a change of key technical personnel and previously appointed project coordinators. Apart from these objective reasons, the poor interest in the benchmarking project may be explained with the absence of additional training and organized workshops for the people engaged in the benchmarking process within communal utilities as well as absence of a coordinator who will lead the process of benchmarking and the technical assistance in these utilities.

3.3 Municipal Services Improvement Project – IBNET questionnaires

The Municipal Services Improvement Project, with the element related to the collection and analysis of performance indicators, is practically an extension to the benchmarking project in Macedonia. In comparison with the questionnaire with data and indicators from the first IBNET project implemented in 2008, the questionnaire has been updated, among other things, with the solid waste service.

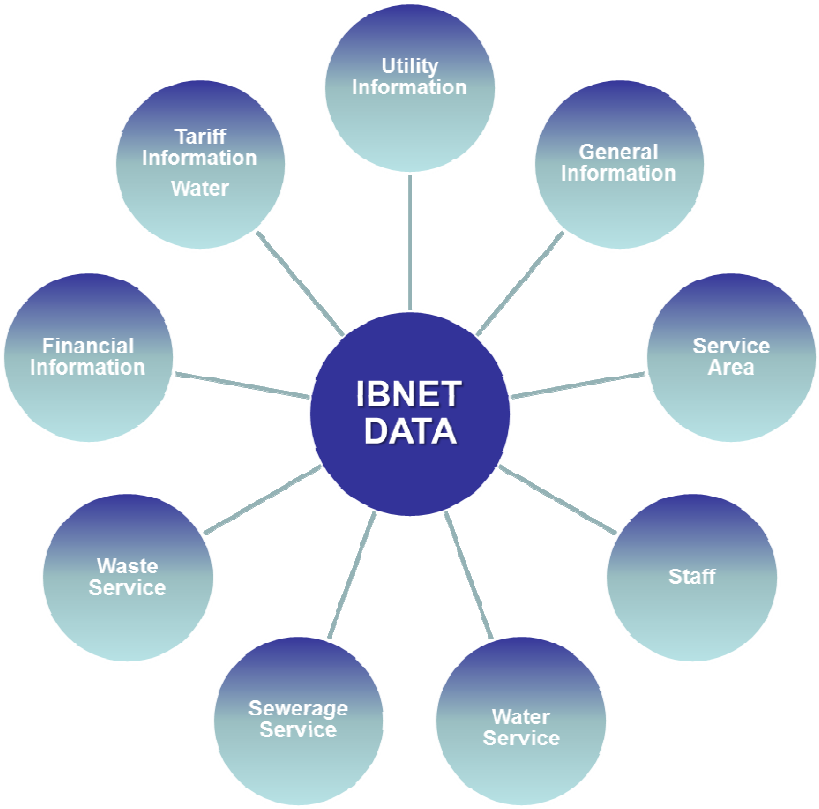


Figure 1. IBNET data

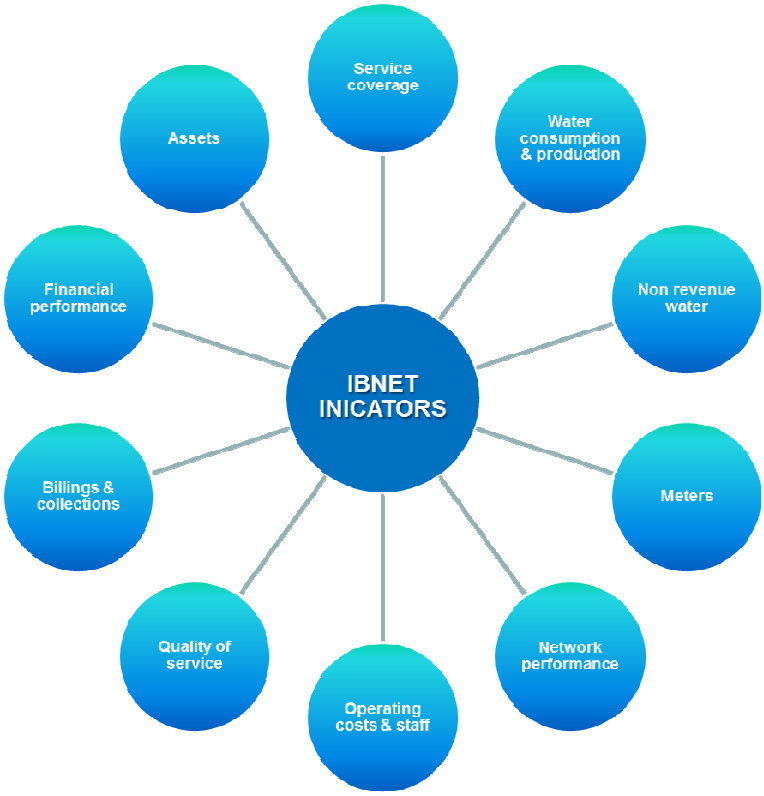


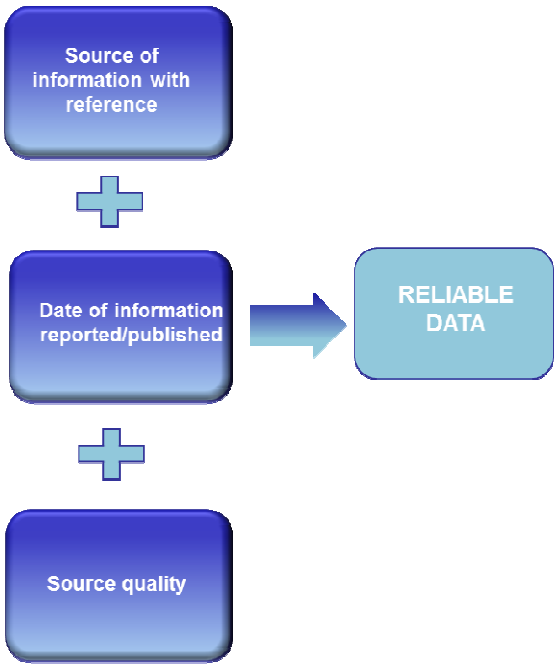
Figure 2. IBNET indicators

The data and indicators questionnaire is prepared by the IBNET team from Washington and is reviewed and adapted to the Macedonian specifications by the IBNET consultant. A copy of the questionnaire is part of this report and can be found in the "Appendix".

The performance indicators are calculated directly into a separate excel worksheet named "Indicators" through previously entered data into excel worksheet named "Data "and the appropriate formulas.

In addition to this, the questionnaire "Data Reliability Protocol" was filled out, in which utilities perform self-assessment with regard to data reliability by defining the source of information, the date of publication and quality of information/source. The purpose of introducing the reliability rate with regard to the relevant data is to better understand the quality of the data and to encourage its improvement over time, resulting in improvement of the measured performances.

The following figure presents the reliability protocol with regard to the data entered in the questionnaire:



Data quality score	Data quality definition	Reliability rate
0	No data available	0%
1	Based on reliable records, procedures, investigations or analyses, that are properly documented and recognised as the best available..	100%
2	Generally as in Score 1, but with minor shortcomings, e.g. some documentation is missing, the assessment is old, or some reliance on unconfirmed reports or extrapolation is made.	80%
3	Extrapolation from a limited sample for which band A or B information is available.	70%
4	Based on the best estimates of Utility staff, without measurement or documented evidence.	50%

Figure 3. Data reliability protocol

3.4 Project participants

As of 11.12.2013, a total of 28 utilities participated in the project, providing data for different fiscal years for the period from 2008 to 2012.

Municipality	Communal Enterprise	Evaluated fiscal years
Berovo	JPKR Usluga	2009-2012
Bogdanci	JP Komunalna Chistota	2010-2012
Bosilovo	JPKD Ograzden	2010-2012
Chaska	JPKD Topolka	2010-2012
Dolneni	JKP Dolnen	2010-2012
Gostivar	JP Komunalec	2010-2012
Gradsko	JKP Komunalec, JKP Klepa	2008-2012
Ilinden	JKP Vodovod	2009-2012
Kavadarci	JP Komunalec	2011-2012
Kichevo	JP Komunalec	2008-2012
Kochani	KJP Vodovod	2008-2012
Kriva Palanka	JP Komunalec	2010-2012
Krushevo	JP Komuna	2009-2012
Mavrovi Anovi	JPKD Mavrovo	2010-2012

Municipality	Communal Enterprise	Evaluated fiscal years
Negotino	JKP Komunalec	2010-2012
Novaci	ZJKP Pela Higiena	2012
Pehchevo	JKP Komunalec	2009-2012
Petrovec	JKP Petrovec	2010-2012
Prilep	JKP Vodovod i Kanalizacija	2008-2012
Probishtip	JKP Nikola Karev	2011-2012
Rankovce	JKP Chist Den	2010-2012
Rosoman	JPKD Rosoman	2011-2012
Shtip	JP Isar	2008-2012
Skopje	JP Vodovod i Kanalizacija	2008-2012
Vasilevo	JPKD Turija	2009-2012
Veles	JKP Derven	2008-2012
Vinica	JP Solidarnost	2010-2012
Vevchani	JP Eremja	2010-2-12

Table 1. Project participants as of 11.12.2013

Taking into consideration the fact that these utilities have different performances, they offer similar or different services in environments with different socio-economic characteristics, and in order to better compare them in terms of performance indicators, it was inevitable to divide them into groups according to the number of population served.

Group 1 (0-10000) population	
Municipality	Communal Enterprise
Bogdanci	JP Komunalna Chistota
Bosilovo	JPKD Ograzden
Chaska	JPKD Topolka
Gradsko	JKP Komunalec, JKP Klepa
Mavrovi Anovi	JPKD Mavrovo
Novaci	ZJKP Pela Higiena
Pehchevo	JKP Komunalec
Petrovec	JKP Petrovec
Rankovce	JKP Chist Den
Rosoman	JPKD Rosoman
Vasilevo	JPKD Turija

Group 2 (10000-45000) population	
Municipality	Communal Enterprise
Berovo	JPKR Usluga
Dolneni	JKP Dolnen
Ilinden	JKP Vodovod
Kavadarci	JP Komunalec
Kichevo	JP Komunalec
Kochani	KJP Vodovod
Kriva Palanka	JP Komunalec
Krushevo	JP Komuna
Negotino	JKP Komunalec
Probishtip	JKP Nikola Karev
Vinica	JP Solidarnost
Vevchani	JP Eremja

Group 3 (45000-100000) population including Skopje	
Municipality	Communal Enterprise
Gostivar	JP Komunalec
Prilep	JKP Vodovod i Kanalizacija
Shtip	JP Isar
Skopje	JP Vodovod i Kanalizacija
Veles	JKP Derven

Table 2. Split of utilities in groups according to the number of population served

3.5 Methodology

The process of filling out and verification of the IBNET questionnaire was performed in a few phases:

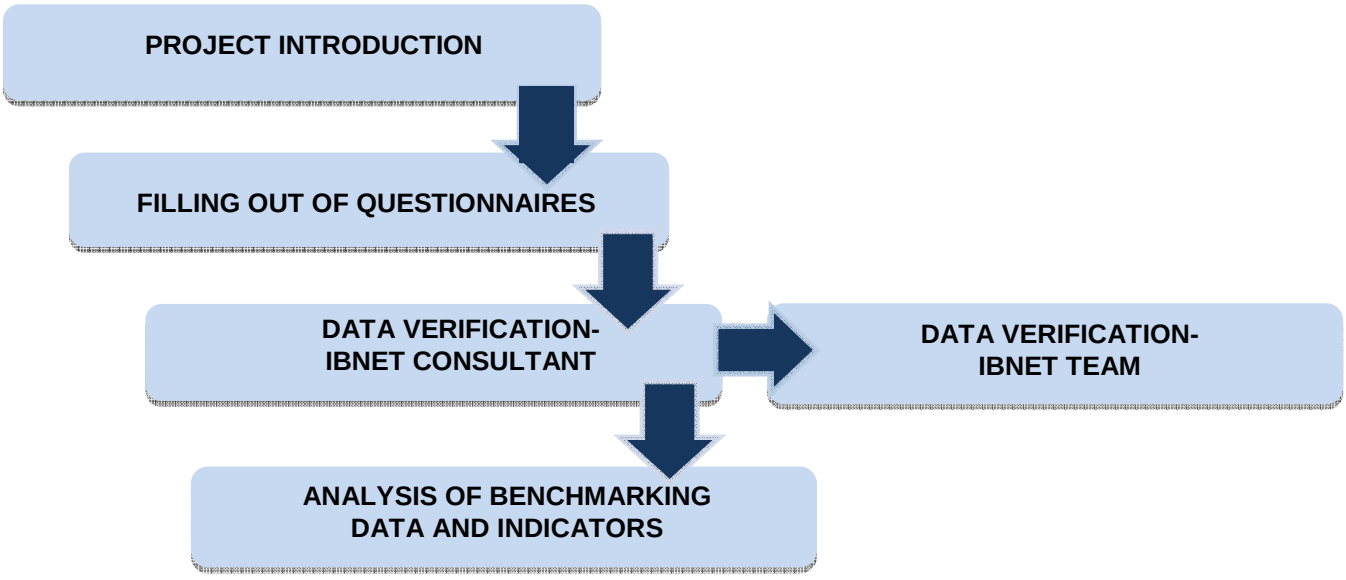


Figure 4. Project methodology

3.5.1 Project introduction

The questionnaires were delivered to utilities electronically in order to introduce them to the type of information that should be provided and the scope of work. Within a short period of time, initial meetings were organised between the IBNET consultant and the utility management, as well as representatives of the financial and technical department, in order to provide a more detailed explanation with regard to questionnaire items and clearing out of any ambiguities detected during the initial questionnaires review.

3.5.2 Filling out of questionnaires – data collection process

The process of filling out the questionnaires was conducted internally, within the utilities. The data was usually taken from the utilities' financial statements and year-end accounts as well as from certain applications, but some of the data was produced through separate calculations. Certain additional issues which arose during the filling out of the questionnaires were solved through phone calls, and quite often with additional visits by the IBNET consultant, which contributed to additional staff training and resolving of disputes.

3.5.3 Conclusions - data collection process

- The data collection process was quite slow and the delivery of the questionnaires was usually one or more months after the agreed deadline.
- Although the significance of the obtained data and indicators was recognized by the utilities, the process was often regarded as a burden and an activity which is in addition to their regular duties.
- Difficulties with regard to the data which is not part of the utility's regular financial statements and year-end accounts:
  - most utilities divide their users to individual consumers and legal entities (institutions and commercial entities together);
  - the number of connections (with larger enterprises in urban areas);
  - the water produced (with small enterprises in rural areas);
  - the quantity of water which is sold through operational water meters;
  - the quantity of collected wastewater;
  - the costs by business activities;
  - the split of fixed assets by activity.

3.5.4 Data verification

3.5.4.1 IBNET Consultant

The questionnaires initially completed by the utilities were delivered to the IBNET consultant in order to check data quality in terms of consistency and completeness through further tests, such as:

- the number of population served is not bigger than the total population;
- the quantities of certain positions are equal to the sum of their components (the total billed quantity should be equal to the amounts billed to residential, industry and institutions);
- the total billed quantity to residential is equal or bigger than the quantities billed to residential for water, waste water, solid waste (depending on the services offered by the utility);
- the total costs are bigger than the laber costs, electrical energy costs, fuel costs, contract out service costs;
- the total revenues are equal or bigger than the sum of revenue for water, waste water and solid waste (depending on the services offered by the utility).

Additionally, the data and indicators of evaluated years were entered into one common table and by comparing the data from year to year and from one utility to another utility with similar performances; the inconsistent and incorrect data and generated indicators could very quickly be recognized.
One of the checks included checking of unit measurements (whether the data entered is in compliance with the required unit measurements).
The questionnaires which were returned for additional improvement included presentation of the faults and shortcomings followed by a detailed description with texts and formulas.

3.5.4.2 IBNET team (Washington)

The completed questionnaires previously checked by the IBNET consultant, were delivered to the IBNET team in Washington for additional checks and verification. Following their detailed analysis and checks to confirm that the data and indicators are within the expected values, they were returned to the IBNET consultant with certain remarks. The verification and control process continued by communication between the utilities and the IBNET consultant, pointing out the remaining symptomatic data and indicators and finalization of the process.

3.5.5 Data analysis - benchmarking

The verified data and indicators are presented in the form of graphs, individually and collectively for each utility, and are compared with those of related utilities according to performance and number of population. Some conclusions and improvement measures resulted from this analysis.
In certain cases in the MSIP project, the development and results from the respective project was followed through monitoring and analysis of key performance parameters from the IBNET questionnaires.

4. RESULTS FROM THE APPRAISAL OF SUCCESSFULNESS AND BENCHMARKING

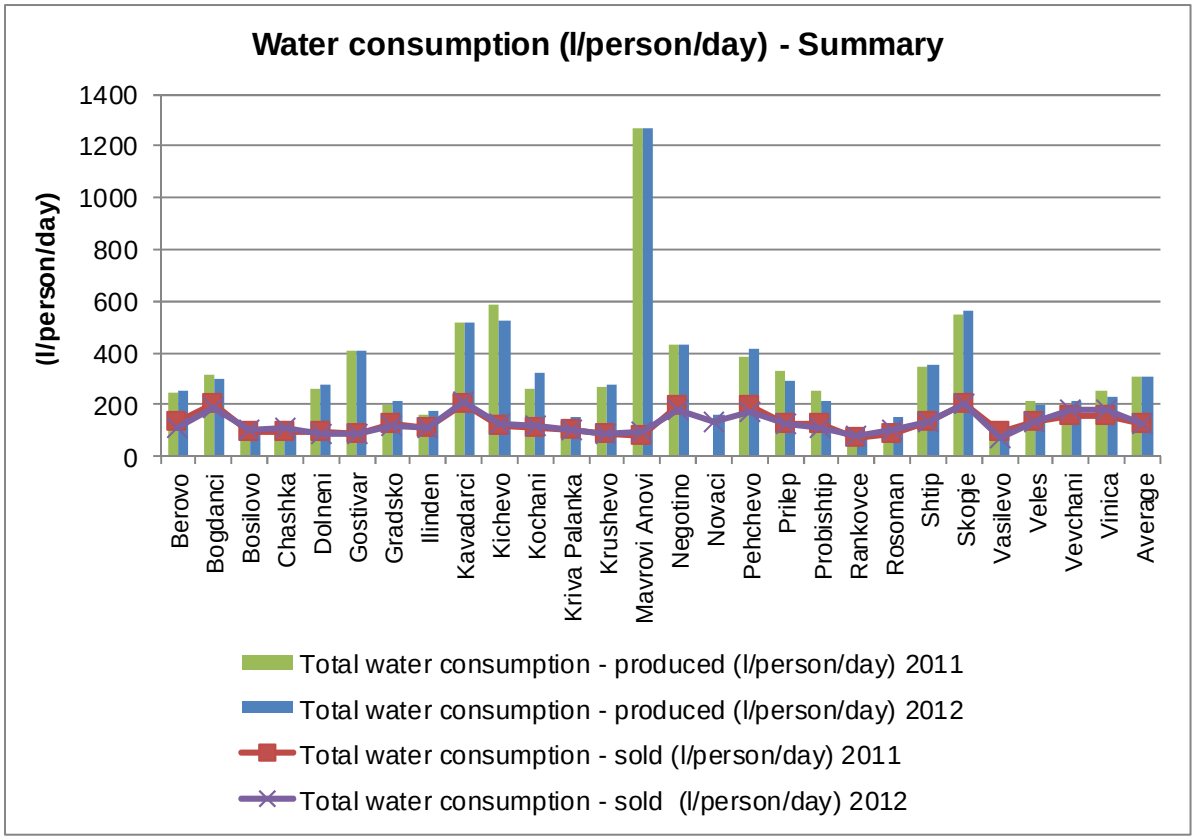
4.1 Water consumption and production

The information with regard to the quantities of produced water is very important to utilities, primarily in order to ensure that the adequate quantities of water are delivered to customers. At the same time, important data is generated through the indicator - non-revenue water, as the difference between produced, consumed and invoiced water.

Significantly larger quantities of produced water have cost implications with regard to capital investments for upgrades when the infrastructure capacity is exceeded.

Water consumption and production are defined with two indicators in the IBNET questionnaires (liters/person/day and m³/connection/month). In the calculation of both indicators, there are potential sources of errors including:

- **Total quantity of water produced** (the existence and accuracy of flow meters, i.e. the absence of meters in rural areas and water meters which have not been calibrated in urban areas present significant uncertainty in the accuracy of reported quantities);
- **Total quantity of sold water** (water meters which have not been calibrated and which are older than 5 years and show smaller quantities of water, the existence of lump-sum customers and customers without water meters);
- **Number of population served or number of connections** (if smaller or bigger values appear, they can significantly affect the indicators for water production and consumption);



Graph 1. Water consumption (l/person/day) – Summary for 2012 and 2011

	Total water consumption - production (l/person/day) 2011	Total water consumption - production (l/person/day) 2012	Total water consumption - sold (l/person/day) 2011	Total water consumption - sold (l/person/day) 2012
Group 1 (0-10000)	**274**	**274.8**	**119**	**122.1**
Group 2 (10000-45000)	**307**	**306.7**	**129.5**	**129.4**
Group 3 (45000-100000), Skopje	**369.7**	**363.3**	**136.6**	**137**
Sum	**310.8**	**308**	**127.2**	**128.1**

Table 3. Water consumption (produced, sold) for 2011 and 2012 by groups and summarized

Municipality	Total water consumption - produced (l/person/day) 2011	Total water consumption - produced (l/person/day) 2012	Total water consumption - sold (l/person/day) 2011	Total water consumption - sold (l/person/day) 2012
Berovo	245	250.2	131.5	113.8
Bogdanci	312	299.6	203	191.6
Bosilovo	96.5	101.5	96.5	101.5
Chashka	105.1	118	98.5	108
Dolneni	260.9	279.4	96.4	86.6
Gostivar	405.9	406.9	88.2	90.9
Gradsko	198.3	218.4	123.9	118.6
Ilinden	158.6	173.1	109	114.1
Kavadarci	515	515	201.1	210.5
Kichevo	583.4	524.8	117.5	122.2
Kochani	261.5	320.1	112.1	116.9
Kriva Palanka	141.1	156.6	99.3	105.7
Krushevo	268.8	275.8	88.7	86.1
Mavrovi Anovi	1270.6	1270.6	78.2	91.3
Negotino	431.7	431.7	192.9	180.7
Novaci		164.4		134.1
Pehchevo	381.7	412.7	197.6	169.8
Prilep	335	291.8	123.7	126.3
Probishtip	254.8	216.4	122.2	107.1
Rankovce	85.8	84.7	68.6	76.4
Rosoman	111.3	150.9	83.6	103.7
Shtip	343.1	353.5	132.4	131.5
Skopje	550.7	561.9	204.1	201.5
Vasilevo	106.9	87.1	94.6	75.3
Veles	213.7	202.2	134.9	134.5
Vevchani	187.3	216.6	156	180.5
Vinica	255.9	230.8	153.9	180.4
Average	**310.8**	**308**	**127.2**	**128.1**

Table 4. Water consumption (production, sold) for 2011 and 2012 by utilities and summarized

Conclusions

- The average consumption of produced water of over 300 l/person/day suggests that the evaluated utilities deliver adequate quantities of water to their customers;
- The difference between the quantity of water consumed and sold clearly indicates excessive amounts of Non-revenue water;

- The average consumption of sold water of almost 130 l/person/day is below the European average of 160 l/person/day. Taking into consideration the habits of Macedonian population with regard to water usage and the relatively low awareness of saving water, this indicator is probably underestimated and is the result of smaller amounts of invoiced water or the smaller number of people served;
- Given the strong dependence of the indicators for water production and consumption on population and number of connections, intensive activities towards determining the exact number of connections is recommended (division between the number of connections and number of consumers-bills), as well as the exact number of consumers - population-users, without the data from other regional or state sources.

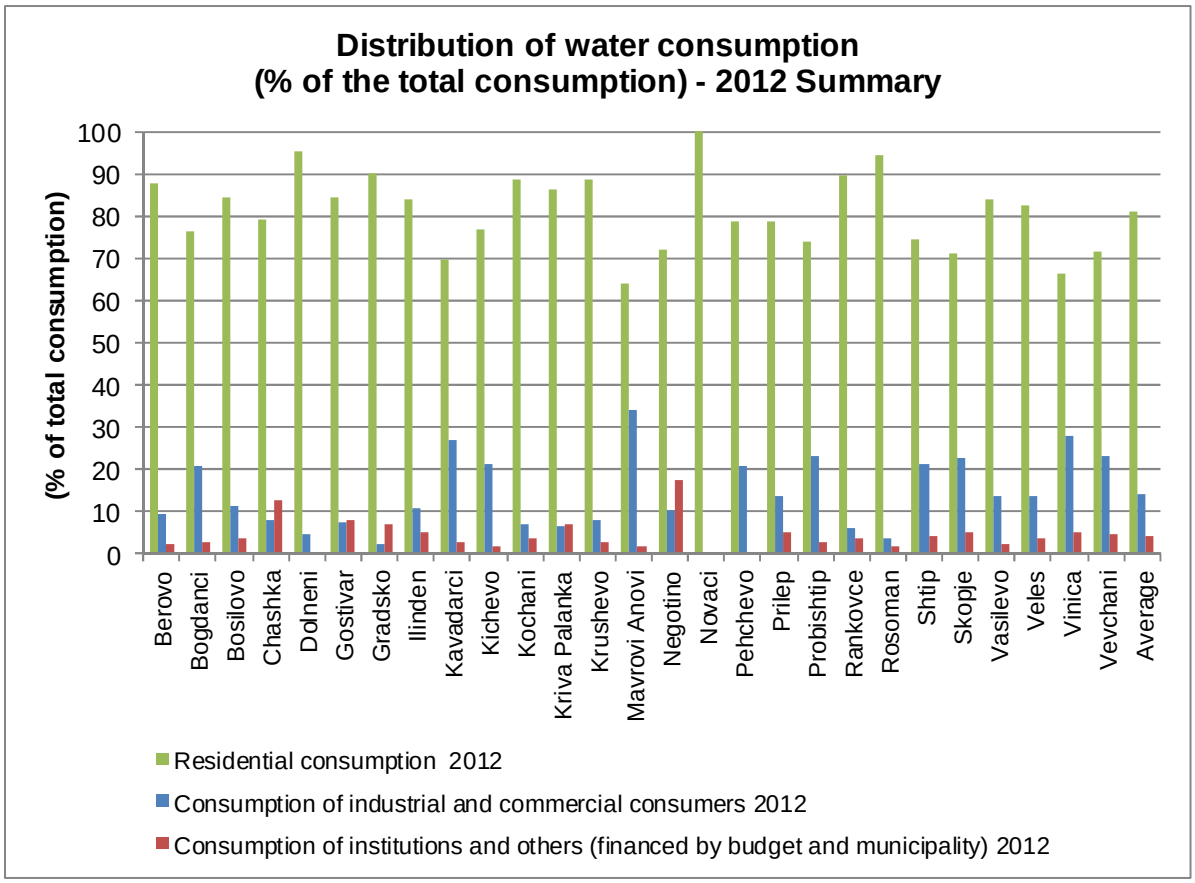
2012 20112010200 9 2008 2007	Macedonia*	Albania	Serbia	Romania	Bulgaria	Turkey	Kosovo
Total water consumption - production (l/person/day)	**308**	**300**		**304**		**192**	
Total water consumption - invoiced (l/person/day)	**128**	**97**	**158**	**153**	**171**	**108**	**125**

*data from 28 evaluated utilities; Source: IBNET

Table 5. Review of water consumption (production, sold) in several neighbouring countries, including the Republic of Macedonia

4.2 Distribution of water consumption

According to the data provided in the tables below, the biggest user of water are households, which accounts for over 80% of the total quantity of water consumed. This division is identical in utilities in rural and urban areas.



Graph 2. Distribution of water consumption

2012	Residential consumption (% of total consumption)	Consumption of industrial and commercial consumers (% of total consumption)	Consumption of institutions and others (financed by budget and municipality) (% of total consumption)
Group 1 (0-10000)	**83.2**	**12.9**	**3.9**
Group 2 (10000-45000)	**81**	**14.3**	**4.7**
Group 3 (45000-100000), Skopje	**78.3**	**15.8**	**5.2**
Summary	**81.4**	**14.1**	**4.4**

Table 6. Distribution of water consumption for 2012 by groups and summarized

Municipality	Residential consumption 2012 (% of total consumption)	Consumption of industrial and commercial consumers 2012 (% of total consumption)	Consumption of institutions and others (financed by budget and municipality) 2012 (% of total consumption)
Berovo	88.1	9.7	2.3
Bogdanci	76.5	20.8	2.7
Bosilovo	84.6	11.6	3.8
Chashka	79.4	7.9	12.6
Dolneni	95.3	4.7	0.0
Gostivar	84.4	7.5	8.2
Gradsko	90.2	2.6	7.2
Ilinden	84.2	10.8	5.0
Kavadarci	70.0	27.0	3.0
Kichevo	76.8	21.4	1.8
Kochani	89.0	7.2	3.8
Kriva Palanka	86.2	6.6	7.2
Krushevo	88.9	8.3	2.9
Mavrovi Anovi	64.1	34.0	2.0
Negotino	72.0	10.6	17.4
Novaci	100.0	0.0	0.0
Pehchevo	78.6	20.9	0.5
Prilep	78.8	13.7	5.0
Probishtip	74.2	23.0	2.7
Rankovce	90.0	6.0	4.0
Rosoman	94.6	3.6	1.8
Shtip	74.7	21.2	4.1
Skopje	71.2	22.6	5.3
Vasilevo	84.0	13.8	2.2
Veles	82.7	13.7	3.6
Vinica	66.6	28.2	5.2
Vevchani	71.9	23.2	4.9
Average	**81.4**	**14.1**	**4.4**

Table 7. Distribution of water consumption for 2012 by utilities and summarized

4.3 Non-revenue water (NRW)

Non-revenue water is one of the major challenges of utility companies which offer the service of water supply in the Republic of Macedonia. Non-revenue water (absolute amount) is calculated as the difference between the produced or water imported into the system and billed water and is the result of technical losses (pipe breaks) and commercial losses (thefts and improper billing). The high levels of water loss indicate low system management in the form of improper payment policy, outdated infrastructure and inadequate system maintenance.

By reducing Non-revenue water, there will be additional amounts of water, which can meet current water demands (and increase the collection rate) and as a result of this, capital investments required for provision of new amounts of water can be postponed (thus reducing costs of enterprises in terms of infrastructure, electricity, chemicals, labour).

If the amounts of Non-revenue water are expressed in monetary terms, we can get an idea of the amount of profits lost and the extent of the problem.

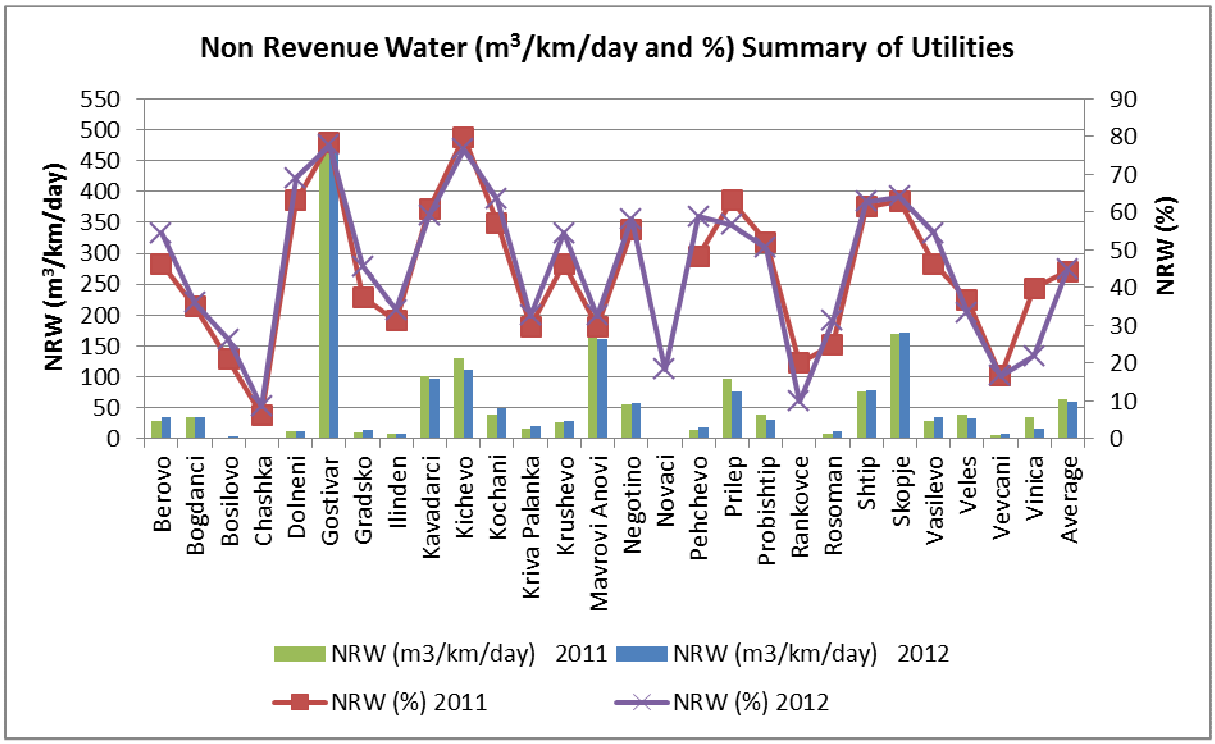
The following indicators have been used in the IBNET questionnaires in order to present non-revenue water:

- % of water produced
- m^3/km/day
- m^3/connection/day

The presentation of Non-revenue water as percentage of the water produced is a simple indicator, widely accepted and understood among utilities in Macedonia. But the fact which is very sensitive to one of the two variables that it is generated by (produced and billed water), and that it does not take into account other network characteristics, such as number of connections, length of connections, network pressure, it is not really suitable for benchmarking among utilities.

This problem can be overcome by presenting Non-revenue water as lost quantities in cubic meters of water daily per kilometer and daily per connection, as recommended by the International Water Association (IWA). These two indicators are also influenced by the number of total connections in the network (problem data in bigger utilities in urban areas) as well as the exact length of the water supply network with no connections.

These two indicators (% of water produced and m^3/km/day) for each utility by groups (Group 1,2,3) are presented below.



* Non-revenue water expressed in m^3/km/day in the case of Gostivar is very high and should be taken with a reserve. Probably the length of the water supply network is underestimated i.e. its length is presented as smaller that the real one.

Graph 3. Non-revenue water (m^3/km/day, %)

	Non-revenue water (m^3/year) 2011	Non-revenue water (m^3/year) 2012	Non-revenue water (m^3/km/day) 2011	Non-revenue water (m^3/km/day) 2012	Non-revenue water (%) 2011	Non-revenue water (%) 2012
Group 1 (0-10000)	**232,157**	**226,158**	**31.1**	**26.3**	**35**	**36.3**
Group 2 (10000-45000)	**1,571,647**	**1,551,168**	**44.6**	**42.9**	**51.1**	**52.2**
Group 3 (45000-100000), Skopje	**16,460,988**	**16,712,874**	**172.9**	**165.8**	**60.5**	**59**
Summary	**3,919,793**	**3,819,073**	**64.1**	**58.9**	**44.2**	**44.7**

Benchmark: Non-revenue water – less than 20 m3/km/day; less than 20%

Table 8. Non-revenue water (%, m^3/year, m^3/km/day) for 2011 and 2012 by groups and summarized

Municipality	Non-revenue water (m^3/km/day) 2011	Non-revenue water (m^3/km/day) 2012	Non-revenue water (%) 2011	Non-revenue water (%) 2012	Non-revenue water (m^3/year) 2011	Non-revenue water (m^3/year) 2012
Berovo	29.5	35.4	46.4	54.5	527000	633000
Bogdanci	35.9	35.5	35	36	262202	259476
Bosilovo	2.7	3.8	21	26.3	86234	125009
Chashka	0.9	1.5	6,3	8.5	8342	13341
Dolneni	11.1	13.1	63	69	637912	747962
Gostivar	483.2	469.9	78.3	77.7	7760362	7717657
Gradsko	10.6	14.2	37.5	45.7	64423	86492
Ilinden	7	8.4	31.3	34.1	459588	556683
Kavadarci	100.2	97.2	61	59.1	4389439	4257339
Kichevo	131.2	111.1	79.9	76.7	5615863	4865008
Kochani	38.3	49.8	57.1	63.5	2181229	2744704
Kriva Palanka	17.1	21	29.7	32.5	259914	325118
Krushevo	27.2	28.7	46.4	54.5	636492	670846
Mavrovi Anovi	202.7	160.4	29.7	32.5	1479800	1463492
Negotino	54.9	57.7	55.3	58.2	1342108	1411191
Novaci		0.7		18.4		5520
Pehchevo	13.6	17.5	48.3	58.9	299072	385650
Prilep	97.3	75.9	63.1	56.7	5929702	4708639
Probishtip	38.6	31.8	52.1	50.5	723539	596279
Rankovce	1.2	0.6	20	9.9	24161	11762
Rosoman	7.2	12.2	25	31.3	40542	68829
Shtip	75.4	79.4	61.4	62.8	3438000	3622245
Skopje	169.5	170.7	62.9	64.1	63737615	66280504
Vasilevo	29.5	35.4	46.4	54.5	27173	33909
Veles	39.3	32.9	36.9	33.5	1439263	1235326
Vevchani	6.8	7.8	16.7	16.7	29617	34260
Vinica	35	17.3	39.9	21.9	515030	254719
Average	**64.1**	**58.9**	**44.2**	**44.7**	**3919793**	**3819073**

Table 9.Non-revenue water (%, m^3/km/day, м^3/day) by utility and summarised

Conclusions

- The average level of Non-revenue water for 2012 in % for the evaluated utilities (28) of 44.7% even though relatively high, it is still estimated as lower than the actual situation in utilities on a state level, first of all due to the small number of evaluated utilities.

The alarming condition can be seen when compared to the adopted benchmark for Non-revenue water expressed in % of the produced water (below 20%) and m³/km/day (20 m³/km/day).

- Expressed in absolute value, the average quantity of Non-revenue water for the evaluated utilities in 2012 amounts to almost 4 million m³ water;
- The level of Non-revenue water for 2012 is lower in smaller utilities – Group 1 (36.3%, 26.3 m³/km/day) – rural areas in comparison to the bigger utilities – Group 3 (59%, 165.8 m³/km/day) – urban areas. One of the possible reasons for this can be the new infrastructure and the fewer connections in rural areas where statistically the largest number of pipe breaks appear, but probably the major reason is the lower estimated lavel of produced water due to lack of installed bulk water meters for produced water;
- Generally speaking, the increase in Non-revenue water in utilities continues, with the exception of a few enterprises (ex. JP Derven Veles);
- Aim of the utilities – to reduce commercial losses to a minimal level and at the same time begin with intense activities towards reduction of technical losses;
- Urgent mobilization is required by utility companies, municipalities, the government, investors and donors in terms of technical assistance, consulting and financing in order to reduce non-revenue water. The following table presents the values of the two evaluated indicators in several countries, including the Republic of Macedonia.

2012201120102009200820072007	Macedonia*	Albania	Serbia	Romania	Bulgaria	Turkey	Kosovo
Non-revenue water (m^3/km/day)	58.9	73.5	22.3	42.8	25.5	43.4	62.5
Non-revenue water (%)	44.7	68	38	51	54	59	58

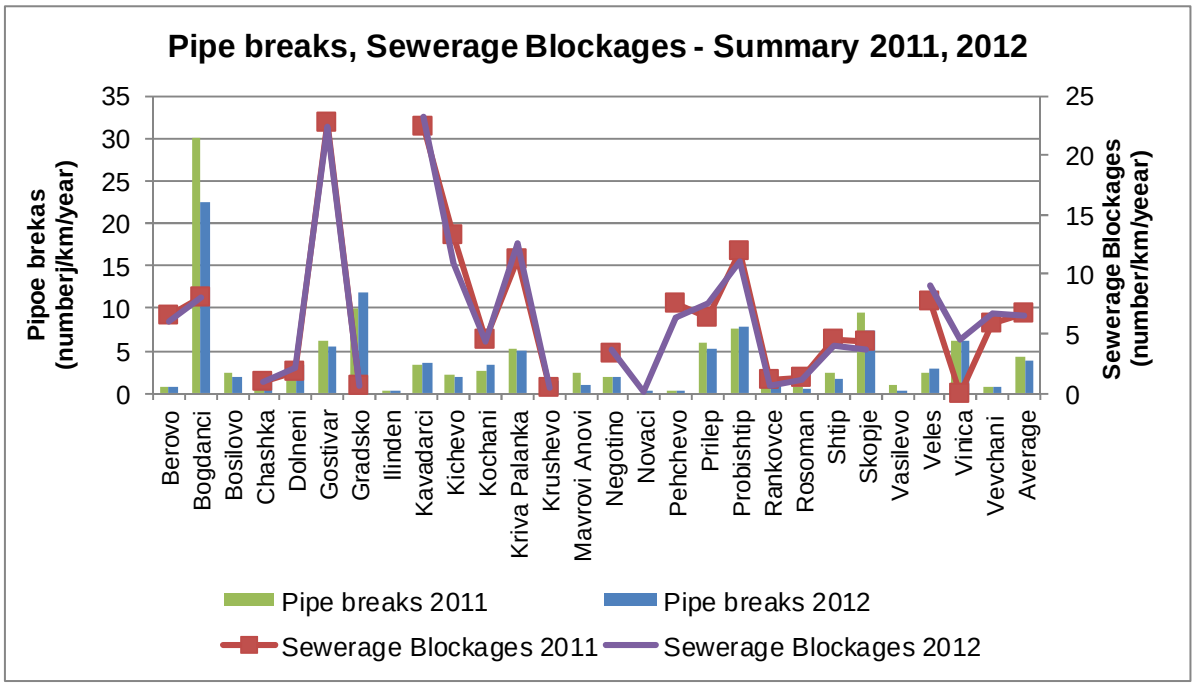
* data from 28 evaluated utilities; Source: IBNET

Table 10. Review of non-revenue water (%, m^3/km/day) in several neighbouring countries, including the Republic of Macedonia

4.4 Performances of water supply and sewer network

The number of pipe breaks in the water supply network and sewerage blockages per kilometer on annual level are parameters that present the condition of the water supply and sewer network, but they also provide information with regard to the effectiveness of asset management, operational processes and maintenance manner. The analysis of the pipe material where occur, their diameter, the soil type and the setup of the water supply network in the soil displays a clear picture of the

reasons behind the increased number of pipe breaks and provides an opportunity to assess and predict the service life of pipes and the need for their reconstruction or replacement.



Graph 4. Pipe breaks, Sewerage blockages for 2011 and 2012

	Pipe brekas 2011	Pipe brekas 2012	Sewerage Blockages 2011	Sewerage Blockages 2012
Group 1 (0-10000)	**5.1**	**3.9**	**3.6**	**3.1**
Group 2 (10000-45000)	**3.2**	**3.3**	**7.6**	**7.9**
Group 3 (45000-100000), Skopje	**5.3**	**4.6**	**9.1**	**9.3**
Summary	**4.3**	**3.8**	**6.7**	**6.5**

Benchmark: Pipe breaks – less than 0.5; Sewerage blockages– less than 0.1

Table 11 Pipe breaks, Sewerage blockages for 2011 and 2012 by groups and summarized

Municipality	Pipe breaks 2011	Pipe breaks 2012	Sewerage Blockages 2011	Sewerage Blockages 2012
Berovo	0.8	0.9	6.5	5.9
Bogdanci	30.0	22.5	8	8
Bosilovo	2.3	2		
Chashka	1.7	1.7	0.9	0.9
Dolneni	3.5	3.3	1.8	2.2
Gostivar	6.1	5.5	22.7	22.4
Gradsko	10.1	12	0.6	0.6
Ilinden	0.2	0.3		
Kavadarci	3.4	3.5	22.4	23.3
Kichevo	2.1	2	13.3	11
Kochani	2.7	3.4	4.6	4.3
Kriva Palanka	5.2	4.9	11.3	12.7
Krushevo	1.6	1.5	0.5	0.5
Mavrovi Anovi	2.5	0.9		
Negotino	2	1.9	3.3	3.6
Novaci		0.1		0.1
Pehchevo	0.1	0.1	7.5	6.3
Prilep	5.9	5.3	6.3	7.6
Probishtip	7.6	7.9	12	11.1
Rankovce	1.8	1.8	1.1	0.7
Rosoman	0.8	0.6	1.3	1.2
Shtip	2.3	1.7	4.5	4
Skopje	9.6	7.4	4.4	3.6
Vasilevo	1	0.2		
Veles	2.4	3	7.7	9
Vinica	6.3	6.3	0	4.5
Vevchani	0.8	0.7	5.9	6.6
Average	**4.3**	**3.8**	**6.7**	**6.5**

Table 12. Pipe breaks, Sewerage blockages for 2011 and 2012 by utility and summarized

Conclusions

- The average number of pipe breaks of over 4 breaks per kilometer annually, compared to the standard benchmark of less than 0.5 breaks and the number of sewerage blockages of over 6 blockages per kilometre annually, compared to the standard benchmark of less than 0.1 blockages, clearly indicate that the water supply and sewer network are in a very poor condition and their urgent reconstruction and replacement is necessary;
- It can be argued with a great deal of accuracy that utilities do not have accurate data on the length of the water supply and sewer network

maintained by them, which has a big impact on the number of breaks per kilometer annually;

- On the other hand, the inefficient keeping of records is evident with regard to breaks by location, material type, pipe diameter and type of soil where they are installed, thus obstructing the presentation of the actual numbers of breaks per kilometre annually;
- In general, those utilities who report larger water losses have a greater number of breaks per kilometre annually. However, there are also utilities that have relatively high water losses, but a small number of brekas. Such utilities either have an underestimated number of breaks, which is more probable, or there are significantly high quantities of commercial losses of water.

Recommendations

- Introduction of a mechanism for precise recording of information such as number of breaks by location, pipe material, diameter, age, type of soil etc. which will help in the planning of rehabilitation and repair of network installations independent of the age;
- Introduction of GIS in the operation of utilities and its update;
- Urgent rehabilitation of installations which according to the number of breaks have surpassed their service life;
- Provision of funds for long-term rehabilitation of the water supply and sewer network.

4.5 Billing and collection

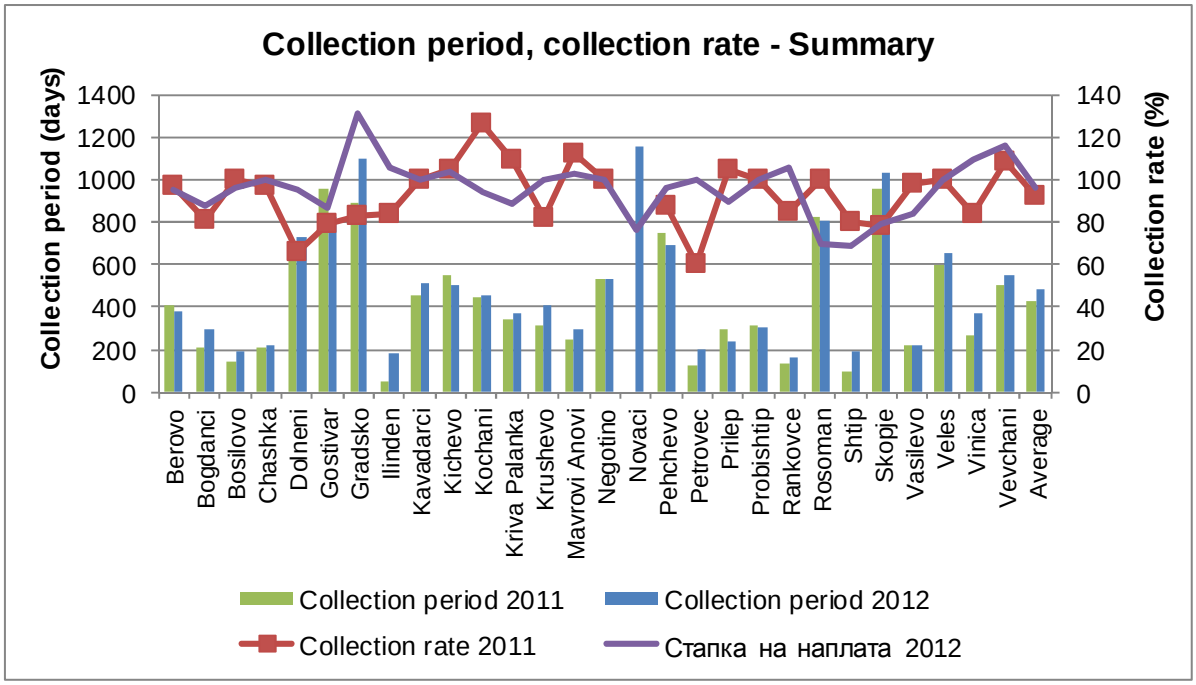
4.5.1 Collection rate and period

The effectiveness and efficiency of the utilities sector depends greatly, among other things, on the infrastructure and the system capacity to fully invoice and charge for products and services delivered,

The financial operation of utilities, especially their liquidity, is directly dependent on the collection process.

The collection rate (%) is a key indicator of success relating to the company's ability to collect its receivables [(income/revenue)*100]. The collection period (days) is the period which is required to collect the receivables [(total receivables at end of year/ total revenue)*365].

The indicators presented below refer to the collection for all products and services provided by the utility.



Graph 5. Collection period, collection rate for 2011 and 2012

	Collection period (days) 2011	Collection period (days) 2012	Collection rate (%) 2011	Collection rate (%) 2012
Group 1 (0-10000)	**387**	**490**	**92**	**97**
Group 2 (10000-45000)	**398**	**431**	**95.7**	**99.3**
Group 3 (45000-100000), Skopje	**581**	**588**	**88.4**	**84.6**
Summary	**427**	**485**	**92.8**	**95.7**

Benchmark: collection period – less than 90 days; collection rate - over 95%

Table 13. Collection period, collection rate by groups and summarized

Municipality	Collection period 2011 (days)	Collection period 2012 (days)	Collection rate 2011 (%)	Collection rate 2012 (%)
Berovo	410	379	96.6	95.5
Bogdanci	212	296	80.6	87.4
Bosilovo	142	190	100	96.1
Chashka	211	215	97	100
Dolneni	690	732	66.1	95.5
Gostivar	953	828	79.2	86.4
Gradsko	894	1096	82.7	131.1
Ilinden	53	179	83.8	105.7
Kavadarci	459	514	100	100
Kichevo	548	504	104.3	103.4
Kochani	447	452	126.3	94.3
Kriva Palanka	340	367	109.2	88.3
Krushevo	310	406	82.2	100
Mavrovi Anovi	251	298	112.1	102.6
Negotino	535	529	100	100
Novaci		1153		75.9
Pehchevo	750	694	88	95.8
Petrovec	128	204	60.2	100
Prilep	296	237	104.8	89.4
Probishtip	314	307	100	100
Rankovce	130	162	84.5	105.4
Rosoman	821	804	100	69.7
Shtip	95	195	80	68.6
Skopje	957	1031	78	78.8
Vasilevo	219	221	98	83.7
Veles	602	650	100	100
Vinica	269	374	83.97	109.4
Vevchani	503	552	108.2	116.4
Average	**427**	**485**	**92.8**	**95.7**

Table 14. Collection period, collection rate for 2011 and 2012 by utilities and summarised

Conclusions

- The average collection period of 485 days for 2012 is considerably large and brings into question the financial and operational sustainability of utilities and their ability to settle their matured payables.

  Reasons for the long collection period:

- Internal: absence of an effective collection system (professional collection contact center, action programs to increase collection, operational plans and procedures, incentives, inadequate treatment of users' complaints, staff corruption, outdated bills that legally cannot be collected, but are not written off due to the significant amount of funds);

- External: political influences, connecting certain actions with the aim to increase collection with interethnic relations.

- The average collection rate of 95.7% is satisfactory.
  It should be taken into consideration that this collection percent does not apply to bills collected in the current year, but cumulatively, from all billing in past years;

- When comparing indicators for 2011 and 2012, the tendency to increase the collection period (bad) can be noted as well as to increase the collection rate (good), with the exception of Group 3 (reduction of the collection rate by about 4%);

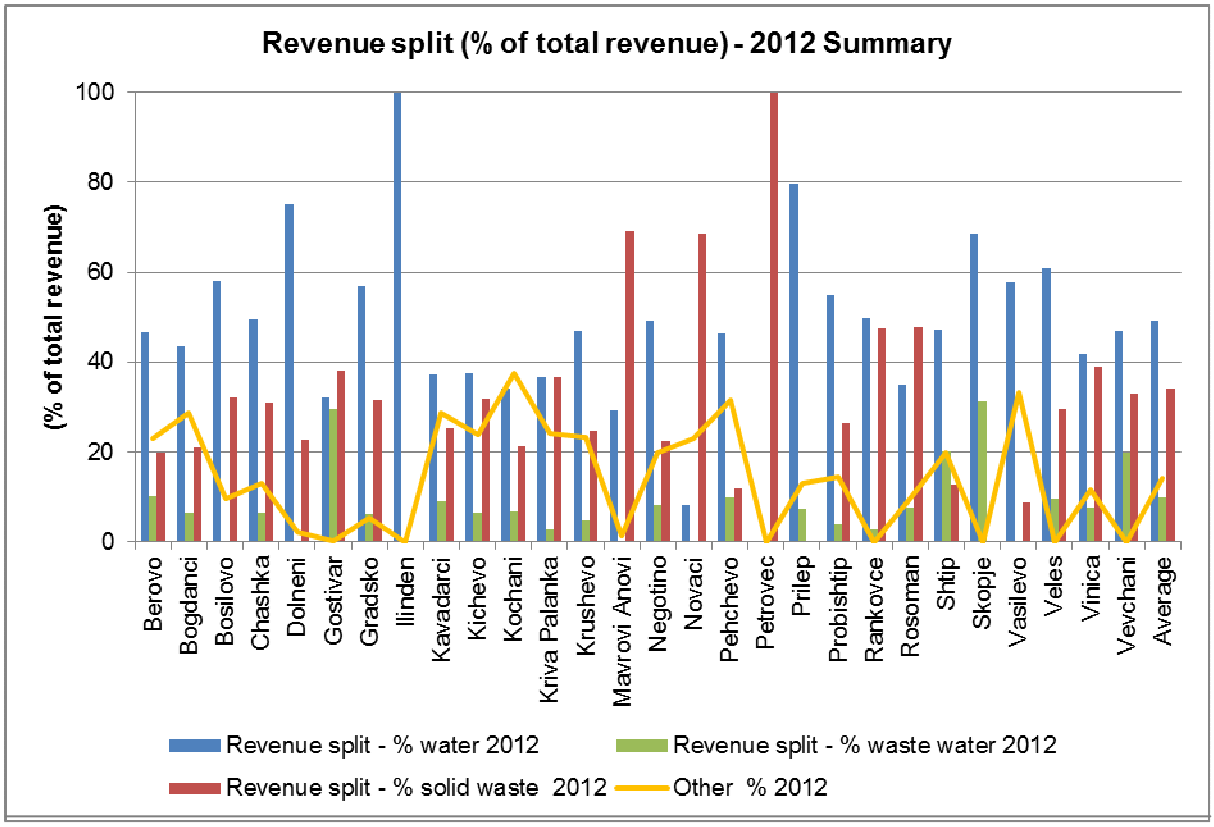
- If collection is a problem that keeps getting worse, it is obvious that the billing and collection system for delivered products and services in the communal sector must undergo structural reforms in order to increase the collection of receivables. Therefore the need for an intervention in this sector is extremely urgent.

