KRUSEVO MUNICIPALITY

PROJECT APPRAISAL DOCUMENT

„Installation of water meters“

Municipal Services Improvement Project
financed with loan from
International Bank for Reconstruction
and Development (World Bank)

Krusevo, May 2014

I. PROJECT DESCRIPTION

A. GENERAL INFORMATION ON THE MUNICIPALITY

Krusevo municipality is located in the south-western part of the Republic of Macedonia and occupies the area of 201km^2. The terrain is mountainous with average altitude of 600-1800m. The administrative centre of the municipality is the city of Krusevo situated at 1250m a.s.l., what makes it the highest located city in the Balkans.

Krusevo is well known by historic heritage: in 1903 the Ilinden uprising took place resulting in creation of Krusevo Republic (lasted 10 days). On this occasion every year, on 2 August there is official celebration of the anniversary that attracts over 10,000 visitors.

The city is characterized by unique architecture and narrow, winding streets.

Krusevo is a native town of the most famous Macedonian pop singer who died in a car accident in 2007. The Tose Proeski Memorial House, located in the area Gumenje, won the first place and the highest "People's Choice Award" for an excellent idea and solution on the World Architecture Festival Awards 2011 in Barcelona, where it competed against 704 architectonic designs from all over the world[1].

This award has given the Republic of Macedonia and the town of Krusevo international recognition and simultaneously has provided an opportunity for the public worldwide to be introduced with the life and work of the greatest music star and legend of all times in Macedonia, Tose Proeski. The building was also chosen as the best work of architecture for 2011 in Macedonia at the annual manifestation organized by the Association of Architects in Macedonia.

The Tose Proeski Memorial House
Source: www.build.mk

The Tose Proeski Memorial House at night

[1] The World Architecture Festival was established in Barcelona in 2008 and has been held there every autumn since. The vote for the best design began in August and ended on 04th November 2011. People from all over the world were able to give their votes for the best building on the Internet portal "Open Buildings". 704 buildings and designs from the world famous architects were competing and with 15,807 votes the Memorial House was the top ranked and won the "People's choice award".

The municipality belongs to the Pelagonia Planning Region together with other eight municipalities.

Municipality comprises one city (Krusevo) and 18 rural settlements. The municipality has 9684 inhabitants (2002 Census), of whom 5330 live in the city, and the rest in the surrounding villages. Over the years population migrates from rural settlements to the city, and out of the municipality, but the total number of population does not change. There are two primary and one secondary school educating 1178 pupils.

B. DEMOGRAPHIC AND ECONOMIC PROFILE

The following tables provide a general picture of Krusevo population by sex, ethnic affiliation and age structure based on last population and household census (2002).

Krusevo is multiethnic municipality with three dominant ethnic groups: Macedonians (63% of population), Albanians (21%) and Vlachs (11%). Vlach population lives only in Krusevo city, whereas two others are distributed. Female comprise 49% of population. Among Albanians and Vlachs women are underrepresented as their share is 48% and 47% respectively.

Municipality has 3 official languages: Macedonian, Albanian (because share of Albanian population exceeds 20%[2]) and Vlach (by municipal Council decision).

Table 1: Population by sex and ethnic affiliation

	Krusevo	Female	Male
Total	9684	4766	4918
Macedonian	6081	3044	3037
Albanian	2064	983	1081
Turks	315	154	161
Roma	--	--	--
Vlachs	1020	478	542
Serbian	38	17	21
Bosnian	137	72	65
Other	29	18	11

Source: 2002 Census

2 The constitution states: The Macedonian language, written using its Cyrillic alphabet, is the official language throughout the Republic of Macedonia and in the international relations of the Republic of Macedonia. Any other language spoken by at least 20 percent of the population is also an official language, written using its alphabet.

The population is relatively young with 15% share of people over 65 years old. Surprisingly, men overweight women. The unemployment rate is much higher than at the state level and amounts to 50.1% (last Census data).

Table 2: Population by sex and age distribution

	Krusevo	Female	Male
Total	9684	4766	4918
0-14	1977	1012	965
15-64	6277	3272	3005
Over 65	1423	634	789
Unknown	7	--	7

Source: 2002 Census

Economic development of the municipality is weak. The tourism as an economic activity occupies an important place in the economy of Krusevo; however its potential has not been used yet. According to the statistic data, it can be noted that in the last two years the total number of visitors and nights spent in the Krusevo municipality increased significantly. Close to the city of Krusevo, there is one ski centre equipped with ski-lift 1.2km long (at the height of 1850m a.s.l.). There are also paths for cross-country skiing 4.5km long, mountain bike road of 6km, sport recreation centre and sport training centre with capacity of 300 seats.

There are 3 big hotels, out of them one is under reconstruction. In total, the municipality offers over 1000 sleeping places, but this capacity is only partly used.

Table 3: Hotel capacity at the municipality Krusevo

Hotel	Number of places
Total:	700
Hotel Montana	220
Hotel Panorama	70
Hotel Ilinden (under reconstruction)	--
Children resort	150
Villa Kola	20
Villa Gora	20
Villa Pavia	20
Private houses	520
Monastery hospices	70

Source: Krusevo municipality

There are one medium, three small and 252 micro-enterprises in the municipality. One big commercial entity is Goldtekst (textile industry) employing 60 persons, in medium firms average employment does not exceed 20 persons and micro-enterprises usually employ 1-2 persons.

Municipality possesses mining assets. Geological investigations confirm existence of quartz, bauxite, gold and wolfram. Only quartz may be exploited, however in small amounts.

C. GENERAL INFORMATION ON THE PROJECT AREA

The villages of Aldanci, Norovo and Sazdevo are located on the territory of the Krusevo municipality. They are mostly located in valley with partly mountainous features. The settlements are situated at an altitude of less than 1000m.

Aldanci is located at the foot of the Krusevo mountain massif, just 13 kilometers from the town, on the road leading to Prilep. Norovo is located northeast of Krusevo at a distance of 15 kilometres from the town. The village of Sazdevo is located 32 km north east of Krusevo, on the left side of the regional road Prilep-Makedonski Brod. Climate that reigns in this area is continental with hot summers and cold winters. The average annual temperature (in 50 year's period) is 11.2°C with a maximum monthly average value of 21.9°C in July and average minimum of -0.3^{o}C in January. The average annual amount of precipitation (in 50 year's period) is 596 l/m^2 unevenly distributed throughout the year. In terms of the air stream winds dominate the northeast direction (throughout the year) and the southwest direction (in winter). Winds in other directions are poorly expressed. Cloud is relatively low, with many cloudless days. Fogs are rare.