2012201120102009200820072012	Macedonia*	Albania	Serbia	Romania	Bulgaria	Turkey	Kosovo
Collection period (days)	**485**	**76**	**178**	**87**	**98**	**108**	
Collection rate (%)	**95.7**	**121**	**89**	**112**	**124**	**90**	**70**

* data from 28 evaluated utilities; Source: IBNET

Table 15.Review of collection rate, collection period in several neighbouring countries, including the Republic of Macedonia

4.5.2 Revenue split



Graph 6. Revenue split by service for 2012split

2012	Revenue split % water	Revenue split % waste water	Revenue split % solid waste	Other
Group 1 (0-10000)	**43.8**	**8.5**	**41.9**	**13**
Group 2 (10000-45000)	**50.9**	**6.7**	**27**	**19**
Group 3 (45000-100000), Skopje	**57.7**	**19.6**	**20.1**	**6.7**
Summary	**49.3**	**9.9**	**34.1**	**14.2**

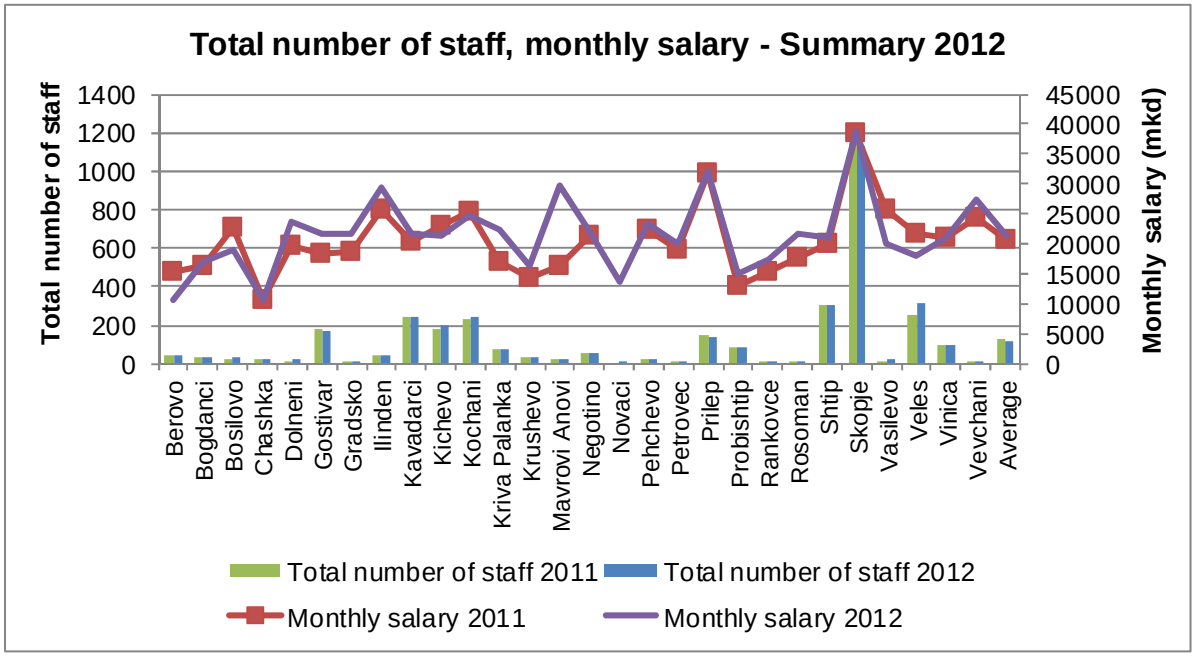
Table 16. Revenue split by service in groups and summarized

Municipality	Revenue split - % water 2012	Revenue split - % waste water 2012	Revenue split - % solid waste 2012	Other (%) 2012
Berovo	46.6	10.4	20	23.1
Bogdanci	43.5	6.7	21	28.8
Bosilovo	58.1		32.2	9.7
Chashka	49.4	6.5	30.9	13.2
Dolneni	75.2		22.6	2.2
Gostivar	32.1	29.6	38	0.3
Gradsko	56.9	6.1	31.7	5.4
Ilinden	100			0.0
Kavadarci	37.2	9	25.3	28.6
Kichevo	37.6	6.6	31.8	24
Kochani	34.2	6.9	21.3	37.6
Kriva Palanka	36.6	2.8	36.6	24
Krushevo	46.9	4.9	24.8	23.4
Mavrovi Anovi	29.4		69.2	1.4
Negotino	49.2	8.4	22.5	19.9
Novaci	8.3	0.0	68.6	23.1
Pehchevo	46.4	10.1	11.9	31.7
Petrovec			100	0
Prilep	79.6	7.3		13.2
Probishtip	54.9	4	26.6	14.5
Rankovce	49.7	2.7	47.5	0.0
Rosoman	34.9	7.6	47.8	9.7
Shtip	47.1	20.2	12.8	19.9
Skopje	68.7	31.3		0.0
Vasilevo	57.8		8.9	33.2
Veles	60.7	9.7	29.6	0.0
Vinica	41.7	7.6	38.9	11.7
Vevchani	47.1	20	32.9	0.0
Average	**49.3**	**9.9**	**34.1**	**14.2**

Table 17. Revenue split by service, by utilities and summarized

4.6 Staff and costs

4.6.1 Total number of staff and monthly salary



Graph 7. Total number of staff, monthly salary for 2012.

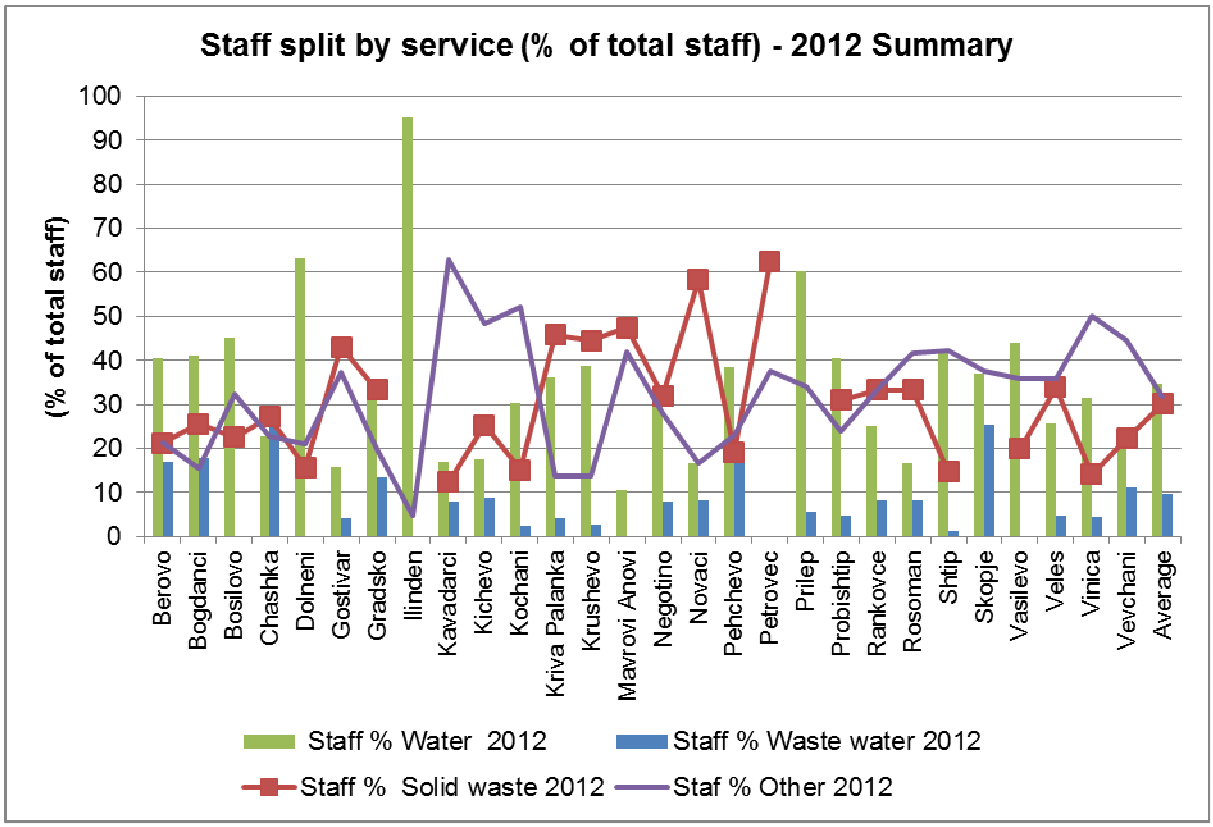
	Total number of staff 2011	Total number of staff 2012	Monthly salary (mkd) 2011	Monthly salary (mkd) 2012
Group 1 (0-10000)	**18**	**19**	**19031**	**20115**
Group 2 (10000-45000)	**100**	**102**	**19672**	**20751**
Group 3 (45000-100000), Skopje	**410**	**413**	**26100**	**26340**
Summary	**124**	**122**	**20601**	**21477**

Table 18. Total number of staff, monthly salary by groups and summarized

Municipality	Total number of staff 2011	Total number of staff 2012	Monthly salary 2011	Monthly salary 2012
Berovo	41	47	15.381	10,738
Bogdanci	39	39	16,505	16,982
Bosilovo	23	31	22,714	18,987
Chashka	20	22	10,687	10,789
Dolneni	15	19	19,573	23,594
Gostivar	184	172	18,476	21,753
Gradsko	15	15	18,566	21,740
Ilinden	42	42	25,869	29,315
Kavadarci	242	242	20,488	21,817
Kichevo	183	201	23,167	21,366
Kochani	233	238	25,453	24,611
Kriva Palanka	72	72	16,913	22,291
Krushevo	39	36	14,268	16,185
Mavrovi Anovi	21	19	16,425	29,668
Negotino	55	50	21,299	22,164
Novaci		12		13,697
Pehchevo	28	26	22,374	23,395
Petrovec	8	8	19,187	19,921
Prilep	146	141	31,837	32,149
Probishtip	85	84	13,042	15,164
Rankovce	10	12	15,244	17,204
Rosoman	12	12	17,599	21,680
Shtip	309	305	20,069	20,976
Skopje	1,155	1,134	38,568	38,837
Vasilevo	18	25	25,644	20,004
Veles	257	313	21,547	17,983
Vinica	92	92	20,940	21,018
Vevchani	9	9	24,398	27,319
Average	**124**	**122**	**20,601**	**21,477**

Table 19. Total number of staff, monthly salary by utilities and summarised

4.6.2 Staff split by service



Graph 8. Staff split by service for 2012

2012	% of staff – water supply	% of staff – waste water	% of staff – solid waste	Other %
Group 1 (0-10000)	**28.7**	**14.2**	**33.8**	**30.4**
Group 2 (10000-45000)	**40.2**	**6.7**	**25.7**	**30.9**
Group 3 (45000-100000), Skopje	**36**	**8.3**	**30.6**	**37.4**
Summary	**34.8**	**9.8**	**30.2**	**31.9**

Table 20. Staff split by service, by groups and summarized

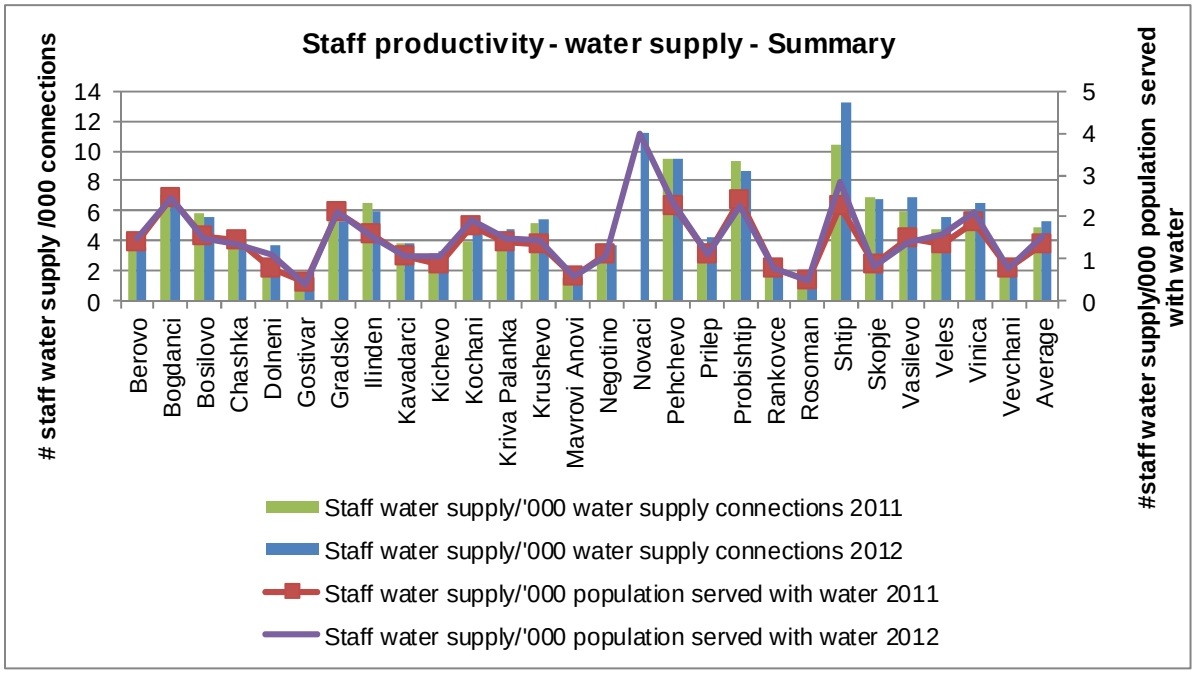
Municipality	Staff % Water 2012	Staff % Waste water 2012	Staff % Solid waste 2012	Staff % Other 2012
Berovo	40.4	17	21.3	21.3
Bogdanci	41	17.9	25.6	15.4
Bosilovo	45.2		22.6	32.3
Chashka	22.7	27.3	27.3	22.7
Dolneni	63.2		15.8	21.1
Gostivar	15.7	4.1	43	37.2
Gradsko	33.3	13.3	33.3	20
Ilinden	95.2			4.8
Kavadarci	16.9	7.9	12.4	62.8
Kichevo	17.4	9	25.4	48.3
Kochani	30.3	2.5	15.1	52.1
Kriva Palanka	36.1	4.2	45.8	13.9
Krushevo	38.9	2.8	44.4	13.9
Mavrovi Anovi	10.5		47.4	42.1
Negotino	32	8	32	28
Novaci	16.7	8.3	58.3	16.7
Pehchevo	38.5	19.2	19.2	23.1
Petrovec			62.5	37.5
Prilep	60.3	5.7		34
Probishtip	40.5	4.8	31	23.8
Rankovce	25	8.3	33.3	33.3
Rosoman	16.7	8.3	33.3	41.7
Shtip	41.6	1.3	14.8	42.3
Skopje	37	25.5		37.5
Vasilevo	44		20	36
Veles	25.6	4.8	33.9	35.8
Vinica	31.5	4.3	14.1	50
Vevchani	22.2	11.1	22.2	44.4
Average	**34.8**	**9.8**	**30.2**	**31.9**

Table 21. Staff split by service, by utilities and summarised

4.6.3 Staff productivity – water supply

Staff productivity – water supply is a key performance indicator which is presented as the ratio between the number of staff in the water industry in relation to 1000 connections or 1000 population served with water. The internationally adopted benchmark is 5 staff per 1000 connections, or 0.4 staff per 1000 population served with water. As presented in the graph and table below, in our case the indicator related to the number of connections is within the recommended, while the indicator related to population served with water is well above the recommended. Thus we can conclude that perhaps the population and/or the number of connections is underestimated / overestimated.

These indicators largely depend on the fact whether the area is urban or rural, on utility size, level of service outsourcing, maintenance of the water supply network, availability of qualified staff.



Graph 9. Staff productivity water supply for 2011 and 2012

	Staff water supply/'000 water supply connections 2011	Staff water supply/'000 water supply connections 2012	Staff water supply /'000 population served with water 2011	Staff water supply/'000 population served with water 2012
Group 1 (0-10000)	**4.6**	**5.2**	**1.4**	**1.6**
Group 2 (10000-45000)	**4.8**	**5**	**1.4**	**1.5**
Group 3 (45000-100000), Skopje	**5.5**	**6.3**	**1.2**	**1.4**
Summary	**4.9**	**5.3**	**1.4**	**1.5**

Benchmark: staff water supply,/000 connection - 5; staff water supply/000 population - 0.4

Table 22.Staff productivity water supply for 2011 and 2012 by groups and summarized

Municipality	Staff water supply/'000 water supply connections 2011	Staff water supply/'000 water supply connections 2012	Staff water supply/'000 population served with water 2011	Staff water supply/'000 population served with water 2012
Berovo	4.5	3.6	1.4	1.5
Bogdanci	7	7	2.4	2.4
Bosilovo	5.8	5.5	1.5	1.5
Chashka	4.3	4.2	1.4	1.4
Dolneni	2.5	3.7	0.8	1.1
Gostivar	1.7	1.6	0.4	0.4
Gradsko	5.3	5.3	2.1	2.1
Ilinden	6.5	6	1.6	1.5
Kavadarci	3.9	3.9	1.1	1.1
Kichevo	2.8	3.4	0.9	1.1
Kochani	4	4.7	1.8	1.9
Kriva Palanka	4.4	4.8	1.4	1.5
Krushevo	5.1	5.5	1.3	1.4
Mavrovi Anovi	1.5	1.5	0.6	0.6
Negotino	3.9	3.7	1.1	1
Novaci		11.2		4
Pehchevo	9.4	9.4	2.2	2.3
Prilep	3.8	4.3	1.1	1.1
Probishtip	9.3	8.7	2.4	2.3
Rankovce	2.6	2.4	0.8	0.8
Rosoman	2	2	0.5	0.5
Shtip	10.5	13.2	2.2	2.8
Skopje	7	6.8	0.8	0.8
Vasilevo	6	6.9	1.5	1.4
Veles	4.7	5.5	1.3	1.6
Vinica	6	6.6	1.9	2.1
Vevchani	2.3	2.3	0.8	0.8
Average	**4.9**	**5.3**	**1.4**	**1.5**

Table 23. Staff productivity water supply by utilities and summarized

20122011 2010 20092008 2007	Macedonia*	Albania	Serbia	Romania	Bulgaria	Turkey	Kosovo
Staff water supply/'000 population served with water	**1.5**		**1.4**	**2**	**1.6**	**1.3**	**1.2**

* data from 28 evaluated utilities; Source: IBNET

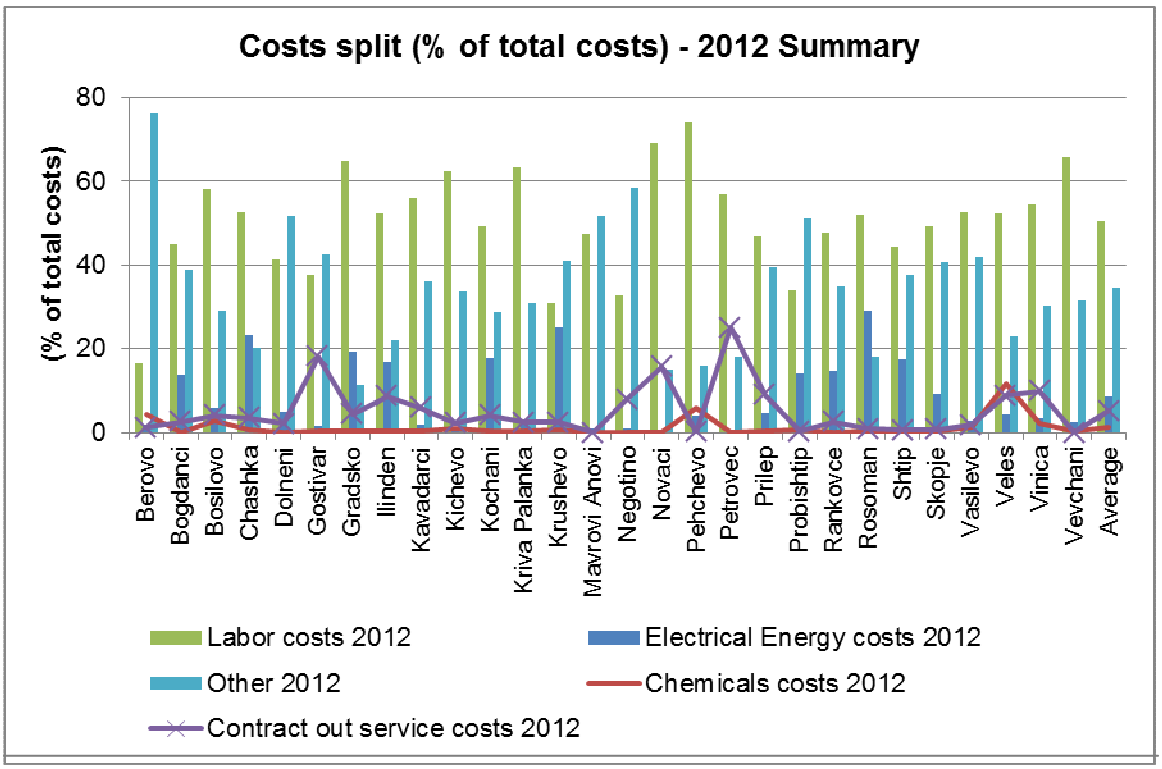
Table 24.Review of staff productivity for water supply (000 population served with water) in several neighbouring countries, including the Republic of Macedonia

4.6.4 Costs split

The sharing of laber costs of over 50 % in total costs poses a threat to the modernization process of the utility and the introduction of new technologies and is above the adopted international benchmark of 20-40%. This indicates overstaffing in public utilities and difficulties in the reformation process. On the other hand, this value, in correlation with staff productivity in water supply, presented as staff number per 1000 water supply connections, which is within the internationally recommended framework, suggests that overstaffing probably occurs in the non-operational sector, i.e. administration.

Taking into consideration that effective usage, management and development of human resources is crucial for companies in the utilities sector, in constant attempts to improve services for customers and operational performances, serious attention should be paid to possible redistribution of existing staff, constant education and training of staff. Any reduction in the number of staff should be considered as a last resort to rationalising costs and increasing operational efficiency.

With respect to electricity costs, which amount to approximately 10% of total costs, serious attention should be paid to projects which provide energy efficiency due to the serious forecasts for future increase of the price of electricity, which would result in increase of these costs.



Graph 10. Costs split for 2012

2012	Labor costs (%)	Electricical Energy costs(%)	Chemicals costs (%)	Contract out service costs (%)	Other (%)
Group 1 (0-10000)	**57.2**	**9.7**	**0.9**	**5**	**27.2**
Group 2 (10000-45000)	**44.8**	**8.2**	**0.9**	**4.3**	**41.8**
Group 3 (45000-100000), Skopje	**46.1**	**7.3**	**2.5**	**7.4**	**36.6**
Summary	**50.4**	**8.7**	**1.2**	**5.1**	**34.6**

Benchmark: Labor costs: 20÷40%

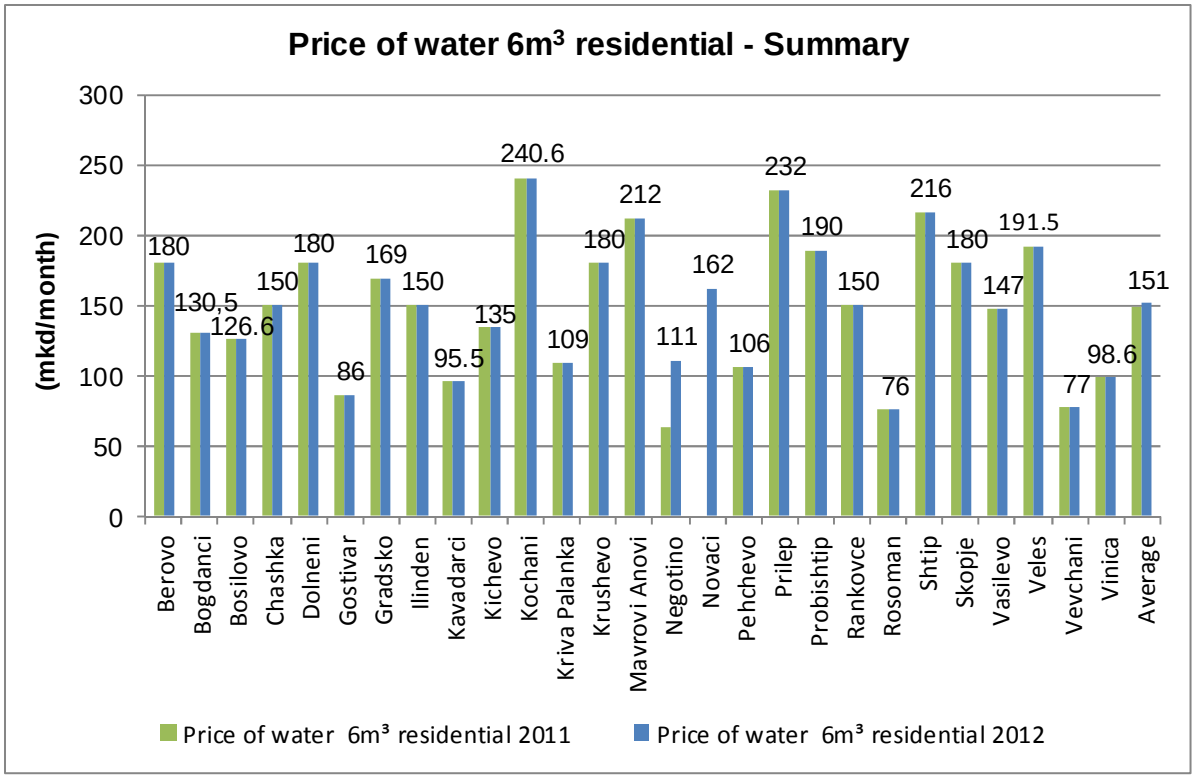
Table 25. Costs split for 2012 by groups and summarized

	Labor costs 2012	Electricical Energy costs 2012	Chemicals costs 2012	Contract out service costs 2012	Other 2012
Berovo	16.4	1.9	4.3	1.2	76.2
Bogdanci	44.9	13.7		2.5	38.9
Bosilovo	58.2	6	2.8	4	29.1
Chashka	52.5	23.4	0.6	3.4	20.1
Dolneni	41.2	5		2	51.7
Gostivar	37.6	1.5	0.2	18.2	42.6
Gradsko	64.8	19.3	0.3	4.3	11.3
Ilinden	52.4	16.7	0.3	8.6	22
Kavadarci	55.9	1.8	0.3	5.9	36.1
Kichevo	62.5	0.8	0.9	2.2	33.6
Kochani	49.4	17.6	0.2	4.1	28.7
Kriva Palanka	63.2	3.2	0.3	2.4	31
Krushevo	31	24.9	0.6	2.4	41
Mavrovi Anovi	47.3	1			51.6
Negotino	32.8	0.9	0.1	7.9	58.3
Novaci	69.2			15.7	15.1
Pehchevo	74.1	3.9	5.9		16
Petrovec	56.9			25	18.1
Prilep	46.9	4.5	0.3	8.9	39.5
Probishtip	33.8	14.1	0.7	0.3	51.1
Rankovce	47.8	14.7	0.1	2.5	34.9
Rosoman	51.9	29	0.3	0.8	18.1
Shtip	44.5	17.4	0.1	0.6	37.5
Skopje	49.3	9.1	0.4	0.6	40.6
Vasilevo	52.6	2.6	1.1	1.8	41.8
Veles	52.4	4.2	11.7	8.8	23
Vinica	54.4	3.4	2.3	9.8	30.2
Vevchani	65.7	2.5	0.3		31.5
Average	**50.3**	**8.7**	**1.2**	**5.1**	**34.6**

Table 26. Costs split by utilities and summarised

4.6.5 Price of water

In the IBNET questionnaire, the price of water is treated as the price of water for 6m³ of consumed water-residential, based on the recommendations of WHO/OECD/Camdessus Commission, accepted by IWA in 1990.



Graph 11. Price of water for consumed 6 m³ - residential

	Price of water (mkd) 6m³ - residential 2011	Price of water (mkd) 6m³ - residential 2012
Group 1 (0-10000)	**134.4**	**136.9**
Group 2 (10000-45000)	**147.5**	**151.7**
Group 3 (45000-100000), Skopje	**181.1**	**181.1**
Summary	**148.9**	**151.1**

Table 27. Price of water for 6 m^3 of consumed water - residential for 2011 and 2012 by group and summarized

Municipality	Price of water 6m^3 - residential 2011	Price of water 6m^3 - residential 2012
Berovo	180	180
Bogdanci	130.5	130.5
Bosilovo	126	126.6
Chashka	150	150
Dolneni	180	180
Gostivar	86	86
Gradsko	169	169
Ilinden	150	150
Kavadarci	95.5	95.5
Kichevo	135	135
Kochani	240	240
Kriva Palanka	109	109
Krushevo	180	180
Mavrovi Anovi	212	212
Negotino	63.9	111
Novaci		162
Pehchevo	106	106
Prilep	232	232
Probishtip	189.5	189.5
Rankovce	150	150
Rosoman	76	76
Shtip	216	216
Skopje	180	180
Vasilevo	147	147
Veles	191.5	191.5
Vevchani	77	77
Vinica	98.6	98.6
Average	**148.9**	**151.1**

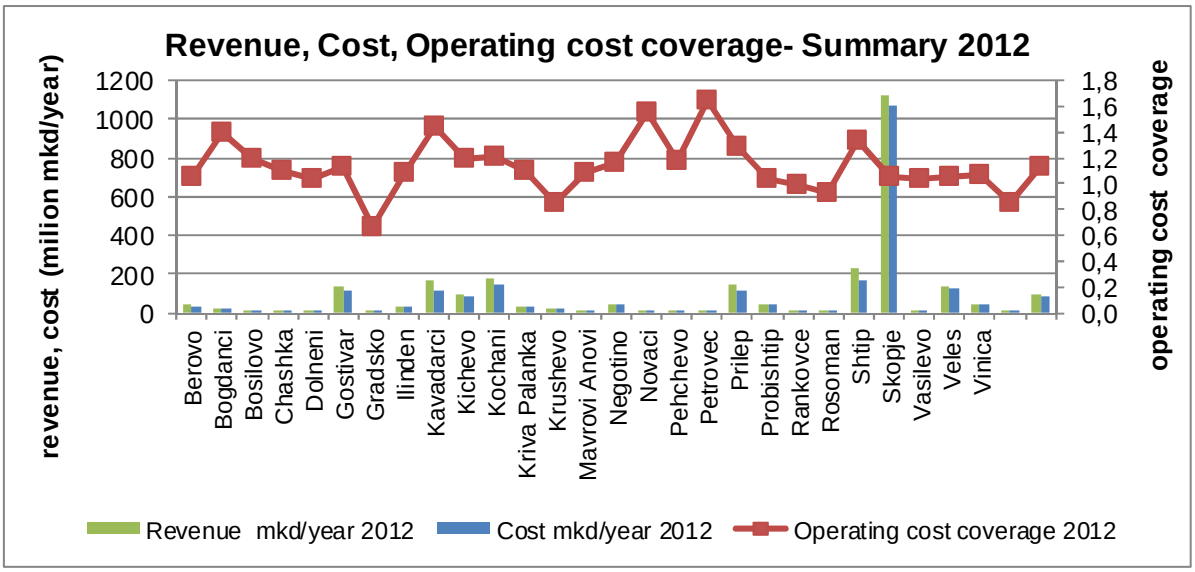
Table 28. Price of water for 6 m^3 of consumed water per household by utility and summarised

According to the prices submitted by utility companies and the average price of water for 6m³ of consumed water-residential of about 150 denars, it can be concluded that the price of water is relatively low and does not provide financial stability to utilities and capital investments and in particular utilities it does not even provide covering of operational costs. Despite this situation, a relatively small number of utilities in the last few years have used the opportunity to increase the price of water in accordance with the current tariff methodology.

Regarding water tariffs and tariff structure, it is expected that the implementation of the project "Development of National Water Tariff Study" implemented through Eptisa-Geing and funded by the European Commission will result in overcoming this problem successfully.

4.7 Revenue, Cost, Operating cost coverage

The indicator "Operating cost coverage" is an extremely important financial indicator which presents the ratio between total revenue and total costs and it is the extent to which a utility is able to cover its costs with its revenues. The internationally acceptable value for this indicator is at least 1.3. Based on the tables and graphs below, the average value of this indicator is 1.1, which is quite below the acceptable value. This value indicates that companies barely manage to cover their costs with collected bills for consumed water and other services and certain utilities are fully dependent on municipal grants or loans.



Graph 12. Revenue, Cost, Operating cost coverage for 2012

2012	Revenue mkd/year	Cost mkd/year	Operating cost coverage
Group 1 (0-10000)	**9397036**	**8227197**	**1.1**
Group 2 (10000-45000)	**64573550**	**54336300**	**1.1**
Group 3 (45000-100000), Skopje	**355049796**	**321831686**	**1.2**
Summary	**92797231**	**82342289**	**1.1**

Benchmark: Operating cost coverage – minimum 1.3

Table 29. Revenue, Cost, Operating cost coverage for 2012 by groups and summarized

Municipality	Revenue mkd/year 2012	Cost mkd/year 2012	Operating cost coverage 2012
Berovo	38,727,841	36,872,174	1.1
Bogdanci	24,774,549	17,682,043	1.4
Bosilovo	14,476,825	12,145,013	1.2
Chashka	5,982,118	5,424,428	1.1
Dolneni	13,585,820	13,048,455	1
Gostivar	134,812,274	119,430,335	1.1
Gradsko	4,024,872	6,036,754	0.7
Ilinden	30,759,443	28,209,470	1.1
Kavadarci	164,048,210	113,409,765	1.5
Kichevo	98,134,027	82,448,310	1.2
Kochani	172,958,396	142,312,086	1.2
Kriva Palanka	33,652,282	30,488,451	1.1
Krushevo	19,043,427	22,539,137	0.8
Mavrovi Anovi	15,591,014	14,286,729	1.1
Negotino	47,094,301	40,527,609	1.7
Novaci	4,433,770	2,848,679	1.6
Pehchevo	11,562,315	9,851,030	1.8
Petrovec	5,513,548	3,358,547	1.6
Prilep	148,556,397	115,876,080	1.3
Probishtip	46,861,035	45,165,530	1.0
Rankovce	5,129,829	5,187,207	1
Rosoman	5,588,464	6,016,617	0.9
Shtip	229,072,158	172,596,579	1.3
Skopje	1,126,149,965	1,072,273,933	1.1
Vasilevo	11,892,913	11,401,802	1
Veles	136,658,187	128,981,504	1.1
Vinica	45,444,265	42,678,308	1.1
Vevchani	3,794,212	4,487,512	0.9
Average	**92,797,231**	**82,342,289**	**1.1**

Table 30. Revenue, Cost, Operating cost coverage for 2012 by utilities and summarised

2012 2011 2010 2009 2008 2007	Macedonia*	Albania	Serbia	Romania	Bulgaria	Turkey	Kosovo
Operating cost coverage	**1.1**	**0.7**	**1.2**	**1.1**	**1.3**	**1.3**	**1.5**

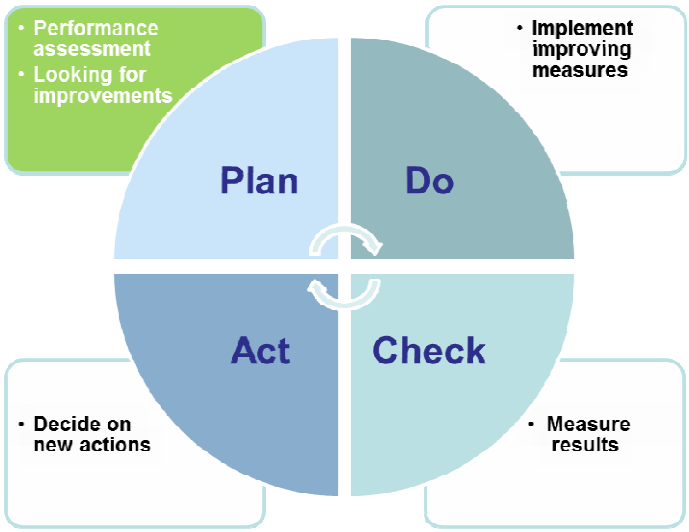
***** data from 28 evaluated utilities; Source: IBNET

Table 31. Review of Operating cost coverage in several neighbouring countries, including the Republic of Macedonia

5. GENERAL CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

- This Benchmarking project represents the first step in the realization of the efforts for continuous monitoring activities with regard to utilities' performances and their improvement over time;



Picture No.4 Project phases regarding long-term Benchmarking initiative

- Despite the limited number of evaluated utilities (28) which present 42% of the total number of utilities in the Republic of Macedonia (providing services in the field of water supply and sewage) and cover approximately 1,200,000 people (59%) of the total population in Macedonia, this project provides significant insight into the current condition in utilities in the Republic of Macedonia and shows trends and areas of weaker performances in the sector and by utility;

- The high level of Non-revenue water, the long period of collection of receivables, the insufficient ratio of Operating cost coverage and the relatively low price of water erode the communal sector as a whole and do not allow its modernization and development, which would result in improvement of services towards customers;

- The continuation of the benchmarking in utilities on a regular annual basis will increase transparency in key operational areas, finance and service quality and will initiate the improvement of efficiency, defining of goals and cooperation between utilities.

5.2 Recommendations

- Submission of the report to utilities for their review, opinion, analysis and proposed measures in order to improve the usefulness and functionality of benchmarking;

- The existing benchmarking system for utilities performance should be improved and the data submitted by these utilities should be checked and evaluated, independently prior to its usage and publication. In terms of institutional framework, it is necessary to encourage or correct utilities (through bonuses or penalties) in order to provide timely and accurate submission of data, which can be used for planning and monitoring of the overall sector performance;

- Establishing of emergency measures to improve areas defined in this project which impair operational and financial stability of utilities;

- Recommended strategy: to begin with small improvements in order to gain self-confidence and later to focus on more ambitious improvement programs;

- Adaptation of the existing accounting/financial software in utilities in order to provide automatic generation of performance indicators;

- Establishment of an independent institution responsible for continuous implementation of benchmarking and monitoring of utilities performances.

6. APPENDIX

6.1 Questionnaire "Macedonia Toolkit

For Fiscal Year

	Code	Definition	Units	Value
Utility long name	**1a**	Full name of utility.		
Utility short name	**1a**	Short name of the utility		
Please mark if water utility regional, municipal, rural, etc	**1**	Level of subordination	regional, provincial capital, municipal, rural, etc	
Towns served with water	**34**	Total number of towns and villages under responsibility of the utility irrespective of their service coverage	Number of towns and villages	
Towns served with sewage	**35**	Total number of towns under responsibility of the utility irrespective of their service coverage.	Number of towns	
Total number of staff	**36**	Total number of staff working at the utility on water and wastewater services. Report in terms of Full Time Equivalent staff numbers (FTEs) at the end of the year	number of staff	
Total number of technical staff - water	**36a**	Total number of staff working at the utility on water (not include drivers, cafeteria staff, etc). Report in terms of Full Time Equivalent staff numbers (FTEs)	number of staff	
Total number of technical staff - wastewater	**36b**	Total number of staff working at the utility on wastewater (not include drivers, cafeteria staff, etc). Report in terms of Full Time Equivalent staff numbers (FTEs)	number of staff	
Total number of technical staff - solid waste	36c	Total number of staff working at the utility on solid waste (not include drivers, cafeteria staff, etc). Report in terms of Full Time Equivalent staff numbers (FTEs)	number of staff	
Total number of staff - administration	**36d**	Total number of staff working at the utility on administration of the utility. Report in terms of Full Time Equivalent staff numbers (FTEs)	number of staff	
Total population living in the service area - water supply	**30a**	Total population under notional responsibility of the utility for water supply, irrespective of whether they receive service	number of people	
Total population living in the service area - wastewater	**30a**	Total population under notional responsibility of the utility for sewerage, irrespective of whether they receive service	number of people	
Total population living in the service area - wastewater	**30b**	Total population under notional responsibility of the utility for wastewater services, irrespective of whether they receive service	number of people	
Total population living in the service area - solid waste	30c	Total population under notional responsibility of the utility for water supply, irrespective of whether they receive service	number of people	

Population served - water	**40**	Population *under responsibility of the utility* with access to water through house connections, yard taps and public water points (either with direct service connection or within 200m of a standpost).	number of people	
Population served - direct water supply & shared taps	**40a**	Population under responsibility of the utility with access to water through house connections and shared yard taps (where 2 or more houses share a private yard with a tap).	number of people	
Population served - public fontains	**40b**	Population under responsibility of the utility with access to water through public water points.	number of people	
Population served from yard	**40c**	Population under responsibility of the utility with access to water through shared yards	number of people	
Population served - sewerage	**70**	Population under responsibility of the utility with sewerage services through house connections	number of people	
Population served - wastewater	**70**	Population *connected to* wastewater network	number of people	
Population served - solid waste	**70a**	Population served with solid waste services	number of people	
Water connections year end	**41**	Number of active water connections at year-end. All active connections should be counted – residential, non-residential etc - but inactive connections to vacant buildings should be excluded.	number of connections	
Number of direct connections to individual houses, apartments	**41a**	Total number of connections	number of connections	
Number of public fontains	**41b**	Total number of fontains	number of fontains	
Total number of non-residential connections	**41c**	Total number of non-residential connections	number of connections	
Connections with operating meter	**53**	Total number of water connections with operating meter at year end	number of connections	
Length of water distribution network	**54**	Total length of the distribution network (excluding transmission lines and service pipes.	km	
Number of pipe breaks	**60**	Total number of water pipe breaks in the distribution network during the year. Failures that require repair of mains, connections, valves and fittings that are the Utility's responsibility, are included. Repairs from active leakage control are excluded	number of breaks	
Duration of supply	**61**	Average hours of service /day. This indicator measures intermittent supply systems; interruptions due to unplanned failures or rehabilitation work should be excluded	hours a day	
Number of customers receiving intermittent supply	**61a**	Number of residential customers who do not normally receive a 24hr/day supply	number of people	
Sewerage connections	**71**	Total number of sewer connections (residential and non-residential) at year end in thousands.		
Length of sewers	**74**	Total length of the sewerage network (excluding service connections).		
Number of sewerage blockages	**79**	Total number of sewer blockages in the network during the year.		

Volume of water produced	**55**	Total volume of water produced for the service area, i.e. leaving treatment works operated by the Utility and purchased treated water, if any.	m3/year	
Volume of water sold	**59**	Total volume of water billed (metered and unmetered) irrespective of whether the bill is paid or not. Clearly any unmetered volume must be estimated from other information about the water users.	m3/year	
Volume of water sold through operating meters	**58**	Total volume of water billed that is metered, irrespective of whether the bill is paid or not.	m3/year	
Volume of water sold - residential	**59a**	Total volume of water billed to residential customers	m3/year	
Volume of water sold to residential customers through direct supplies	**59a1**	Total volume of water billed to residential customers through direct supplies	m3/year	
Volume of water sold to residential customers through the shared yard	**59a2**	Total volume of water billed to residential customers through shared yard	m3/year	
Total volume of water supplied and sold through the public fontains	**59a3**	Total volume of water supplied and sold through the public fontains	m3/year	
Volume of water sold to industrial and commercial customers	**59b**	Total volume of water billed to industrial customers	m3/year	
Volume of water sold to institutions and others	**59c**	Total volume of water billed to state or municipal institutions, including for water for fire-fighting, etc.	m3/year	
Volume of water sold treated in bulk	**59d**	Total volume of water billed for sales in bulk to third companies, distributors of water	m3/year	
Required number of water tests required	**63**	The number of samples of potable water that are required by law/regulation to be taken from the distribution system to be tested	number of tests	
Number of tests of treated water carried out	**64**	The number of samples of potable water actually taken from the distribution system , that have been tested	number of tests	
Number of tests of treated water passed	**65**	The number of samples of potable water taken from the distribution system passed the test	number of tests	
Total volume of wastewater collected	**81a**	Volume of wastewater collected through the sewer system or by tanker. Where it cannot be measured, estimates should be made based on water use & infiltration from the ground (which should be included).		
Volume of wastewater collected - residential	**81b**	Volume of wastewater collected - residential		
Volume of wastewater collected - industrial & commercial	**81c**	Volume of wastewater collected - industrial & commercial		
Volume of wastewater collected that is treated to primary level	**81d**	Volume of wastewater collected that is treated to primary level		
Volume of wastewater collected that is treated to at least secondary level	**81e**	Volume of wastewater collected that is treated to at least secondary level		

What would be the monthly water bill for a household consuming 6m3 of water per month through a household or shared yard tap (but excluding the use of standposts)?	**C.4**	What would be the monthly water lowest bill for a household a household or shared yard tap (but excluding the use of fontains)?:	MCD/month	
Connection charges - water	**147**	Connection charges - water	MCD/month	
Connection charges - sewers	**148**	Connection charges - sewers	MCD/month	
Monthly payment for Solid waste per family	149	Solid waste	MCD/month	
Total operating revenues	**90**	Total billing of water, sewer, waste and other services, connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes	MCD/year	
Total billings - residential	**90a**	Total billed amounts to residential customers during year	MCD/year	
Total billings - industrial	**90b**	Total billed amounts to industrial customers during year	MCD/year	
Total billings - commercial	**90b1**	Total billed amounts commercial customers during year	MCD/year	
Total water operating billings	**90c**	Total billing of water, connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes	MCD/year	
Total wastewater operating billings	**90d**	Total billing of wastewater, connection fees, environmental fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes	MCD/year	
Total solid waste operating billings	90d1	Total billing of solid waste, user fees, environmental fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes	MCD/year	
Total water billings to residential customers	**90e**	Total billing of water services for residential customers, including connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes	MCD/year	
Total water billings to industrial and commercial customers	**90f**	Total billing of water services for industrial and commercial customers, including connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes	MCD/year	
Total water billings to institutions and others	**90g**	Total billing of water services of institutions, budget financed and municipal users (schools, hospitals, fire fighters and others) , including connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes	MCD/year	
Total water billings for treated bulk supplies	**90h**	Total billing of water services of thrid parties involved in distribution of water that have no direct institutional relations with bulk water provider	MCD/year	

Total billing for water from shared yards	**90k**	Total billing for water from shared yards	MCD/year	
Total billing for water in fontains	**90l**	Total billing for water in fontains	MCD/year	
Total wastewater billings to residential customers	**90i**	Total billed amounts for wastewater to residential customers during year	MCD/year	
Total wastewater billings to industrial, commercial and institution customers	**90j**	Total billed ampounts for wastewater to industrial, commercial, budget and institutional customers	MCD/year	
Total solid waste billings to residential customers	90i	Total billed amounts for solid waste to residential customers during year	MCD/year	
Total solid waste billings to industrial, commercial and institution customers	90j	Total billed ampounts for solid waste to industrial, commercial, budget and institutional customers	MCD/year	
Total debt service	**114**	Total debt service costs (Including interest and repayment of capital)	MCD/year	
Year end accounts receivable	**120**	Total of all accounts receivable at year end including water billings, and all other outstanding invoices.	MCD/year	
Total REVENUE COLLECTED:	**91**	Income **actually received** for COMPANY services	MCD/year	
Total operational costs	**94**	Total operational expenses **excluding** depreciation and financing charges (interest and capital repayments).	MCD/year	
Total water operational expenses	**94a**	Total water operational expenses **excluding** depreciation and financing charges (interest and capital repayments).	MCD/year	
Total wastewater operational expenses	**94b**	Total wastewater operational expenses **excluding** depreciation and financing charges (interest and capital repayments).	MCD/year	
Total solid waste operational expenses	94c	Total solid waste operational expenses excluding depreciation and financing charges (interest and capital repayments).	MCD/year	
Cost of the fuel for slid waste tracks	94d	Total cost of the fuel for the solid waste operations	MCD/year	
Labor costs	**96**	All costs within (94) that are labour related (salaries, wages, pensions, other benefits, etc.).	MCD/year	
Electrical energy costs	**97**	All electrical energy costs within (94)	MCD/year	
Chemicals cost	98	Chemicals cost	MCD/year	
Contracted out services costs	**99**	Costs of all services within Item (94) provided by private firms.	MCD/year	
Gross fixed assets including work in progress	**112**	Gross Book Value of fixed assets at year end, including work in progress	MCD/year	
Gross fixed assets including work in progress - water	**112a**	Gross Book Value of fixed assets at year end, including work in progress - water	MCD/year	
Gross fixed assets including work in progress - wastewater	**112b**	Gross Book Value of fixed assets at year end, including work in progress - wastewater	MCD/year	

Money from regional and federal water authorities	**F.1**	Money from regional and federal water authorities	MCD/year	
Borrowing from water research and development fund	**F.2**	Borrowing from water research and development fund	MCD/year	
Loans from government owned banks	**F.3**	Government owned banks	MCD/year	
Commercial banks or bond holders	**F.4**	Commercial banks or bond holders	MCD/year	
Contributions from the community	F.5	Contributions from the community	MCD/year	
Total electricity consumption	30.01	Total electricity consumption	kWh/year	
Electricity consumption - water	30.02	Electricity consumption - water	kWh/year	
Electricity consumption - Watewater	30.03	Electricity consumption - Watewater	kWh/year	
Electricity consumption other services and admin buildings	30.04	Electricity consumption other services and admin buildings	kWh/year	
Solid waste collected	80,01	Total weight of the solid waste collected	Tons a year	
Solid waste collected pre-separated by customers	80,02	Total weigh of the solid waste that was sorted by customers BEFORE disposal to the trash bins	Tons a year	
Tons (or volume) of waste disposed at landfill	80,03	Total weight of the solid waste disposed and buried at the landfill	Tons a year	
Solid waste processed/recycled	80,04	Total weight of the solid waste sent for recycling at any stage of the solid waste operations	Tons a year	
Total length of waste collected routs	80,05	Total length of the routs of the solid waste collectors trucks	km	
Distance between the city and landfill	80,06	Distance between the city border and the solid waste landfill	km	
Does utility operate landfill?	80,07	Operation of the landfil	yes/no	

6.2 Questionnaire "Data Reliability Protocol"

	Code	Units	Definition in IBNET	Definition at source	Source of information with reference	Date of information reported/ published	Source quality
Utility long name	**1a**		Full name of utility.				
Utility short name	**1a**		Short name of the utility				
Please mark if water utility	**1**						
Towns served with water	**34**	**#**	Total number of towns under responsibility of the utility irrespective of their service coverage.				
Towns served with sewage	**35**	**#**	Total number of towns under responsibility of the utility irrespective of their service coverage.				
Total number of staff	**36**	**number**	Total number of staff working at the utility on water and wastewater services. Report in terms of Full Time Equivalent staff numbers (FTEs).				
Total number of staff - water	**36a**	**number**	Total number of staff working at the utility on water. Report in terms of Full Time Equivalent staff numbers (FTEs)				
Total number of staff - watewater	**36b**	**number**	Total number of staff working at the utility on wastewater. Report in terms of Full Time Equivalent staff numbers (FTEs)				
Total population living in the service area - water supply	**30**	**000**	Total population under notional responsibility of the utility for water supply, irrespective of whether they receive service				
Total population living in the service area - wastewater	**30a**	**000**	Total population under notional responsibility of the utility for sewerage, irrespective of whether they receive service				
Population served - water	**40**	**000**	Population *under responsibility of the utility* with access to water through house connections, yard taps and public water points (either with direct service connection or within 200m of a standpost).				
Population served - direct water supply & shared taps	**40a**	**000**	Population under responsibility of the utility with access to water through house connections and shared yard taps (where 2 or more houses share a private yard with a tap).				

Population served - public water points	**40b**	**000**	Population under responsibility of the utility with access to water through public water points.				
Population served - sewerage	**70**	**000**	Population under responsibility of the utility with sewerage services through house connections				
Water connections year end	**41**	**000**	Number of active water connections at year-end. All active connections should be counted – residential, non-residential etc - but inactive connections to vacant buildings should be excluded.				
Connections with operating meter	**53**	**000**	Total number of water connections with operating meter at year end				
Length of water distribution network	**54**	**km**	Total length of the distribution network (excluding transmission lines and service pipes.				
Number of pipe breaks	**60**	#	Total number of water pipe breaks in the distribution network during the year. Failures that require repair of mains, connections, valves and fittings that are the Utility's responsibility, are included. Repairs from active leakage control are excluded				
Duration of supply	**61**	**hours a day**	Average hours of service /day. This indicator measures intermittent supply systems; interruptions due to unplanned failures or rehabilitation work should be excluded				
Number of customers receiving intermittent supply	**61a**	**000**	Percentage of residential customers who do not normally receive a 24hr/day supply				
Sewerage connections	**71**	**000**	Total number of sewer connections (residential and non-residential) at year end in thousands.				
Length of sewers	**74**	**km**	Total length of the sewerage network (excluding service connections).				
Number of sewerage blockages	**79**	#	Total number of sewer blockages in the network during the year.				
Volume of water produced	**55**	**millions m3/ year**	Total volume of water produced for the service area, i.e. leaving treatment works operated by the Utility and purchased treated water, if any.				

Volume of water sold	**59**	**millions m3/ year**	Total volume of water billed (metered and unmetered) irrespective of whether the bill is paid or not. Clearly any unmetered volume must be estimated from other information about the water users.				
Volume of water sold through operating meters	**58**	**millions m3/ year**	Total volume of water billed that is metered, irrespective of whether the bill is paid or not.				
Volume of water sold - residential	**59a**	**millions m3/ year**	Total volume of water billed to residential customers				
Volume of water sold to residential customers through direct supplies	**59a1**	**millions m3/ year**	Total volume of water billed to residential customers through direct supplies				
Volume of water sold to residential customers through public water points	**59a2**	**millions m3/ year**	Total volume of water billed to residential customers through water points, standpipes, utility own vendors, etc				
Volume of water sold to industrial and commercial customers	**59b**	**millions m3/ year**	Total volume of water billed to industrial and commercial customers				
Volume of water sold to institutions and others	**59c**	**millions m3/ year**	Total volume of water billed to state or municipal institutions, including frr water for fire-fighting, etc.				
Volume of water sold treated in bulk	**59d**	**millions m3/ year**	Total volume of water billed for sales in bulk to third companies, distributors of water				
Required number of tests of treated water for residual chlorine	**63**	**#**	The number of samples of potable water that are required by law/regulation to be taken from the distribution system to be tested for residual chlorine				
Number of tests of treated water for residual chlorine carried out	**64**	**#**	The number of samples of potable water actually taken from the distribution system , that have been tested for residual chlorine				
Number of tests of treated water for residual chlorine passed	**65**	**#**	The number of samples of potable water taken from the distribution system, that have been tested for residual chlorine and comply with the standard				
Total volume of wastewater collected	**81a**	**million m3/a year**	Volume of wastewater collected through the sewer system or by tanker. Where it cannot be measured, estimates should be made based on water use & infiltration from the ground (which should be included).				
Volume of wastewater	**81b**	**million m3/a year**	Volume of wastewater collected - residential				

collected - residential							
Volume of wastewater collected - industrial & commercial	**81c**	**million m3/a year**	Volume of wastewater collected - industrial & commercial				
Volume of wastewater collected that is treated to primary level	**81d**	**million m3/a year**	Volume of wastewater collected that is treated to primary level				
Volume of wastewater collected that is treated to at least secondary level	**81e**	**million m3/a year**	Volume of wastewater collected that is treated to at least secondary level				
What would be the monthly water bill for a household consuming 6m3 of water per month through a household or shared yard tap (but excluding the use of standposts)?:	**C.4**	**Local currency units**	What would be the monthly water bill for a household consuming 6m3 of water per month through a household or shared yard tap (but excluding the use of standposts)?:				
Fixed charge per month for water and wastewater services for residential customers	**146**	**Local currency units**	Fixed charge per month for water and wastewater services for residential customers				
Fixed charge per month for water services for residential customers	**146a**	**Local currency units**	Fixed charge per month for water services for residential customers				
Fixed charge per month for wastewater services for residential customers	**146b**	**Local currency units**	Fixed charge per month for wastewater services for residential customers				
Connection charges - water	**147**	**Local currency units**	Connection charges - water				
Connection charges - sewers	**148**	**Local currency units**	Connection charges - sewers				
Total operating revenues	**90**	**Local currency units**	Total billing of water and wastewater services, connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes				
Total billings - residential	**90a**	**Local currency units**	Total billed amounts to residential customers during year				

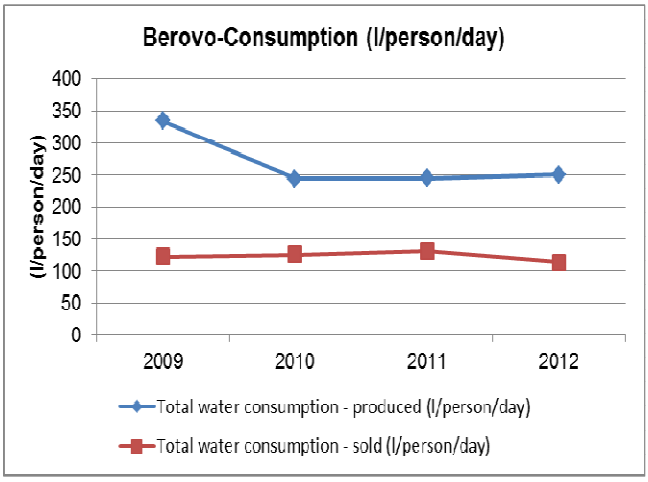
Total billings - industrial and commercial	**90b**	**Local currency units**	Total billed amounts to industrial and commercial customers during year				
Total water operating billings	**90c**	**Local currency units**	Total billing of water, connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes				
Total wastewater operating billings	**90d**	**Local currency units**	Total billing of wastewater, connection fees, environmental fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes				
Total water billings to residential customers	**90e**	**Local currency units**	Total billing of water services for residential customers, including connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes				
Total water billings to industrial and commercial customers	**90f**	**Local currency units**	Total billing of water services for industrial and commercial customers, including connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes				
Total water billings to institutions and others	**90g**	**Local currency units**	Total billing of water services of institutions, budget financed and municipal users (schools, hospitals, fire fighters and others) , including connection fees, well abstraction fees, reconnection fees and other operational revenues including subsidies, but excluding all taxes				
Total water billings for treated bulk supplies	**90h**	**Local currency units**	Total billing of water services of thrid parties involved in distribution of water that have no direct institutional relations with bulk water provider				
Total wastewater billings to residential customers	**90i**	**Local currency units**	Total billed amounts for wastewater to residential customers during year				
Total wastewater billings to industrial and commercial customers	**90j**	**Local currency units**	Total billed ampounts for wastewater to industrial, commercial, budget and institutional customers				
Total debt service	**114**	**Local currency**	Total debt service costs (Including interest and				

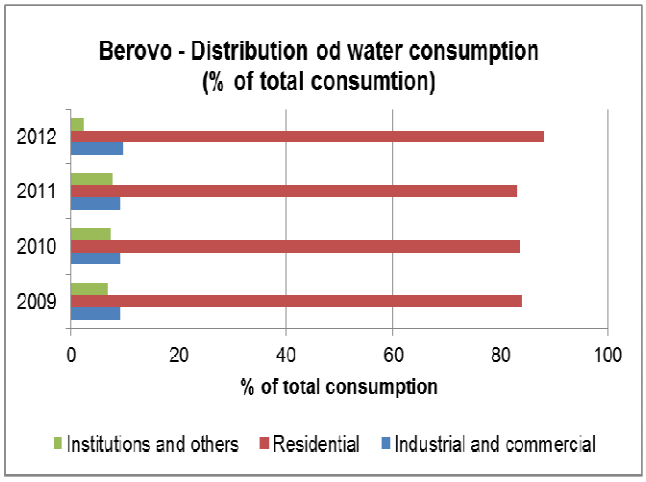
		units	repayment of capital)				
Year end accounts receivable	**120**	**Local currency units**	Total of all accounts receivable at year end including water billings, and all other outstanding invoices.				
Total water and wasterwater (cash) income:	**91**	**Local currency units**	Income **actually received** for water and wastewater services				
Total water and wastewater operational expenses	**94**	**Local currency units**	Total operational expenses (W&S) **excluding** depreciation and financing charges (interest and capital repayments).				
Total water operational expenses	**94a**	**Local currency units**	Total water operational expenses **excluding** depreciation and financing charges (interest and capital repayments).				
Total wastewater operational expenses	**94b**	**Local currency units**	Total wastewater operational expenses **excluding** depreciation and financing charges (interest and capital repayments).				
Labor costs	**96**	**Local currency units**	All costs within (94) that are labour related (salaries, wages, pensions, other benefits, etc.).				
Electrical energy costs	**97**	**Local currency units**	All electrical energy costs within (94)				
Contracted out services costs	**99**	**Local currency units**	Costs of all services within Item (94) provided by private firms.				
Total gross fixed assets including work in progress	**112**	**Local currency units**	Gross Book Value of fixed assets at year end, including work in progress				
Gross fixed assets including work in progress - water	**112a**	**Local currency units**	Gross Book Value of fixed assets at year end, including work in progress - water				
Gross fixed assets including work in progress - wastewater	**112b**	**Local currency units**	Gross Book Value of fixed assets at year end, including work in progress - wastewater				
Grants or government transfers to the utility	**F.1**	**Local currency units**	Grants or government transfers to the utility				
Borrowing from international finanicial agencies (multi or bilateral)	**F.2**	**Local currency units**	Borrowing from international finanicial agencies (multi or bilateral)				
Government owned banks	**F.3**	**Local currency units**	Government owned banks				
Commercial banks or bond holders	**F.4**	**Local currency units**	Commercial banks or bond holders				
Total electricity consumption	**30.01**	**Millions kWh**	Total electricity consumption				

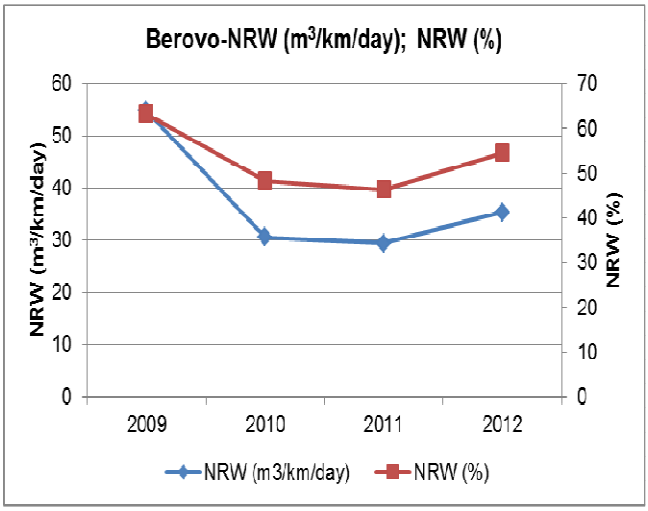
Electricity consumption - water	**30.02**	**Millions kWh**	Electricity consumption - water				
Electricity consumption - Watewater	**30.03**	**Millions kWh**	Electricity consumption - Watewater				
Electricity consumption other services and admin buildings	**30.04**	**Millions kWh**	Electricity consumption other services and admin buildings				

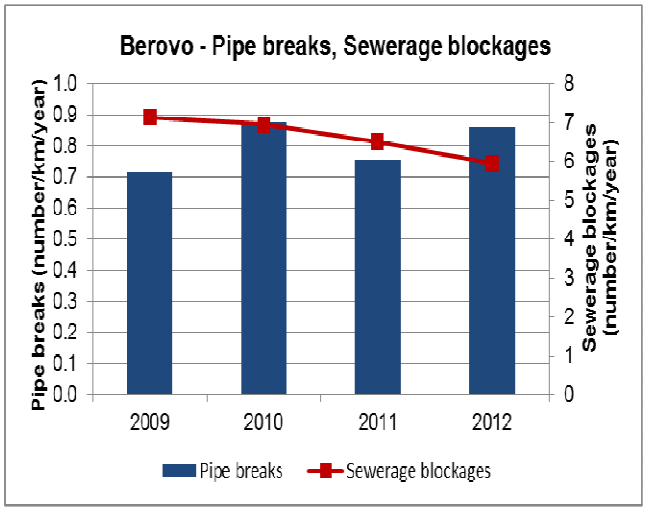
7. Utilities' profile

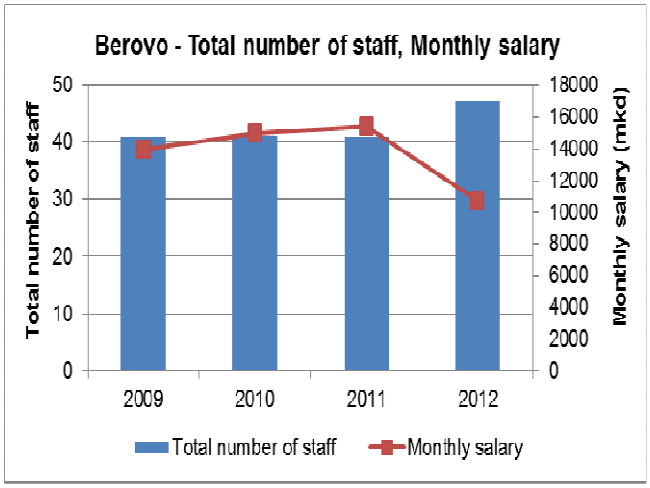
7.1 Berovo – JPKR Usluga

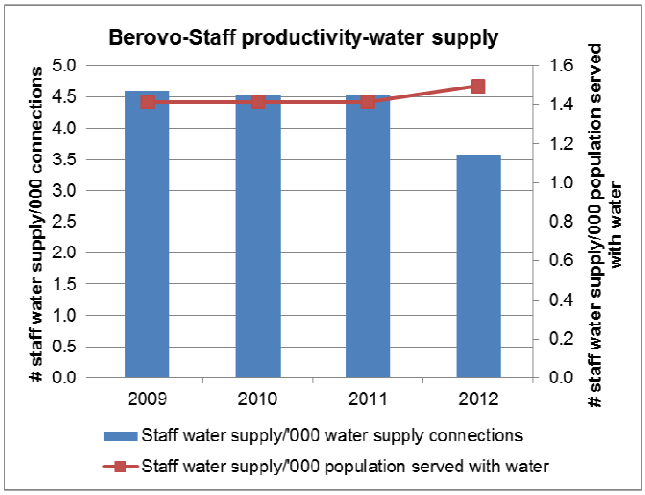


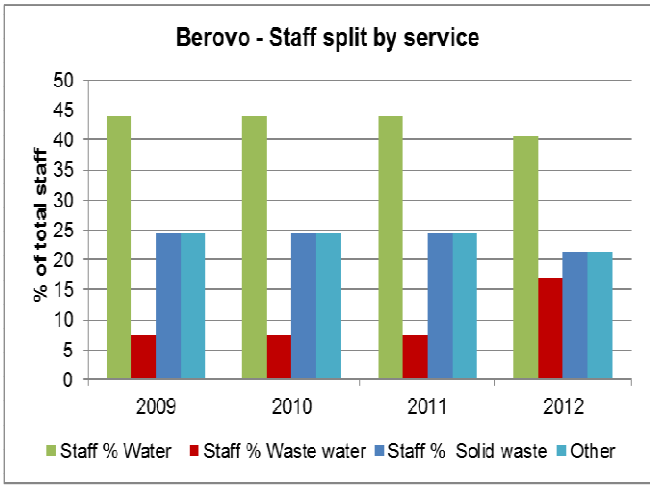


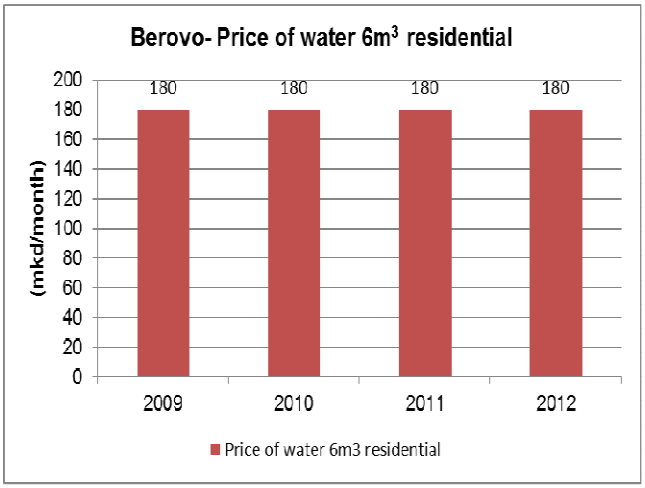


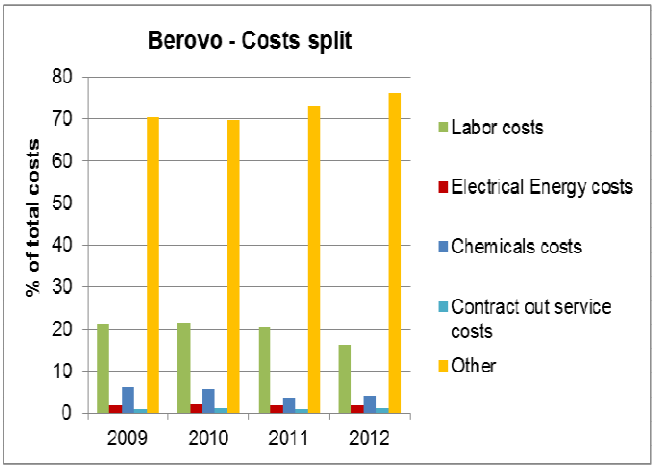


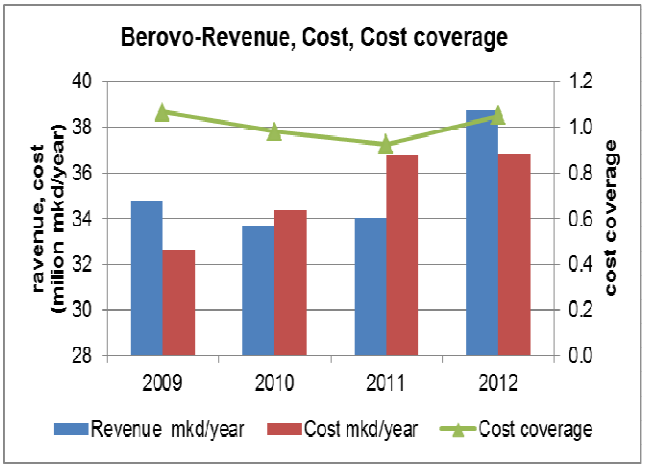


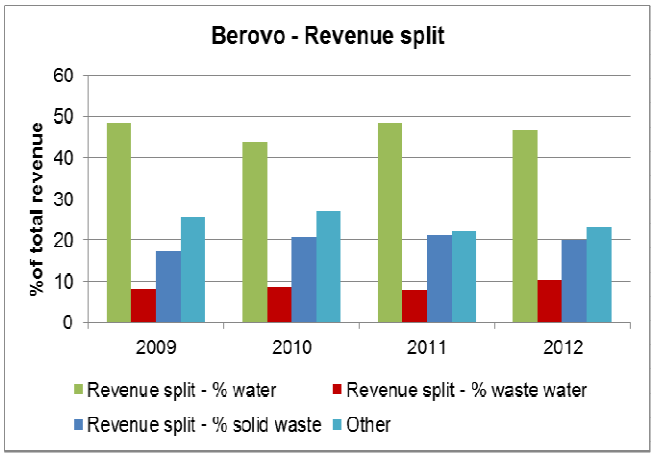


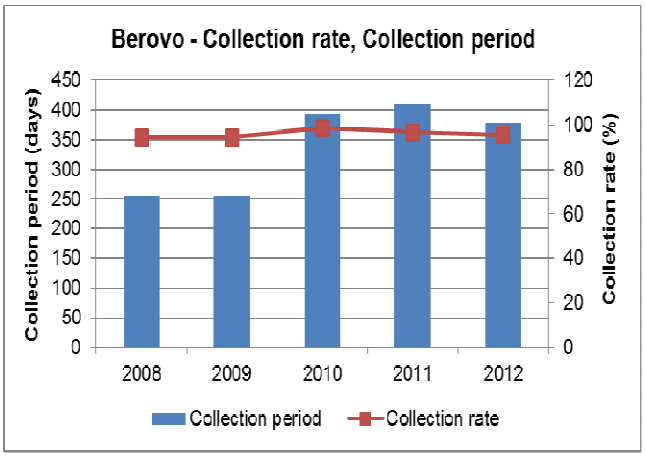

Berovo - Staff split by service
% of total staff
50
45
40
35
30
25
20
15
10
5
0
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Berovo- Price of water 6m3 residential
(mkd/month)
200
180
160
140
120
100
80
60
40
20
0
180
180
180
180
2009
2010
2011
2012
Price of water 6m3 residential

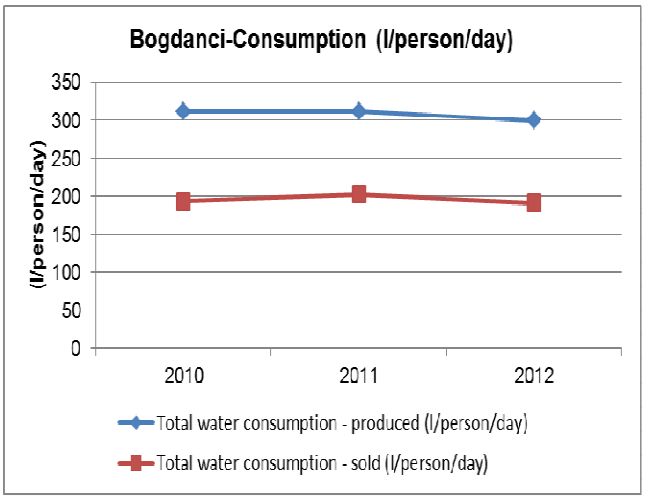

Berovo - Costs split
% of total costs
80
70
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

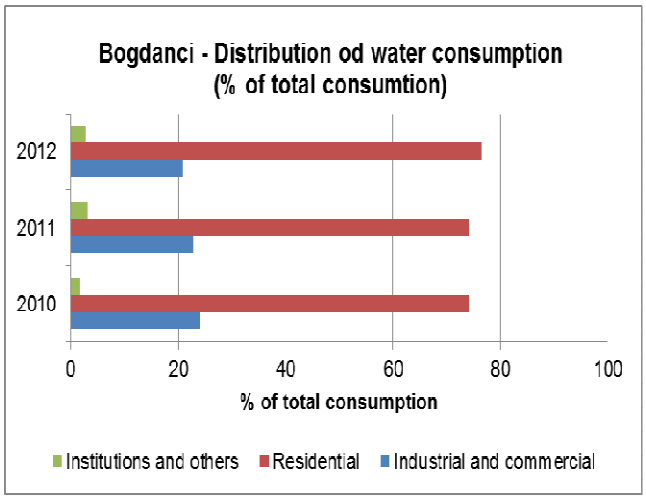

Berovo-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
40
38
36
34
32
30
28
1.2
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

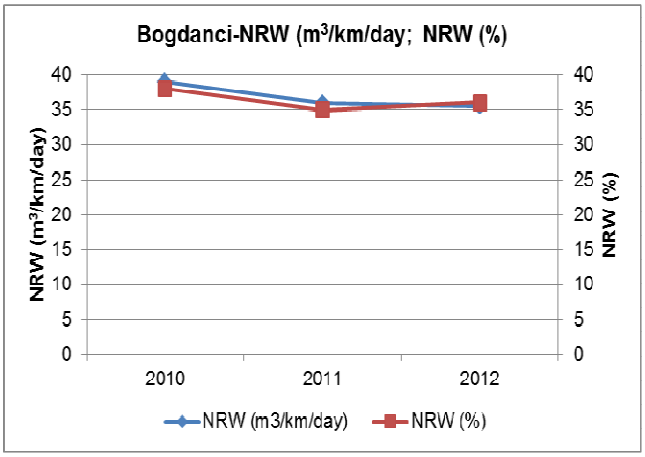

Berovo - Revenue split
%of total revenue
60
50
40
30
20
10
0
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

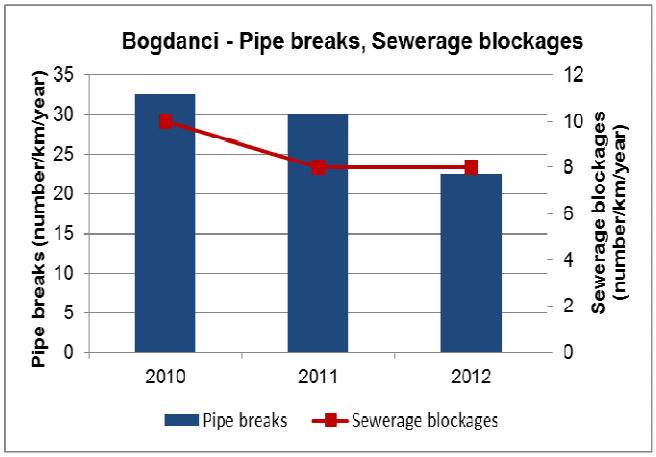

Berovo - Collection rate, Collection period
Collection period (days)
450
400
350
300
250
200
150
100
50
0
120
100
80
60
40
20
0
Collection rate (%)
2008
2009
2010
2011
2012
Collection period
Collection rate

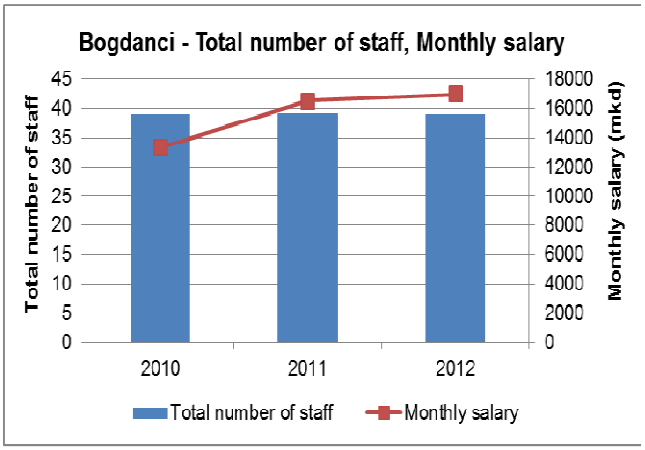
7.2 Bogdanci – JP Komunalna Chistota

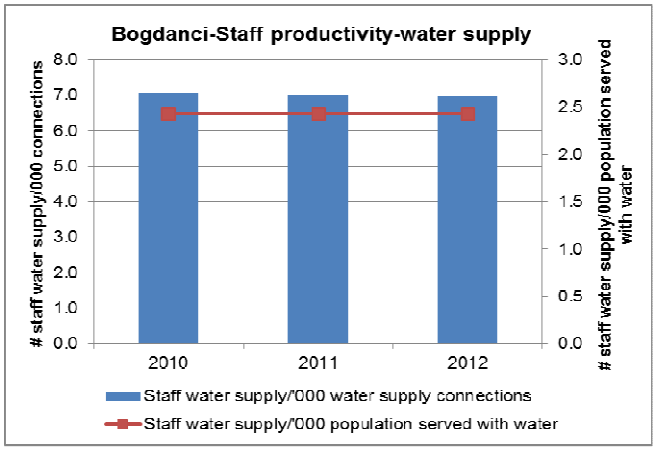


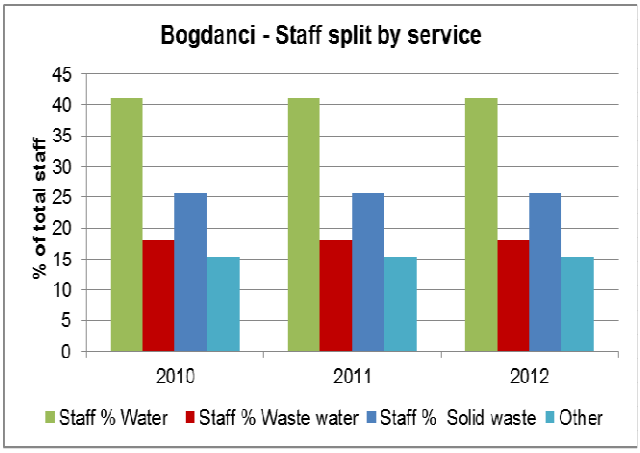


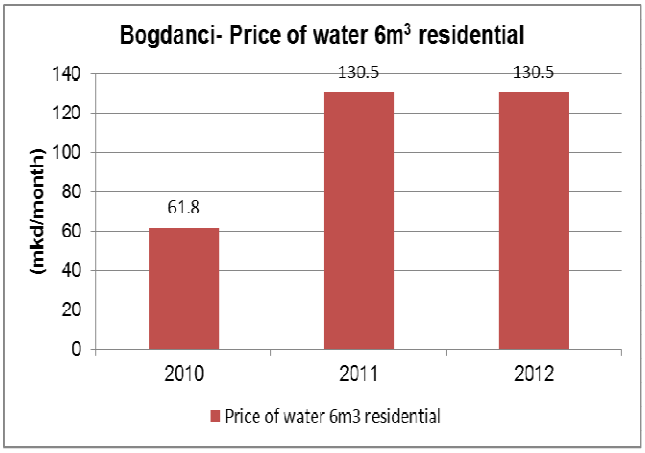


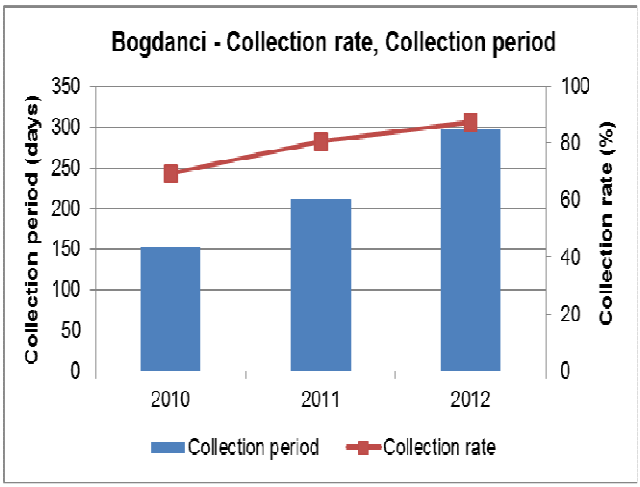


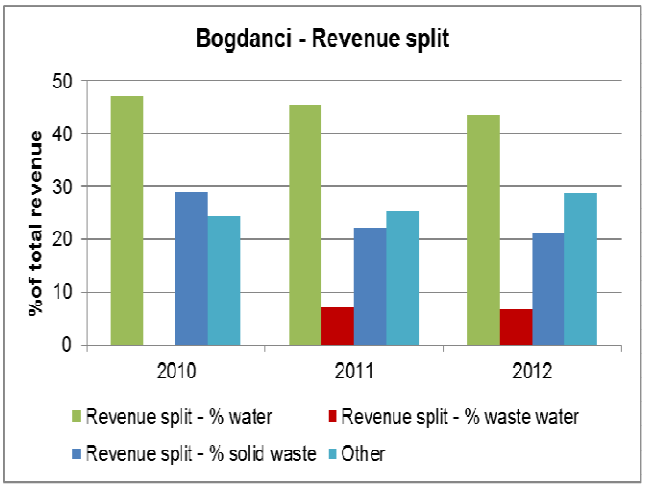


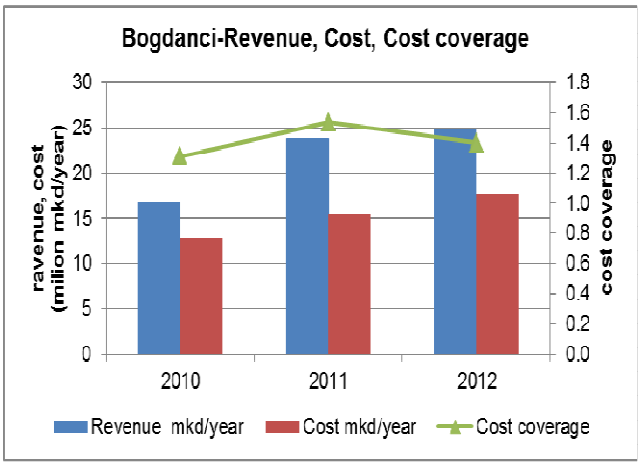


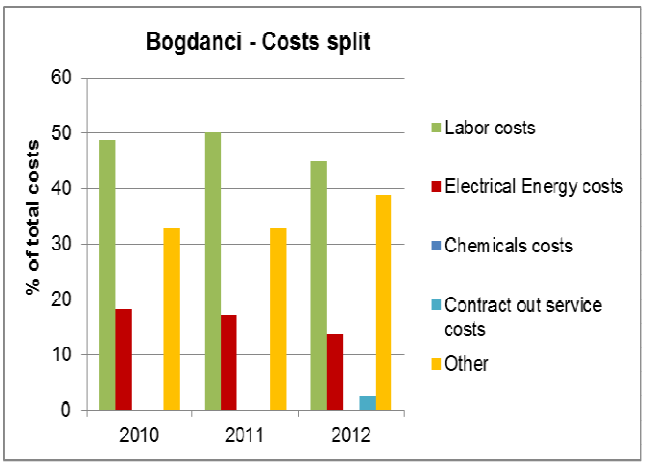

Bogdanci - Staff split by service
% of total staff
45
40
35
30
25
20
15
10
5
0
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Bogdanci- Price of water 6m3 residential
(mkd/month)
140
120
100
80
60
40
20
0
61.8
130.5
130.5
2010
2011
2012
Price of water 6m3 residential

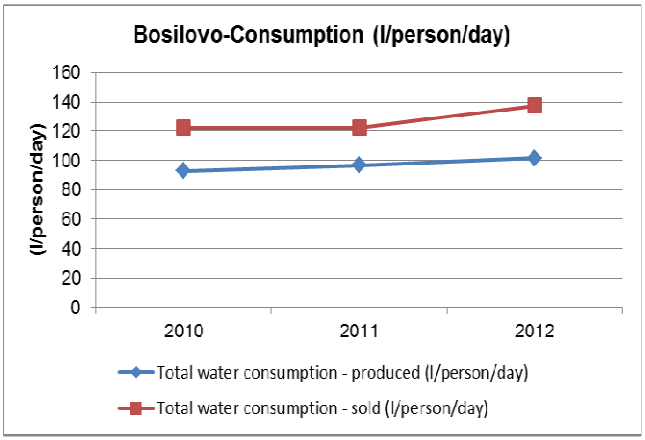

Bogdanci - Collection rate, Collection period
Collection period (days)
350
300
250
200
150
100
50
0
Collection rate (%)
100
80
60
40
20
0
2010
2011
2012
Collection period
Collection rate

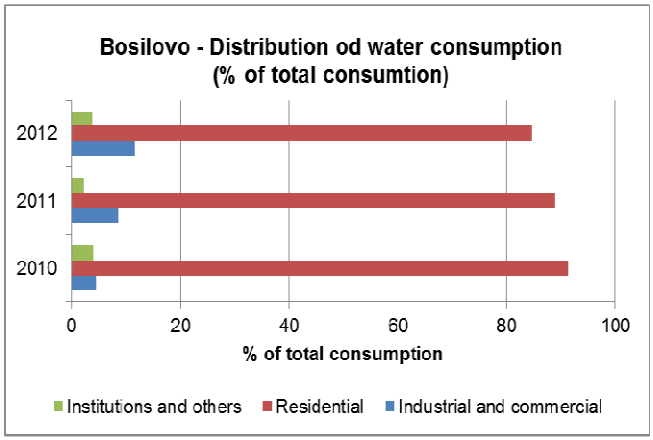

Bogdanci - Revenue split
%of total revenue
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

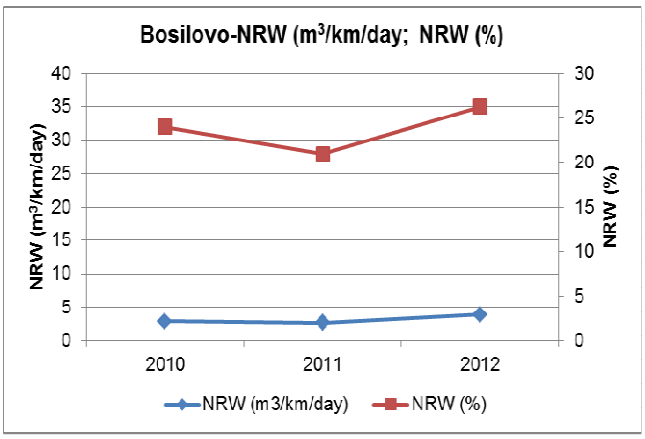

Bogdanci-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
30
25
20
15
10
5
0
cost coverage
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

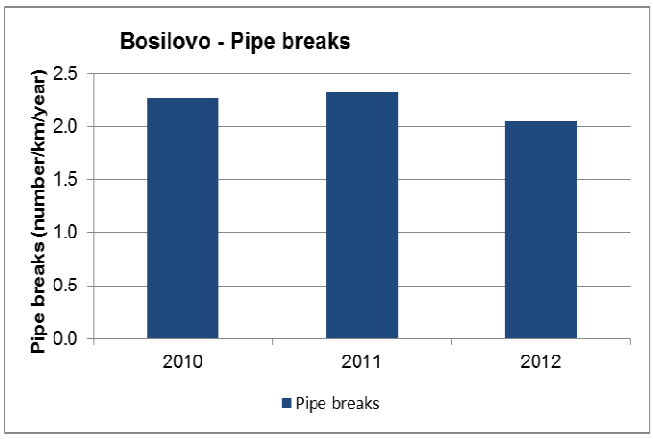

Bogdanci - Costs split
% of total costs
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

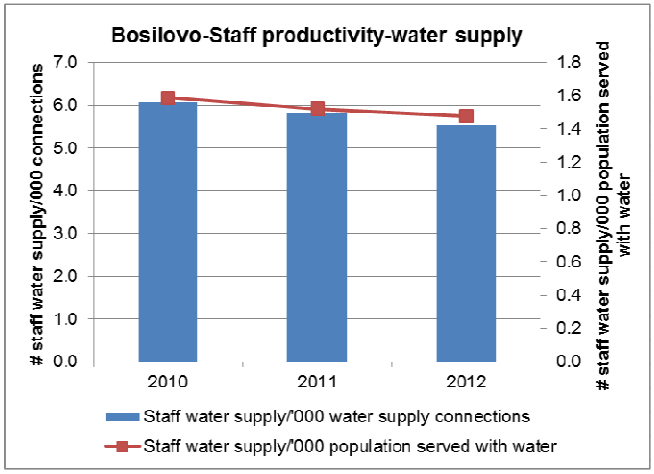
7.3 Bosilovo – JPKD Ograzden

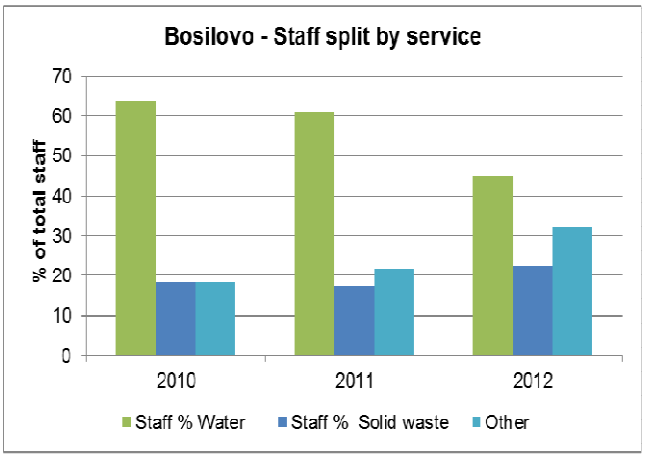


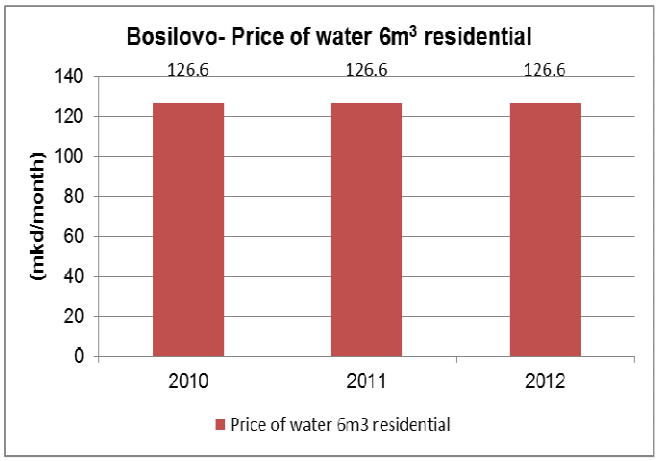


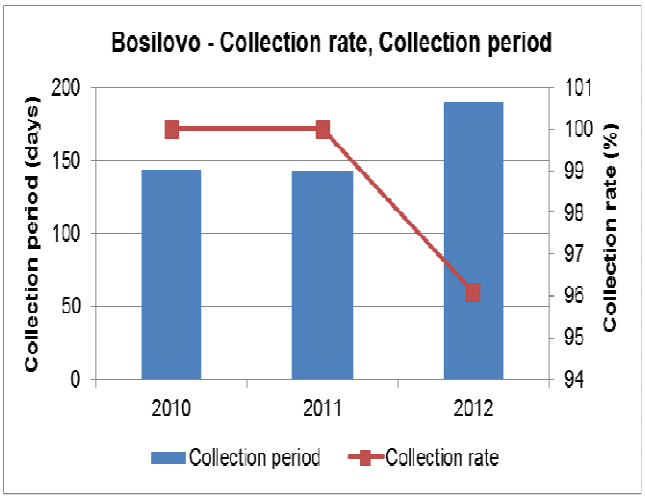


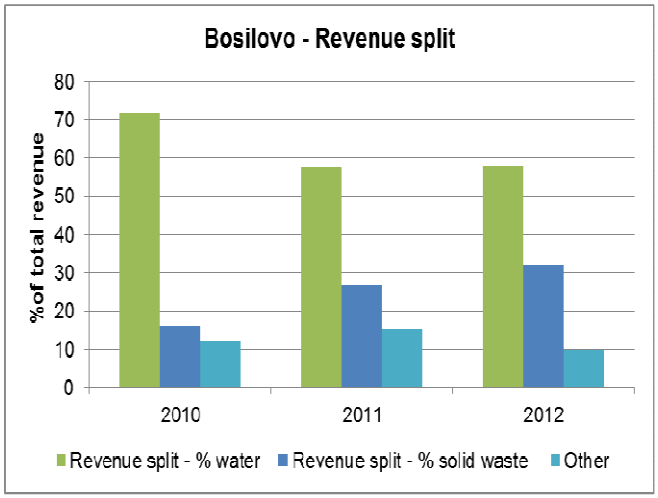


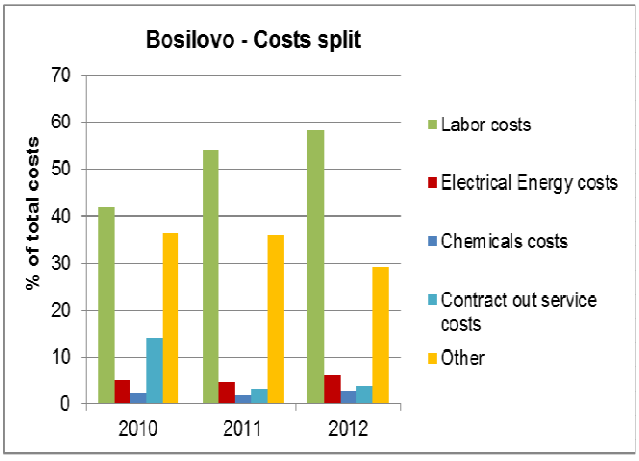


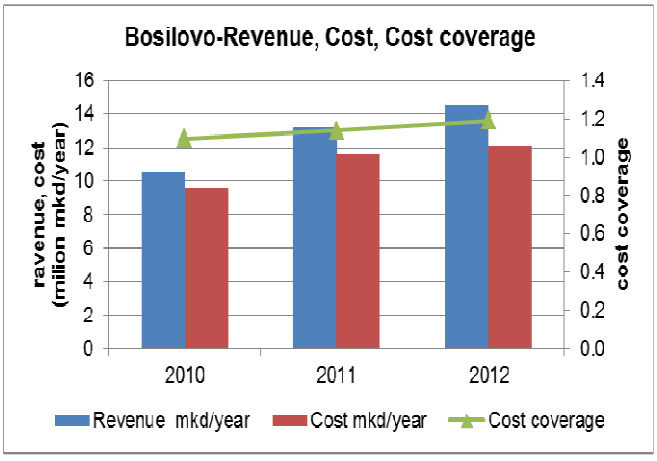

Bosilovo - Staff split by service
% of total staff
70
60
50
40
30
20
10
0
2010
2011
2012
Staff % Water
Staff % Solid waste
Other


Bosilovo- Price of water 6m3 residential
(mkd/month)
140
120
100
80
60
40
20
0
126.6
126.6
126.6
2010
2011
2012
Price of water 6m3 residential

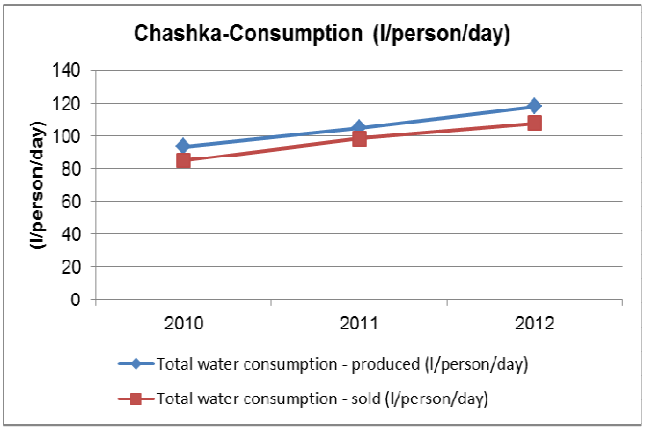

Bosilovo - Collection rate, Collection period
Collection period (days)
200
150
100
50
0
101
100
99
98
97
96
95
94
Collection rate (%)
2010
2011
2012
Collection period
Collection rate

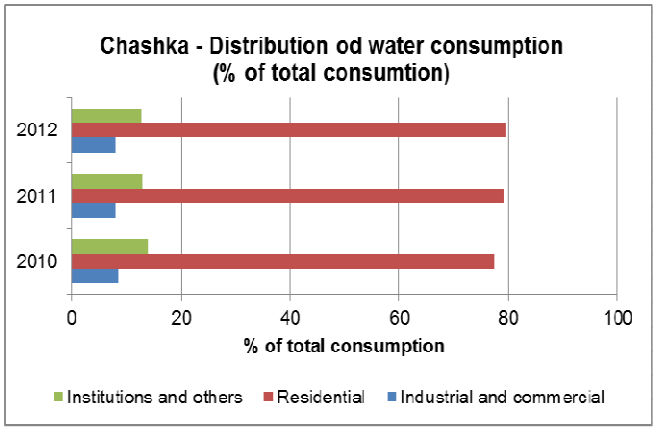

Bosilovo - Revenue split
%of total revenue
80
70
60
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % solid waste
Other

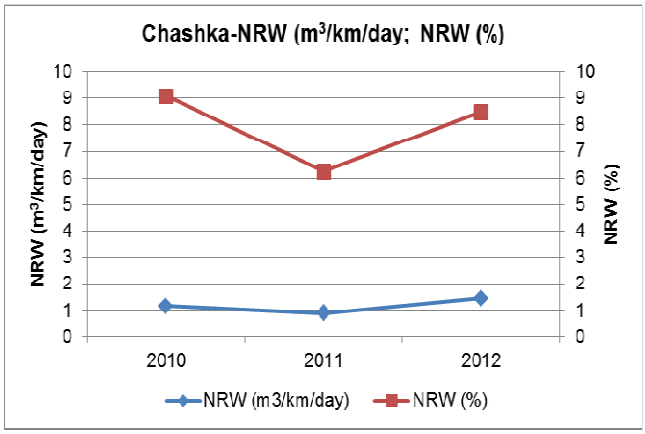

Bosilovo - Costs split
% of total costs
70
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

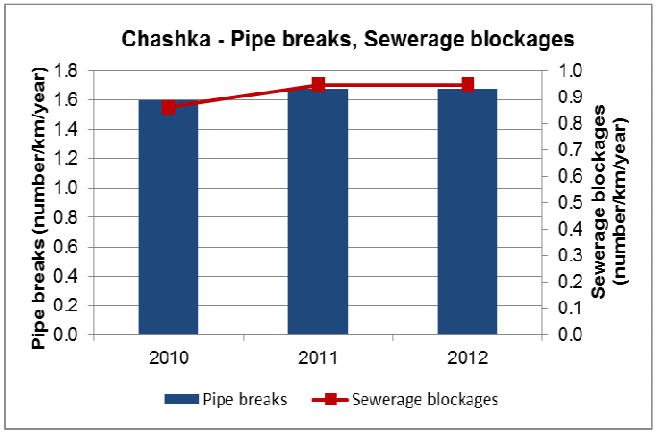

Bosilovo-Revenue, Cost, Cost coverage
ravenue, cost (million mkd/year)
16
14
12
10
8
6
4
2
0
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

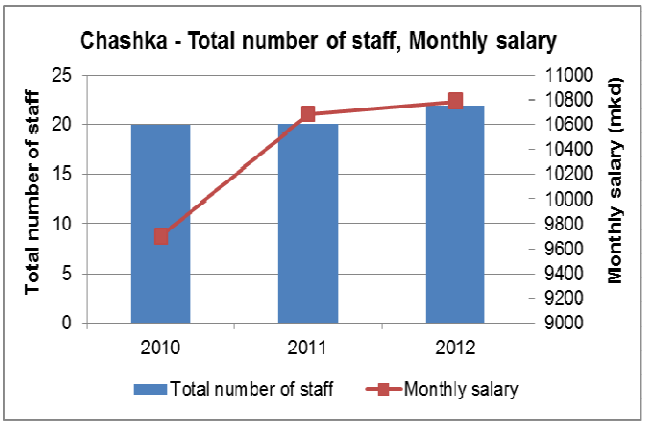
7.4 Chashka – JPKD Topolka

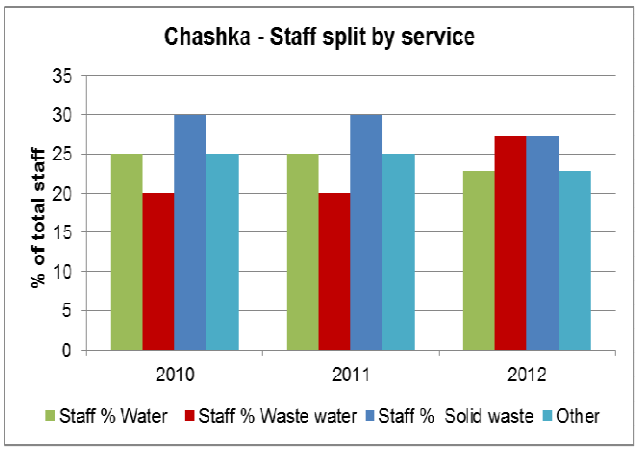


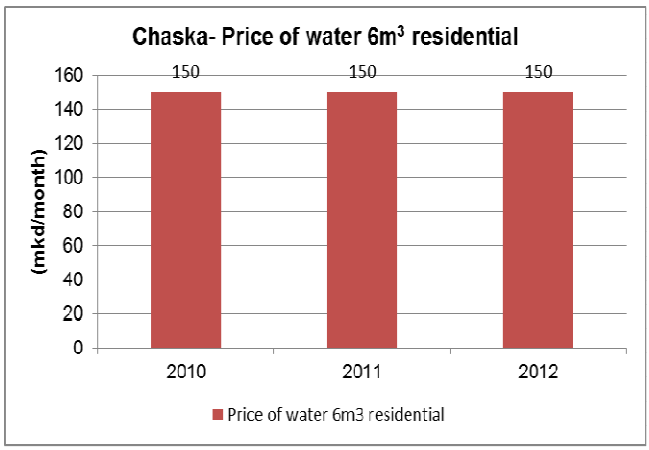


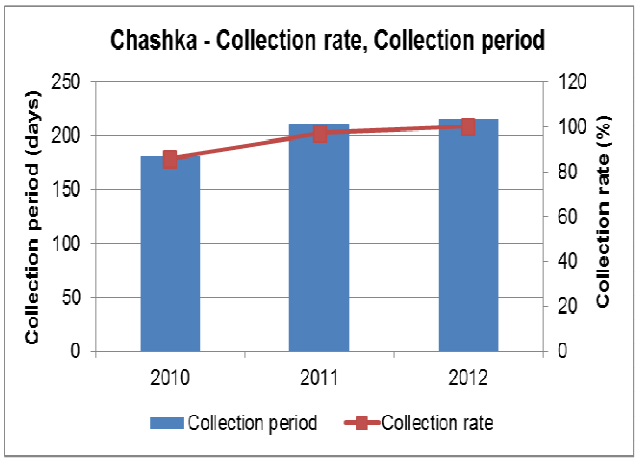


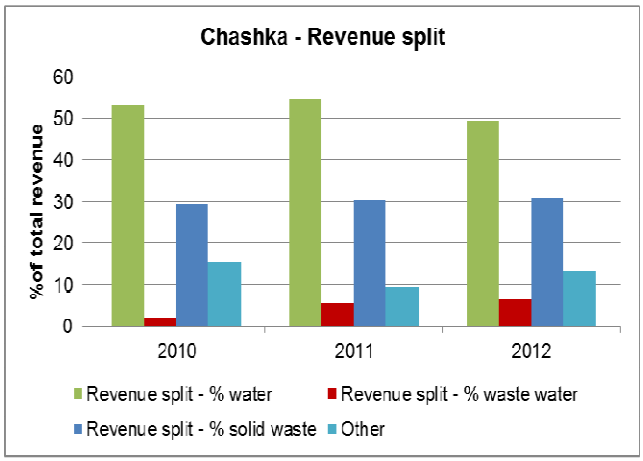


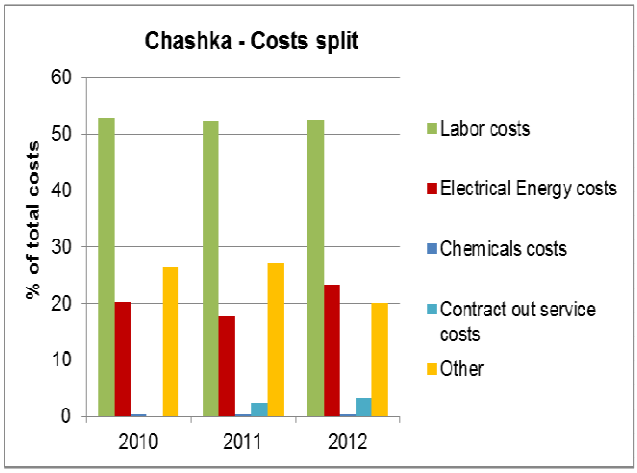


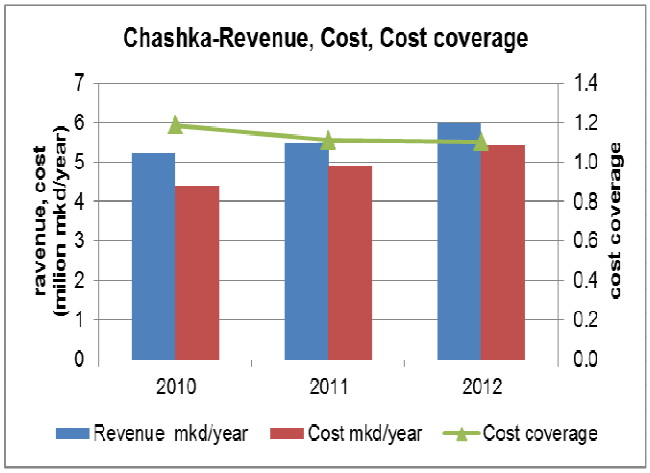

Chashka - Staff split by service
% of total staff
35
30
25
20
15
10
5
0
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Chaska- Price of water 6m3 residential
(mkd/month)
160
140
120
100
80
60
40
20
0
150
150
150
2010
2011
2012
Price of water 6m3 residential

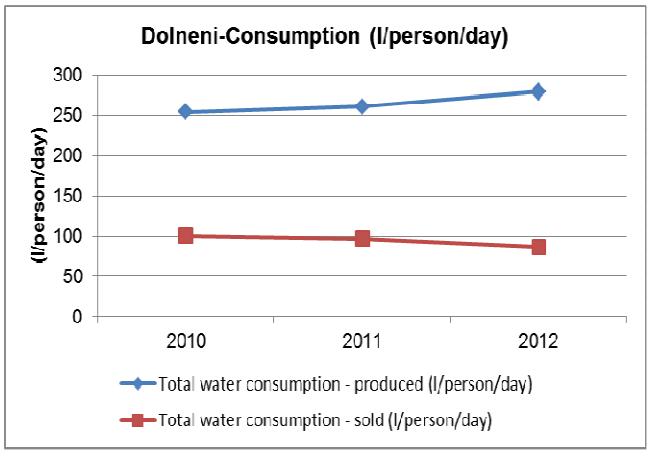

Chashka - Collection rate, Collection period
Collection period (days)
250
200
150
100
50
0
120
100
80
60
40
20
0
Collection rate (%)
2010
2011
2012
Collection period
Collection rate

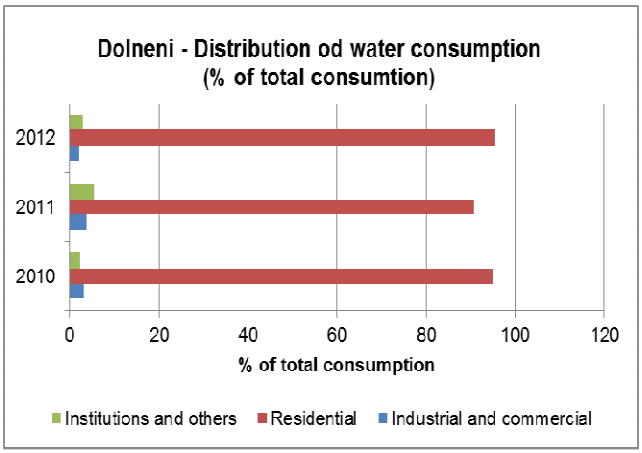

Chashka - Revenue split
%of total revenue
60
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

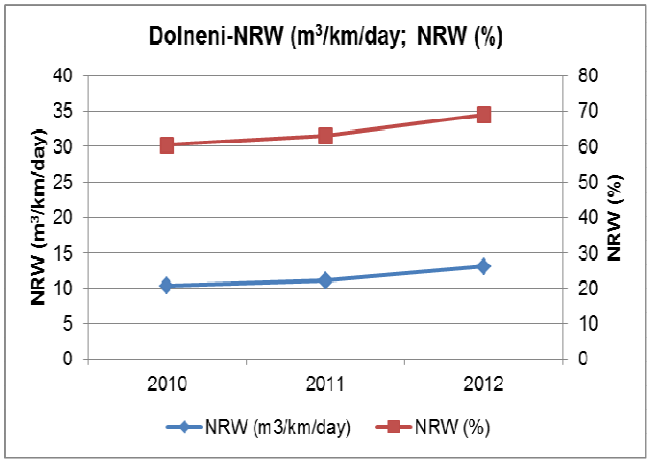

Chashka - Costs split
% of total costs
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

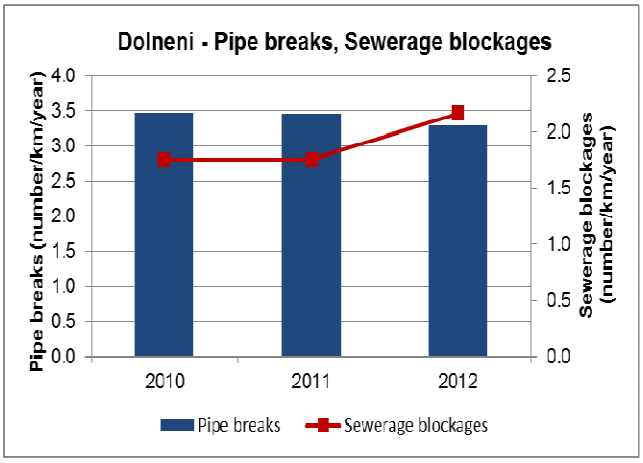

Chashka-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
7
6
5
4
3
2
1
0
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

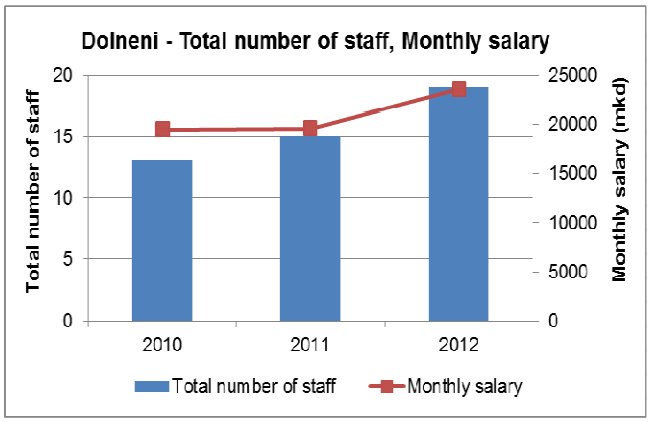
7.5 Dolneni – JKP Dolneni

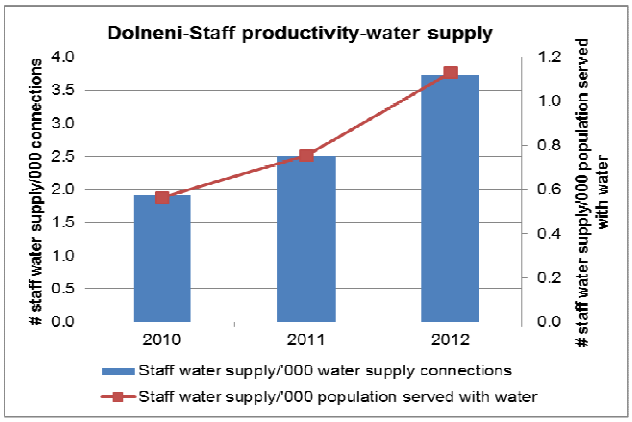


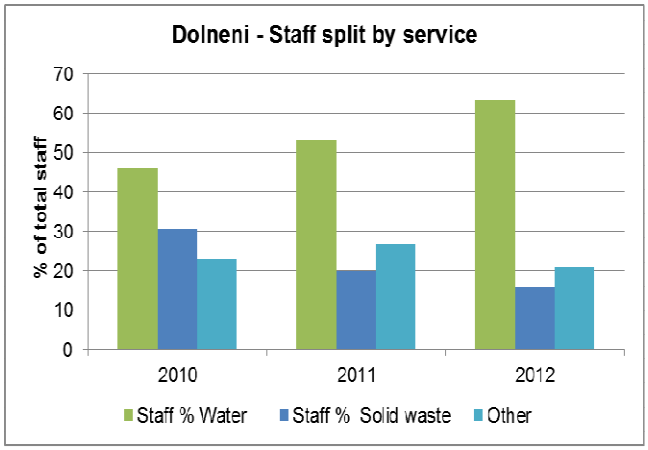


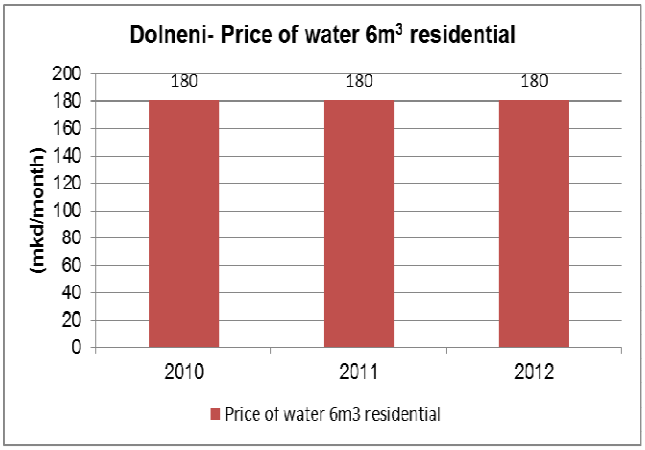


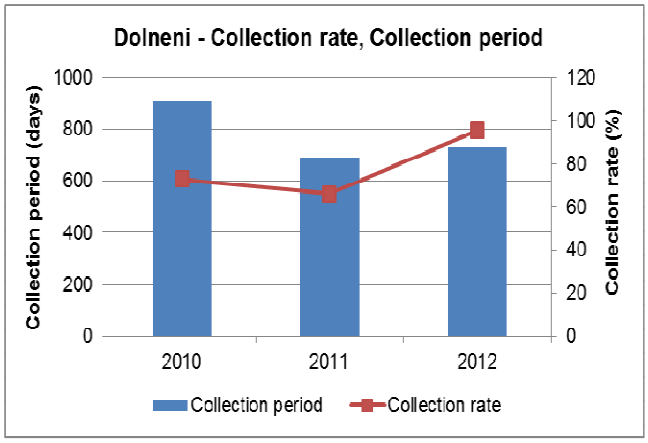


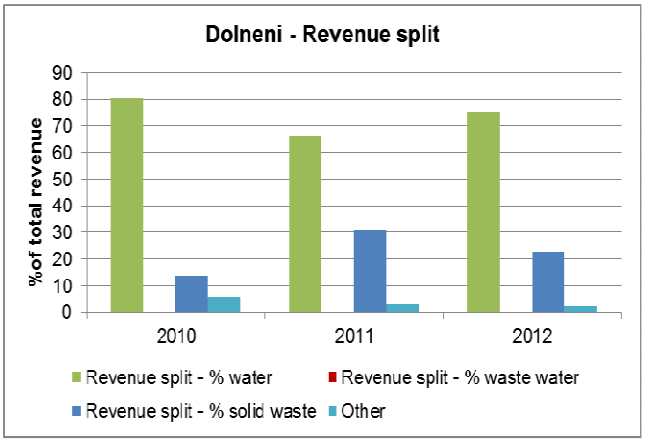


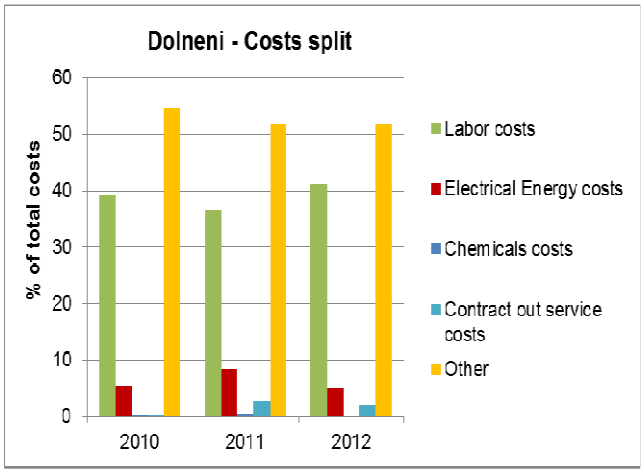


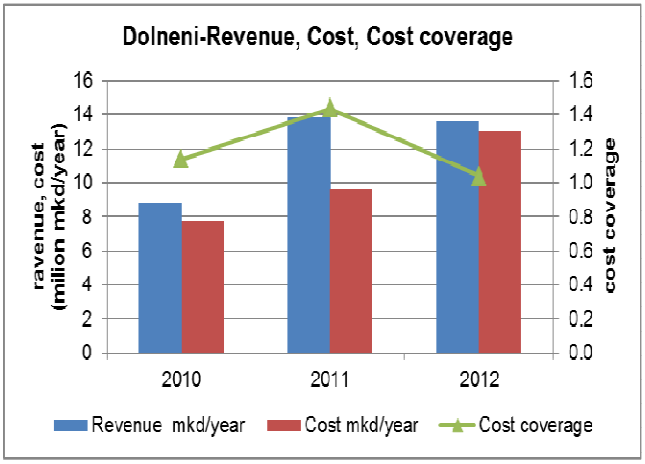

Dolneni - Staff split by service
% of total staff
70
60
50
40
30
20
10
0
2010
2011
2012
Staff % Water
Staff % Solid waste
Other


Dolneni- Price of water 6m3 residential
(mkd/month)
200
180
160
140
120
100
80
60
40
20
0
180
180
180
2010
2011
2012
Price of water 6m3 residential

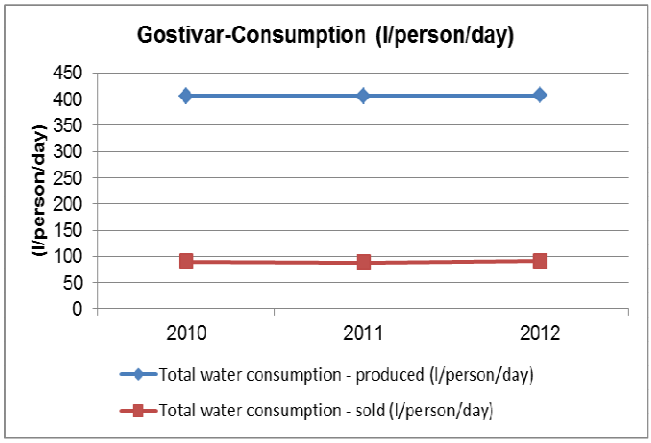

Dolneni - Collection rate, Collection period
Collection period (days)
1000
800
600
400
200
0
120
100
80
60
40
20
0
Collection rate (%)
2010
2011
2012
Collection period
Collection rate

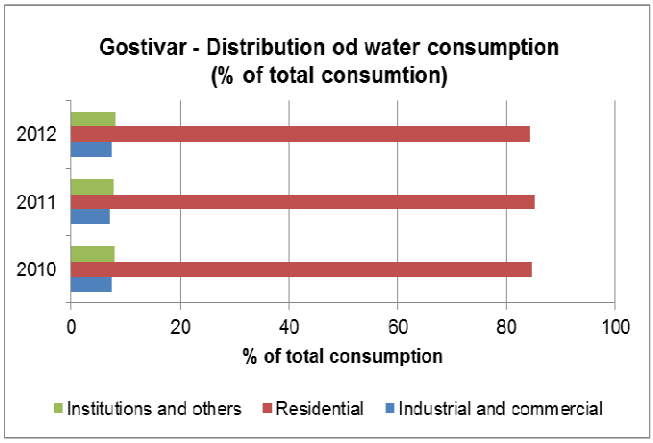

Dolneni - Revenue split
%of total revenue
90
80
70
60
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

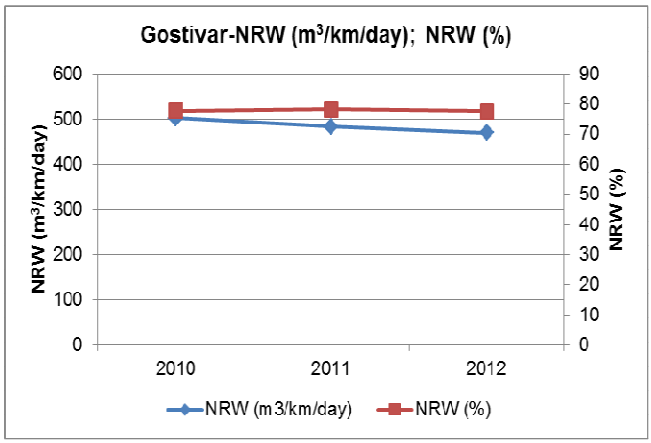

Dolneni - Costs split
% of total costs
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

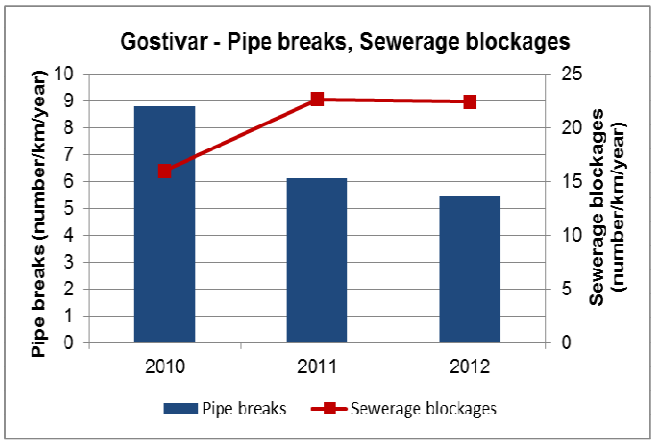

Dolneni-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
16
14
12
10
8
6
4
2
0
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

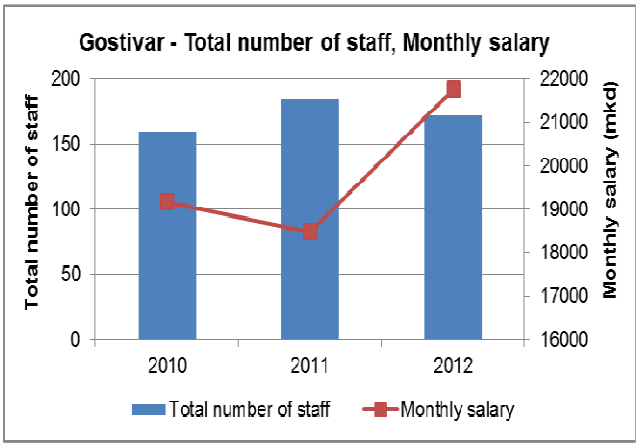
7.6 Gostivar – JP Komunalec

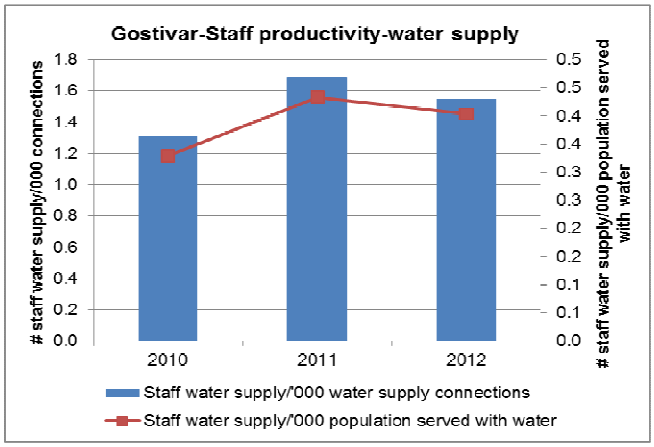


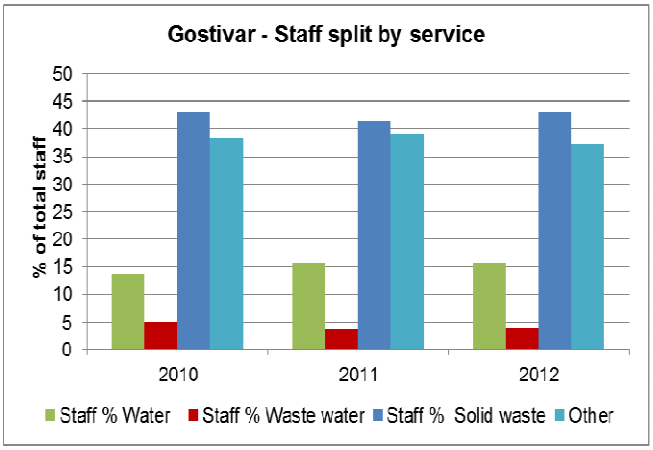


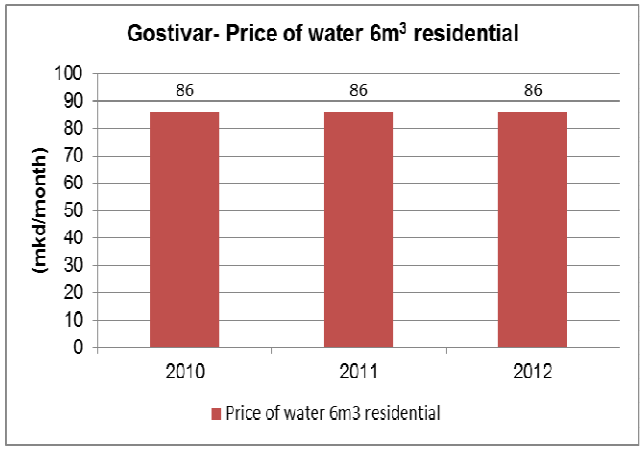


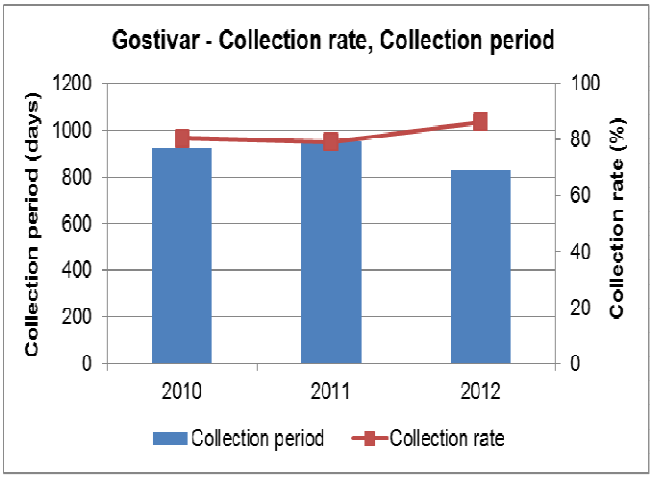


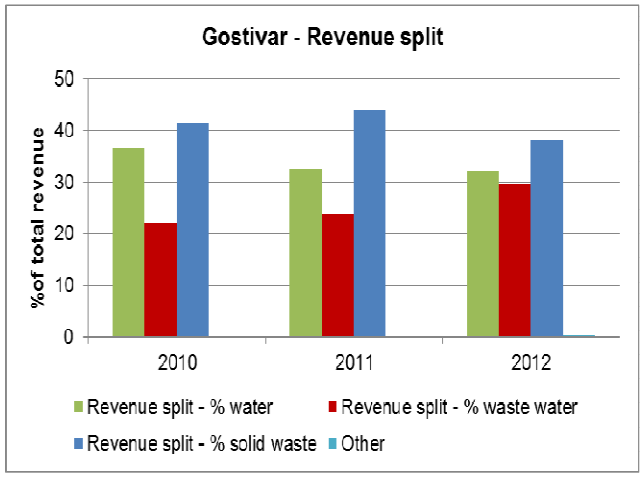


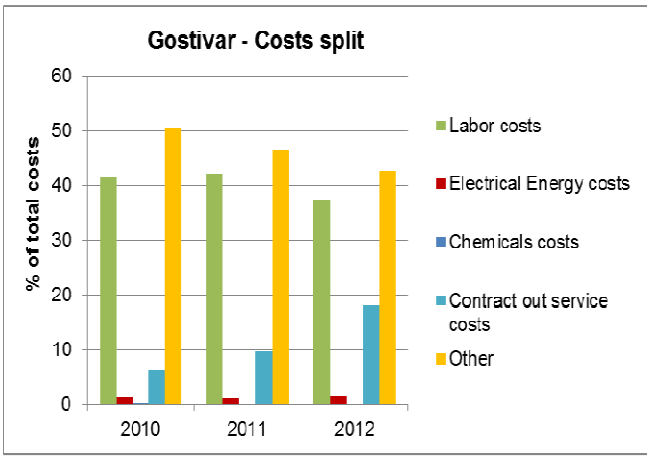


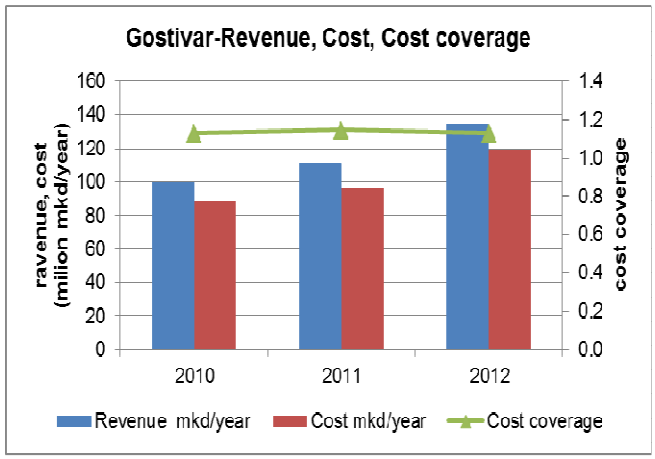

Gostivar - Staff split by service
% of total staff
50
45
40
35
30
25
20
15
10
5
0
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Gostivar- Price of water 6m3 residential
(mkd/month)
100
90
80
70
60
50
40
30
20
10
0
86
86
86
2010
2011
2012
Price of water 6m3 residential

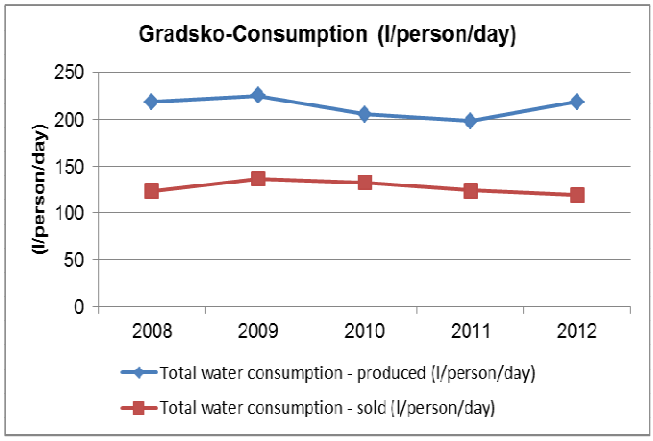

Gostivar - Collection rate, Collection period
Collection period (days)
1200
1000
800
600
400
200
0
Collection rate (%)
100
80
60
40
20
0
2010
2011
2012
Collection period
Collection rate

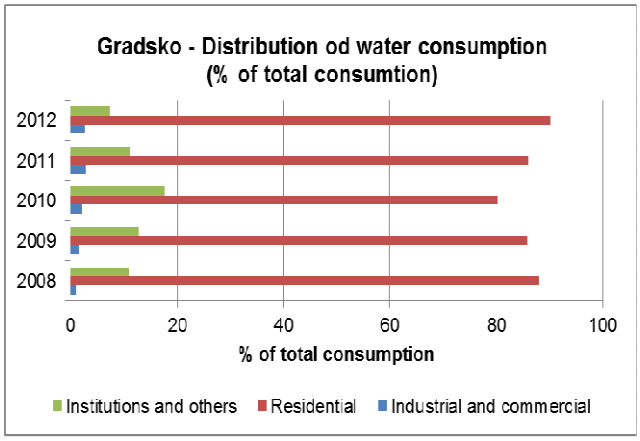

Gostivar - Revenue split
%of total revenue
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

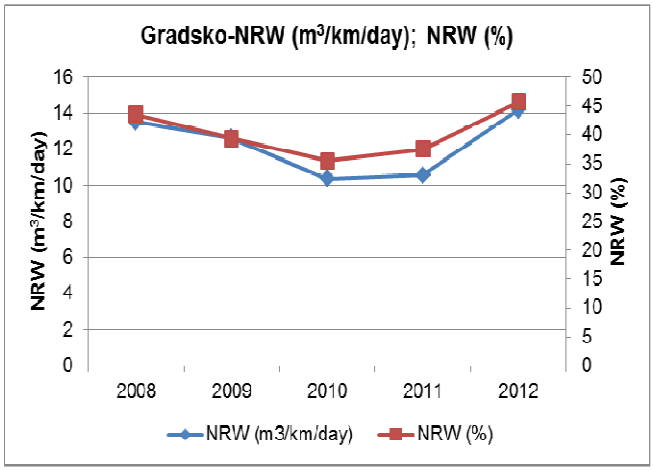

Gostivar - Costs split
% of total costs
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

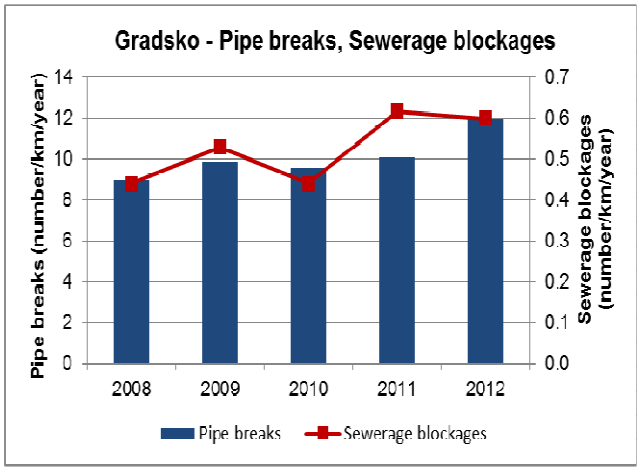

Gostivar-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
160
140
120
100
80
60
40
20
0
cost coverage
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

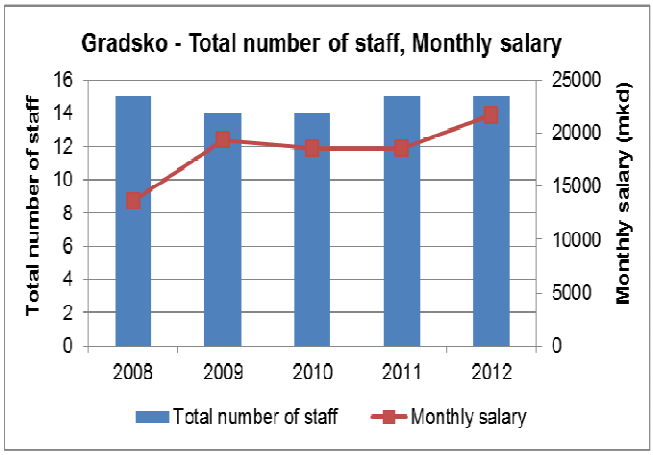
7.7 Gradsko – JKP Komunalec, JKP Klepa

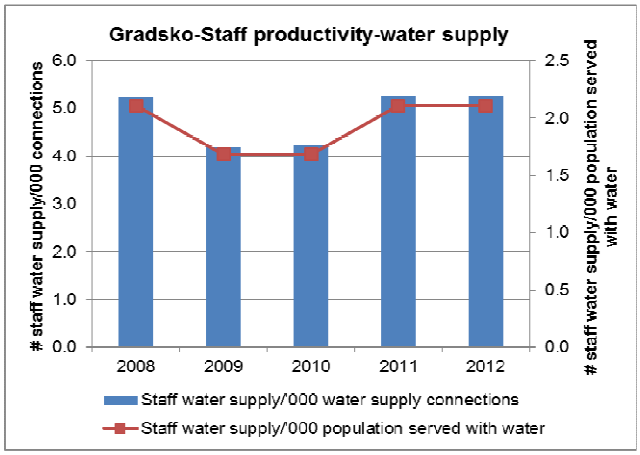


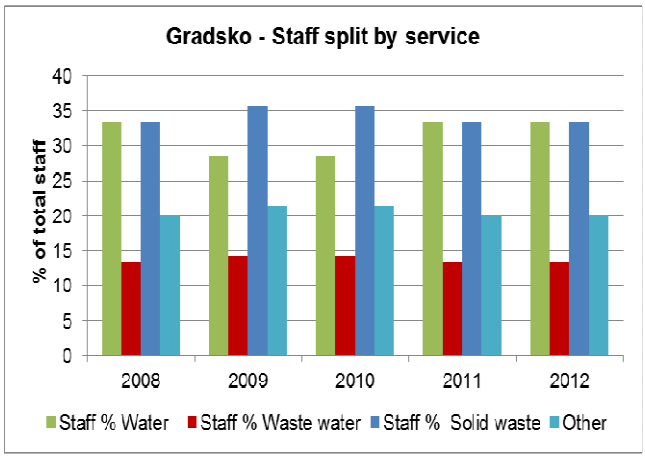


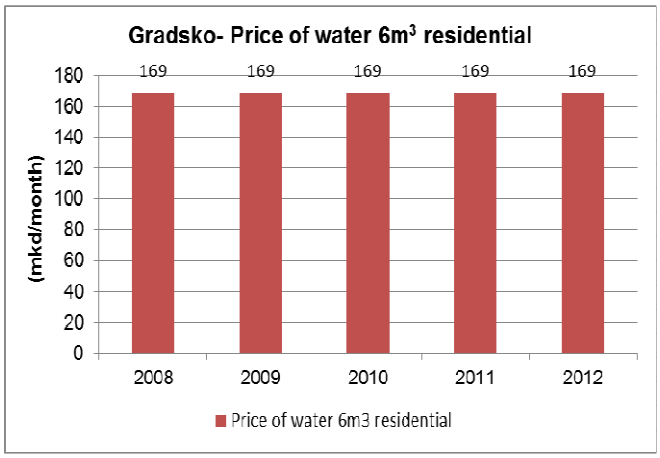


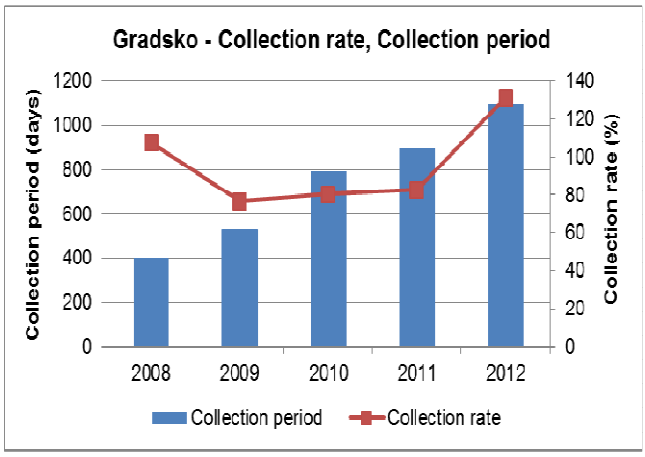


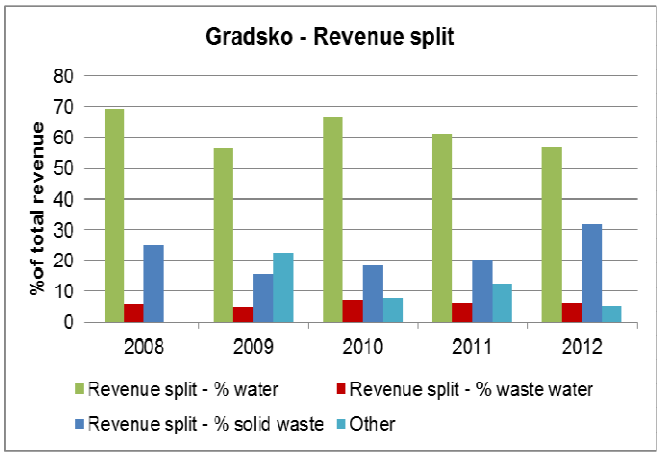


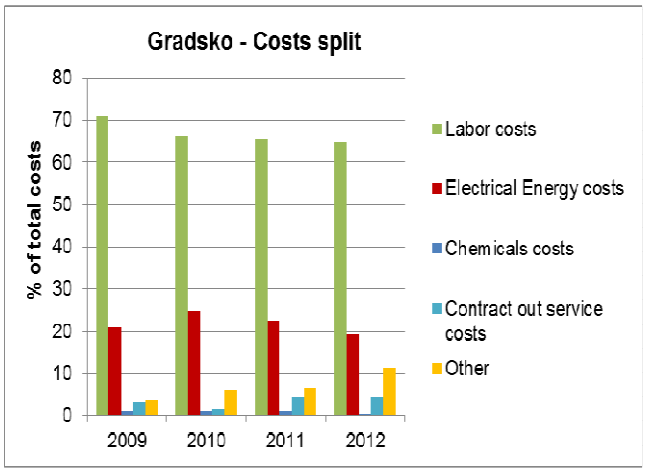


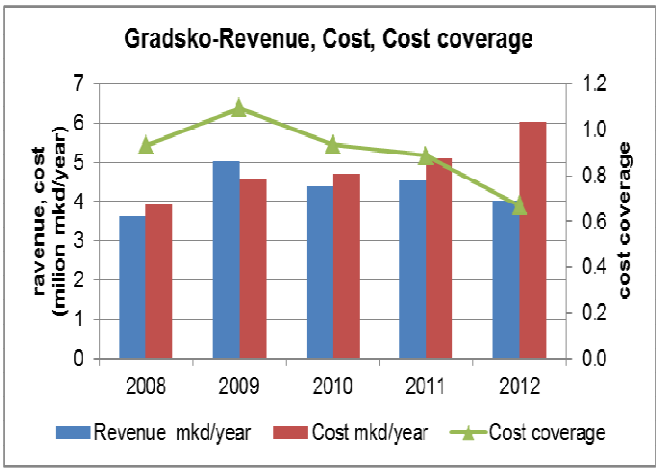

Gradsko - Staff split by service
% of total staff
40
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Gradsko- Price of water 6m3 residential
(mkd/month)
180
160
140
120
100
80
60
40
20
0
169
169
169
169
169
2008
2009
2010
2011
2012
Price of water 6m3 residential

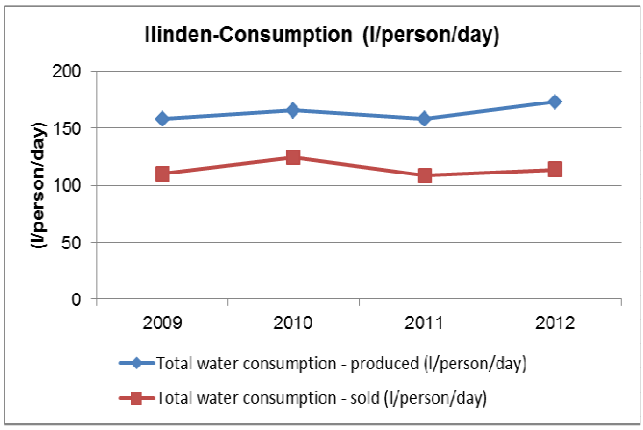

Gradsko - Collection rate, Collection period
Collection period (days)
1200
1000
800
600
400
200
0
Collection rate (%)
140
120
100
80
60
40
20
0
2008
2009
2010
2011
2012
Collection period
Collection rate

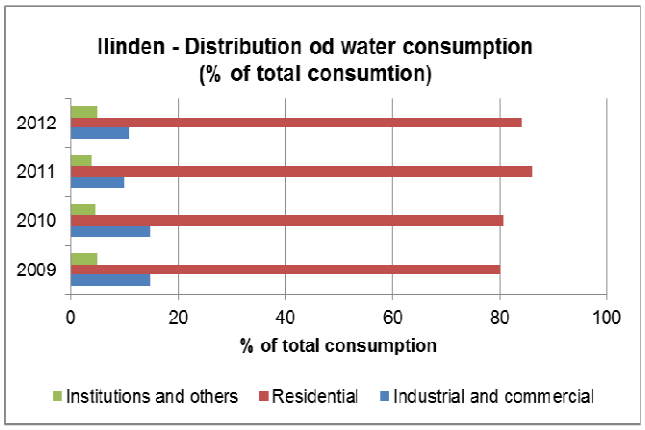

Gradsko - Revenue split
%of total revenue
80
70
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

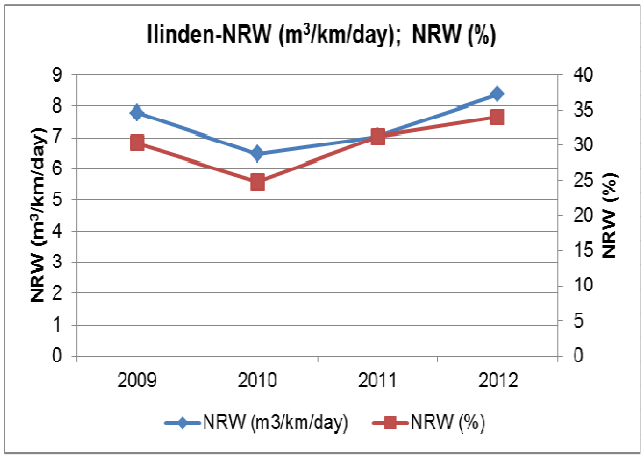

Gradsko - Costs split
% of total costs
80
70
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

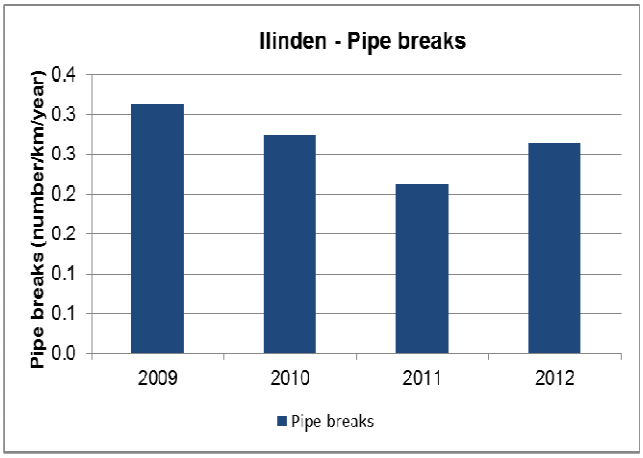

Gradsko-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
7
6
5
4
3
2
1
0
cost coverage
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2008
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

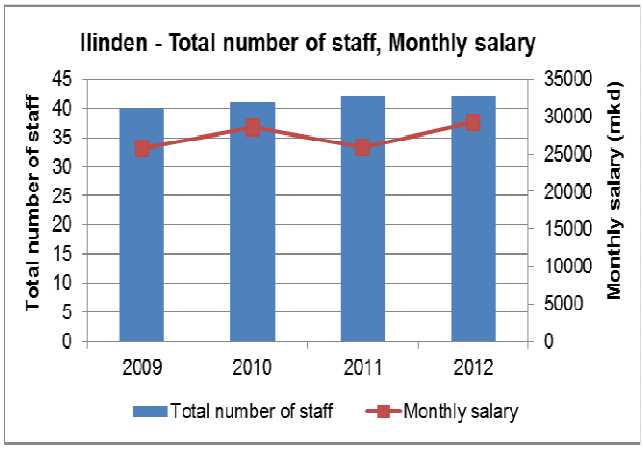
7.8 Ilinden – JKP Vodovod

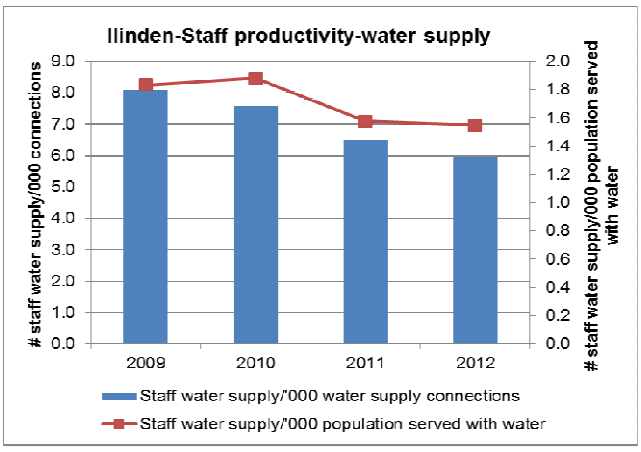


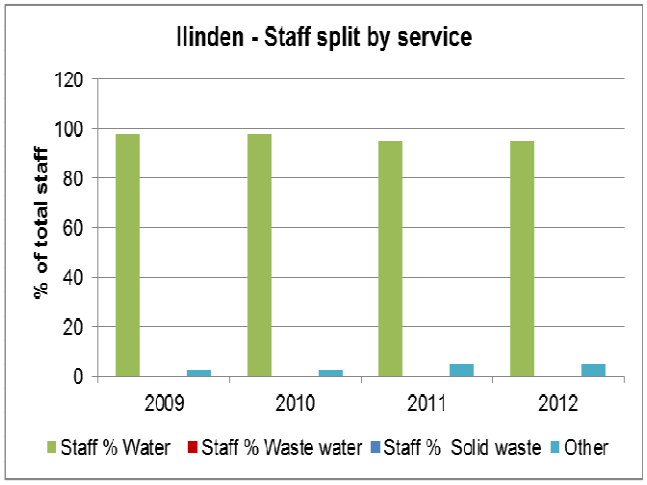


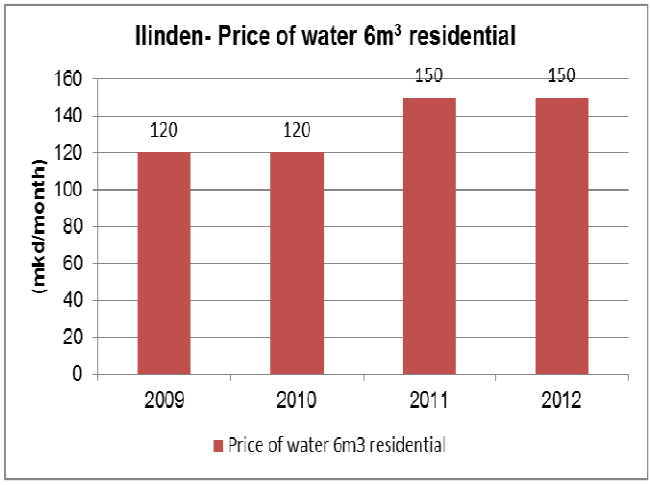


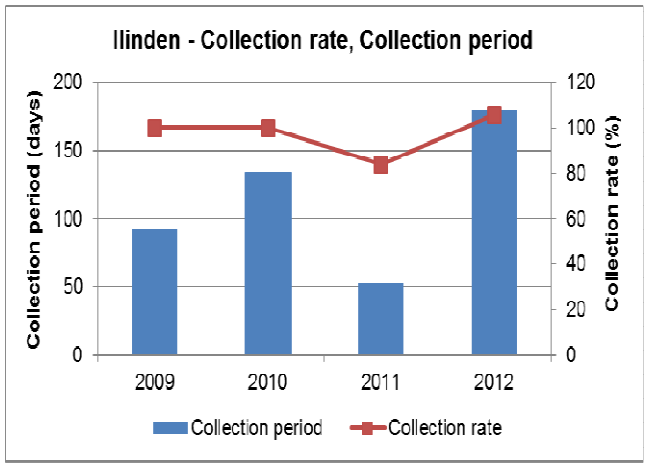


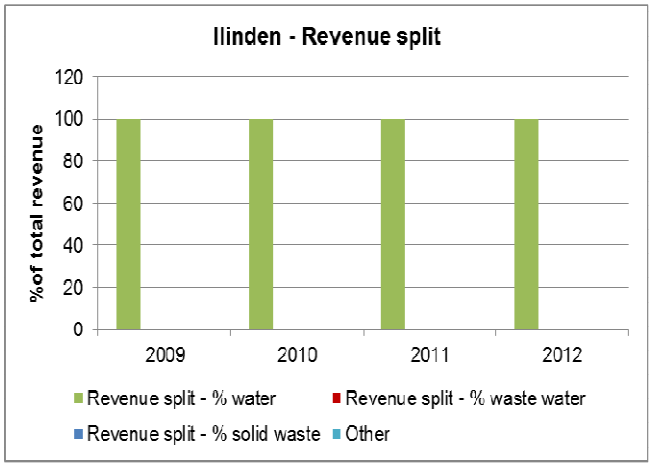


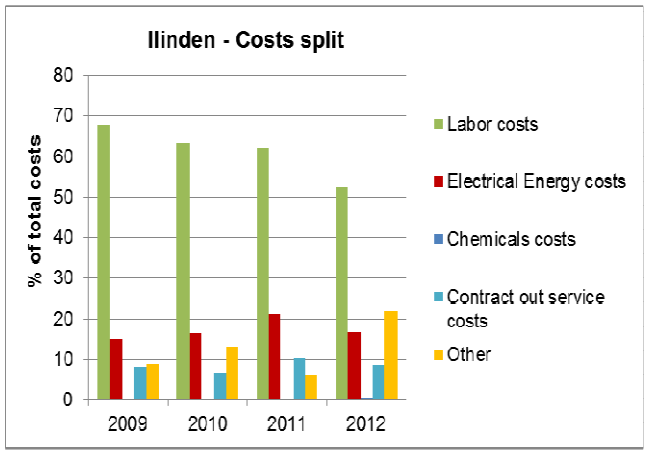


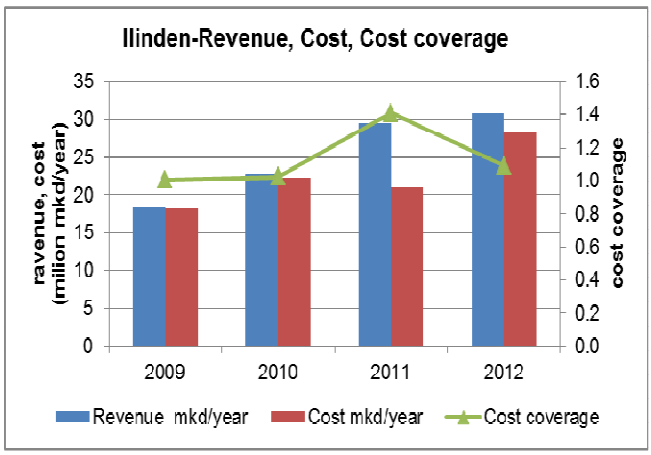

Ilinden - Staff split by service
% of total staff
120
100
80
60
40
20
0
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Ilinden- Price of water 6m³ residential
(mkd/month)
160
140
120
100
80
60
40
20
0
120
120
150
150
2009
2010
2011
2012
Price of water 6m3 residential

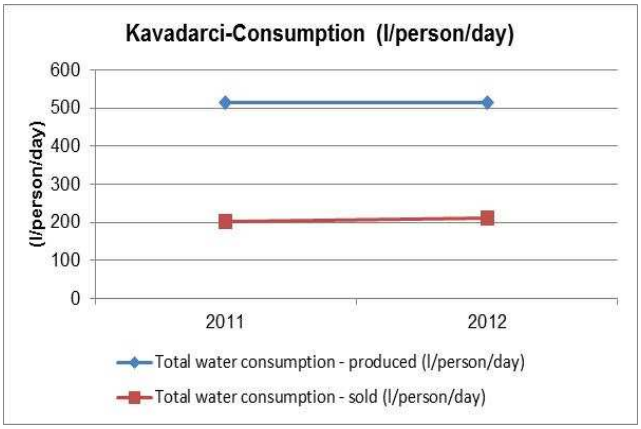

Ilinden - Collection rate, Collection period
Collection period (days)
200
150
100
50
0
Collection rate (%)
120
100
80
60
40
20
0
2009
2010
2011
2012
Collection period
Collection rate

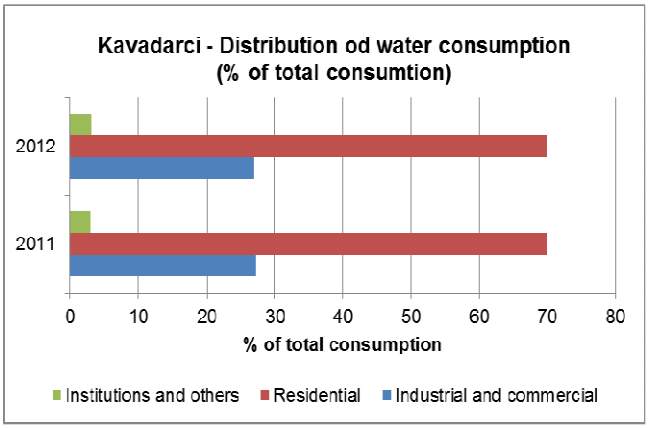

Ilinden - Revenue split
%of total revenue
120
100
80
60
40
20
0
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

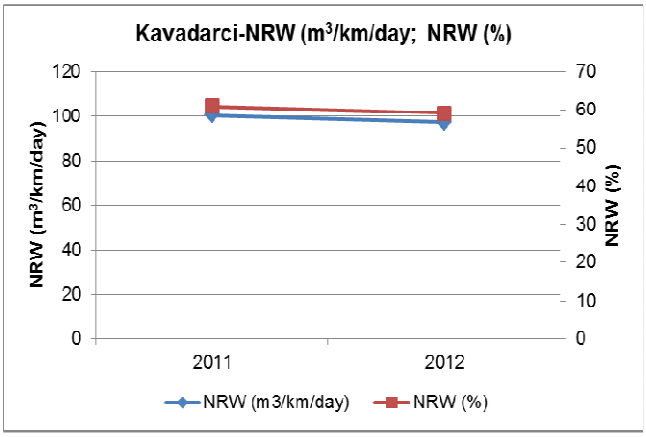

Ilinden - Costs split
% of total costs
80
70
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

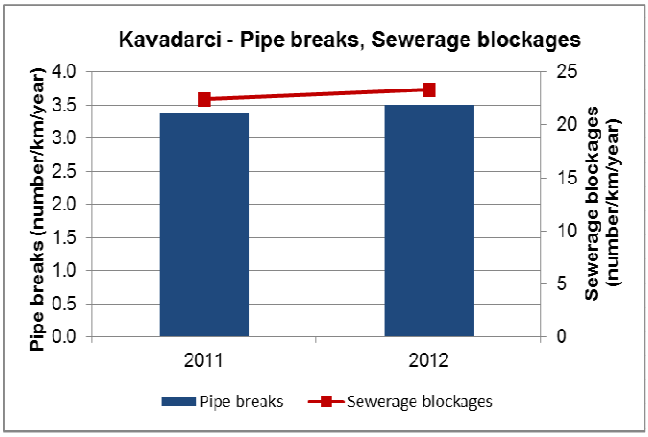

Ilinden-Revenue, Cost, Cost coverage
ravenue, cost (million mkd/year)
35
30
25
20
15
10
5
0
cost coverage
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

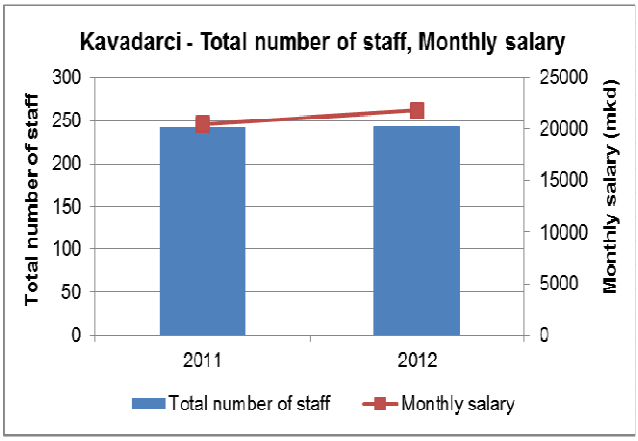
7.9 Kavadarci – JP Komunalec

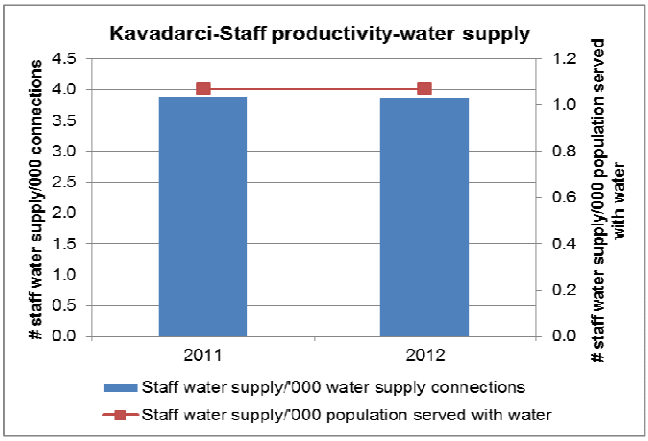


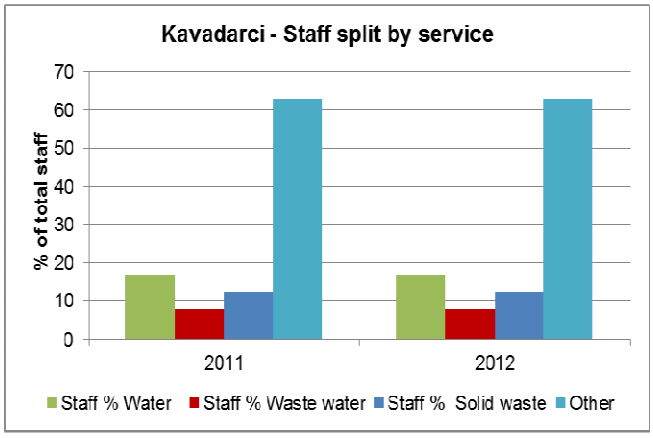


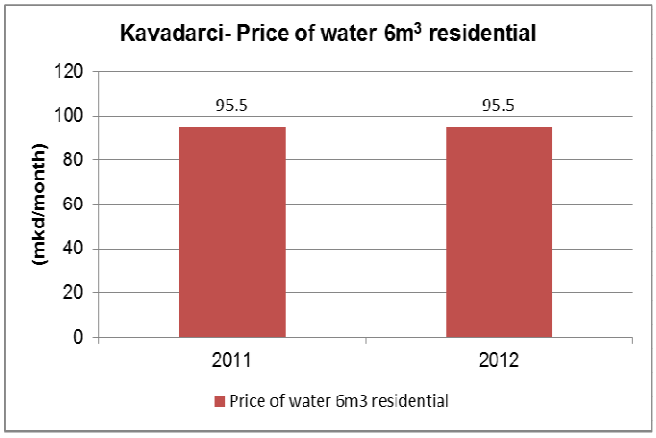


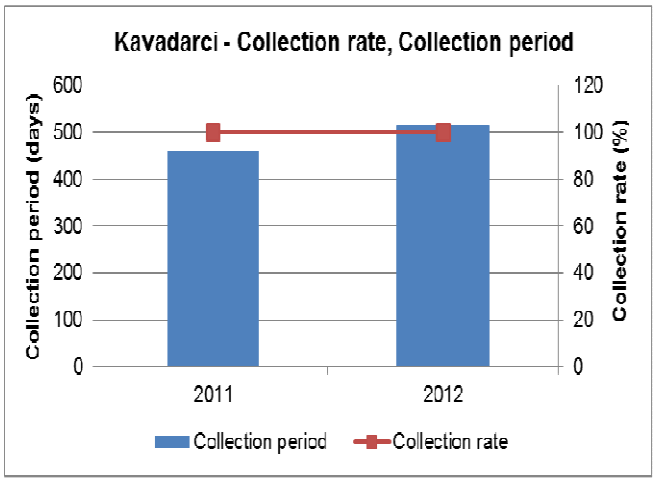


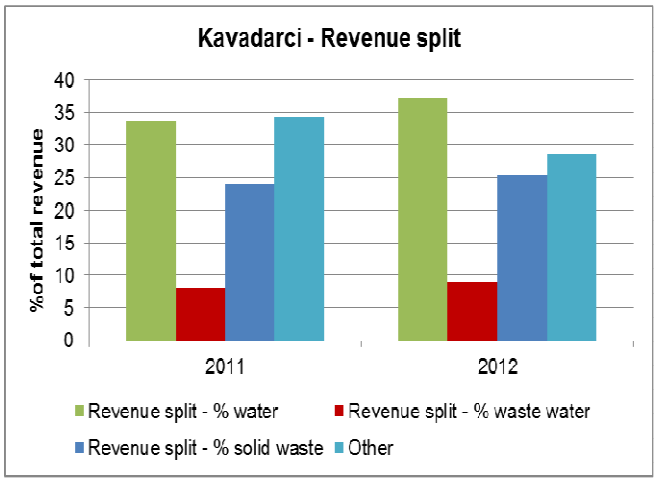


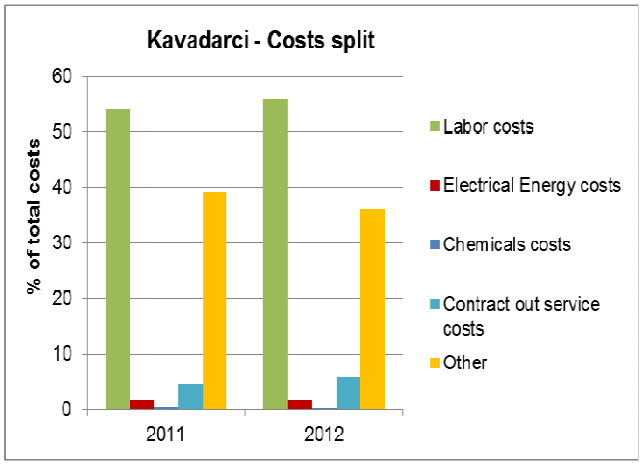


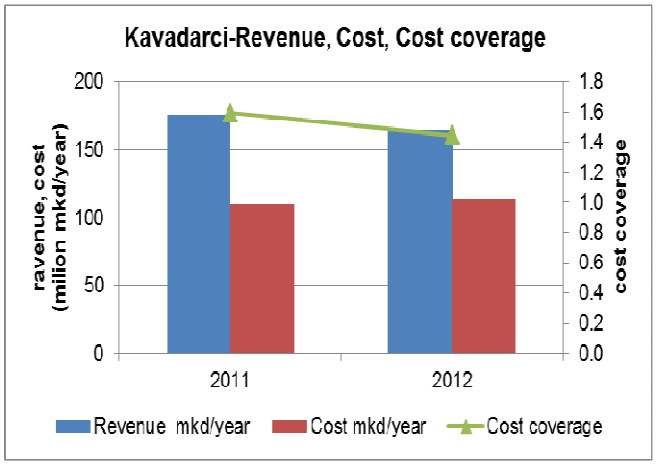

Kavadarci - Staff split by service
% of total staff
70
60
50
40
30
20
10
0
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Kavadarci- Price of water 6m3 residential
(mkd/month)
120
100
80
60
40
20
0
95.5
95.5
2011
2012
Price of water 6m3 residential

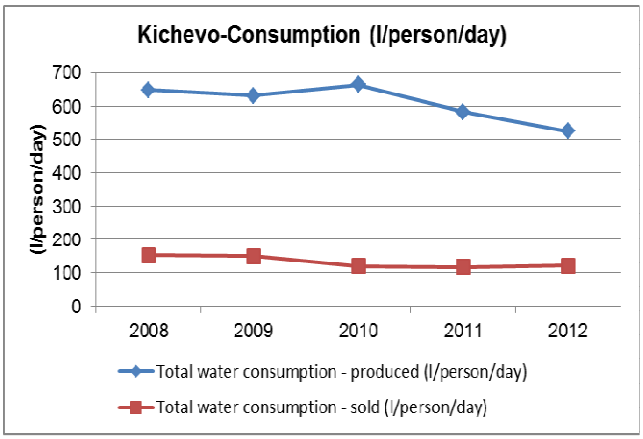

Kavadarci - Collection rate, Collection period
Collection period (days)
600
500
400
300
200
100
0
120
100
80
60
40
20
0
Collection rate (%)
2011
2012
Collection period
Collection rate

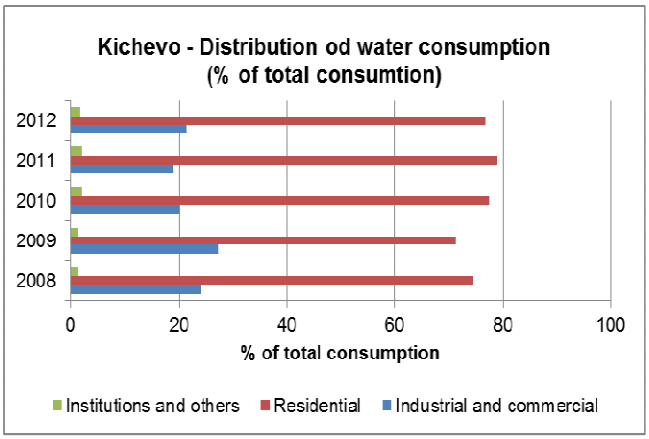

Kavadarci - Revenue split
%of total revenue
40
35
30
25
20
15
10
5
0
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

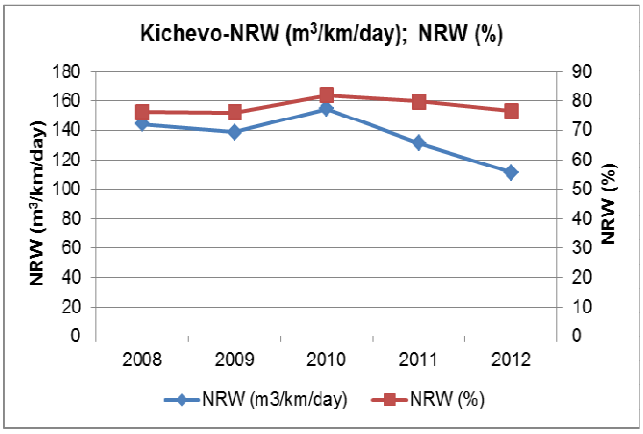

Kavadarci - Costs split
% of total costs
60
50
40
30
20
10
0
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

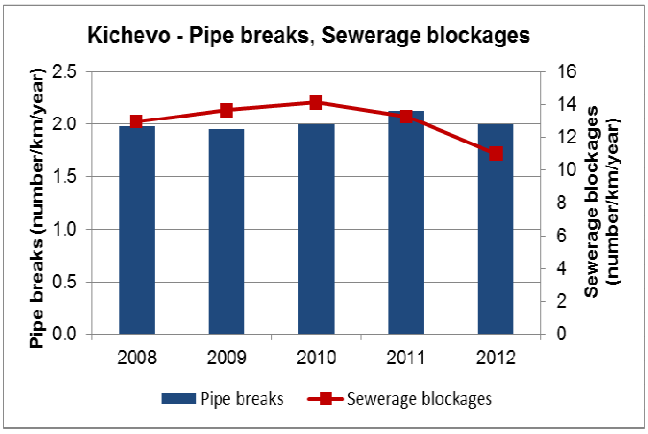

Kavadarci-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
200
150
100
50
0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

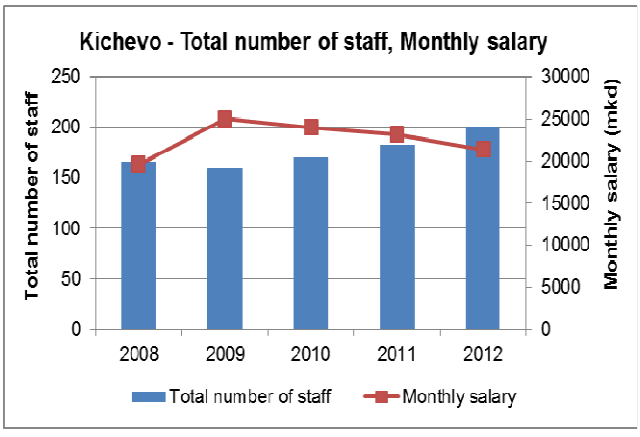
7.10 Kichevo – JP Komunalec

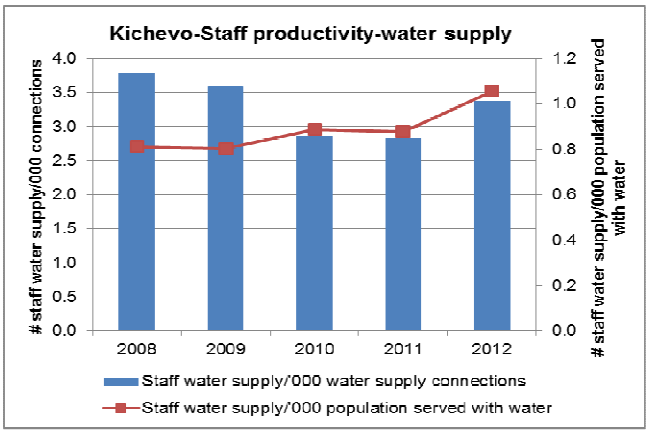


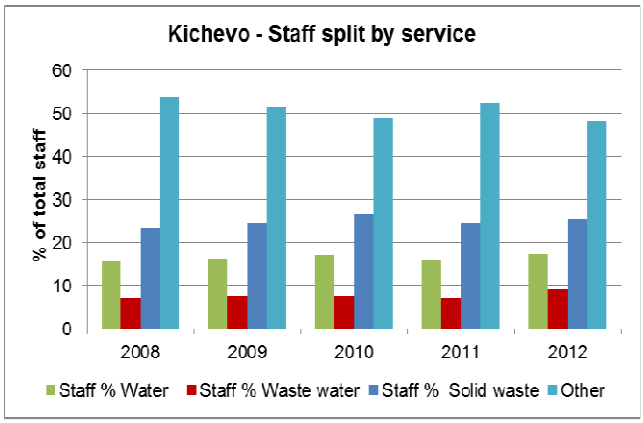


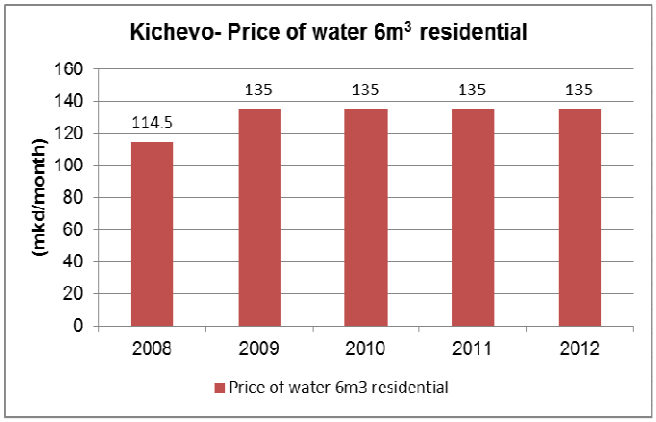


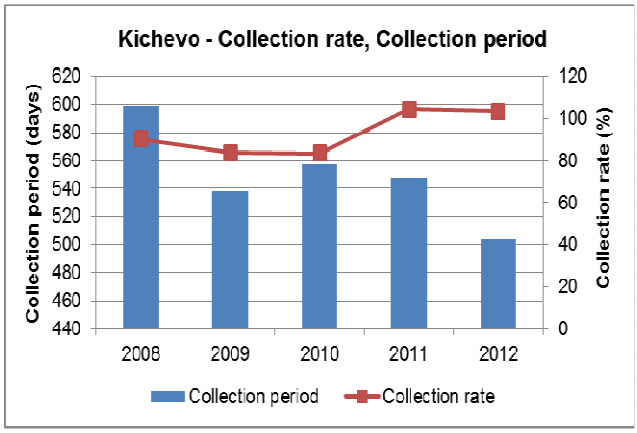


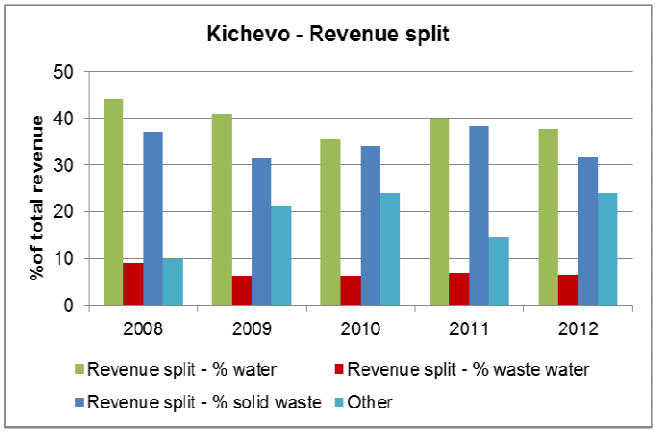


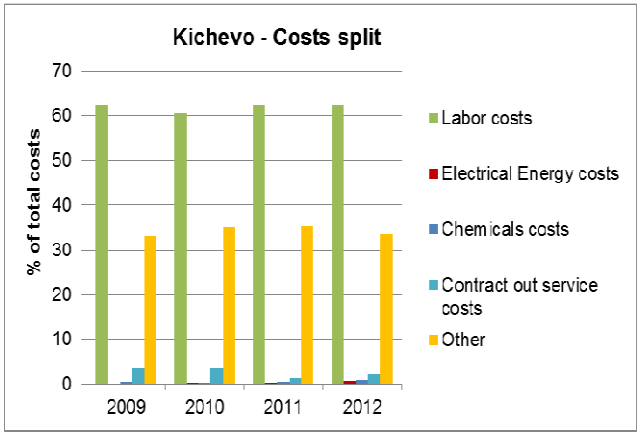


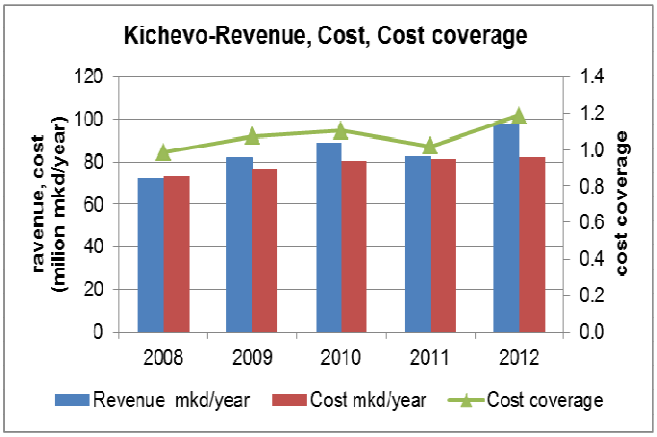

Kichevo - Staff split by service
% of total staff
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Kichevo- Price of water 6m3 residential
(mkd/month)
160
140
120
100
80
60
40
20
0
114.5
135
135
135
135
2008
2009
2010
2011
2012
Price of water 6m3 residential

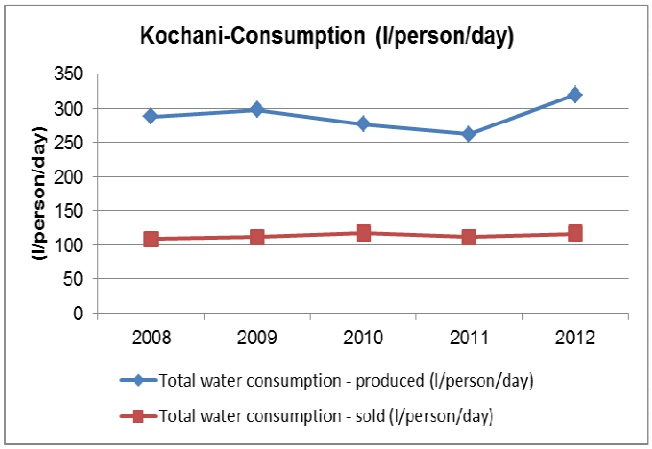

Kichevo - Collection rate, Collection period
Collection period (days)
620
600
580
560
540
520
500
480
460
440
Collection rate (%)
120
100
80
60
40
20
0
2008
2009
2010
2011
2012
Collection period
Collection rate

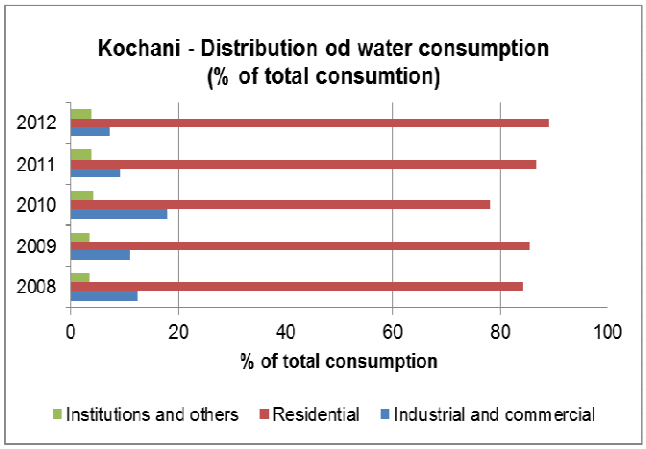

Kichevo - Revenue split
%of total revenue
50
40
30
20
10
0
2008
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

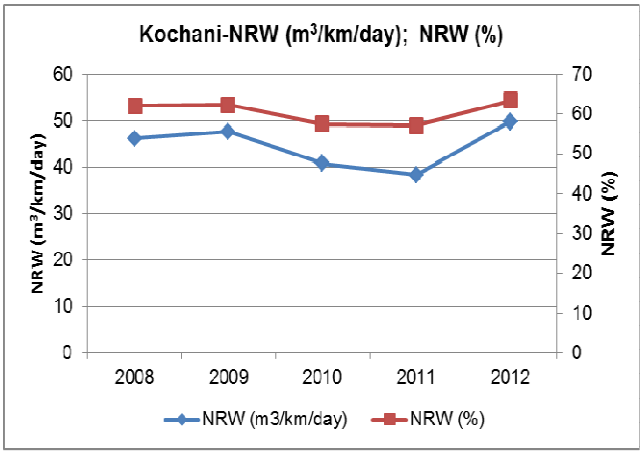

Kichevo - Costs split
% of total costs
70
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

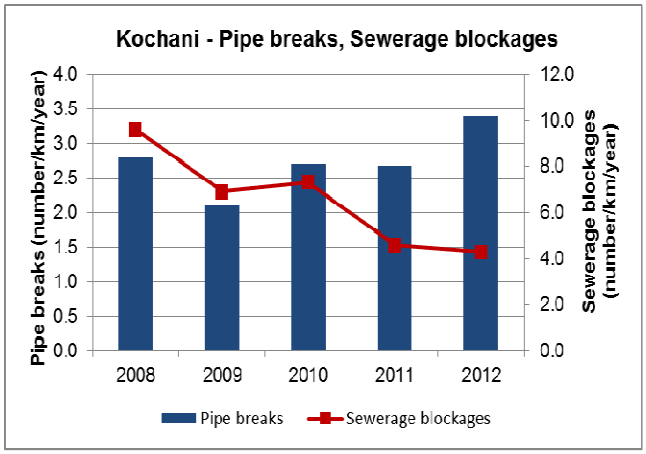

Kichevo-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
120
100
80
60
40
20
0
cost coverage
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2008
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

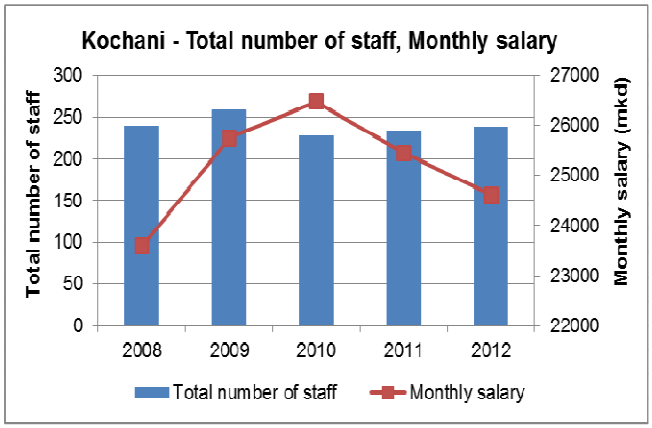
7.11 Kochani – KJP Vodovod

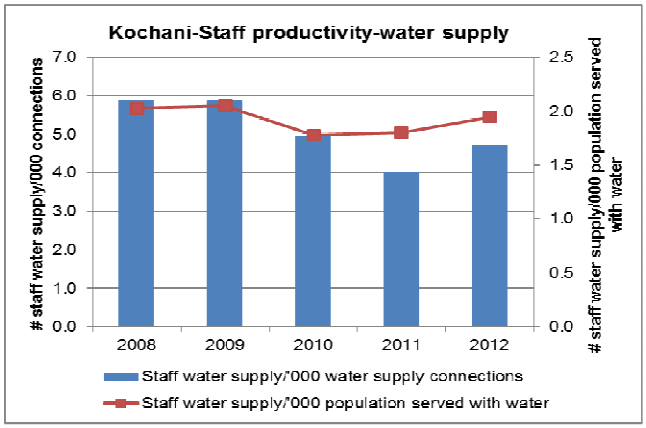


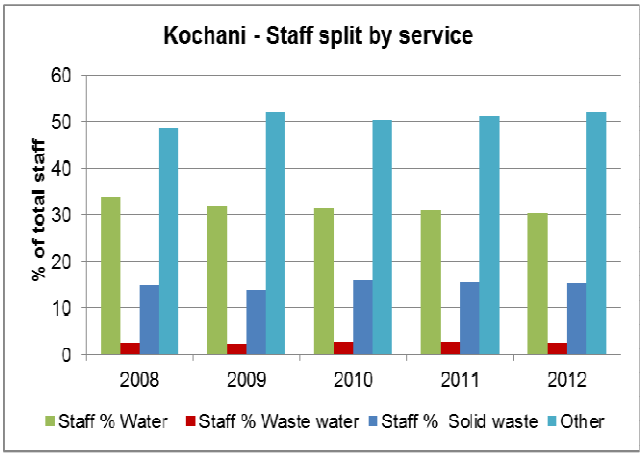


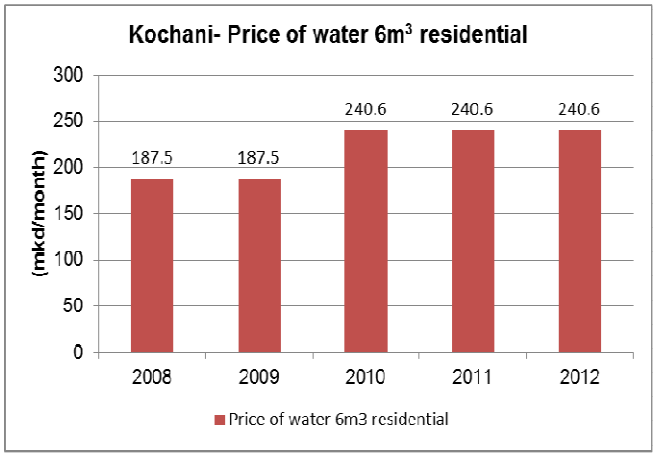


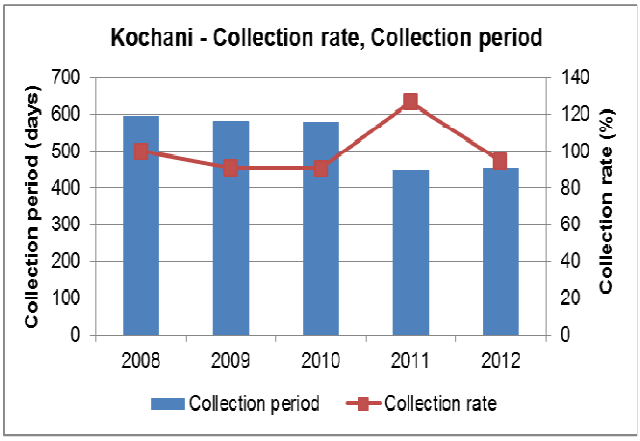


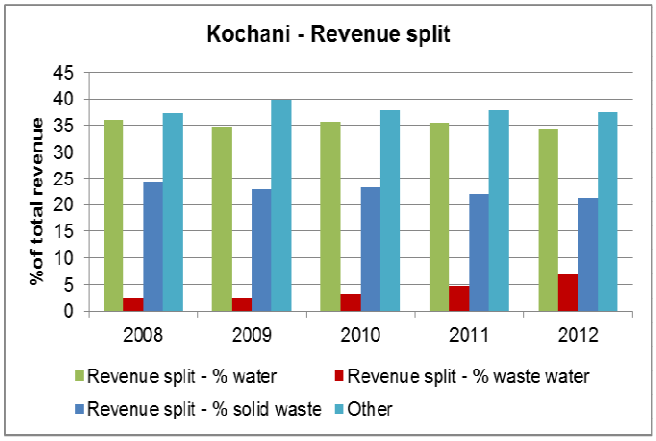


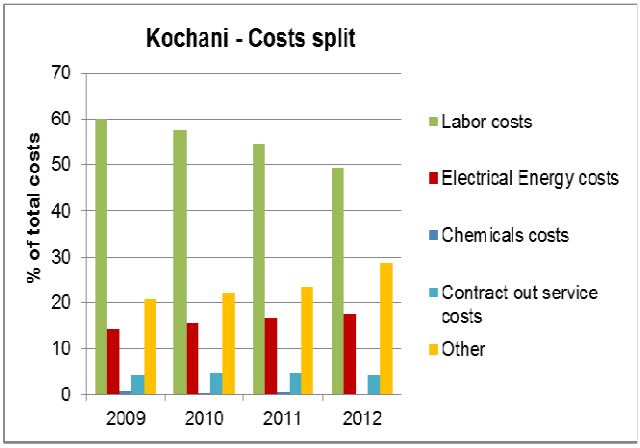


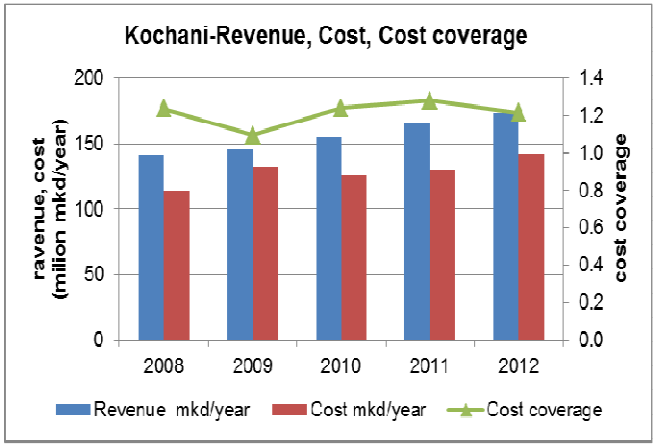

Kochani - Staff split by service
% of total staff
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Kochani- Price of water 6m3 residential
(mkd/month)
300
250
200
150
100
50
0
187.5
187.5
240.6
240.6
240.6
2008
2009
2010
2011
2012
Price of water 6m3 residential

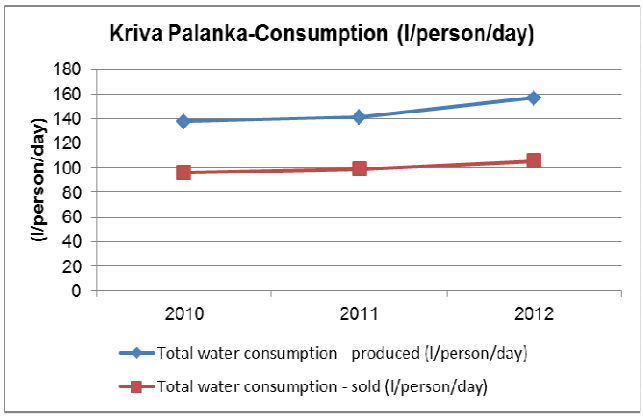

Kochani - Collection rate, Collection period
Collection period (days)
700
600
500
400
300
200
100
0
Collection rate (%)
140
120
100
80
60
40
20
0
2008
2009
2010
2011
2012
Collection period
Collection rate

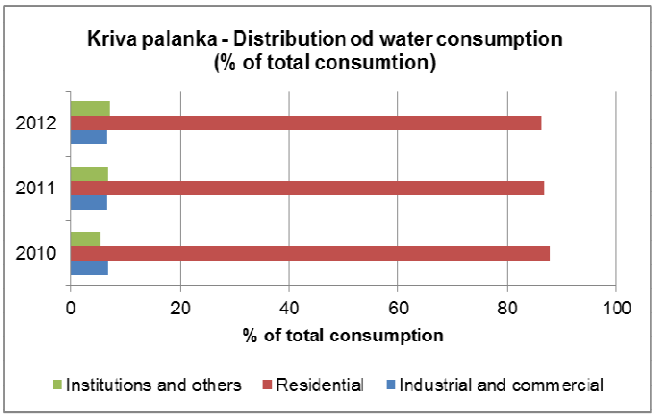

Kochani - Revenue split
%of total revenue
45
40
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

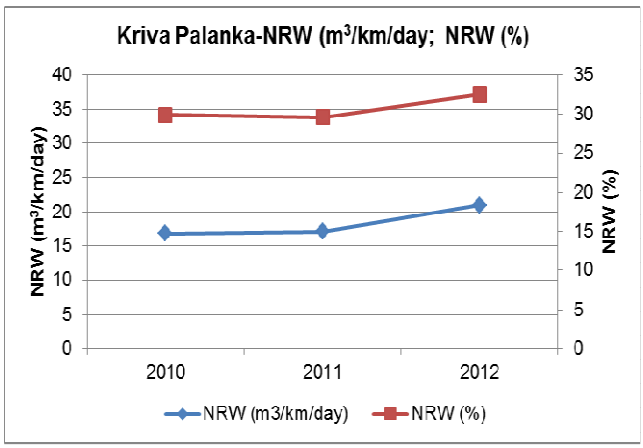

Kochani - Costs split
% of total costs
70
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

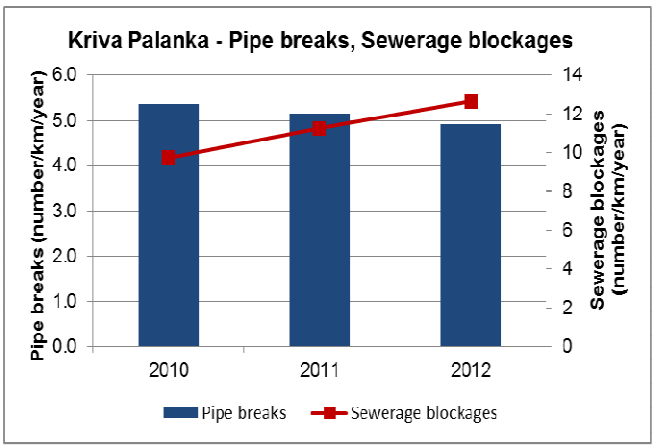

Kochani-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
200
150
100
50
0
cost coverage
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2008
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

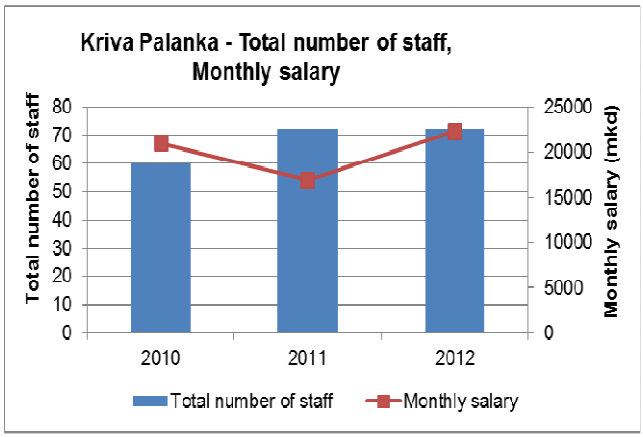
7.12 Kriva Palanka – JP Komunalec

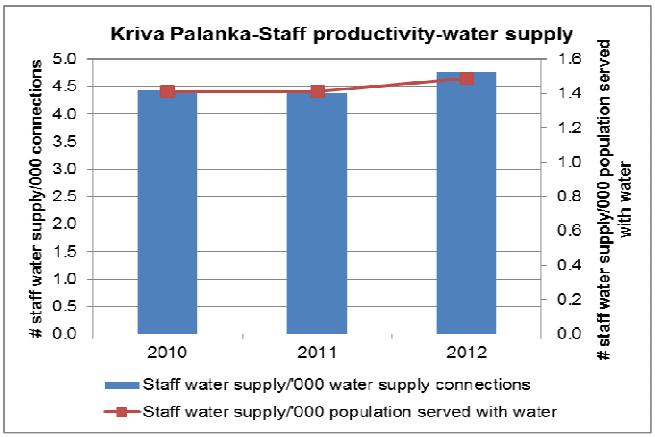


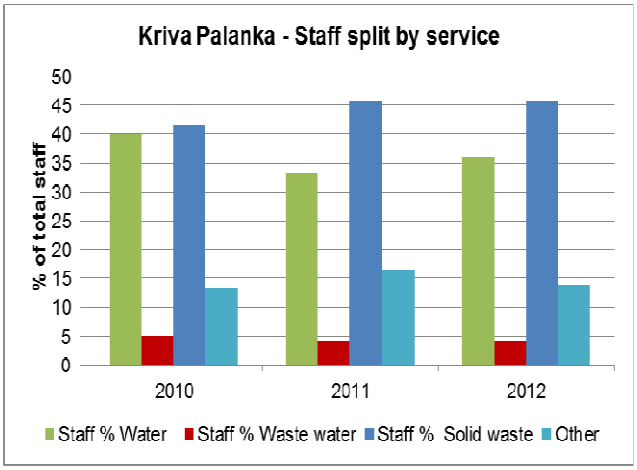


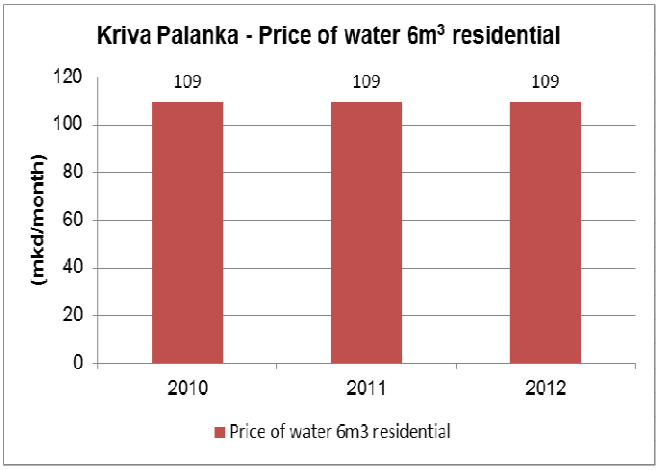


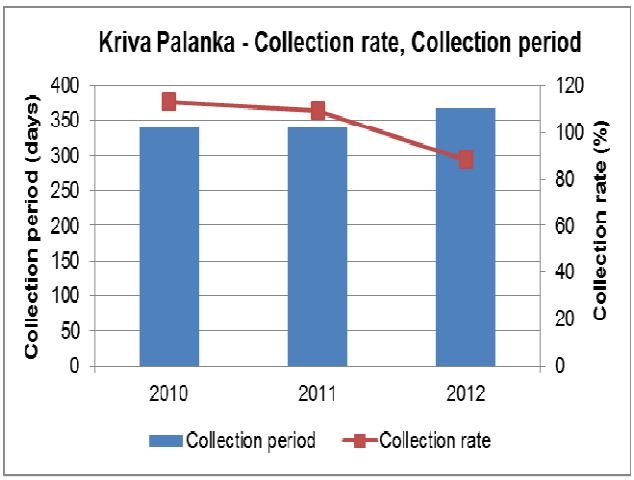


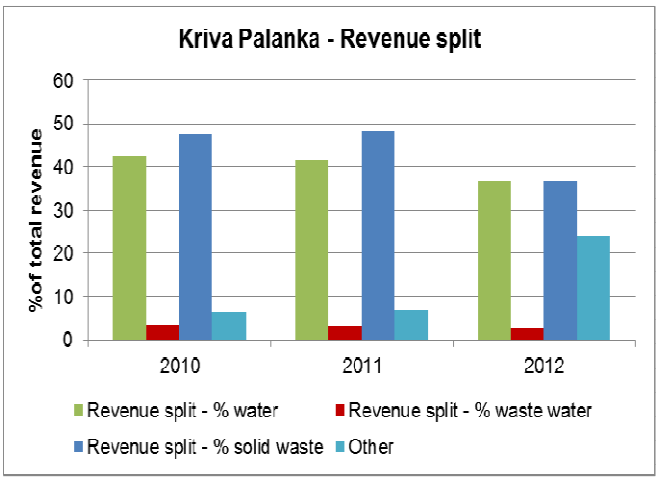


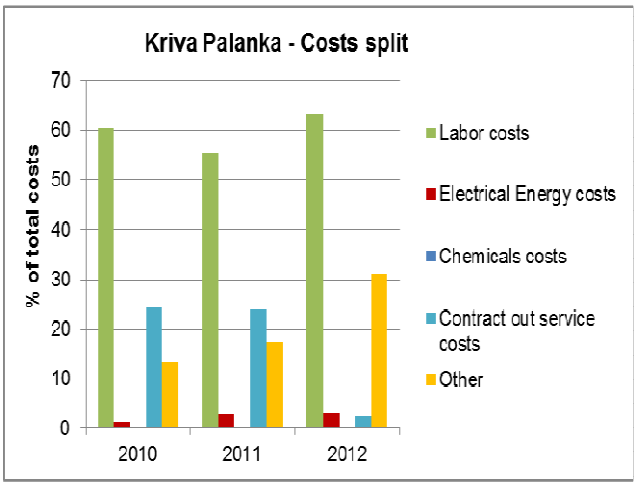


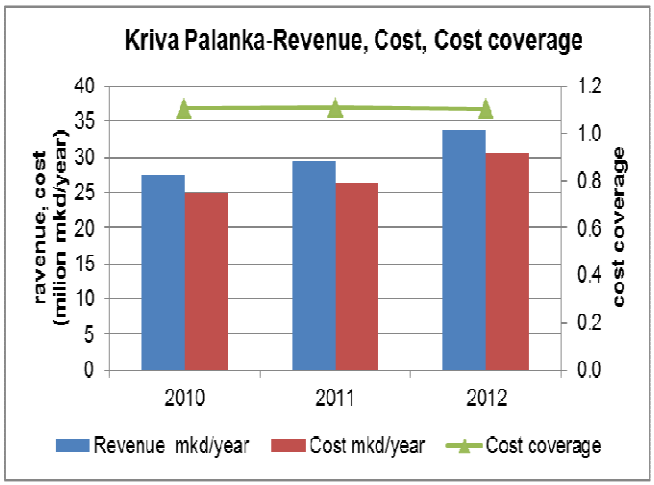

Kriva Palanka - Staff split by service
% of total staff
50
45
40
35
30
25
20
15
10
5
0
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Kriva Palanka - Price of water 6m³ residential
(mkd/month)
120
100
80
60
40
20
0
109
109
109
2010
2011
2012
Price of water 6m3 residential

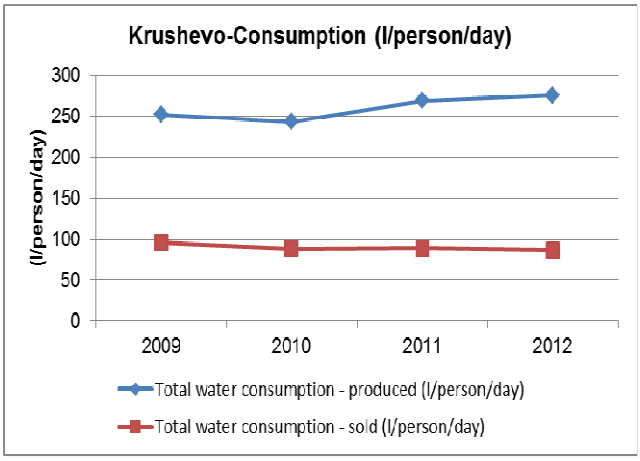

Kriva Palanka - Collection rate, Collection period
Collection period (days)
400
350
300
250
200
150
100
50
0
Collection rate (%)
120
100
80
60
40
20
0
2010
2011
2012
Collection period
Collection rate

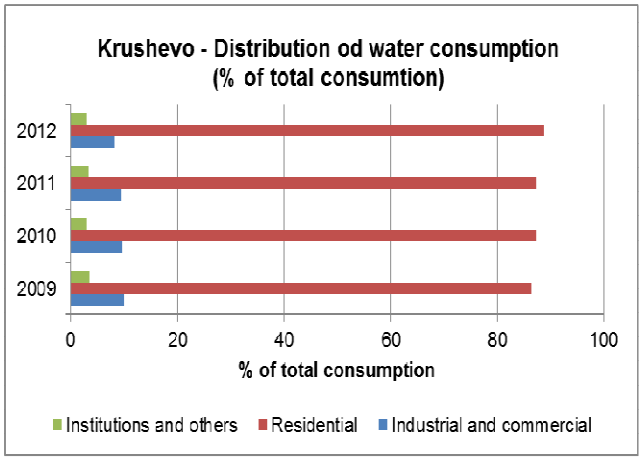

Kriva Palanka - Revenue split
%of total revenue
60
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

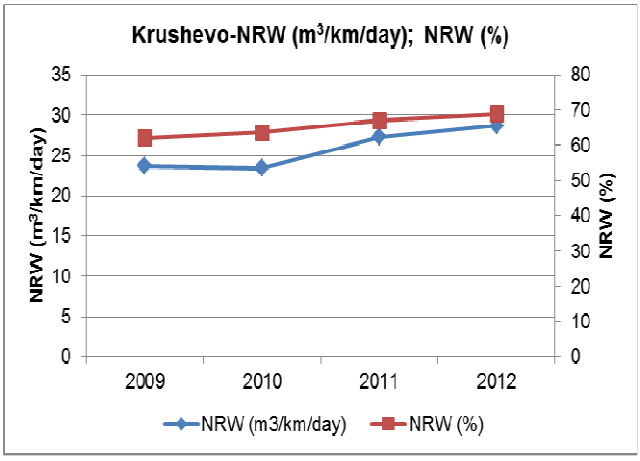

Kriva Palanka - Costs split
% of total costs
70
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

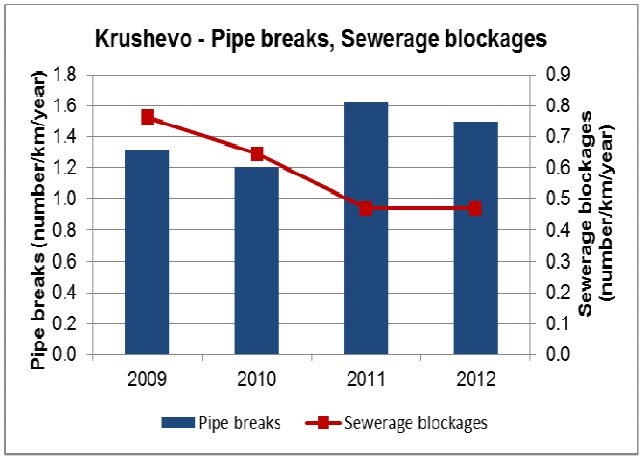

Kriva Palanka-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
40
35
30
25
20
15
10
5
0
cost coverage
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

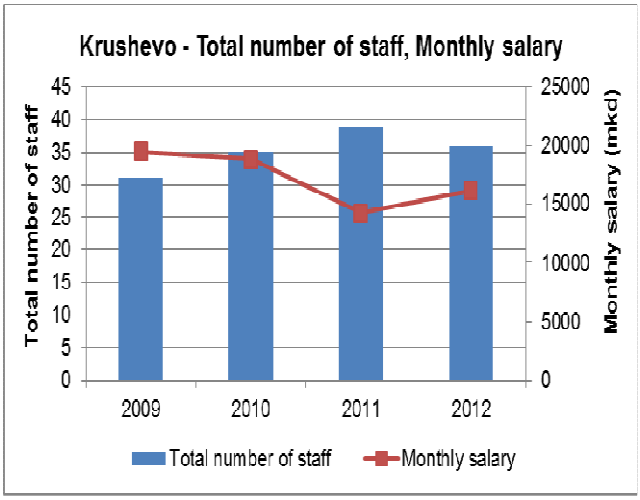
7.13 Krushevo – JP Komuna

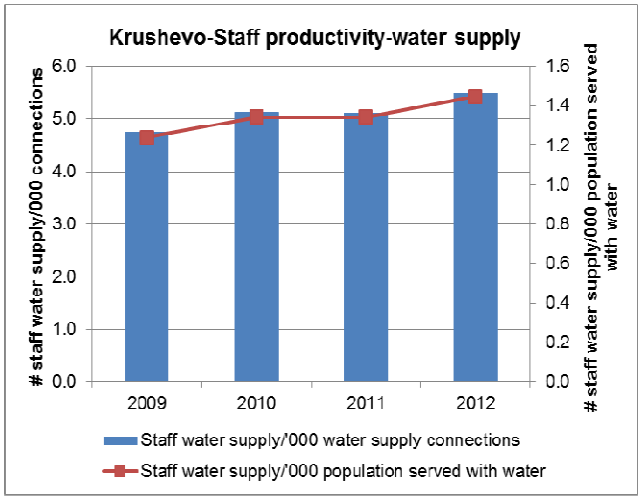


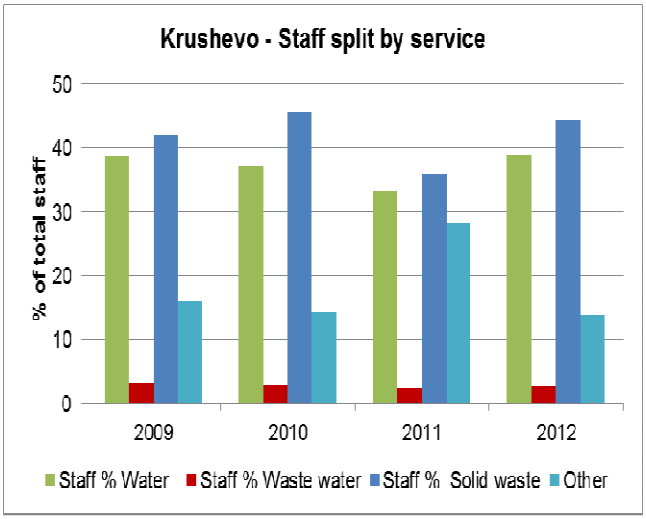


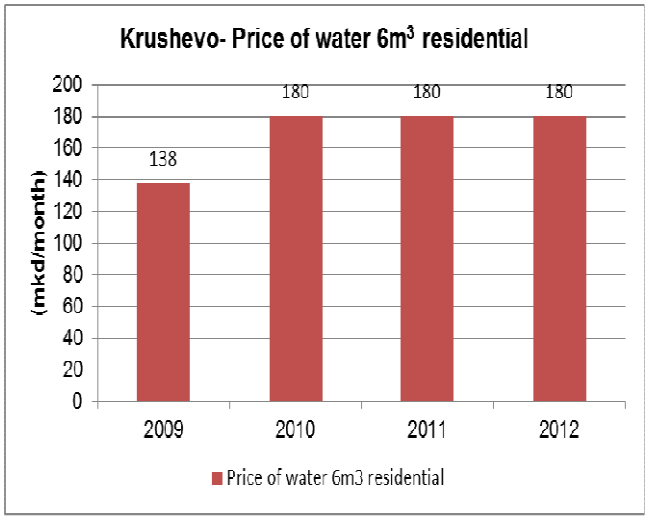


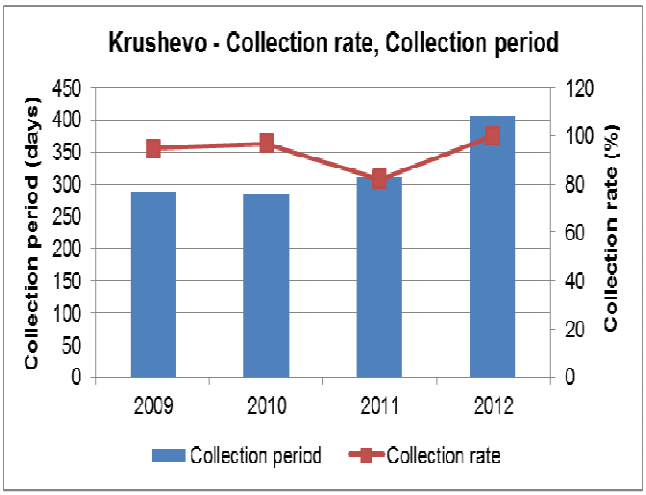


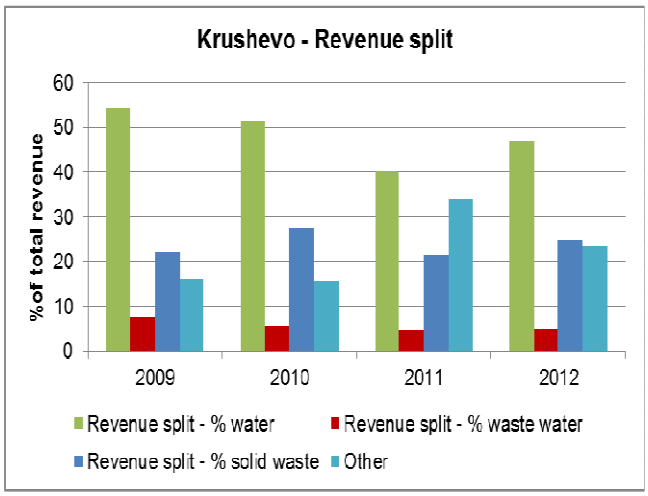


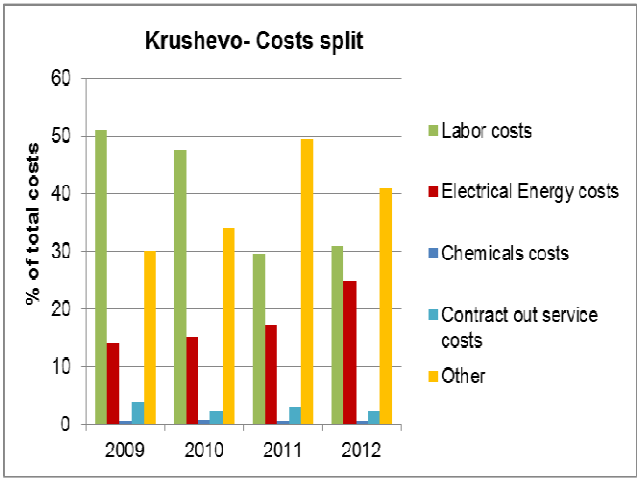


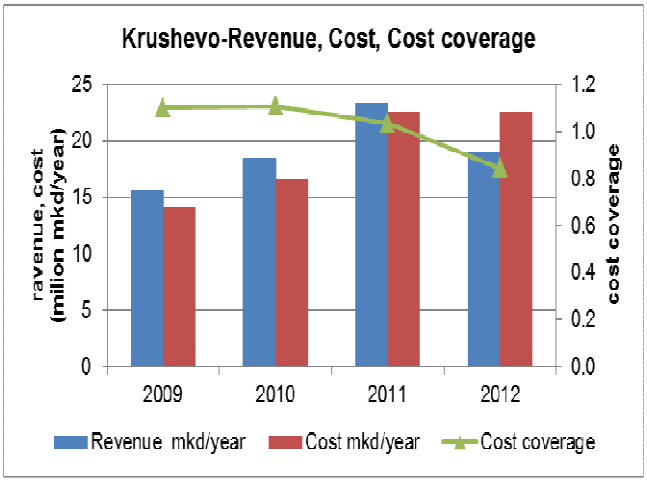

Krushevo - Staff split by service
% of total staff
50
40
30
20
10
0
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Krushevo- Price of water 6m3 residential
(mkd/month)
200
180
160
140
120
100
80
60
40
20
0
138
180
180
180
2009
2010
2011
2012
Price of water 6m3 residential

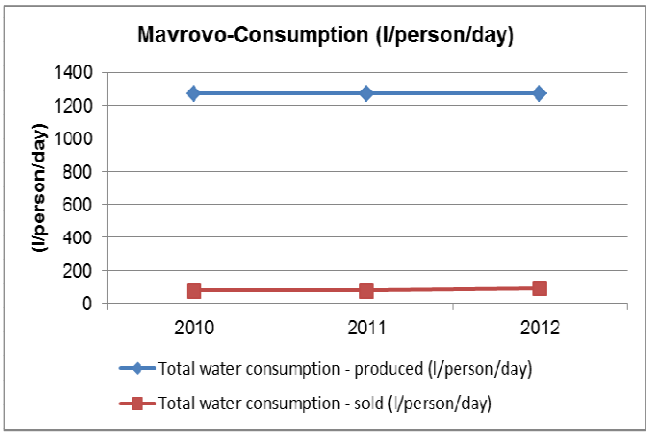

Krushevo - Collection rate, Collection period
Collection period (days)
450
400
350
300
250
200
150
100
50
0
Collection rate (%)
120
100
80
60
40
20
0
2009
2010
2011
2012
Collection period
Collection rate

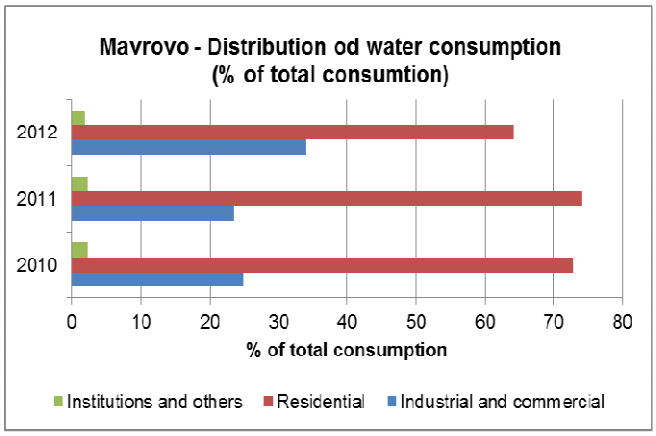

Krushevo - Revenue split
%of total revenue
60
50
40
30
20
10
0
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

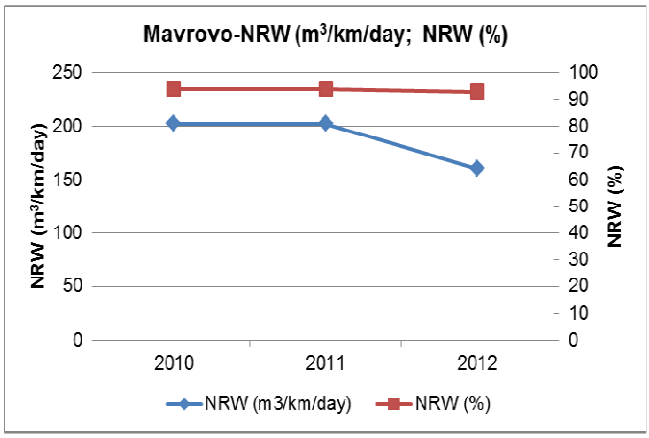

Krushevo- Costs split
% of total costs
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

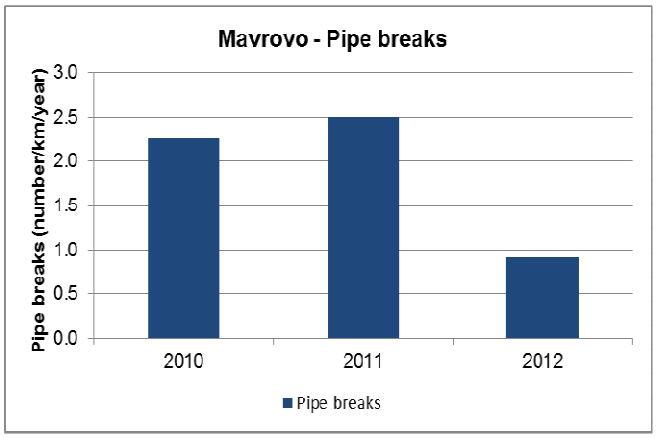

Krushevo-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
25
20
15
10
5
0
cost coverage
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

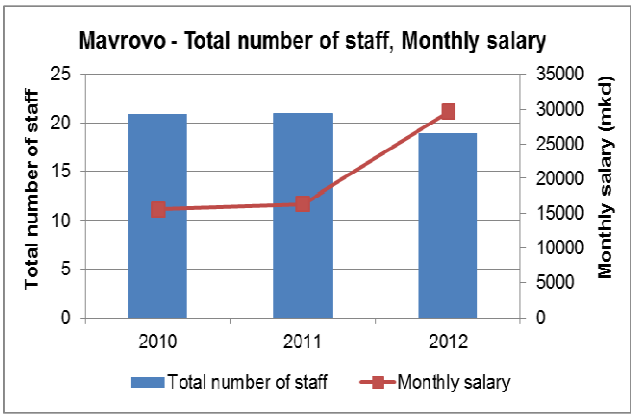
7.14 Mavrovi Anovi – JPKD Mavrovo

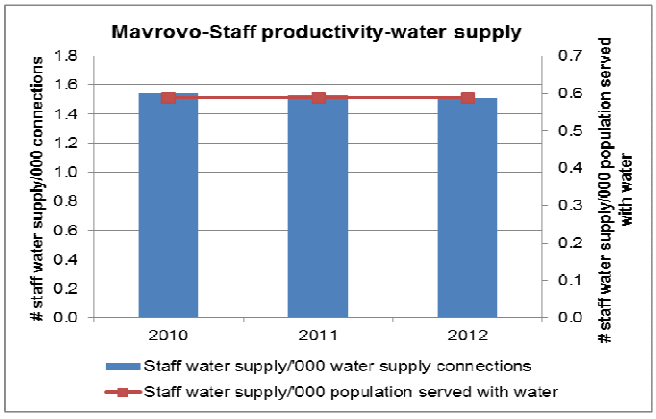


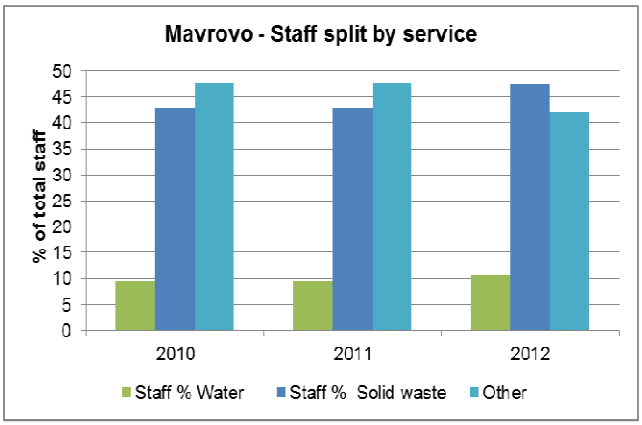


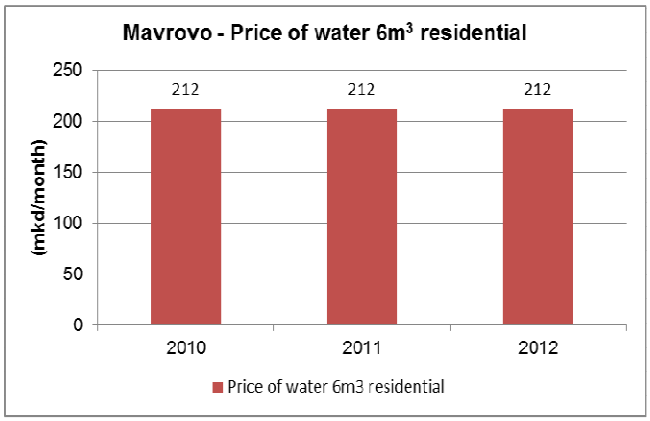


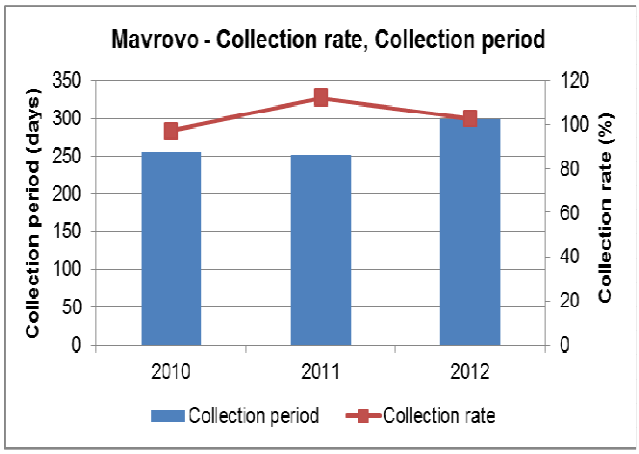


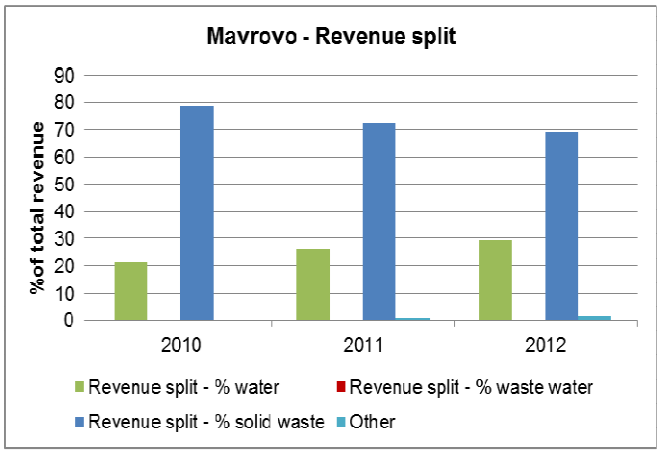


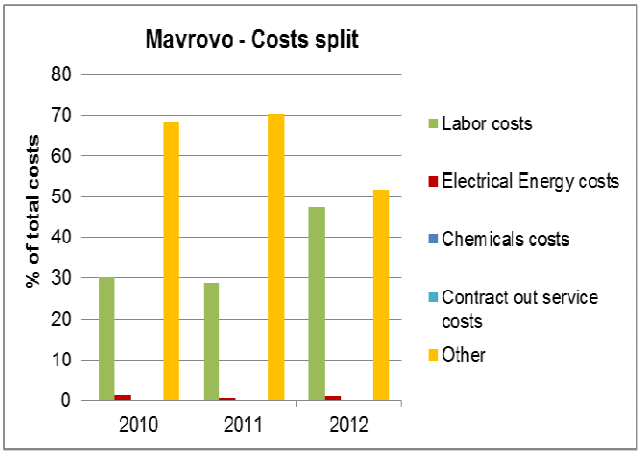


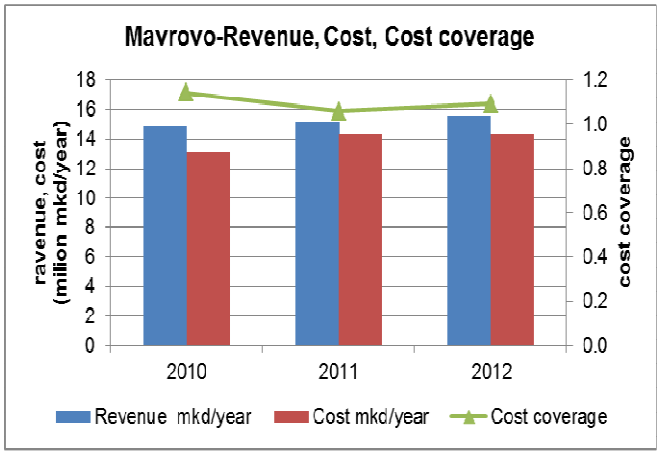

Mavrovo - Staff split by service
% of total staff
50
45
40
35
30
25
20
15
10
5
0
2010
2011
2012
Staff % Water
Staff % Solid waste
Other


Mavrovo - Price of water 6m³ residential
(mkd/month)
250
200
150
100
50
0
212
212
212
2010
2011
2012
Price of water 6m3 residential

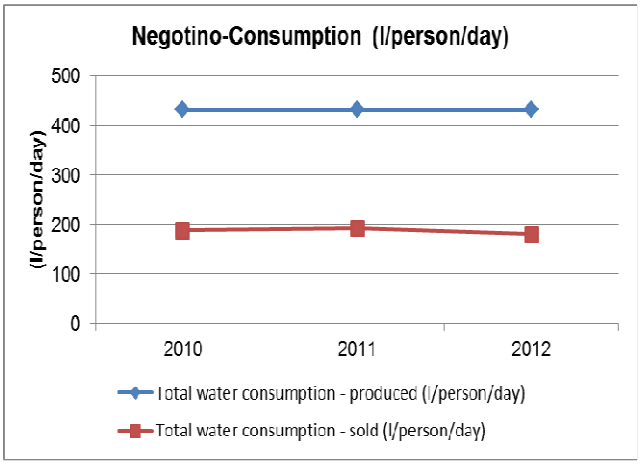

Mavrovo - Collection rate, Collection period
Collection period (days)
350
300
250
200
150
100
50
0
Collection rate (%)
120
100
80
60
40
20
0
2010
2011
2012
Collection period
Collection rate

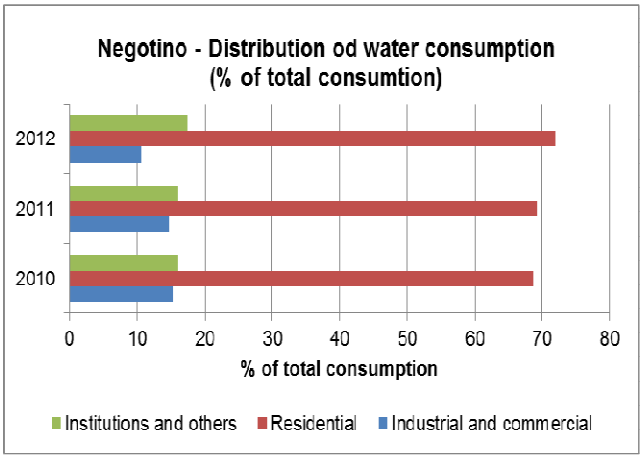

Mavrovo - Revenue split
%of total revenue
90
80
70
60
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

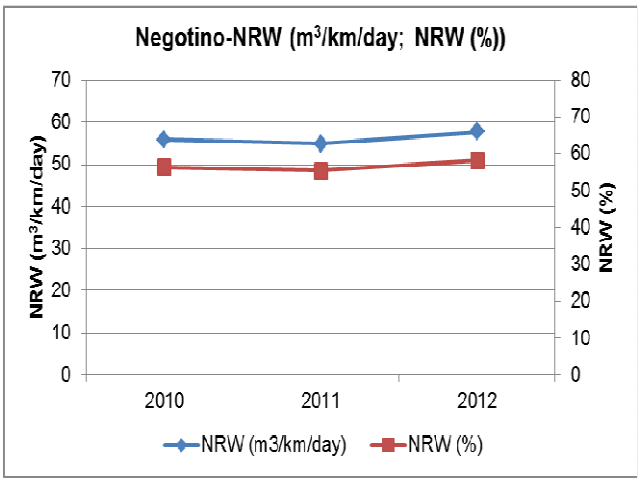

Mavrovo - Costs split
% of total costs
80
70
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

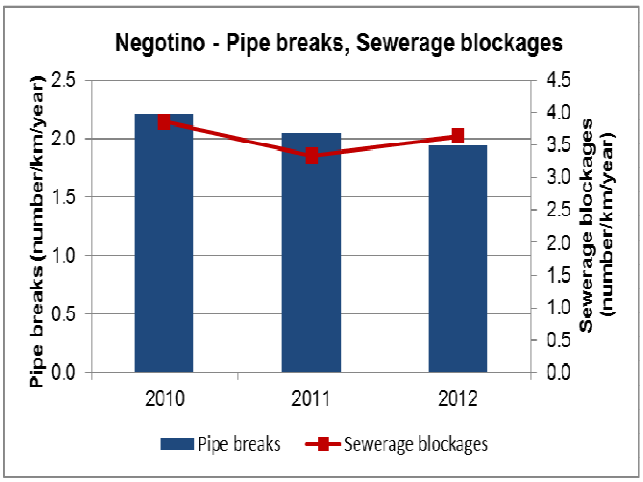

Mavrovo-Revenue, Cost, Cost coverage
ravenue, cost (million mkd/year)
18
16
14
12
10
8
6
4
2
0
cost coverage
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

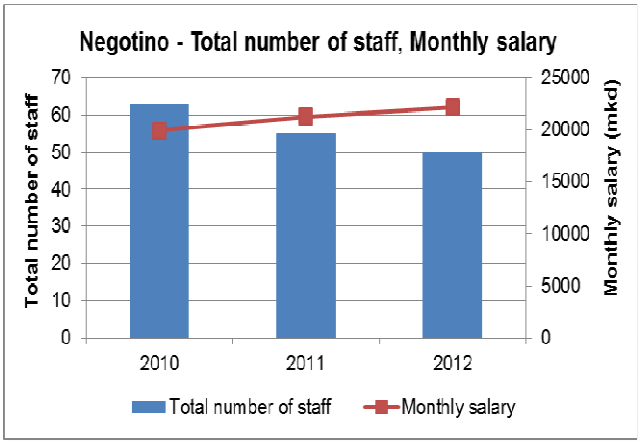
7.15 Negotino – JKP Komunalec

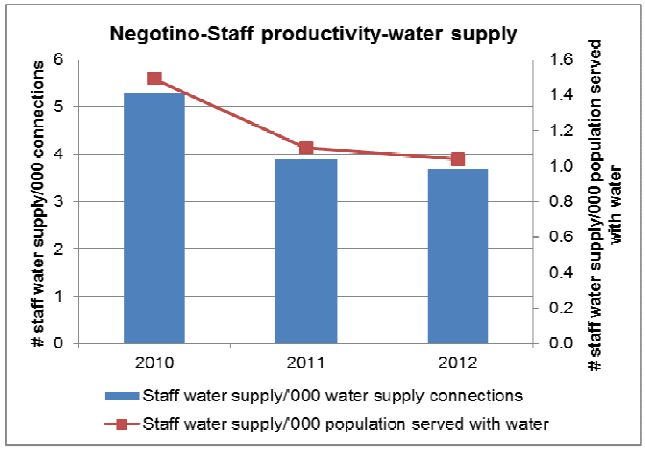


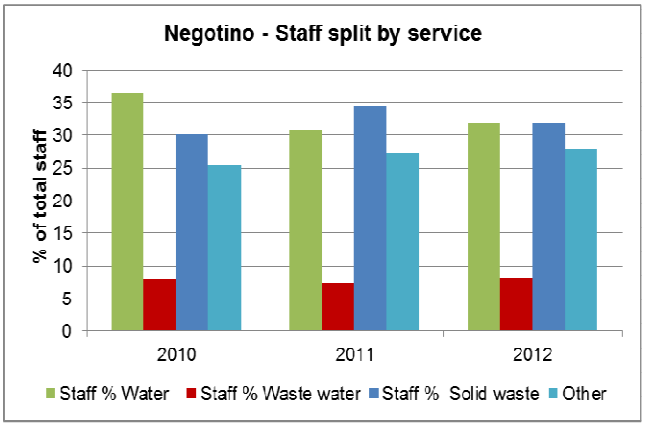


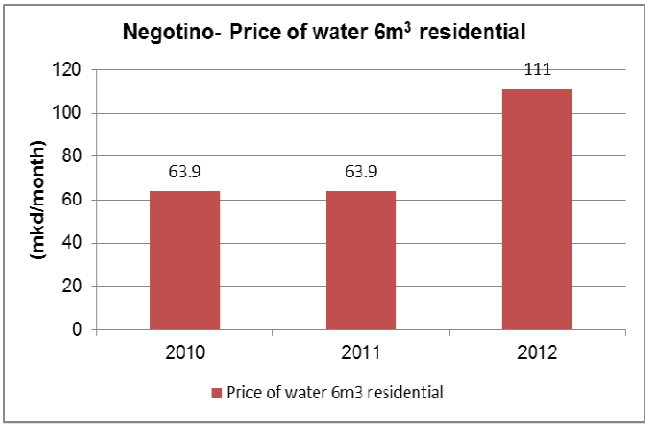


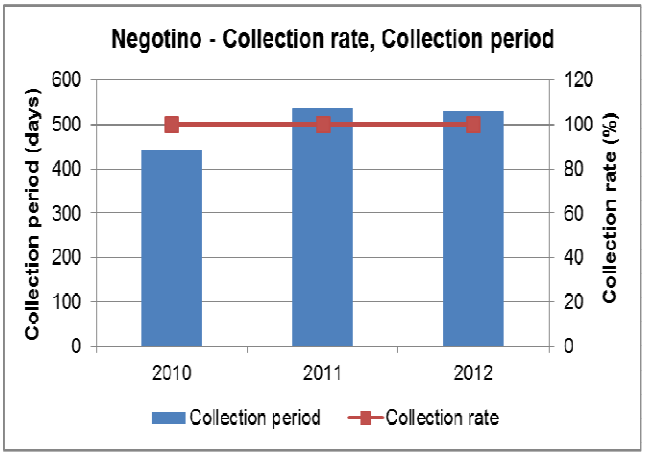


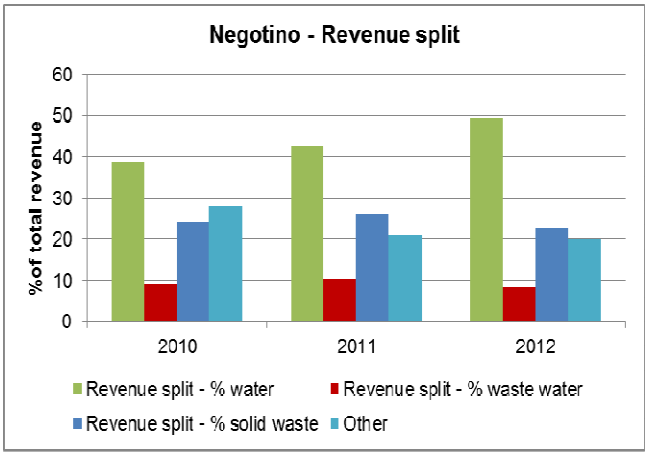


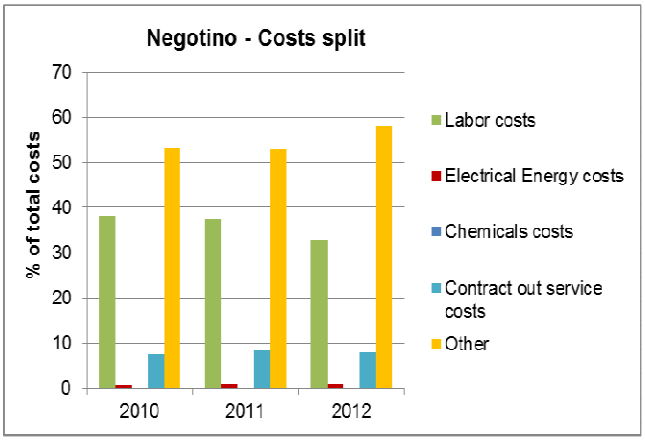


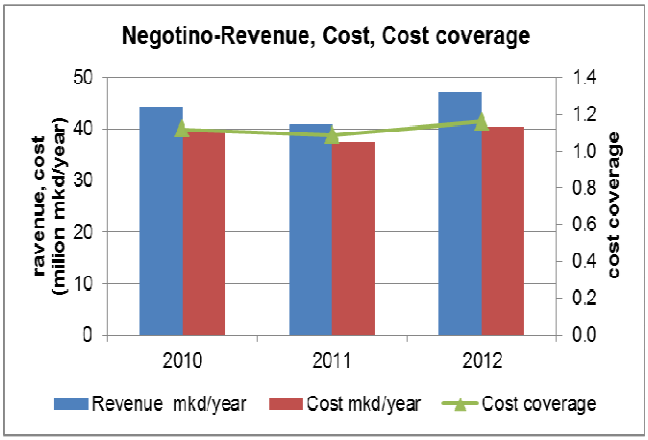

Negotino - Staff split by service
% of total staff
40
35
30
25
20
15
10
5
0
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Negotino- Price of water 6m3 residential
(mkd/month)
120
100
80
60
40
20
0
63.9
63.9
111
2010
2011
2012
Price of water 6m3 residential

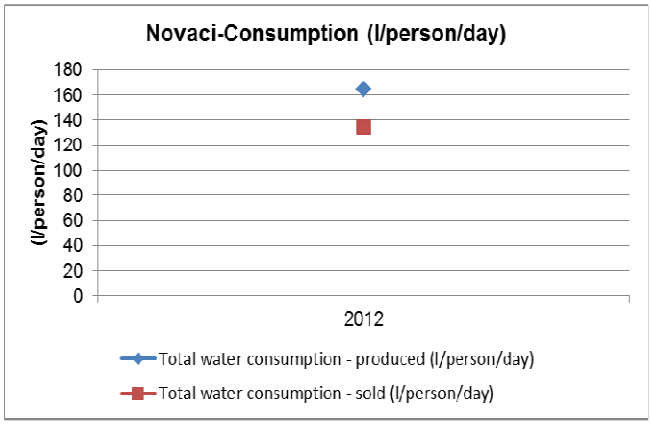

Negotino - Collection rate, Collection period
Collection period (days)
600
500
400
300
200
100
0
120
100
80
60
40
20
0
Collection rate (%)
2010
2011
2012
Collection period
Collection rate

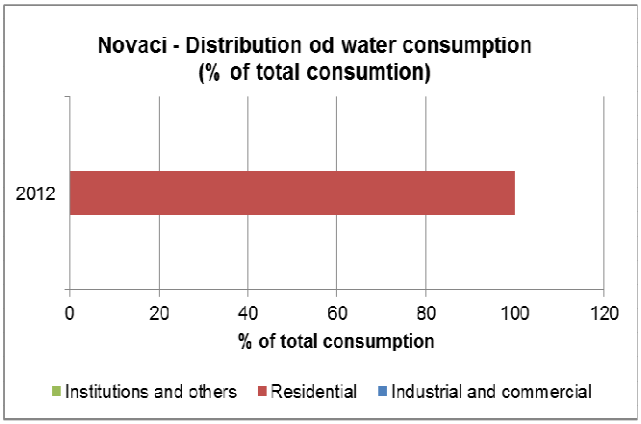

Negotino - Revenue split
%of total revenue
60
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

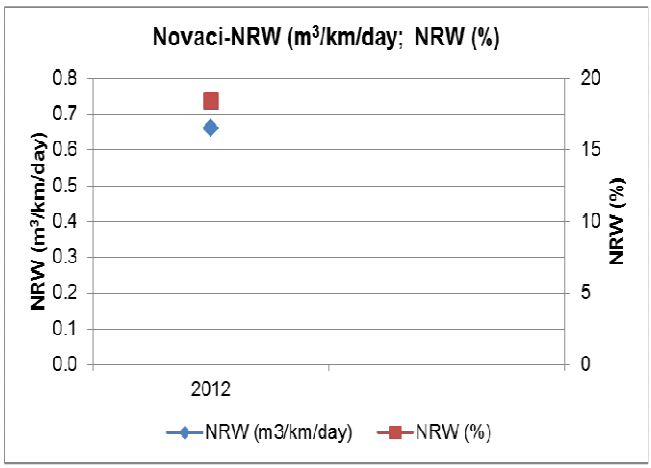

Negotino - Costs split
% of total costs
70
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

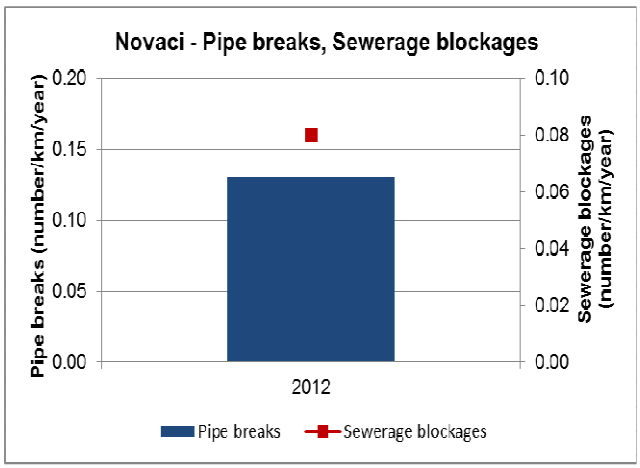

Negotino-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
50
40
30
20
10
0
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

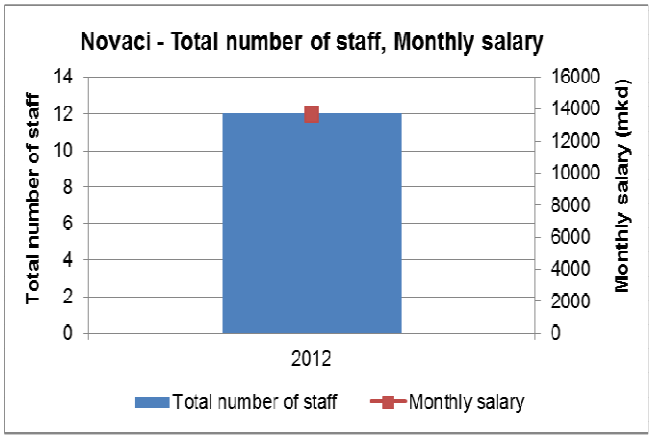
7.16 Novaci – ZJKP Pela Higiena

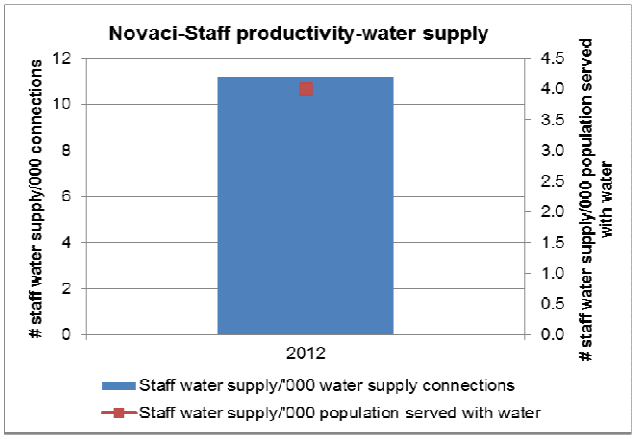


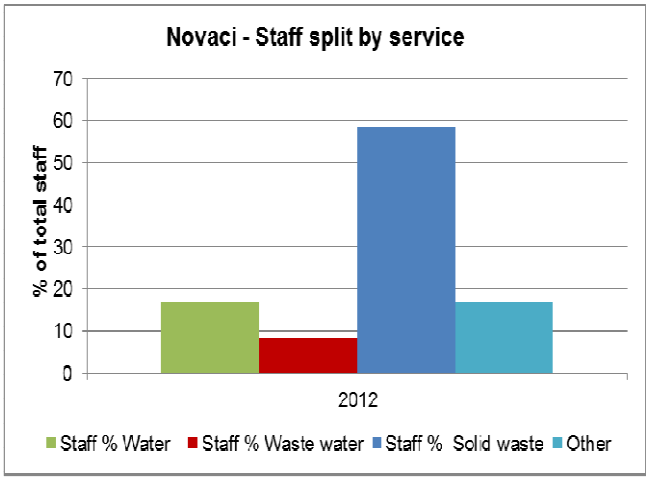


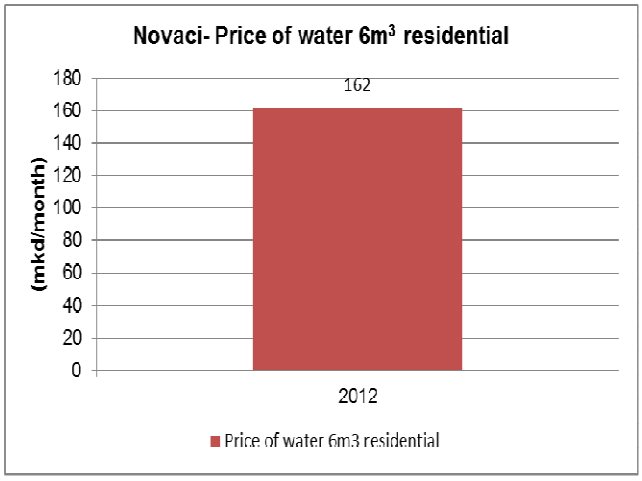


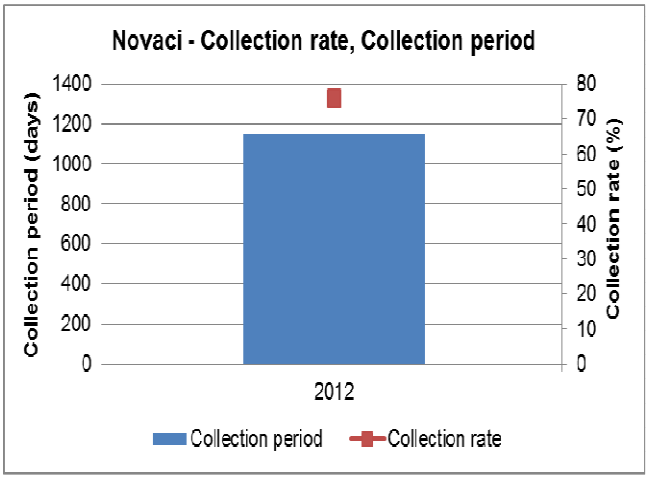


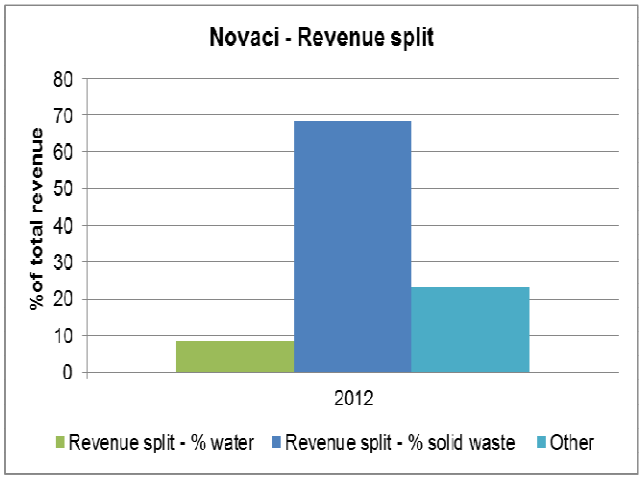


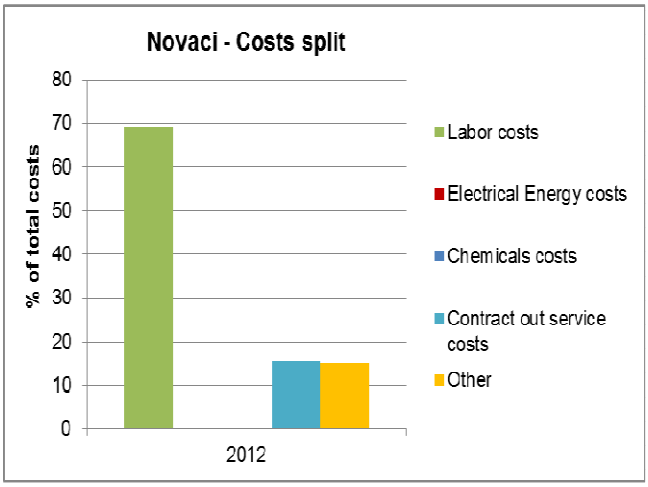


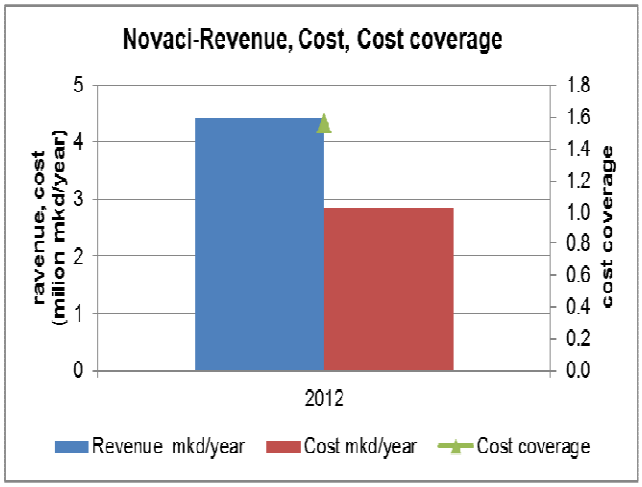

Novaci - Staff split by service
% of total staff
70
60
50
40
30
20
10
0
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Novaci- Price of water 6m3 residential
(mkd/month)
180
160
140
120
100
80
60
40
20
0
162
2012
Price of water 6m3 residential

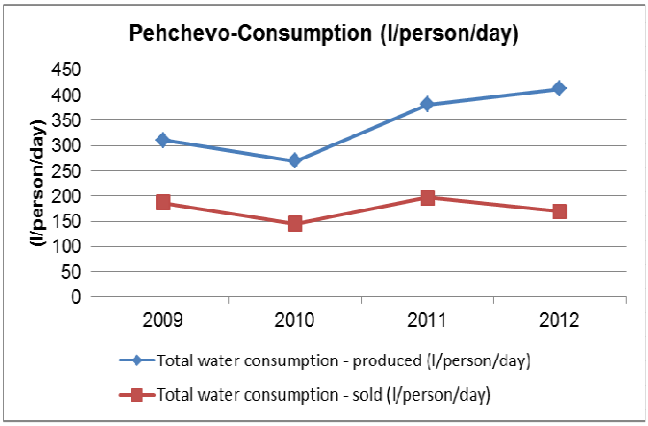

Novaci - Collection rate, Collection period
Collection period (days)
1400
1200
1000
800
600
400
200
0
Collection rate (%)
80
70
60
50
40
30
20
10
0
2012
Collection period
Collection rate

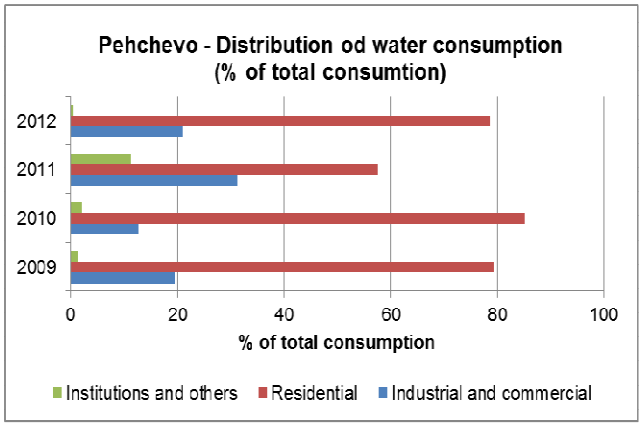

Novaci - Revenue split
% of total revenue
80
70
60
50
40
30
20
10
0
2012
Revenue split - % water
Revenue split - % solid waste
Other

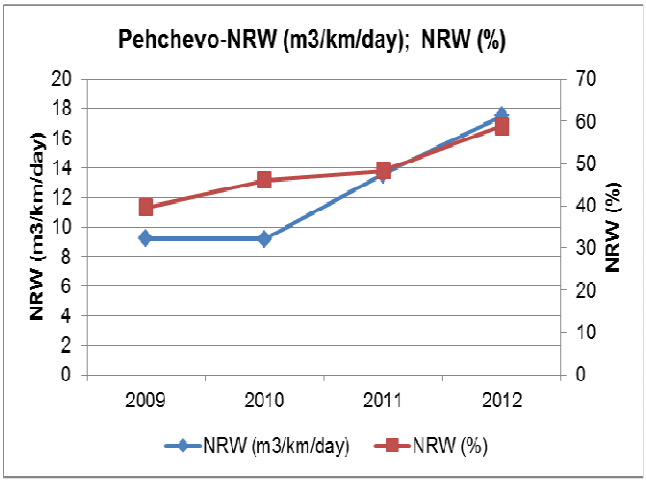

Novaci - Costs split
% of total costs
80
70
60
50
40
30
20
10
0
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

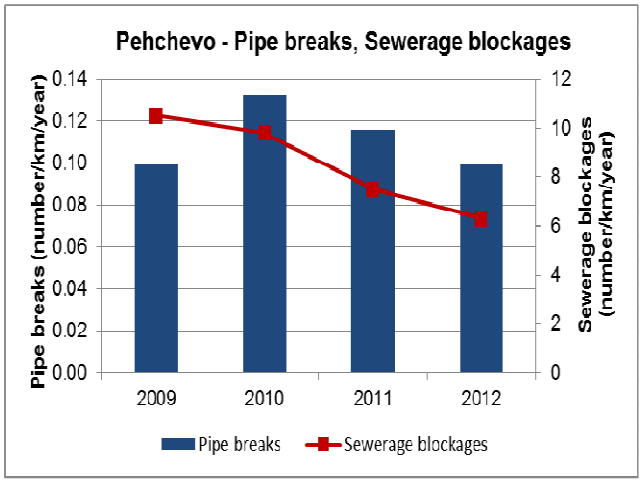

Novaci-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
5
4
3
2
1
0
cost coverage
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

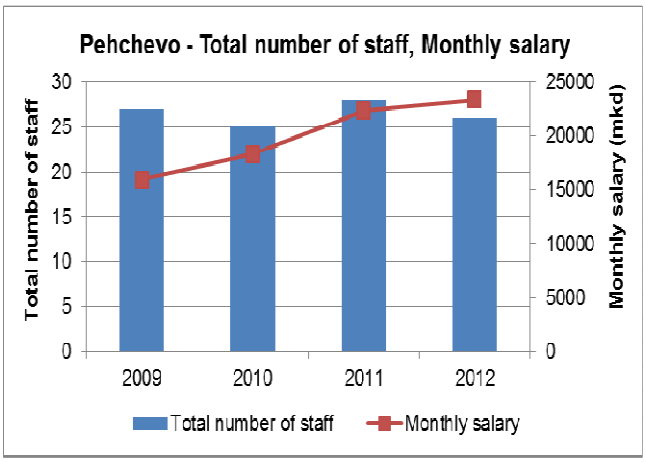
7.17 Pehchevo – JKP Komunalec

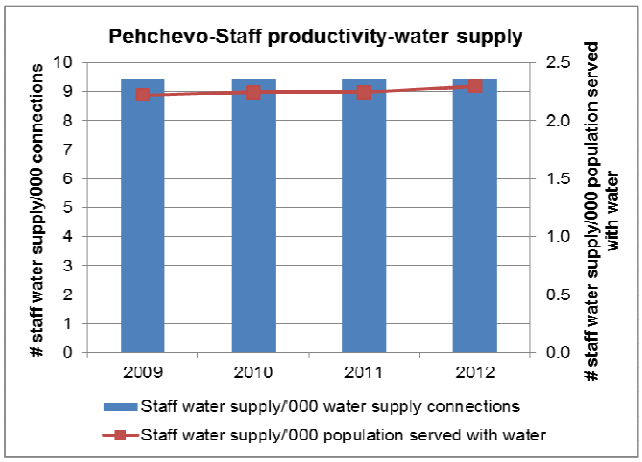


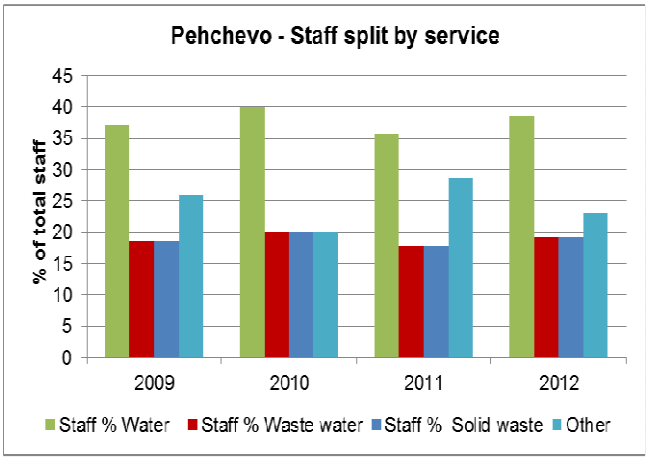


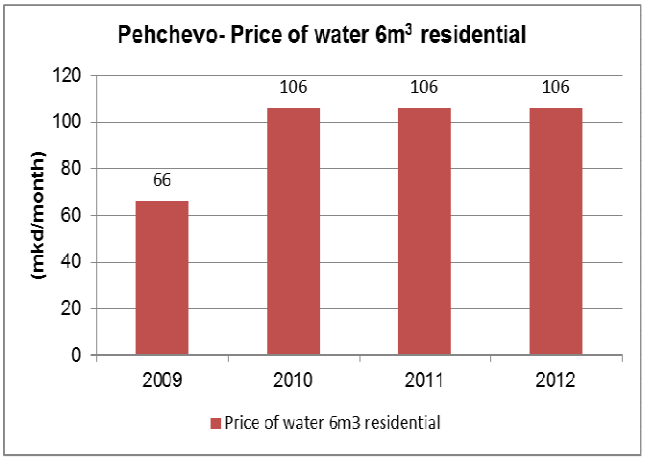


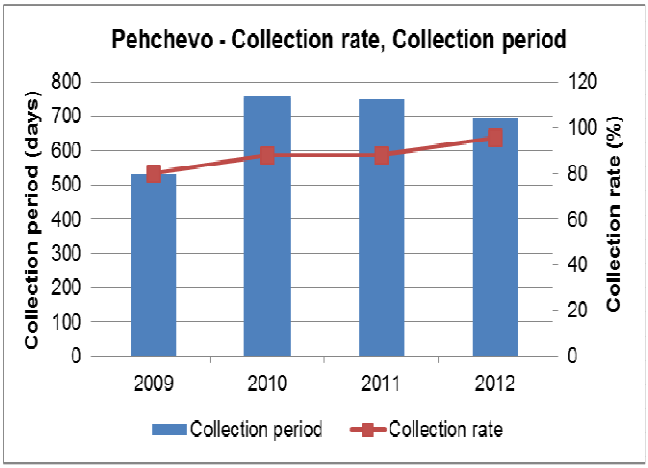


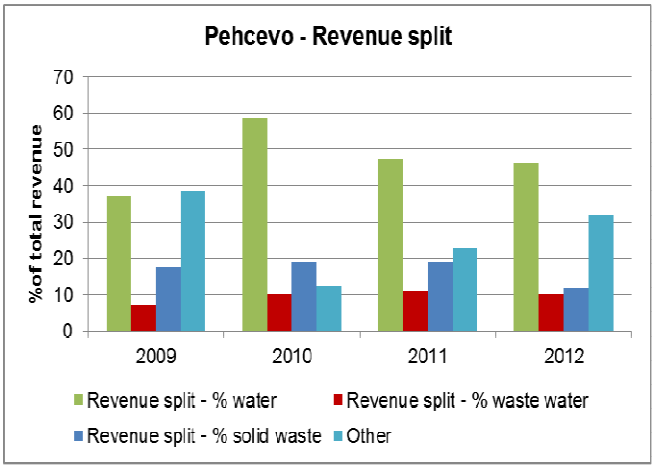


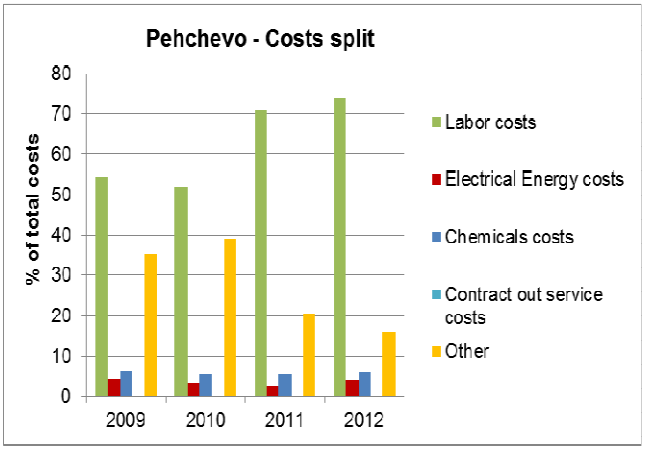


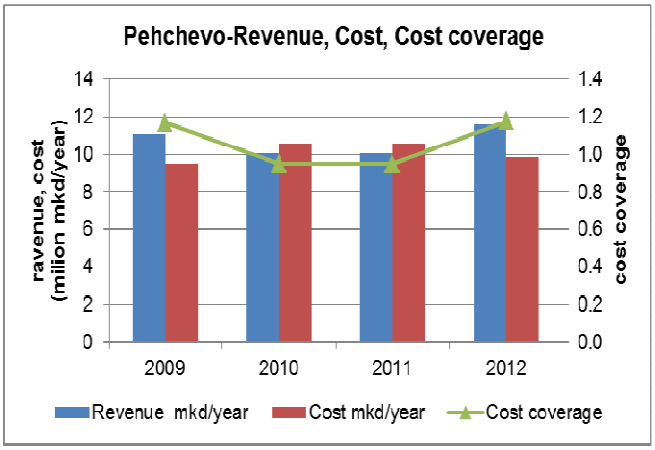

Pehchevo - Staff split by service
% of total staff
45
40
35
30
25
20
15
10
5
0
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Pehchevo- Price of water 6m3 residential
(mkd/month)
120
100
80
60
40
20
0
66
106
106
106
2009
2010
2011
2012
Price of water 6m3 residential

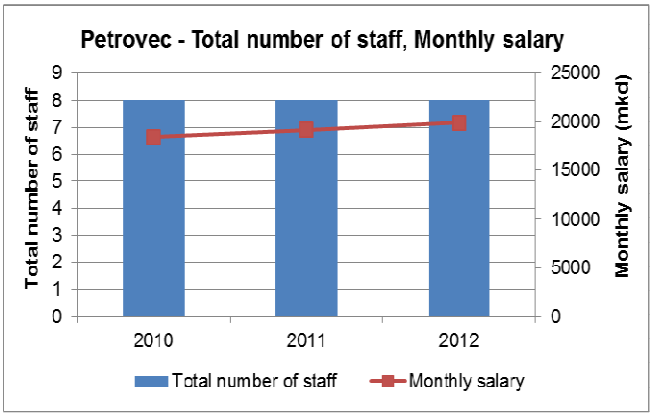

Pehchevo - Collection rate, Collection period
Collection period (days)
800
700
600
500
400
300
200
100
0
Collection rate (%)
120
100
80
60
40
20
0
2009
2010
2011
2012
Collection period
Collection rate

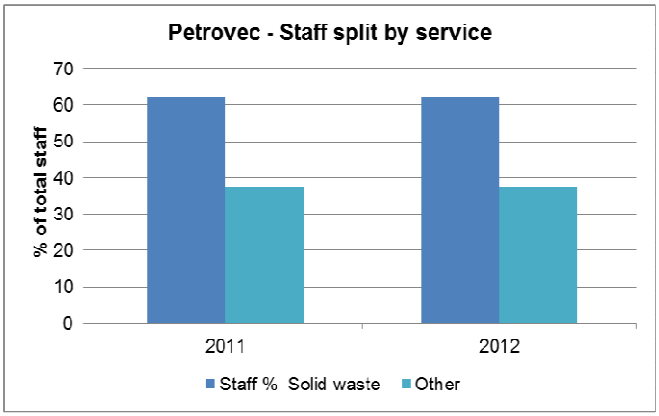

Pehcevo - Revenue split
%of total revenue
70
60
50
40
30
20
10
0
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

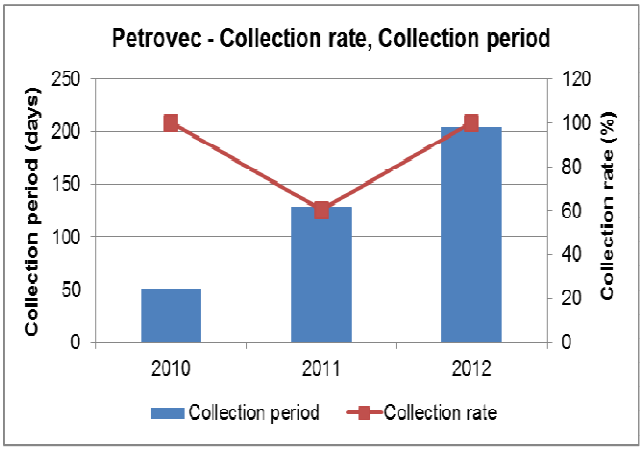

Pehchevo - Costs split
% of total costs
80
70
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

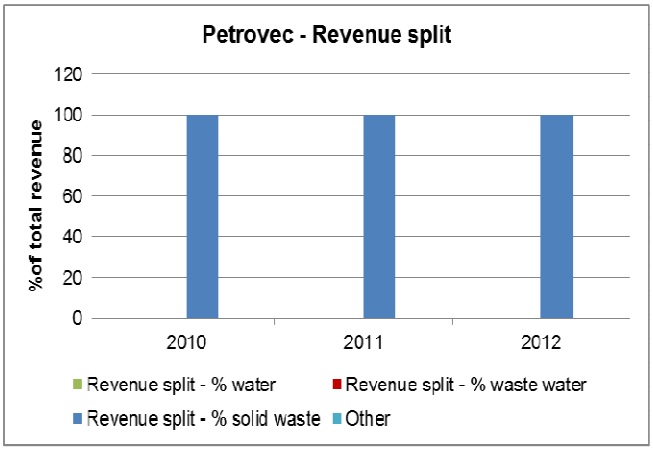

Pehchevo-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
14
12
10
8
6
4
2
0
cost coverage
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

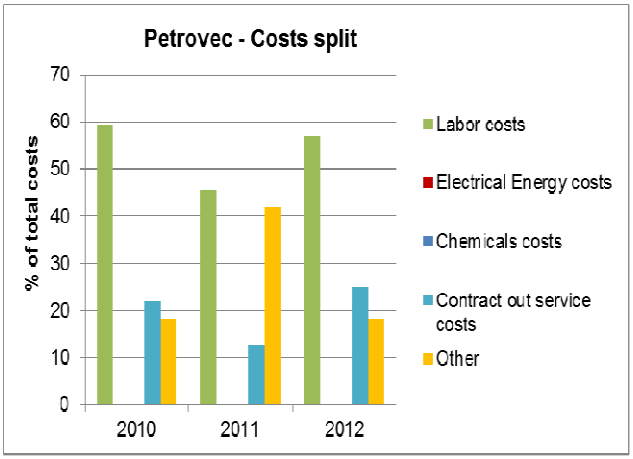
7.18 Petrovec – JKP Petrovec

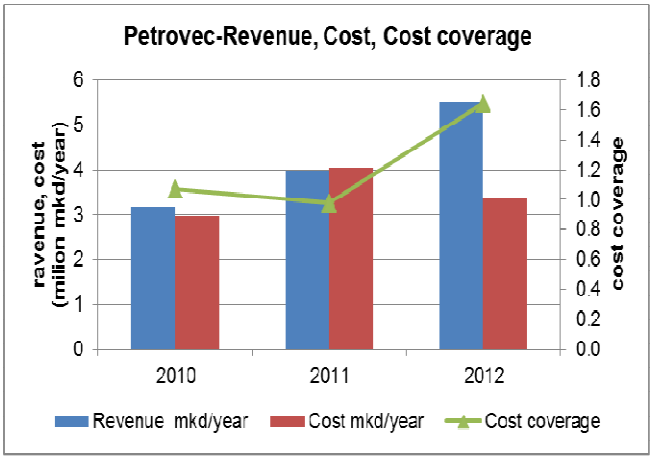




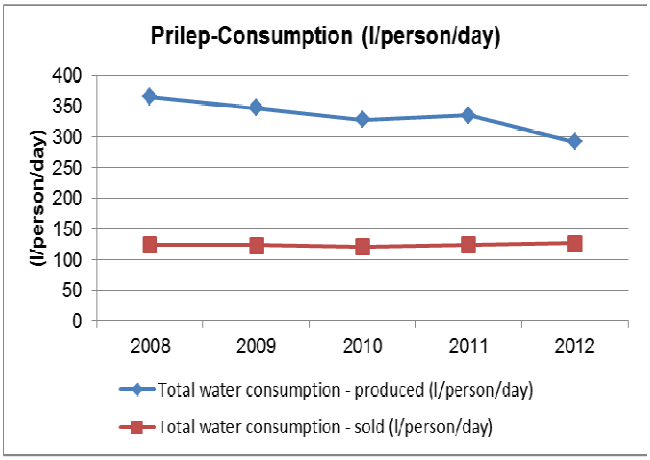


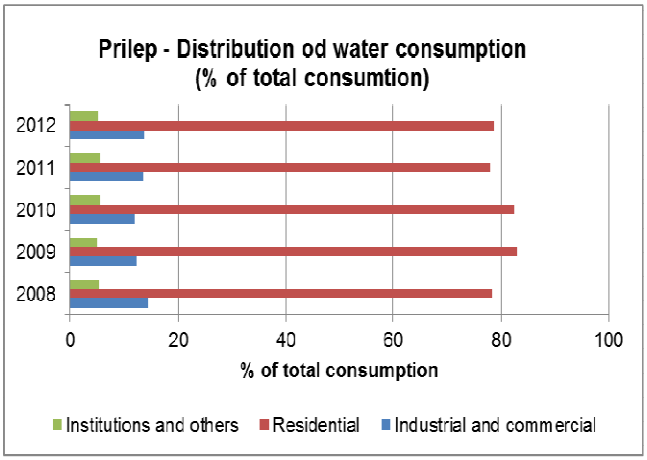


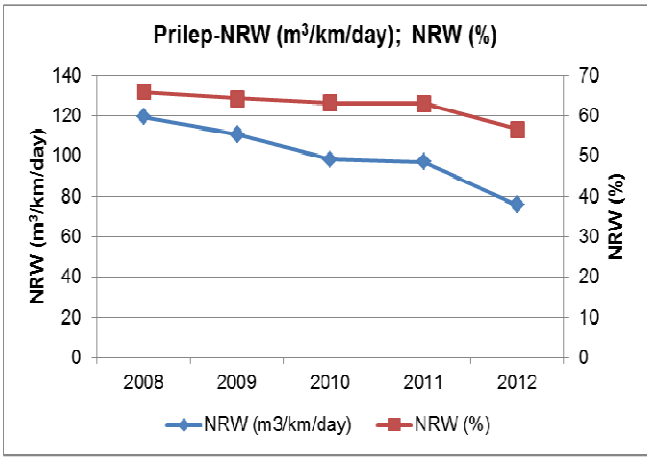


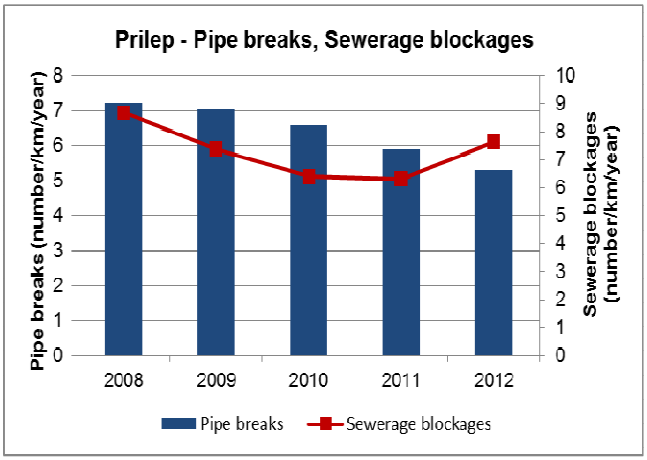


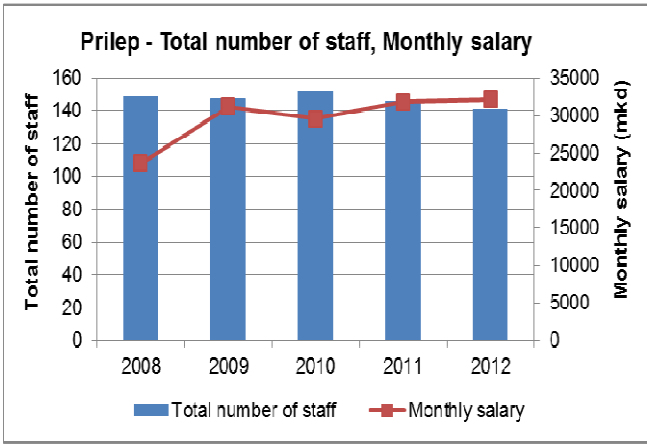
7.19 Prilep – JKP Vodovod I Kanalizacija

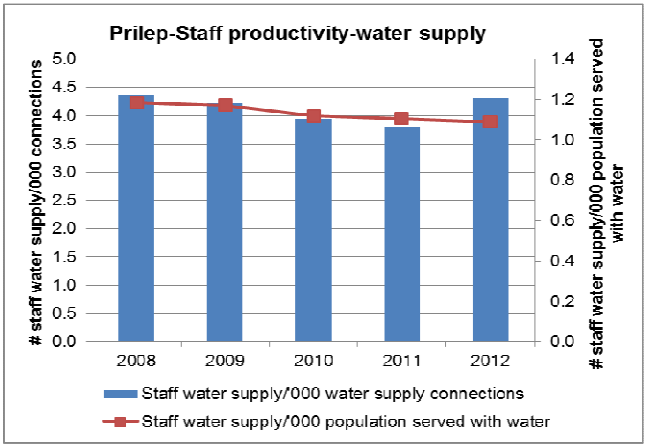


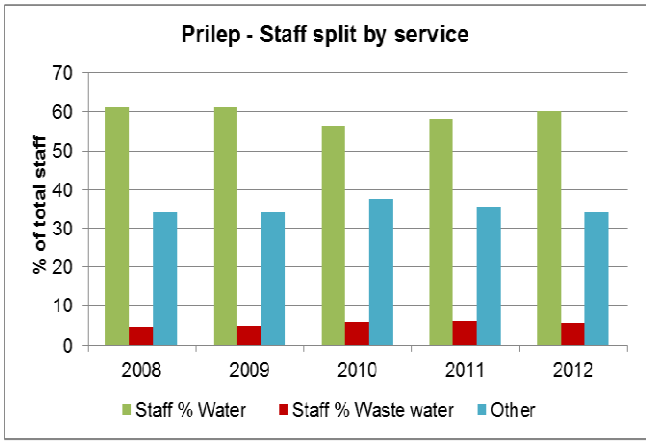


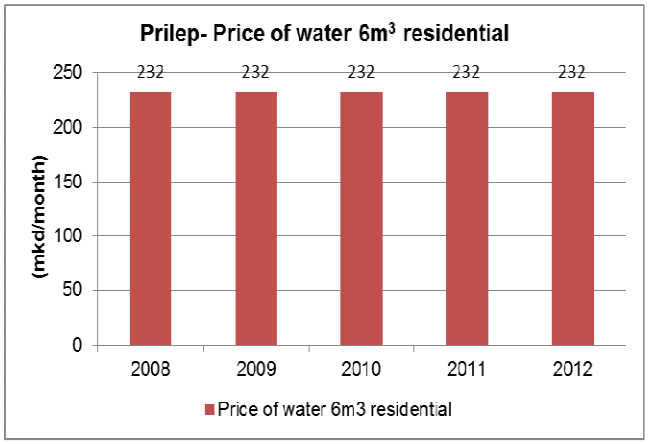


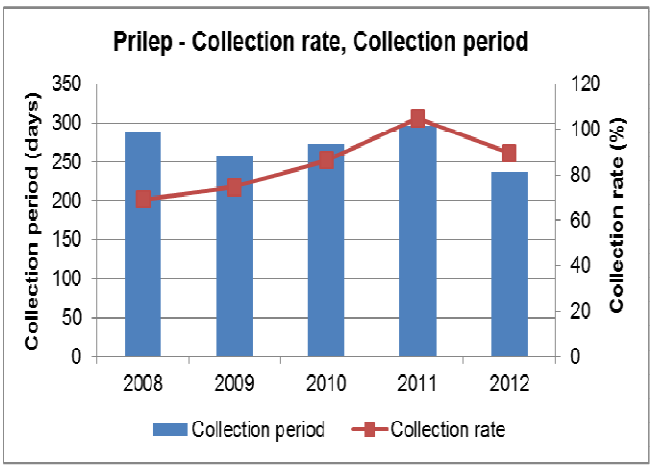


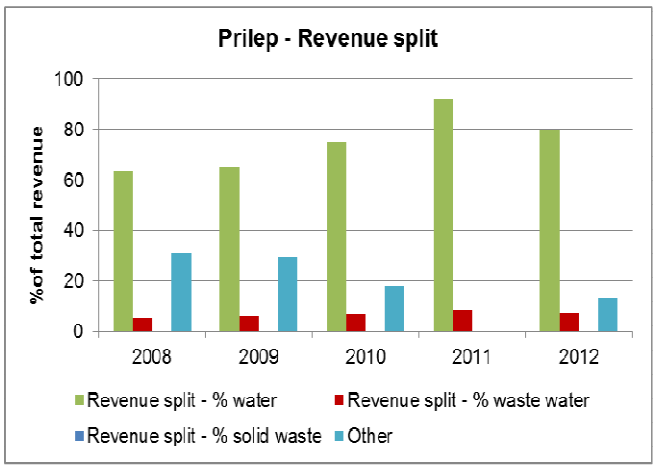


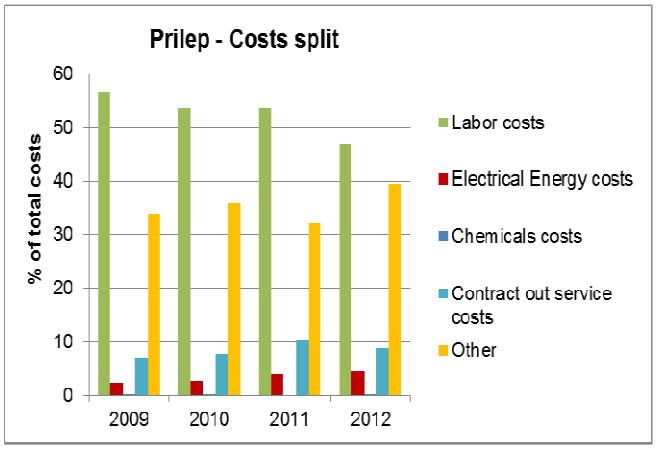


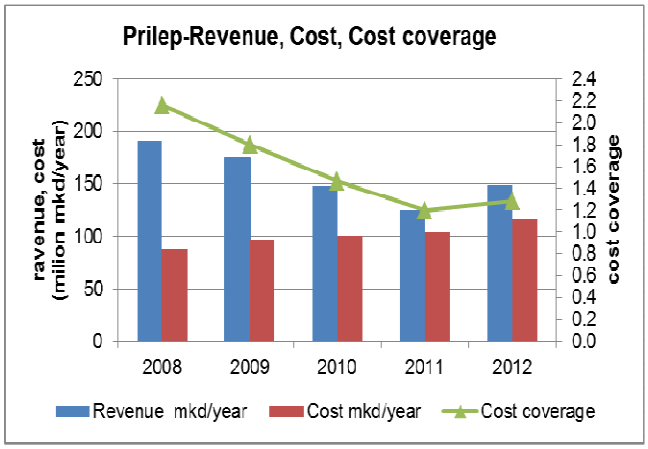

Prilep - Staff split by service
% of total staff
70
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Other


Prilep- Price of water 6m3 residential
(mkd/month)
250
200
150
100
50
0
232
232
232
232
232
2008
2009
2010
2011
2012
Price of water 6m3 residential

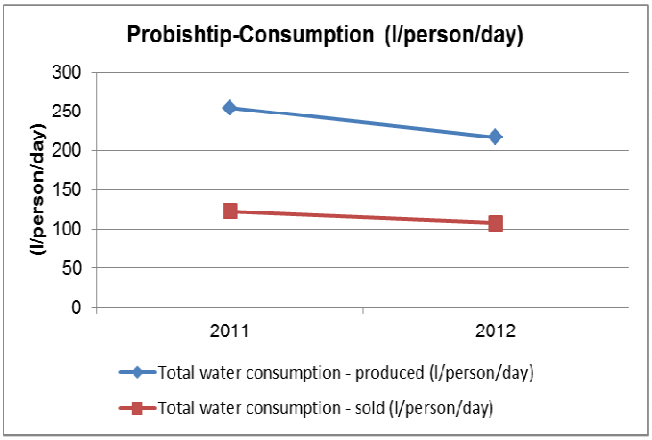

Prilep - Collection rate, Collection period
Collection period (days)
350
300
250
200
150
100
50
0
Collection rate (%)
120
100
80
60
40
20
0
2008
2009
2010
2011
2012
Collection period
Collection rate

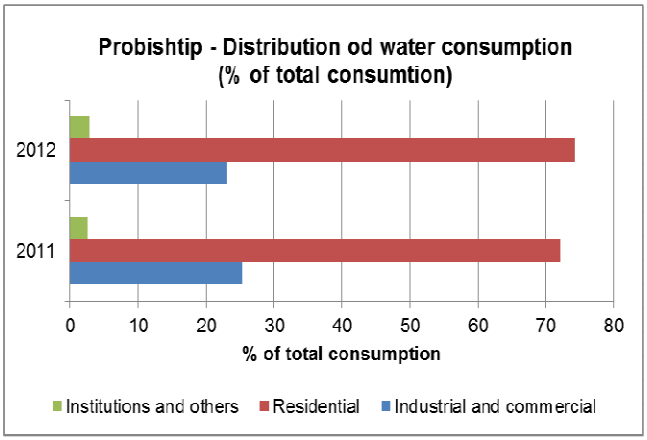

Prilep - Revenue split
%of total revenue
100
80
60
40
20
0
2008
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

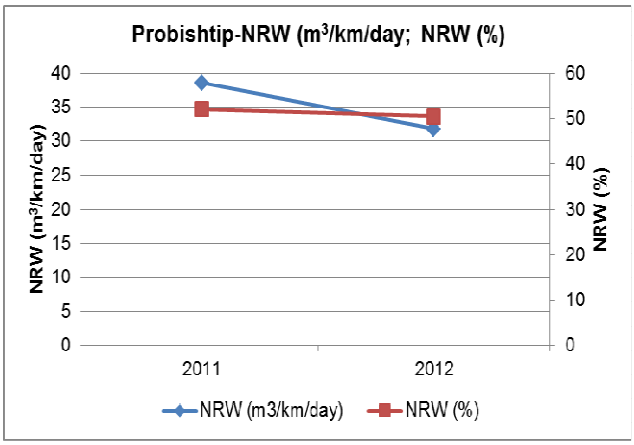

Prilep - Costs split
% of total costs
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

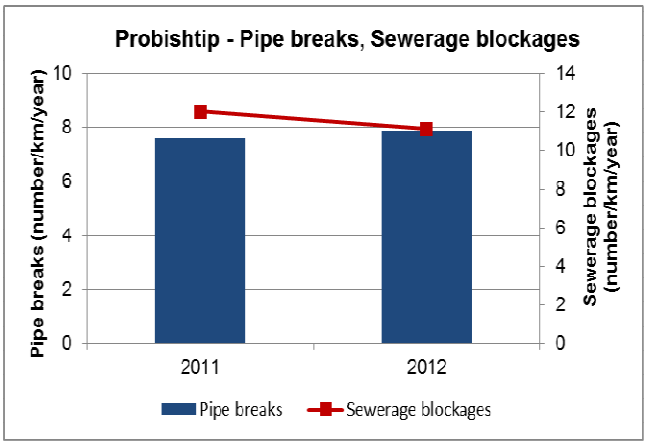

Prilep-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
250
200
150
100
50
0
cost coverage
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2008
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

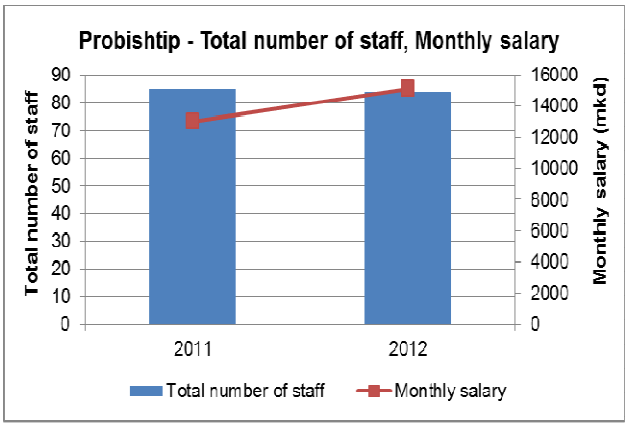
7.20 Probishtip – JKP Nikola Karev

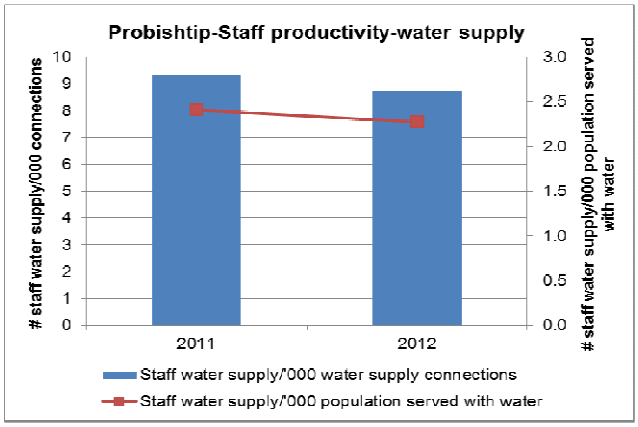


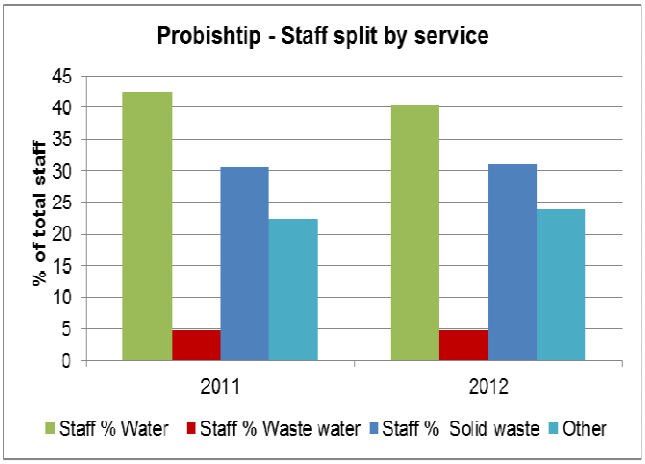


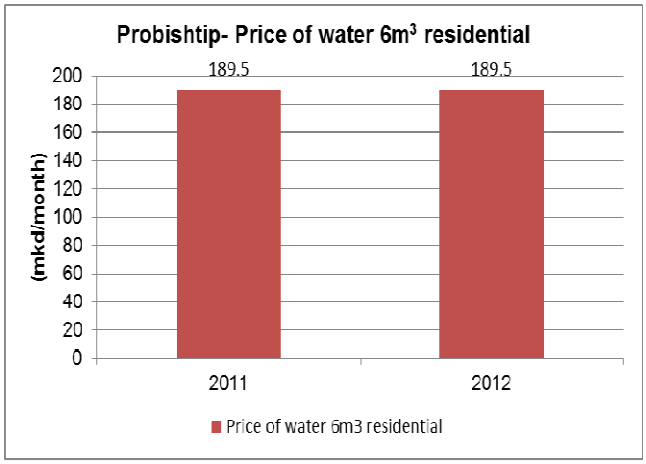


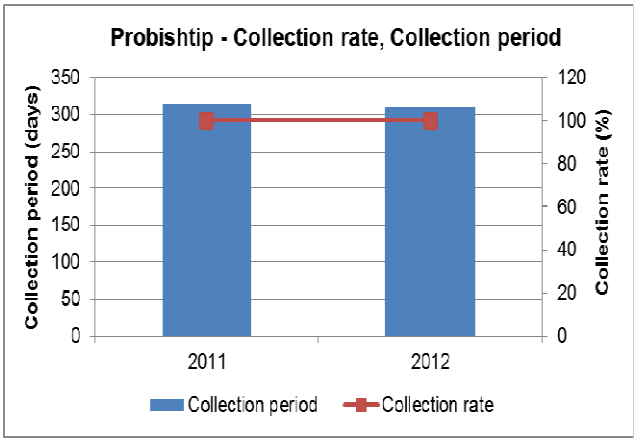


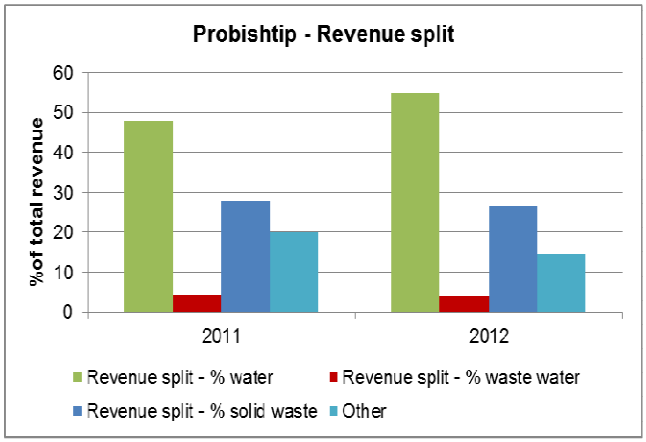


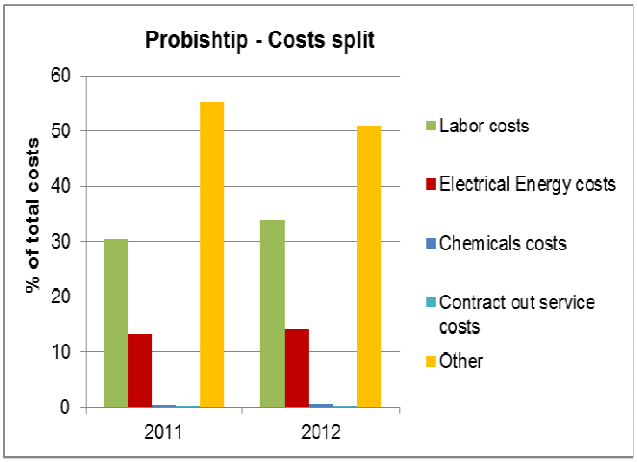


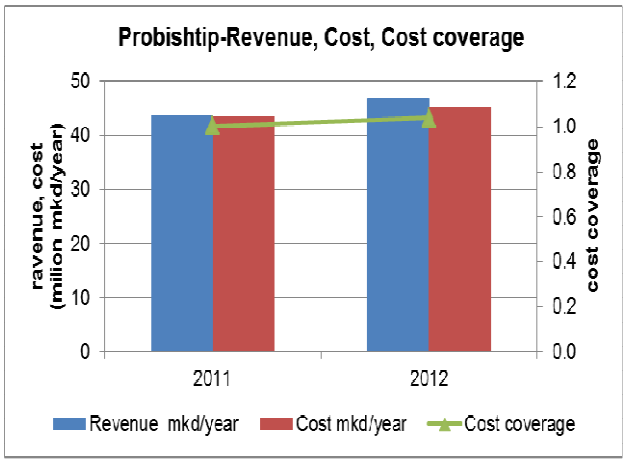

Probishtip - Staff split by service
% of total staff
45
40
35
30
25
20
15
10
5
0
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Probishtip- Price of water 6m3 residential
(mkd/month)
200
180
160
140
120
100
80
60
40
20
0
189.5
189.5
2011
2012
Price of water 6m3 residential

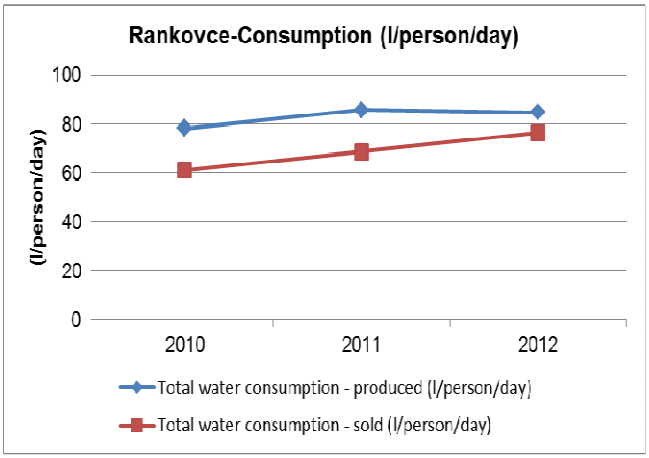

Probishtip - Collection rate, Collection period
Collection period (days)
350
300
250
200
150
100
50
0
120
100
80
60
40
20
0
Collection rate (%)
2011
2012
Collection period
Collection rate

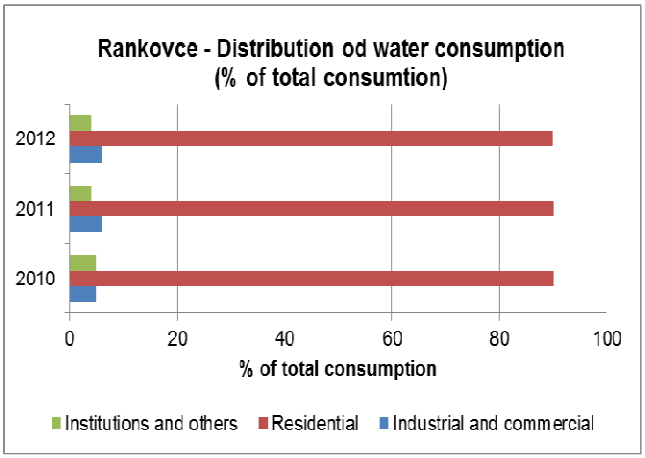

Probishtip - Revenue split
%of total revenue
60
50
40
30
20
10
0
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

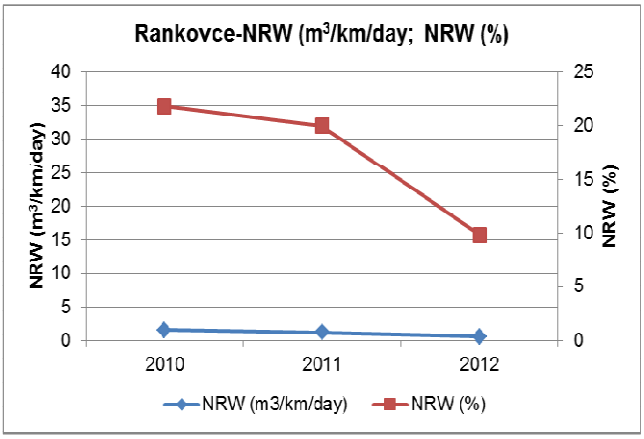

Probishtip - Costs split
% of total costs
60
50
40
30
20
10
0
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

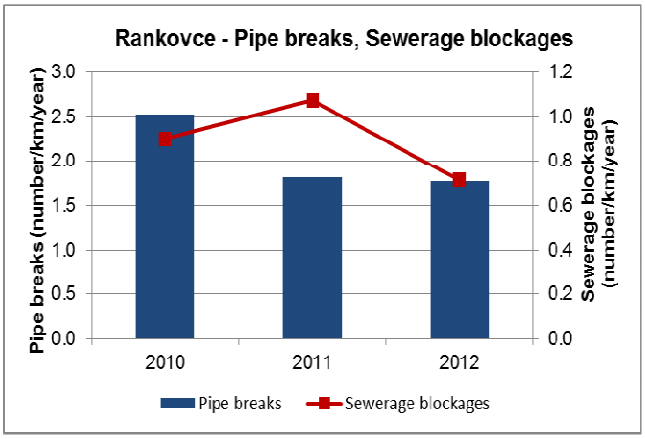

Probishtip-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
50
40
30
20
10
0
1.2
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

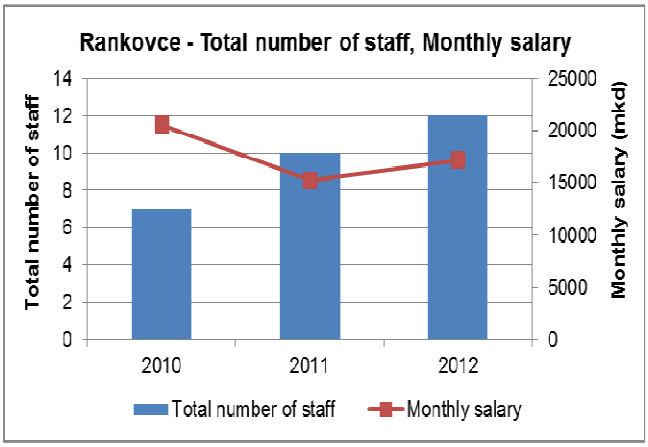
7.21 Rankobce – JKP Chist Den

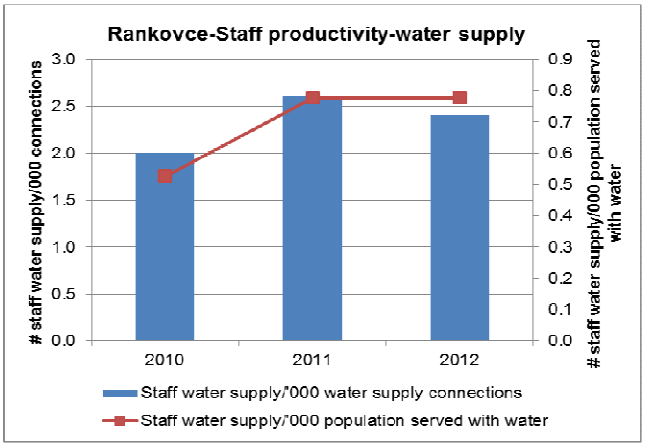


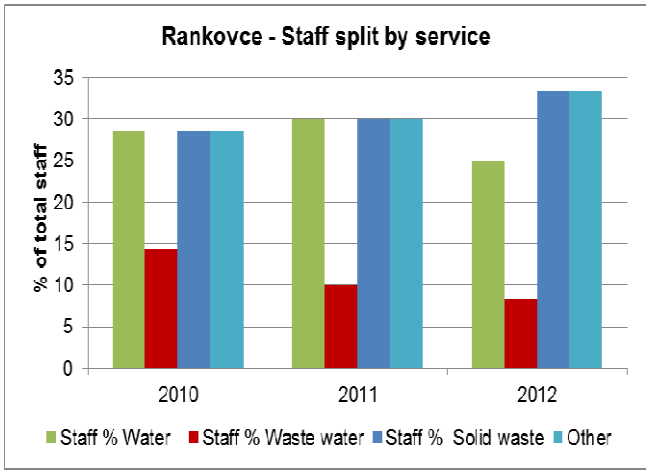


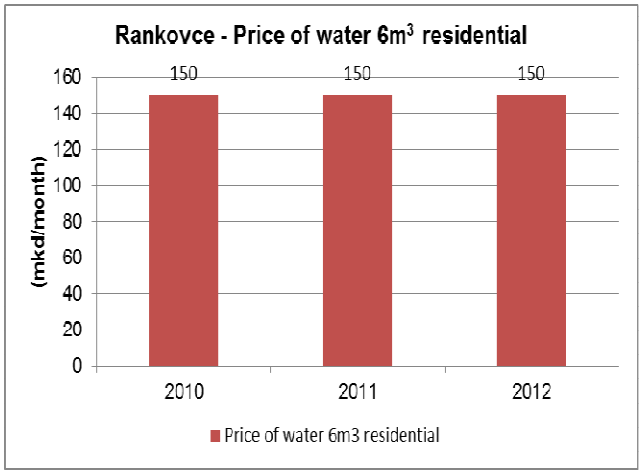


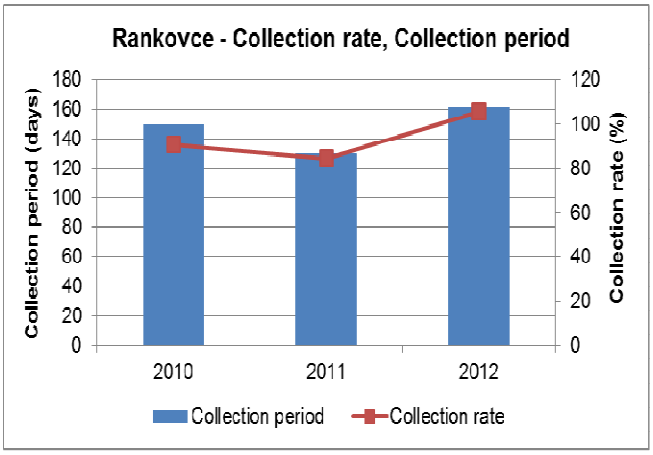


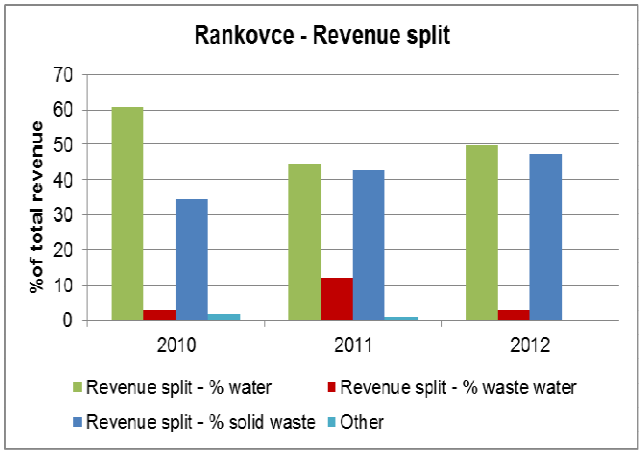


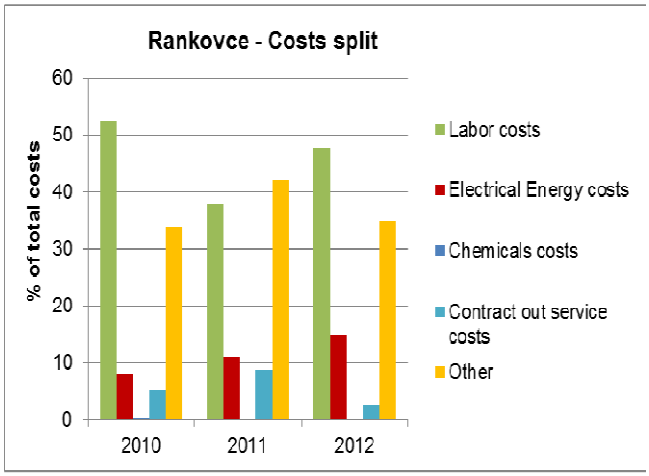


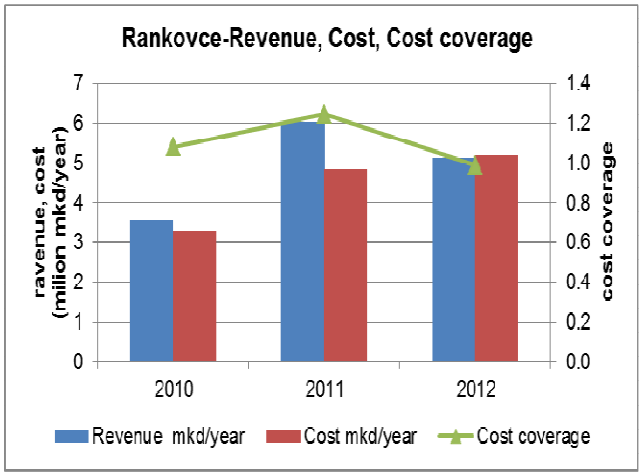

Rankovce - Staff split by service
% of total staff
35
30
25
20
15
10
5
0
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Rankovce - Price of water 6m3 residential
(mkd/month)
160
140
120
100
80
60
40
20
0
150
150
150
2010
2011
2012
Price of water 6m3 residential

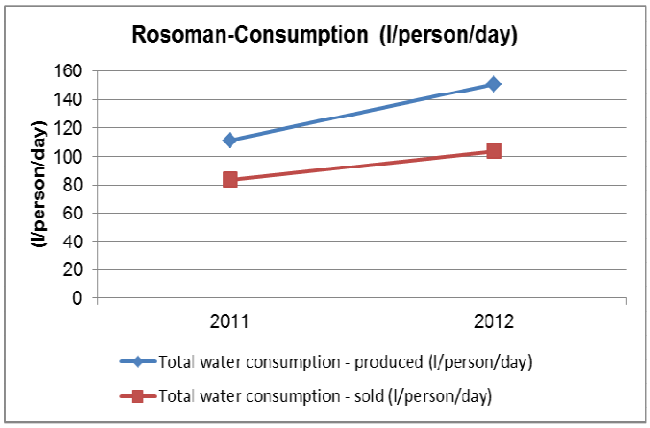

Rankovce - Collection rate, Collection period
Collection period (days)
180
160
140
120
100
80
60
40
20
0
Collection rate (%)
120
100
80
60
40
20
0
2010
2011
2012
Collection period
Collection rate

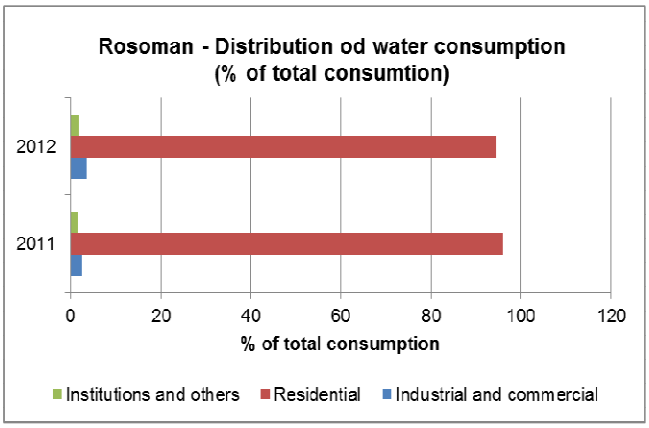

Rankovce - Revenue split
%of total revenue
70
60
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

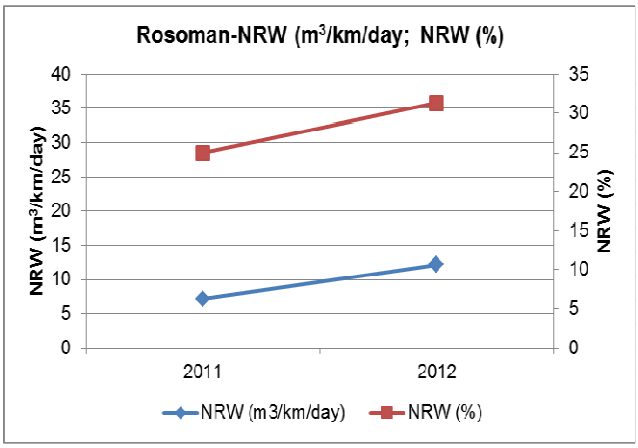

Rankovce - Costs split
% of total costs
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

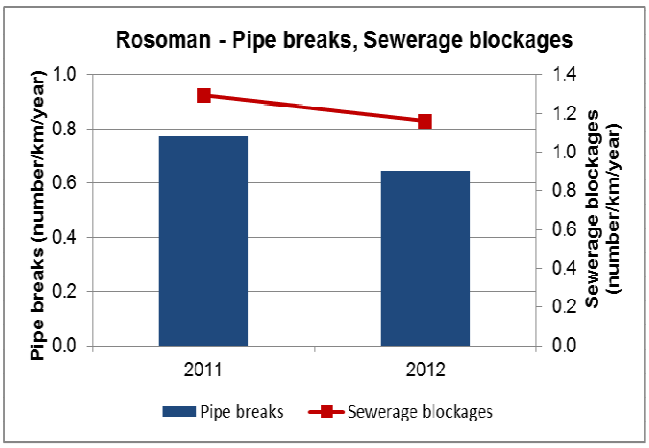

Rankovce-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
7
6
5
4
3
2
1
0
cost coverage
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

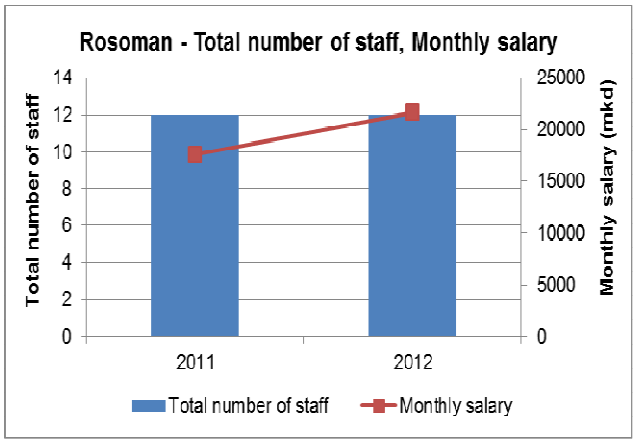
7.22 Rosoman – JPKD Rosoman

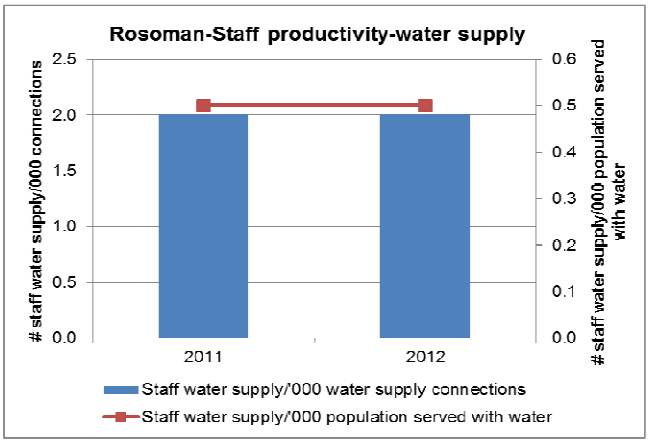


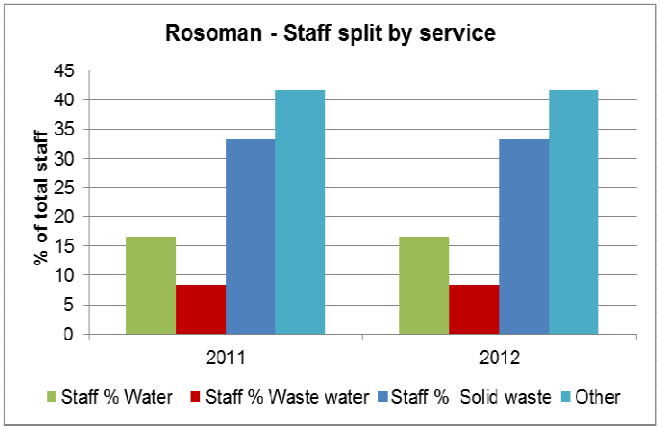


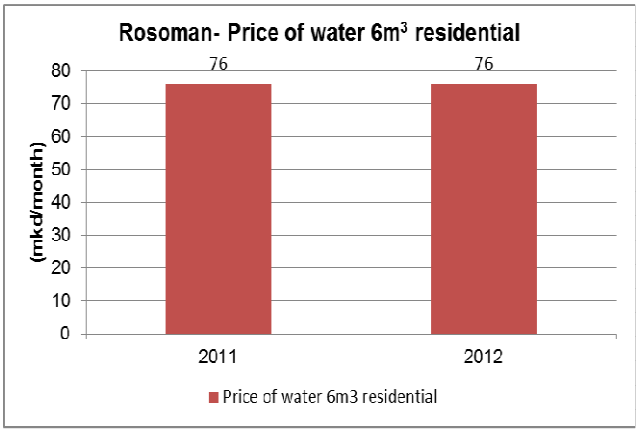


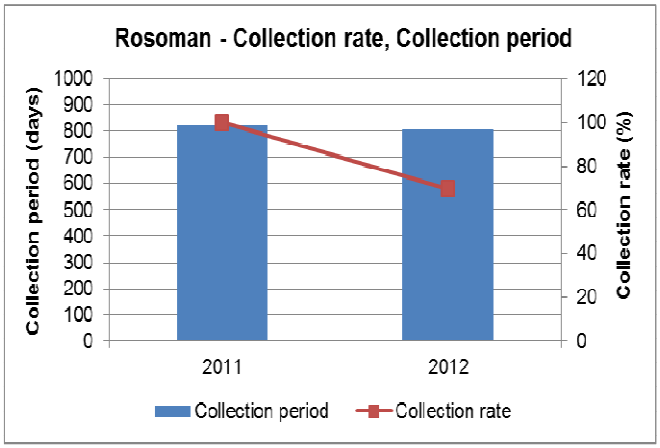


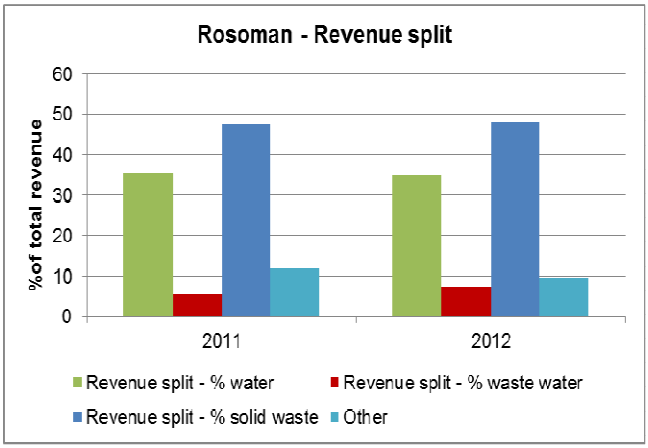


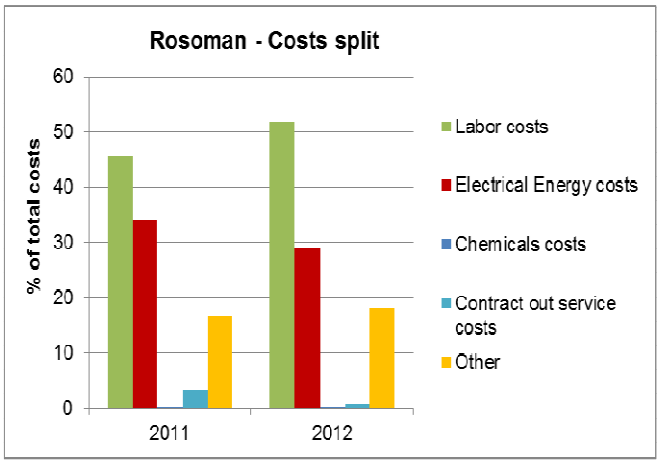


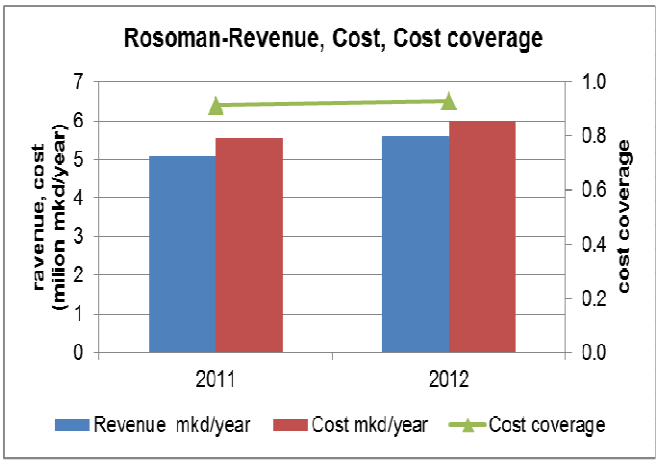

Rosoman - Staff split by service
% of total staff
45
40
35
30
25
20
15
10
5
0
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Rosoman- Price of water 6m3 residential
(mkd/month)
80
70
60
50
40
30
20
10
0
76
76
2011
2012
Price of water 6m3 residential

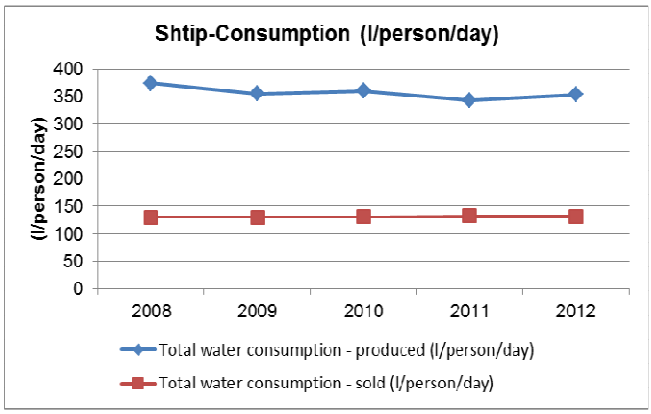

Rosoman - Collection rate, Collection period
Collection period (days)
1000
900
800
700
600
500
400
300
200
100
0
120
100
80
60
40
20
0
Collection rate (%)
2011
2012
Collection period
Collection rate

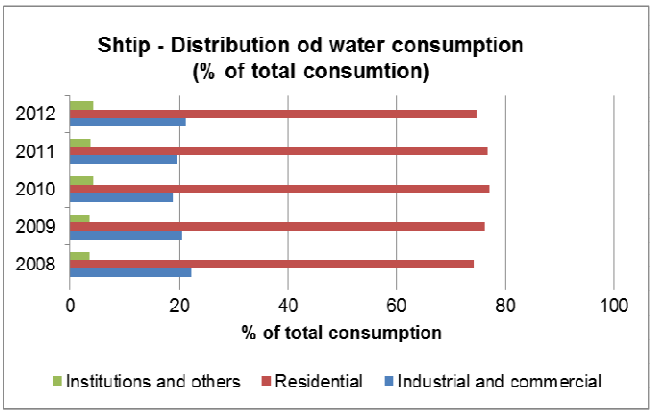

Rosoman - Revenue split
%of total revenue
60
50
40
30
20
10
0
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

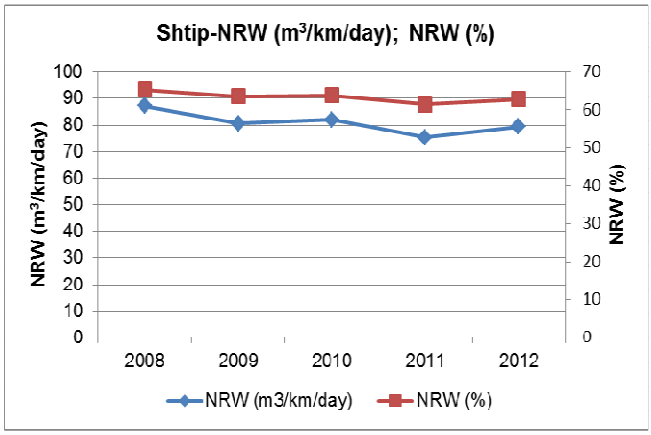

Rosoman - Costs split
% of total costs
60
50
40
30
20
10
0
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

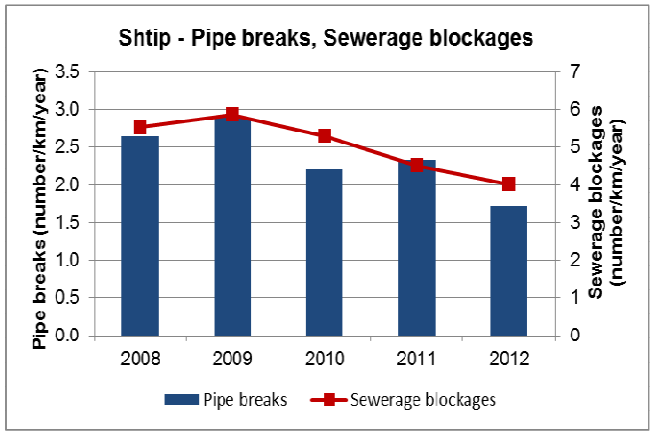

Rosoman-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
7
6
5
4
3
2
1
0
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

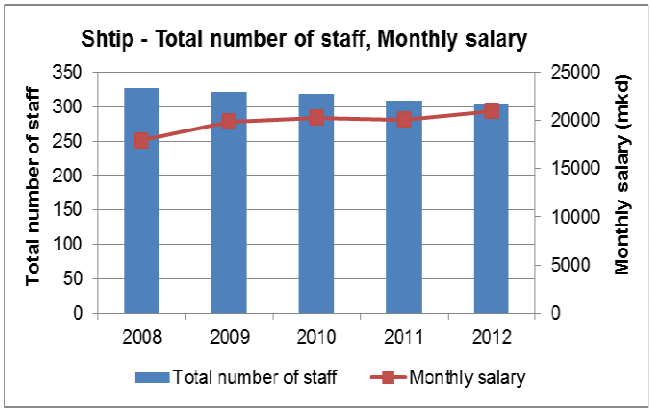
7.23 Shtip – JP Isar

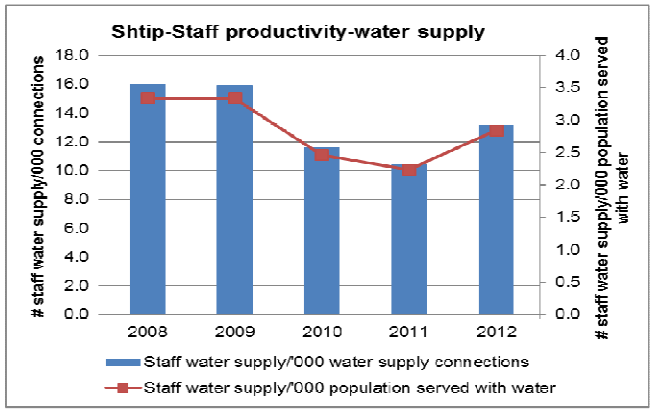


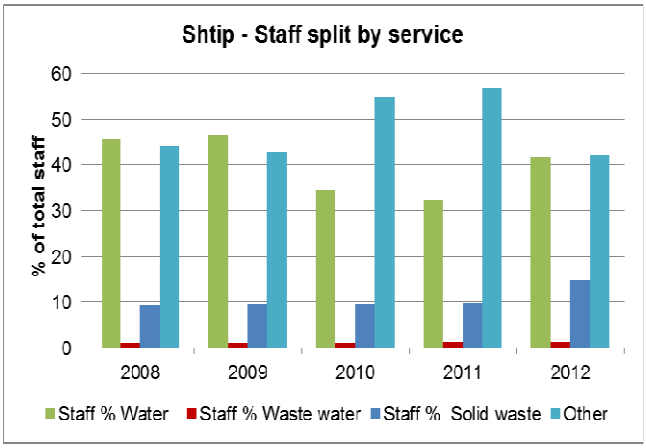


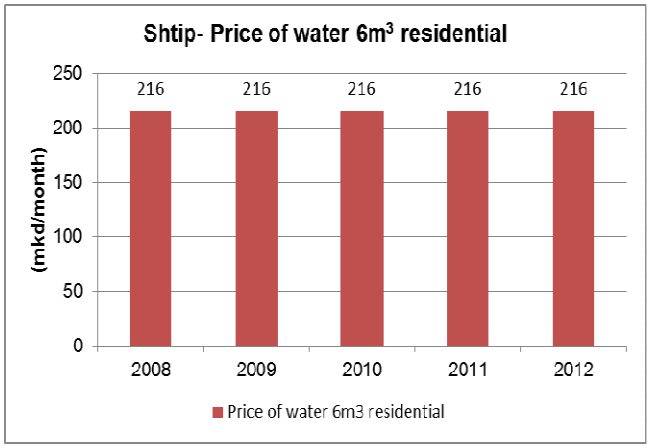


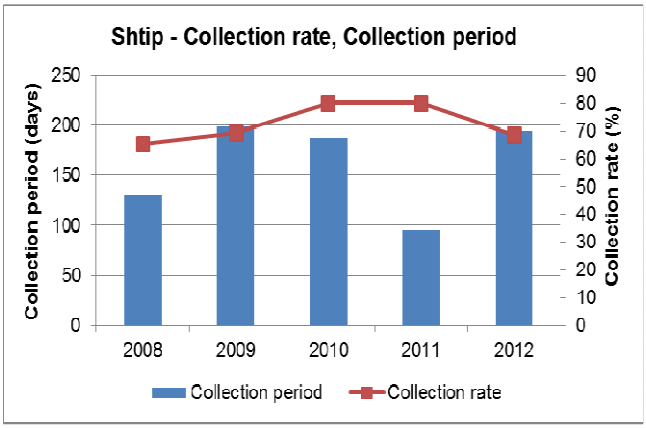


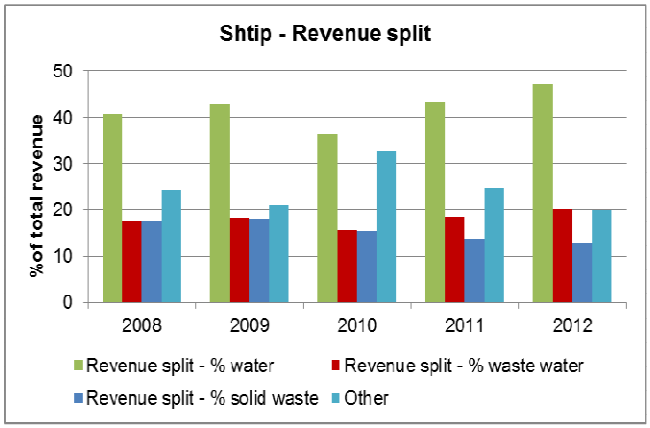


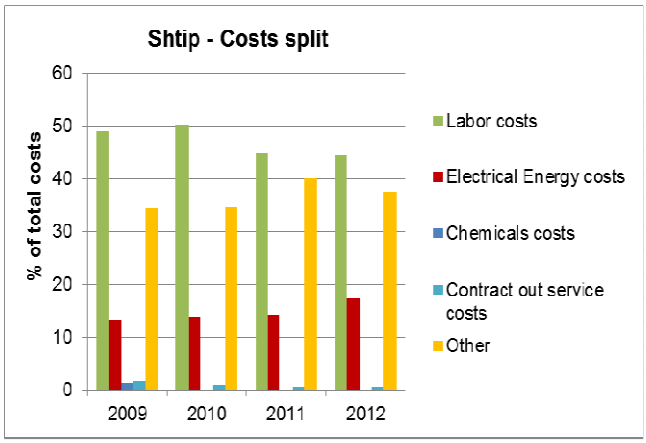


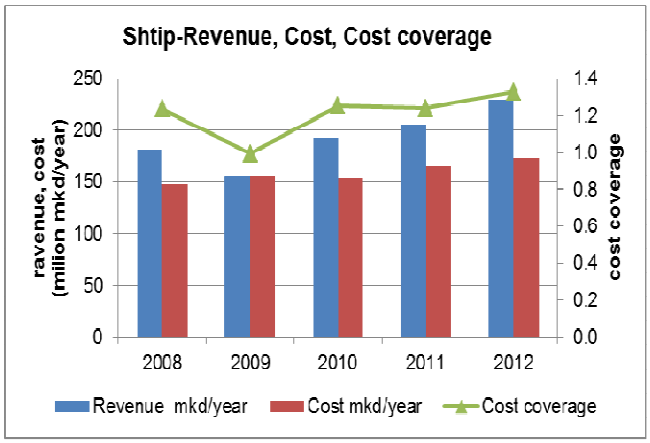

Shtip - Staff split by service
% of total staff
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Shtip- Price of water 6m3 residential
(mkd/month)
250
200
150
100
50
0
216
216
216
216
216
2008
2009
2010
2011
2012
Price of water 6m3 residential

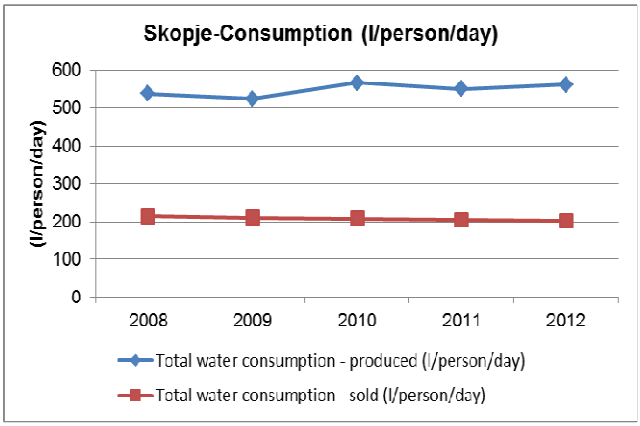

Shtip - Collection rate, Collection period
Collection period (days)
250
200
150
100
50
0
Collection rate (%)
90
80
70
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Collection period
Collection rate

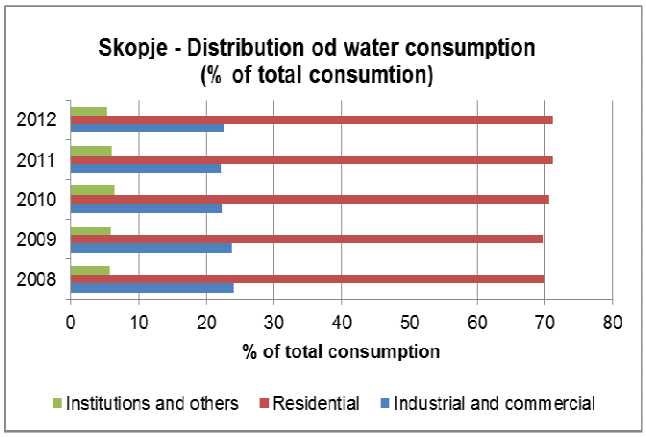

Shtip - Revenue split
%of total revenue
50
40
30
20
10
0
2008
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

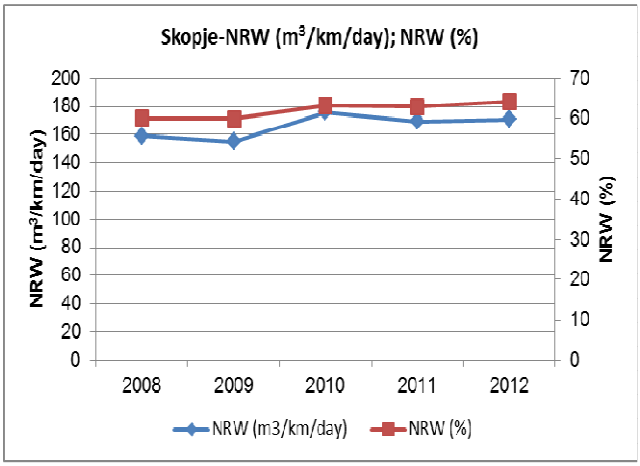

Shtip - Costs split
% of total costs
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

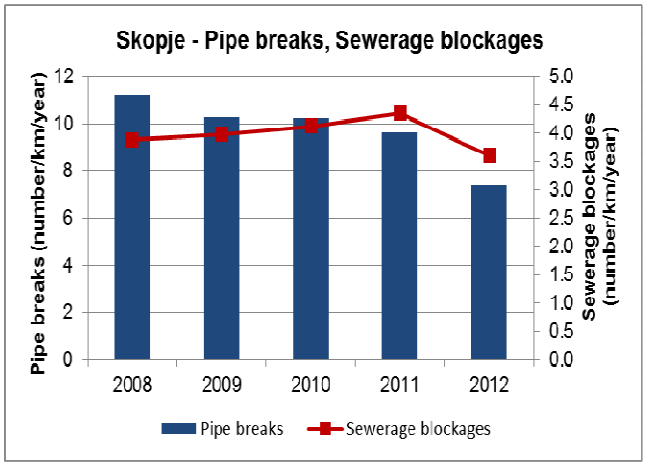

Shtip-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
250
200
150
100
50
0
cost coverage
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2008
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

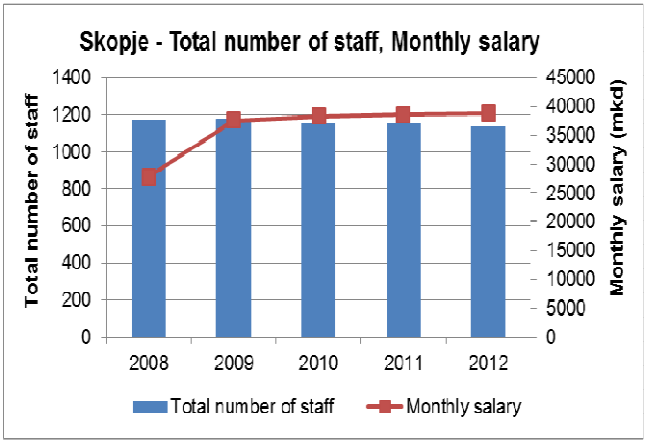
7.24 Skopje – JP Vodovod I Kanalizacija

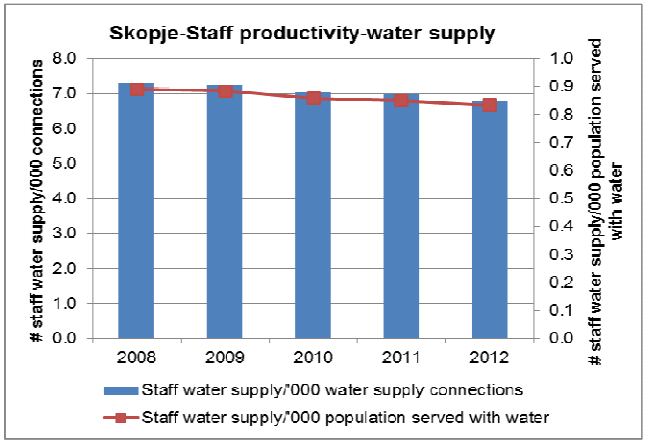


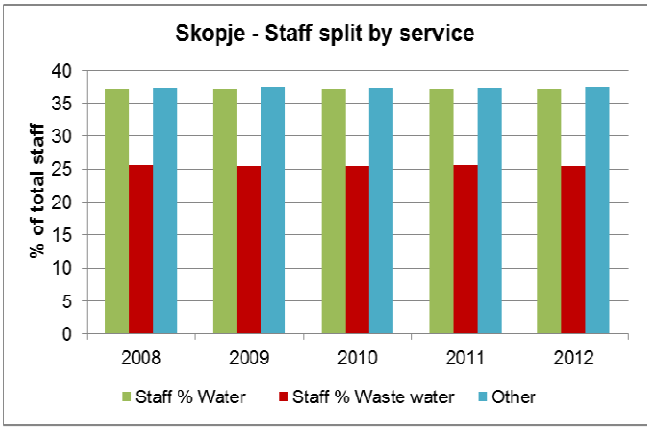


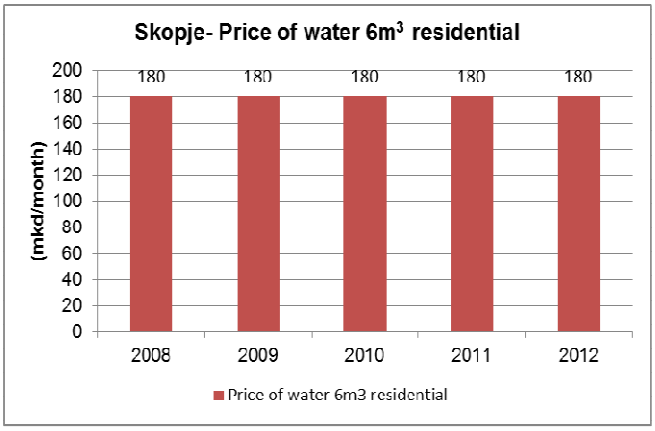


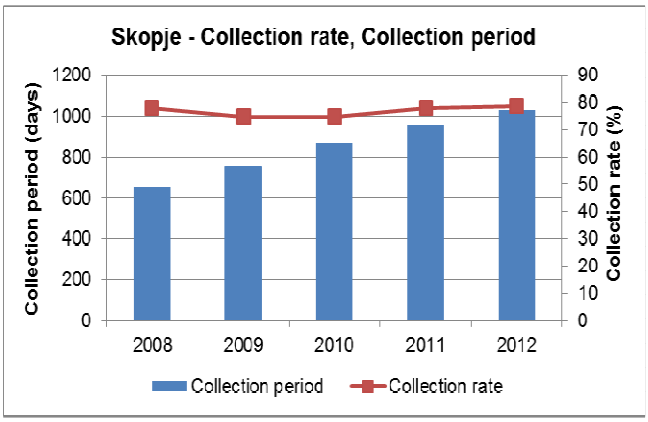


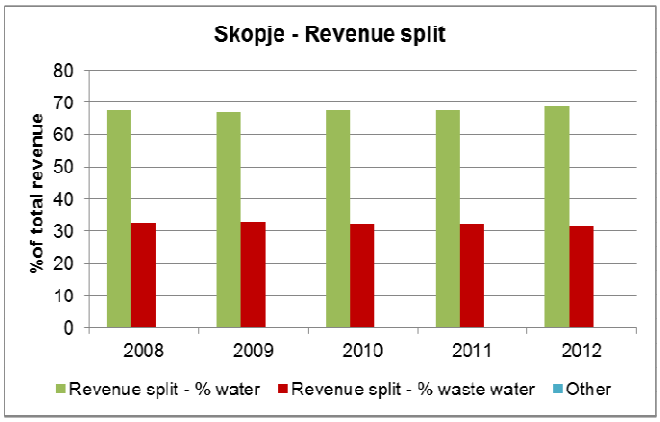


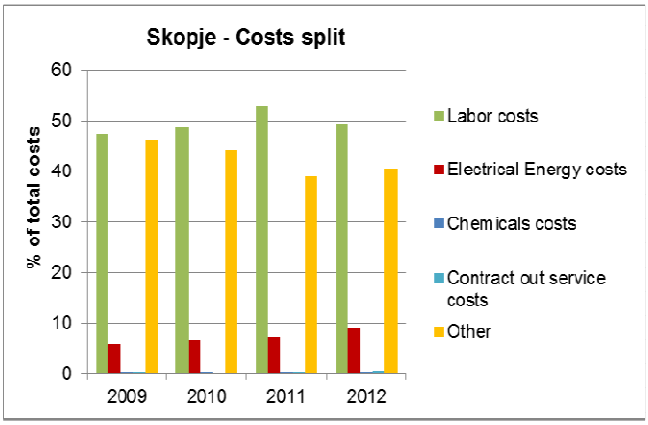


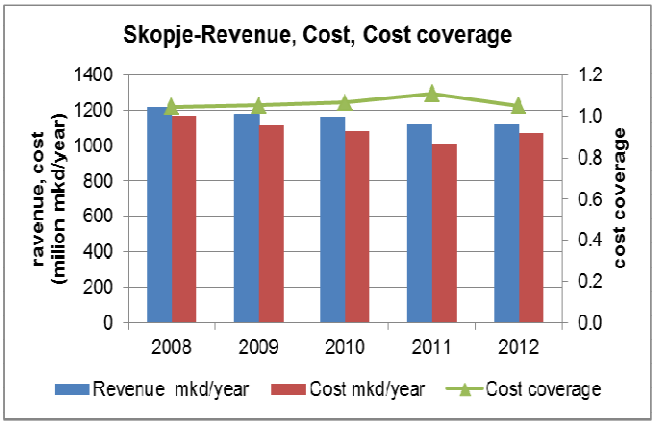

Skopje - Staff split by service
% of total staff
40
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Other


Skopje- Price of water 6m3 residential
(mkd/month)
200
180
160
140
120
100
80
60
40
20
0
180
180
180
180
180
2008
2009
2010
2011
2012
Price of water 6m3 residential

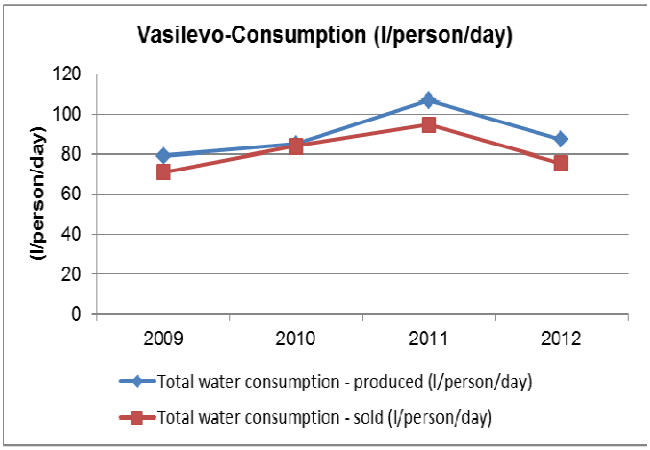

Skopje - Collection rate, Collection period
Collection period (days)
1200
1000
800
600
400
200
0
Collection rate (%)
90
80
70
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Collection period
Collection rate

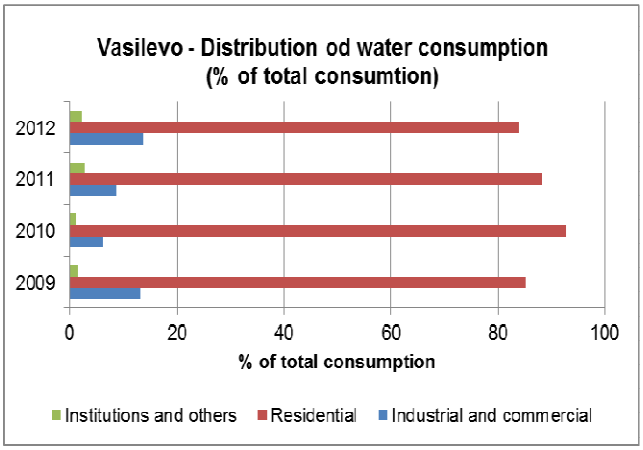

Skopje - Revenue split
%of total revenue
80
70
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Other

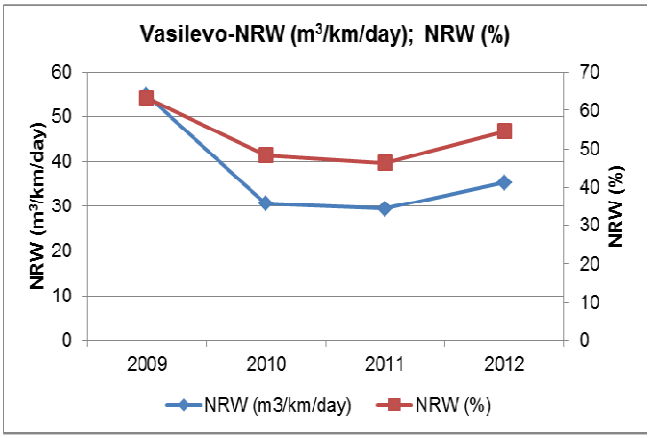

Skopje - Costs split
% of total costs
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

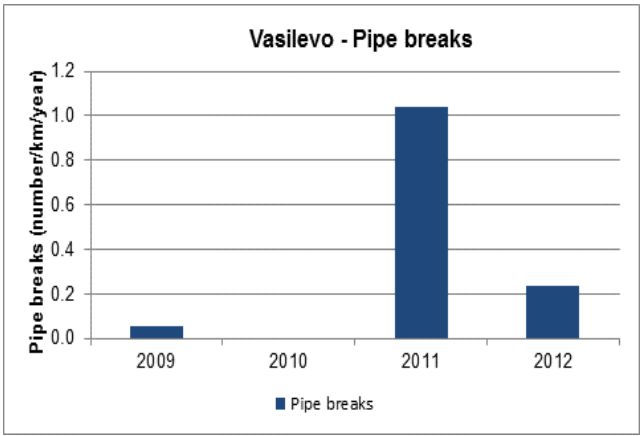

Skopje-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
1400
1200
1000
800
600
400
200
0
cost coverage
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2008
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

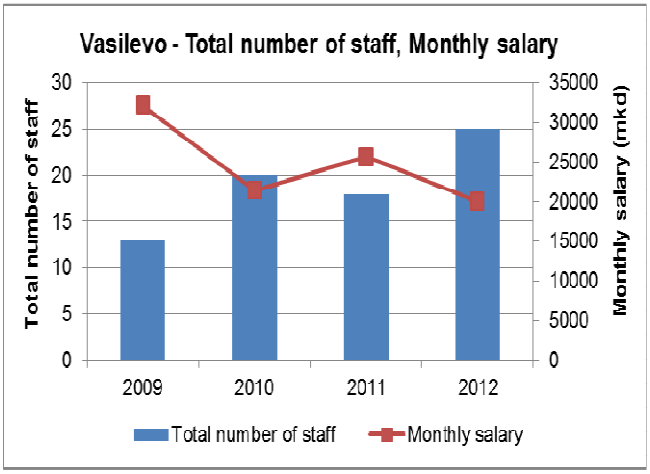
7.25 Vasilevo – JPKD Turija

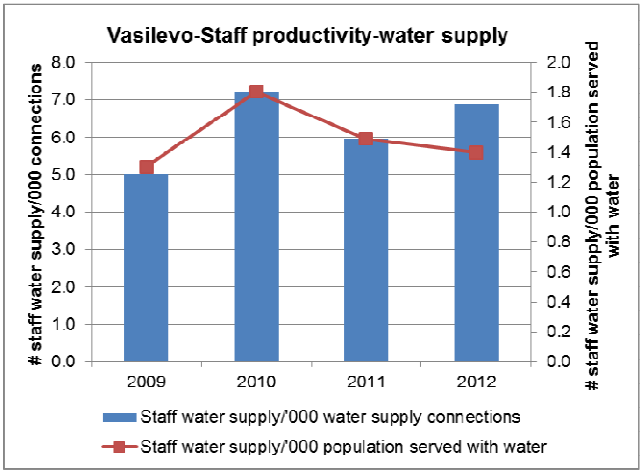


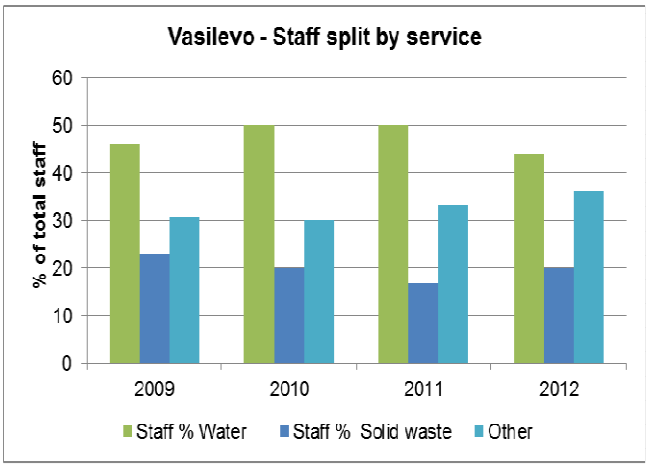


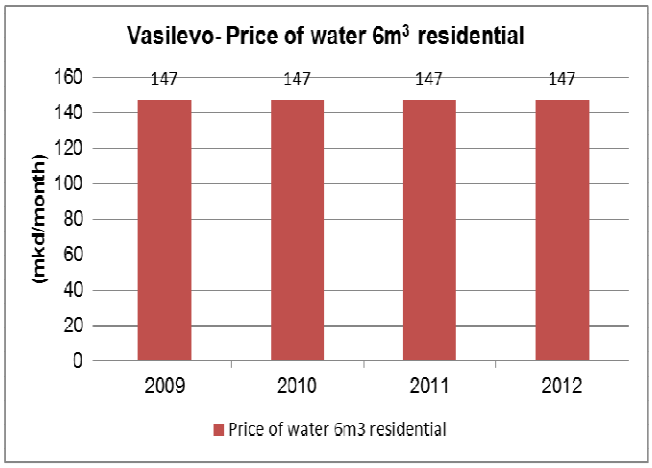


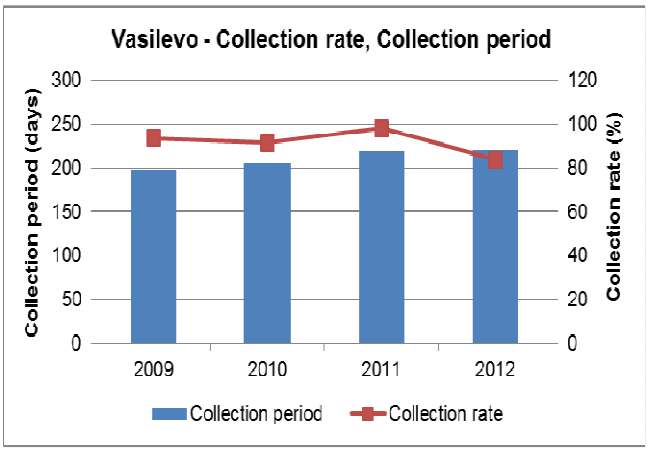


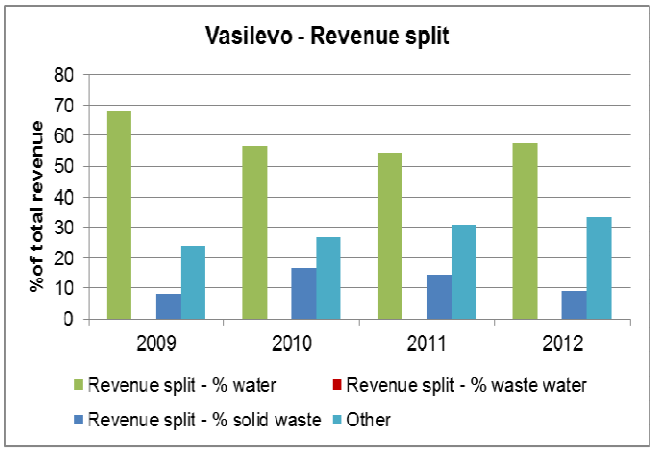


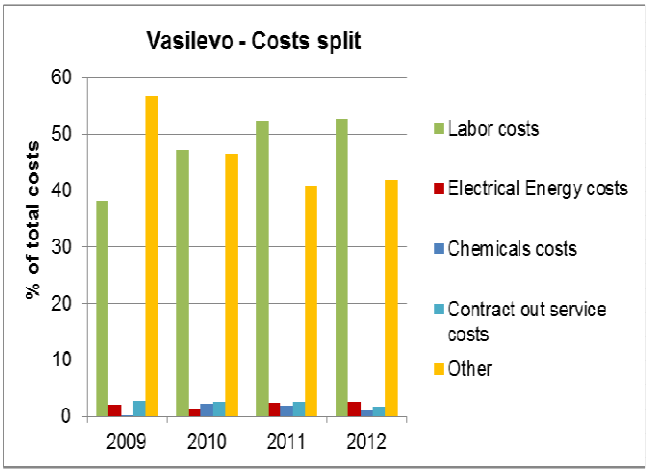


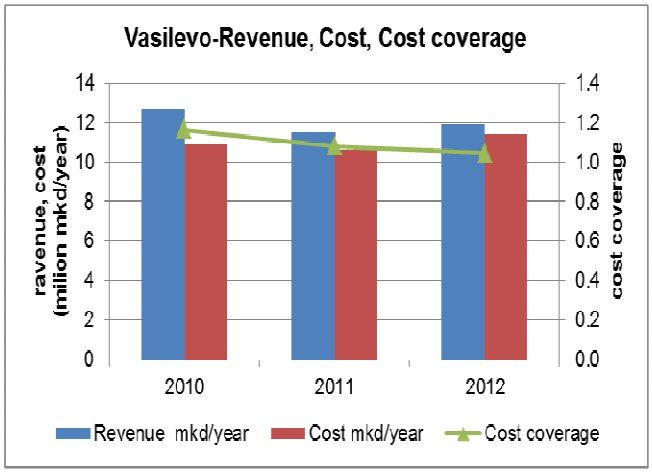

Vasilevo - Staff split by service
% of total staff
60
50
40
30
20
10
0
2009
2010
2011
2012
Staff % Water
Staff % Solid waste
Other


Vasilevo- Price of water 6m3 residential
(mkd/month)
160
140
120
100
80
60
40
20
0
147
147
147
147
2009
2010
2011
2012
Price of water 6m3 residential

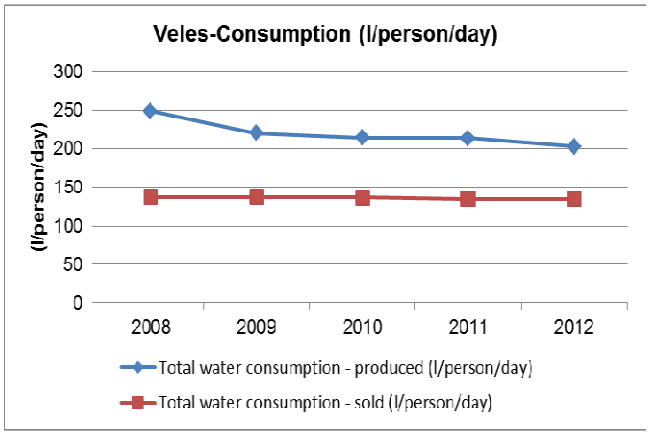

Vasilevo - Collection rate, Collection period
Collection period (days)
300
250
200
150
100
50
0
Collection rate (%)
120
100
80
60
40
20
0
2009
2010
2011
2012
Collection period
Collection rate

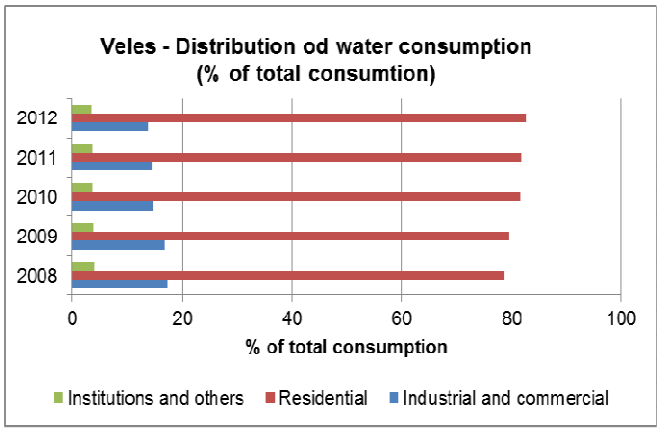

Vasilevo - Revenue split
%of total revenue
80
70
60
50
40
30
20
10
0
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

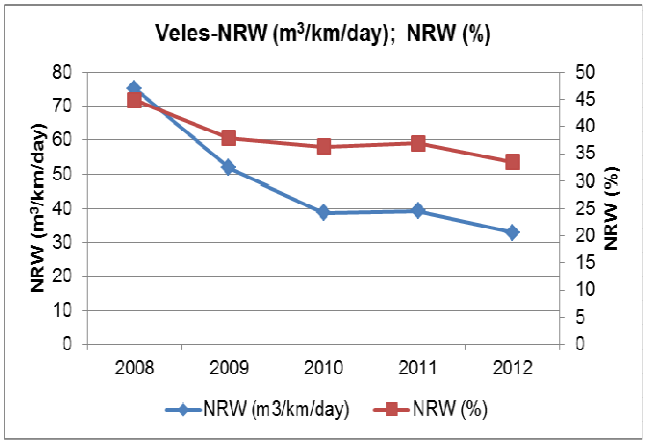

Vasilevo - Costs split
% of total costs
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

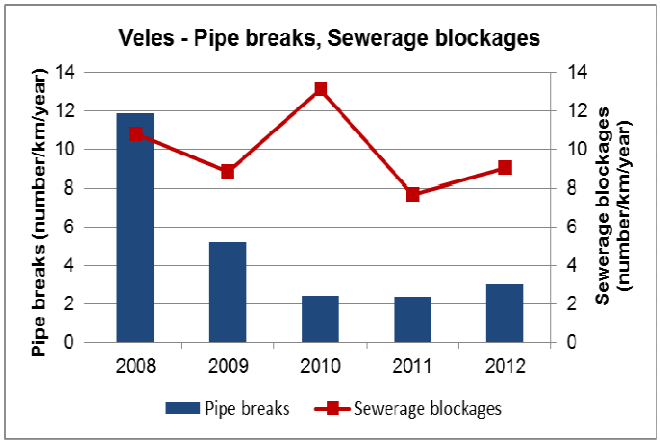

Vasilevo-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
14
12
10
8
6
4
2
0
cost coverage
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

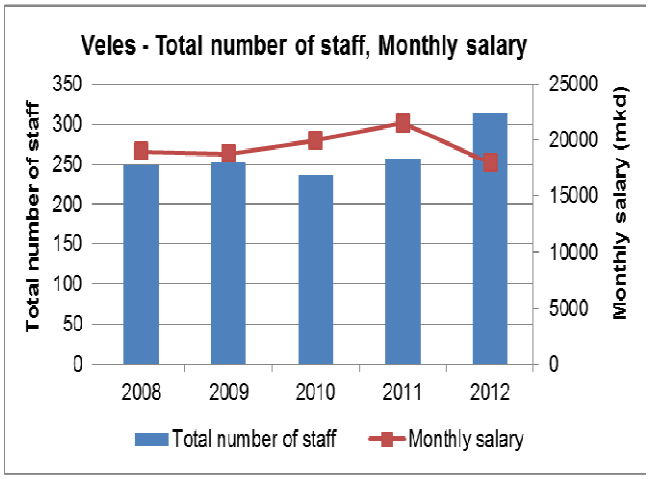
7.26 Veles – JKP Derven

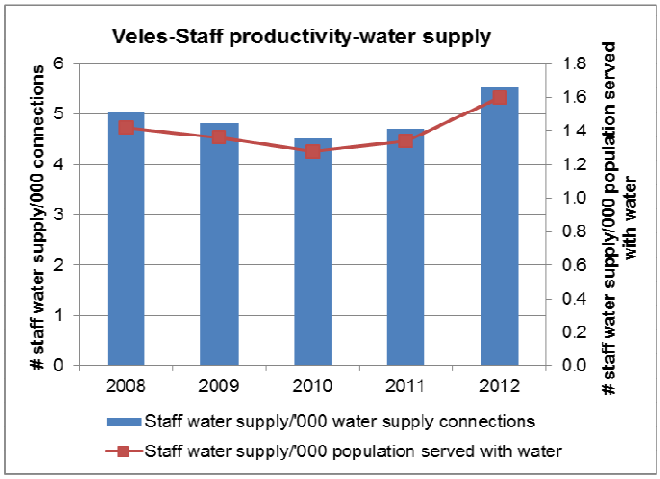


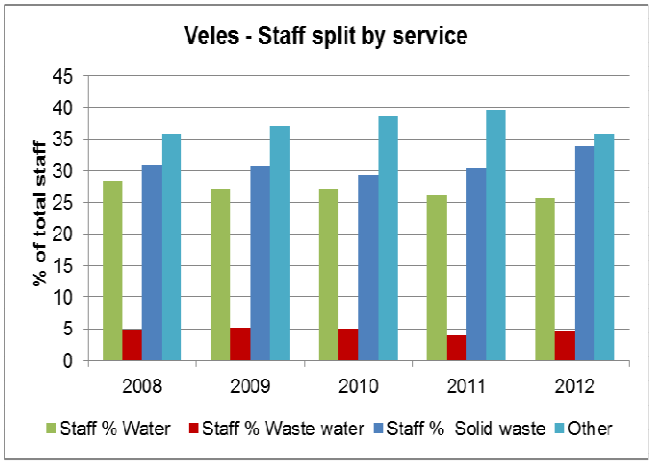


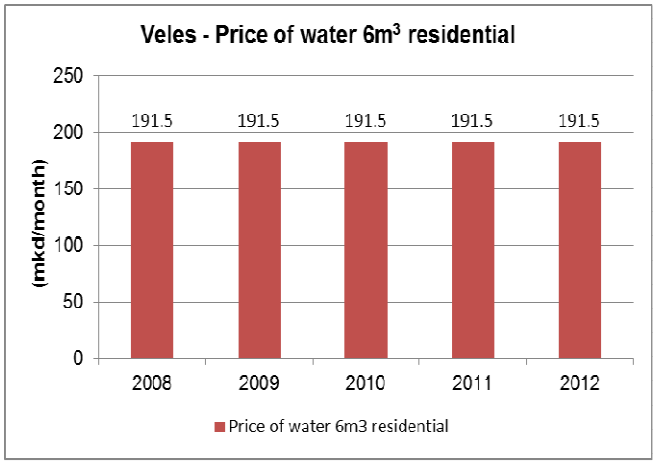


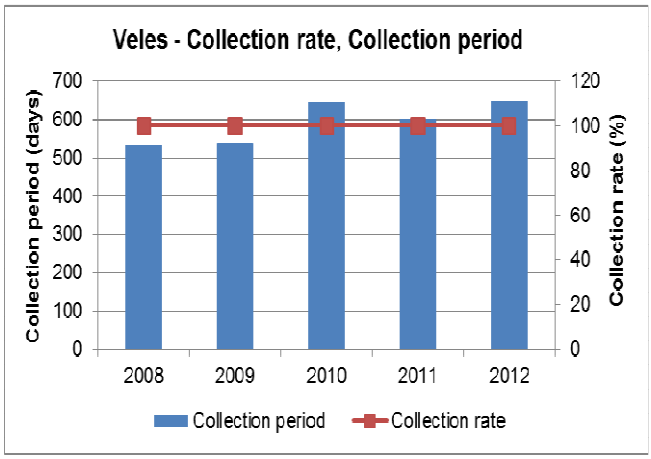


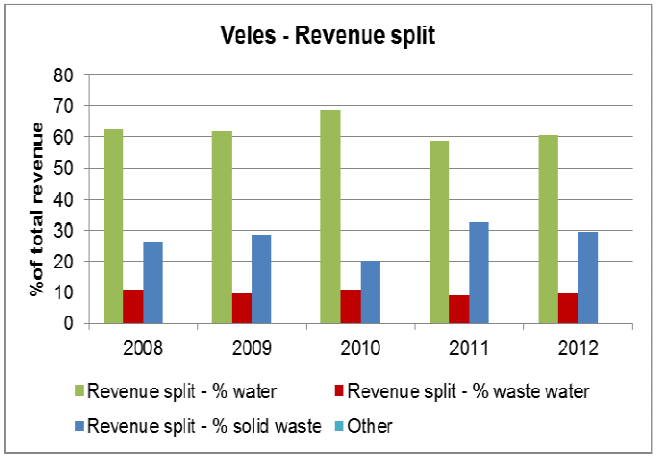


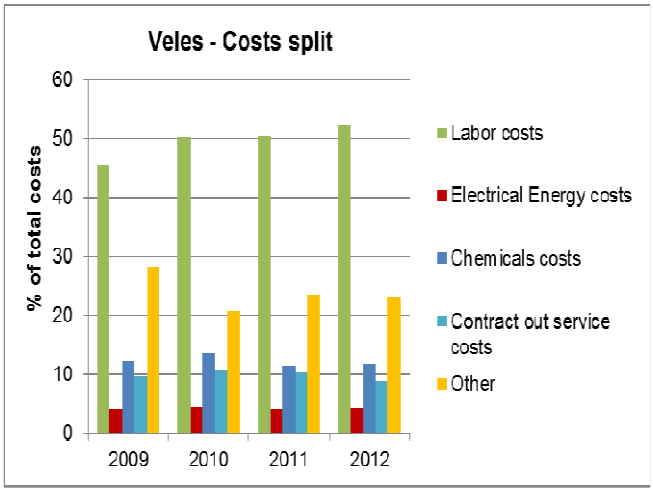


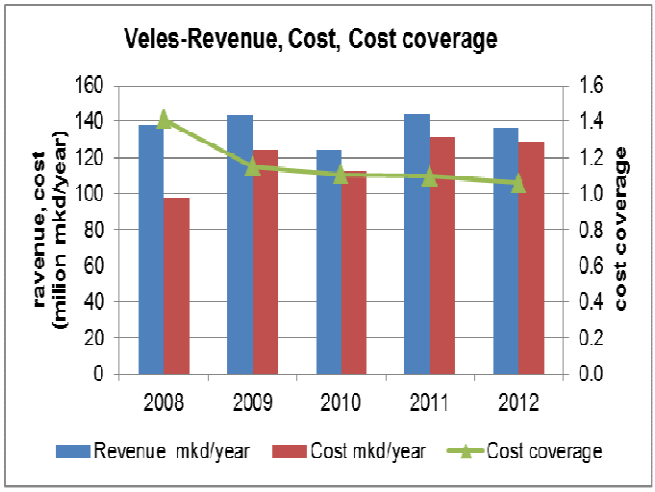

Veles - Staff split by service
% of total staff
45
40
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Veles - Price of water 6m3 residential
(mkd/month)
250
200
150
100
50
0
191.5
191.5
191.5
191.5
191.5
2008
2009
2010
2011
2012
Price of water 6m3 residential

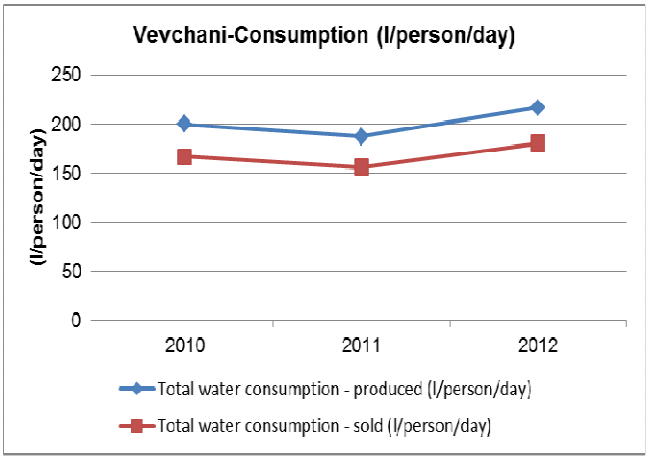

Veles - Collection rate, Collection period
Collection period (days)
700
600
500
400
300
200
100
0
120
100
80
60
40
20
0
Collection rate (%)
2008
2009
2010
2011
2012
Collection period
Collection rate

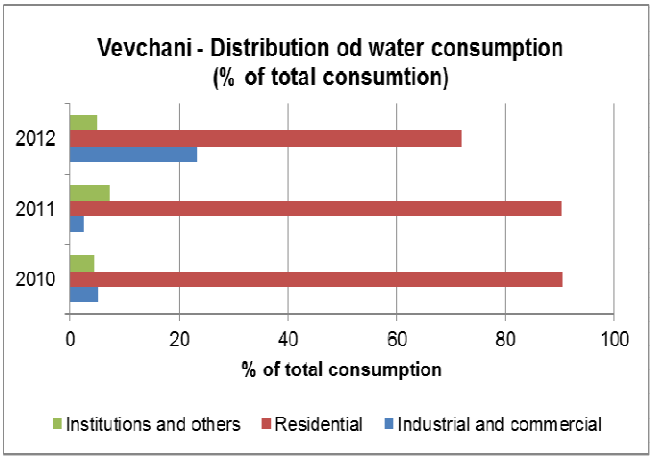

Veles - Revenue split
%of total revenue
80
70
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

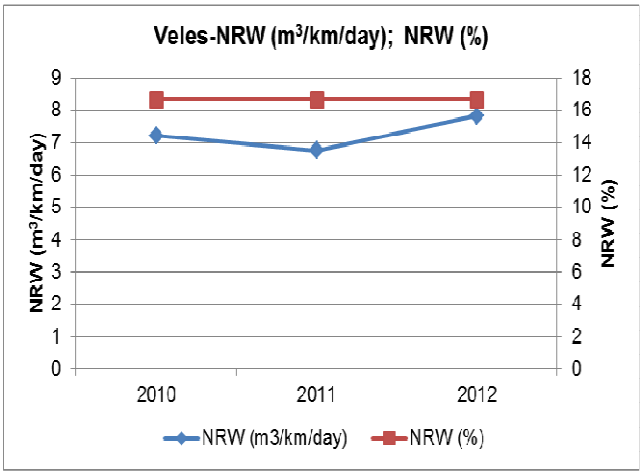

Veles - Costs split
% of total costs
60
50
40
30
20
10
0
2009
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

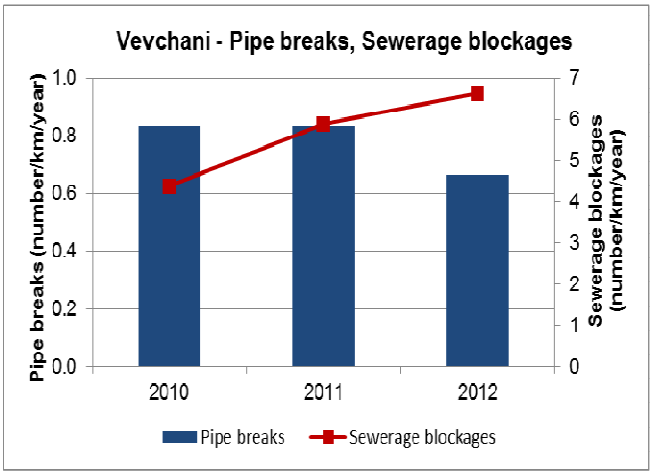

Veles-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
160
140
120
100
80
60
40
20
0
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
cost coverage
2008
2009
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

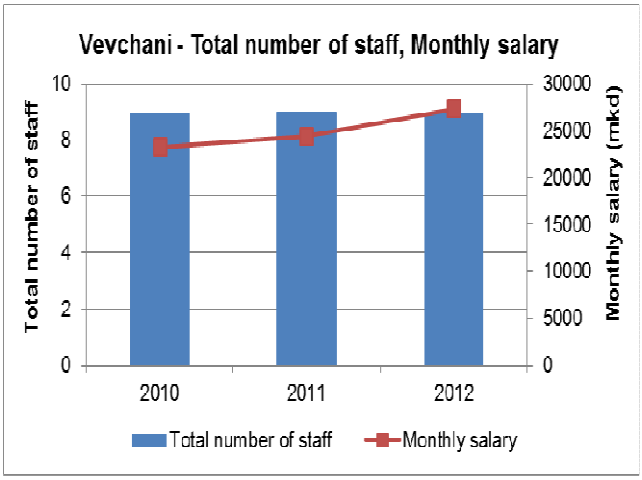
7.27 Vevchani – JP Eremja

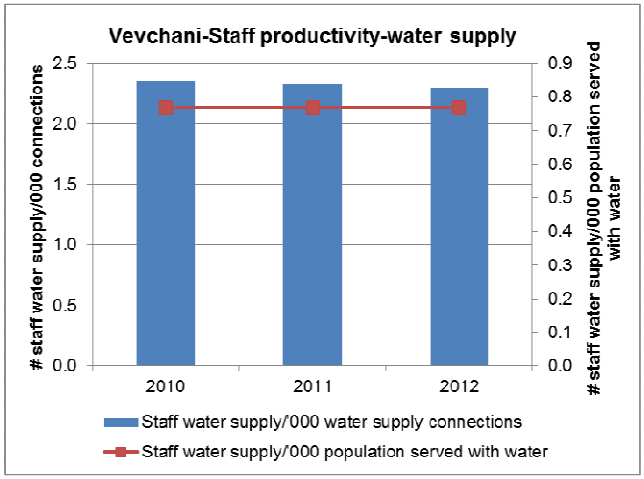


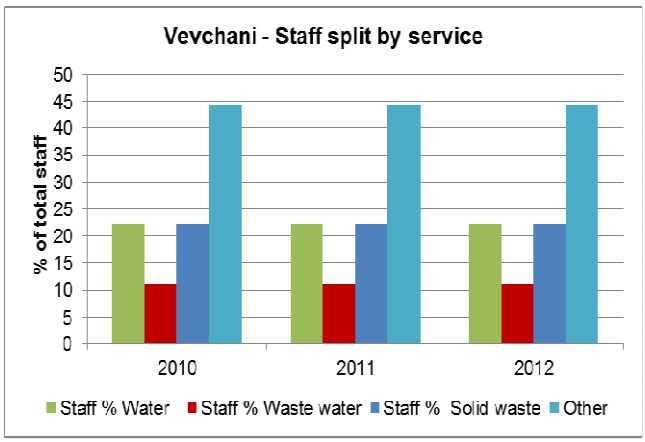


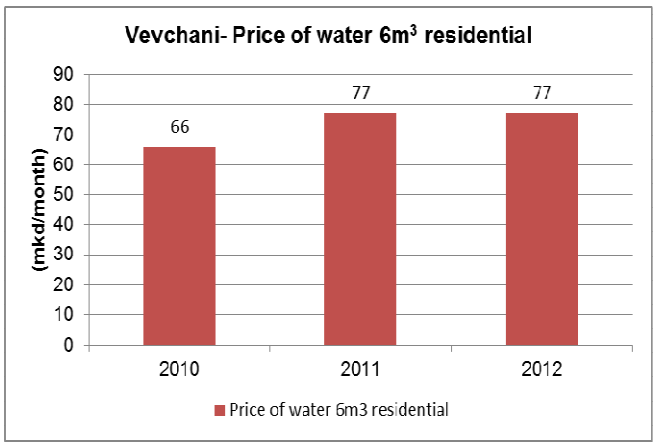


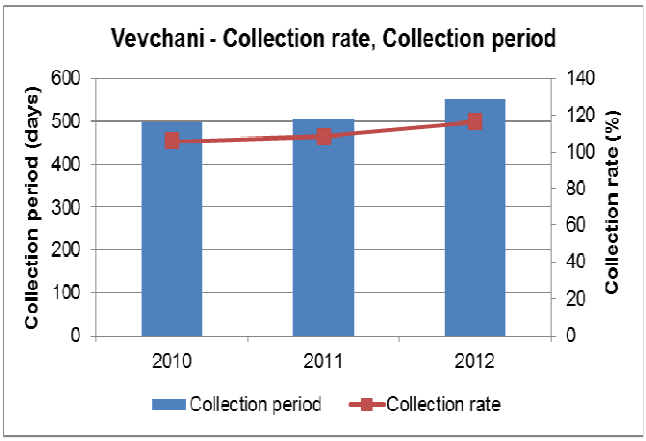


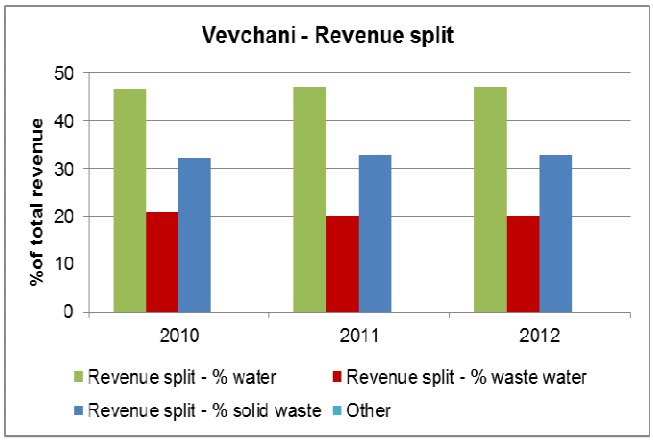


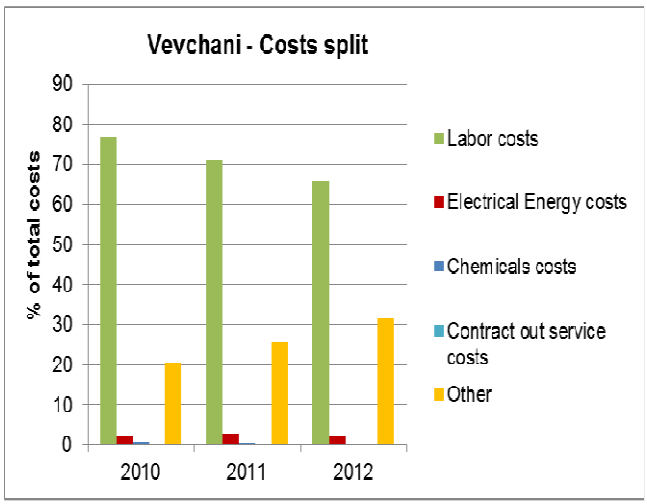


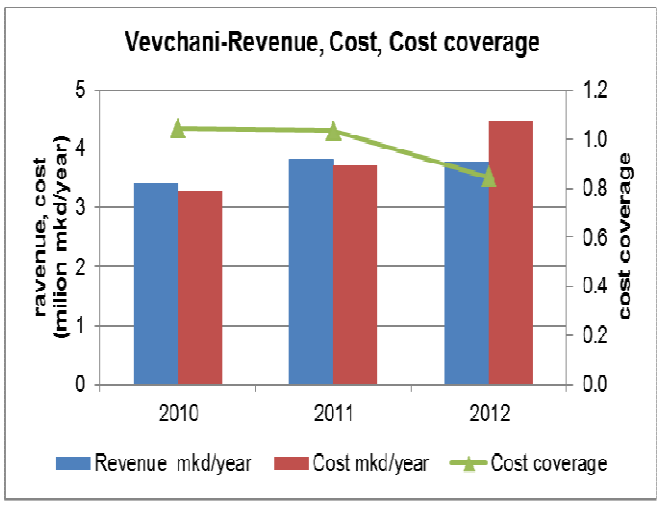

Vevchani - Staff split by service
% of total staff
50
45
40
35
30
25
20
15
10
5
0
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Vevchani- Price of water 6m3 residential
(mkd/month)
90
80
70
60
50
40
30
20
10
0
66
77
77
2010
2011
2012
Price of water 6m3 residential

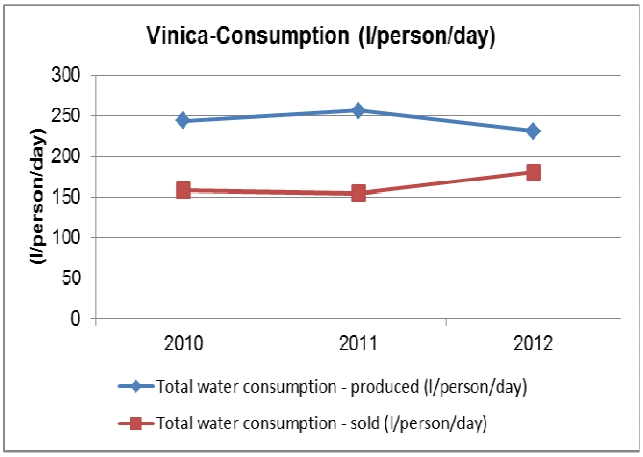

Vevchani - Collection rate, Collection period
Collection period (days)
600
500
400
300
200
100
0
Collection rate (%)
140
120
100
80
60
40
20
0
2010
2011
2012
Collection period
Collection rate

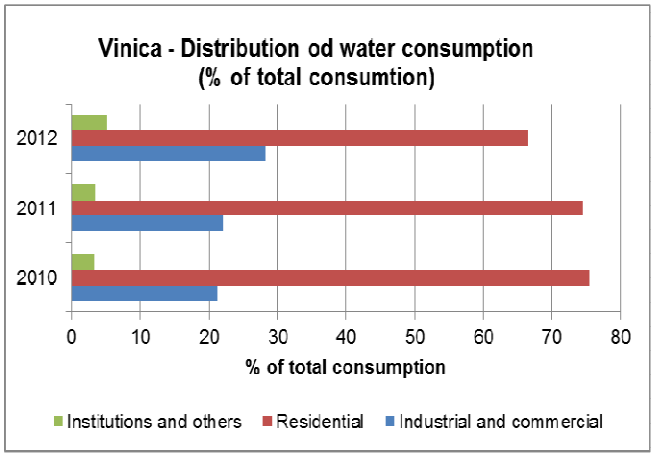

Vevchani - Revenue split
%of total revenue
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other

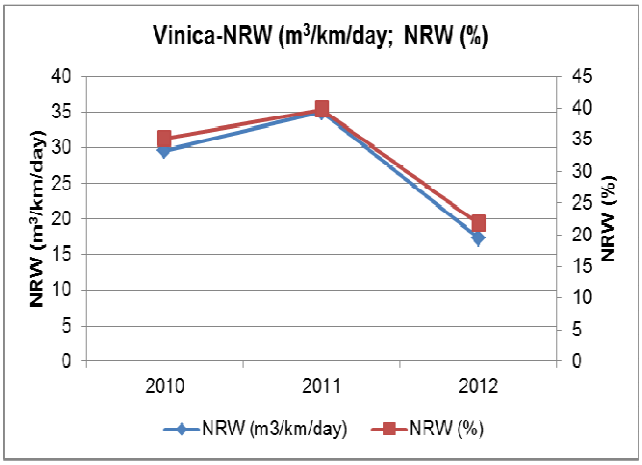

Vevchani - Costs split
% of total costs
90
80
70
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other

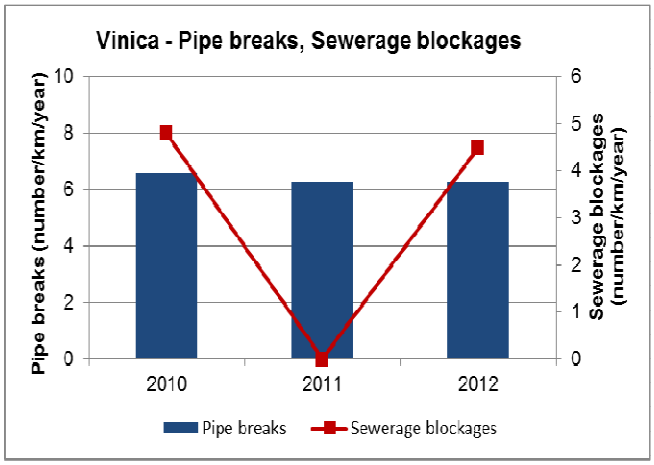

Vevchani-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
5
4
3
2
1
0
cost coverage
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage

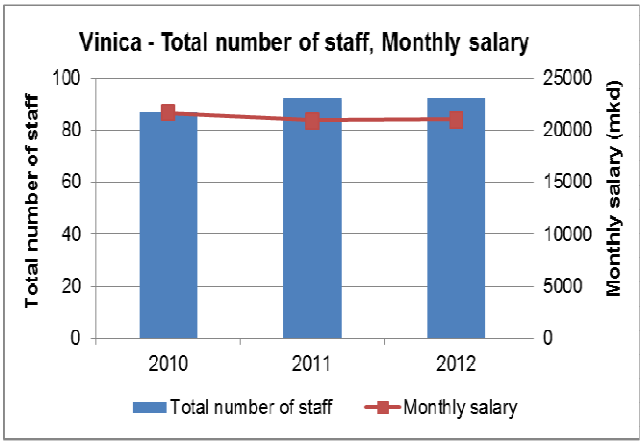
7.28 Vinica – JP Solidarnost

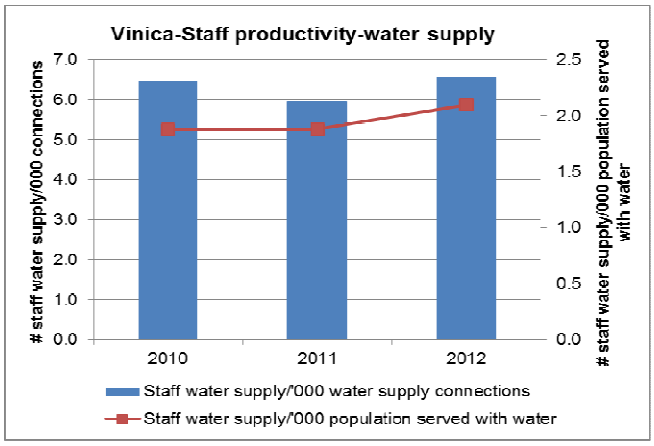


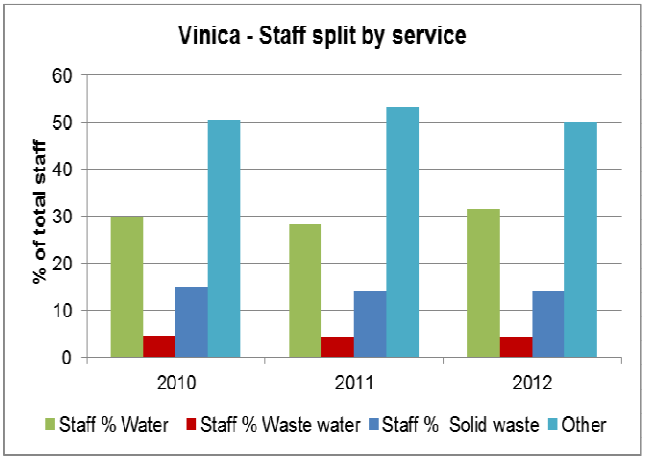


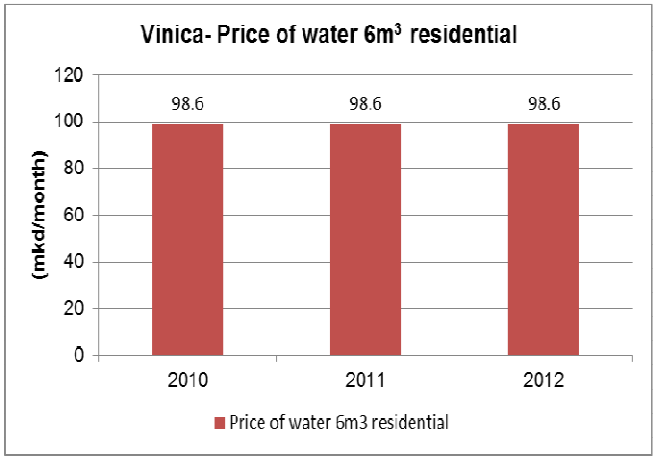


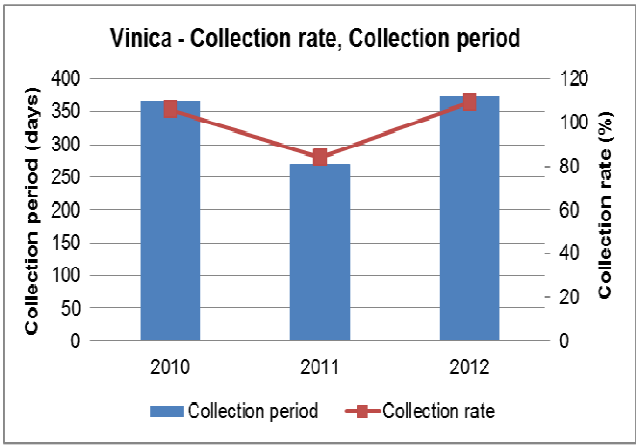


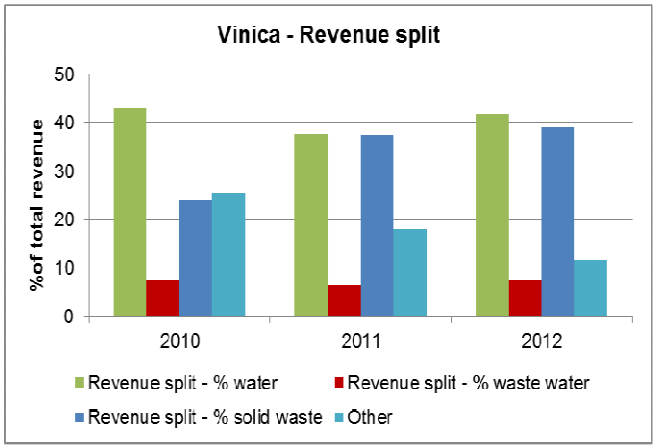


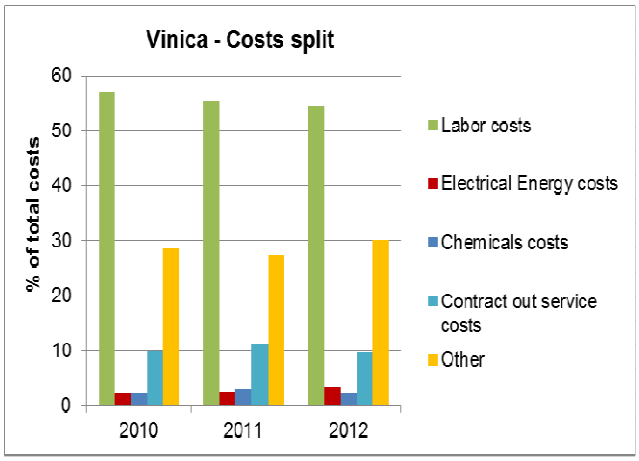


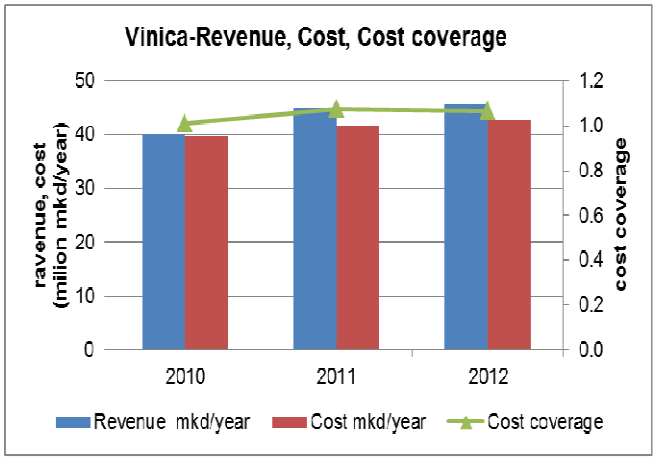

Vinica - Staff split by service
% of total staff
60
50
40
30
20
10
0
2010
2011
2012
Staff % Water
Staff % Waste water
Staff % Solid waste
Other


Vinica- Price of water 6m³ residential
(mkd/month)
120
100
80
60
40
20
0
98.6
98.6
98.6
2010
2011
2012
Price of water 6m3 residential


Vinica - Collection rate, Collection period
Collection period (days)
400
350
300
250
200
150
100
50
0
Collection rate (%)
120
100
80
60
40
20
0
2010
2011
2012
Collection period
Collection rate


Vinica - Revenue split
%of total revenue
50
40
30
20
10
0
2010
2011
2012
Revenue split - % water
Revenue split - % waste water
Revenue split - % solid waste
Other


Vinica - Costs split
% of total costs
60
50
40
30
20
10
0
2010
2011
2012
Labor costs
Electrical Energy costs
Chemicals costs
Contract out service costs
Other


Vinica-Revenue, Cost, Cost coverage
ravenue, cost (milion mkd/year)
50
40
30
20
10
0
cost coverage
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2010
2011
2012
Revenue mkd/year
Cost mkd/year
Cost coverage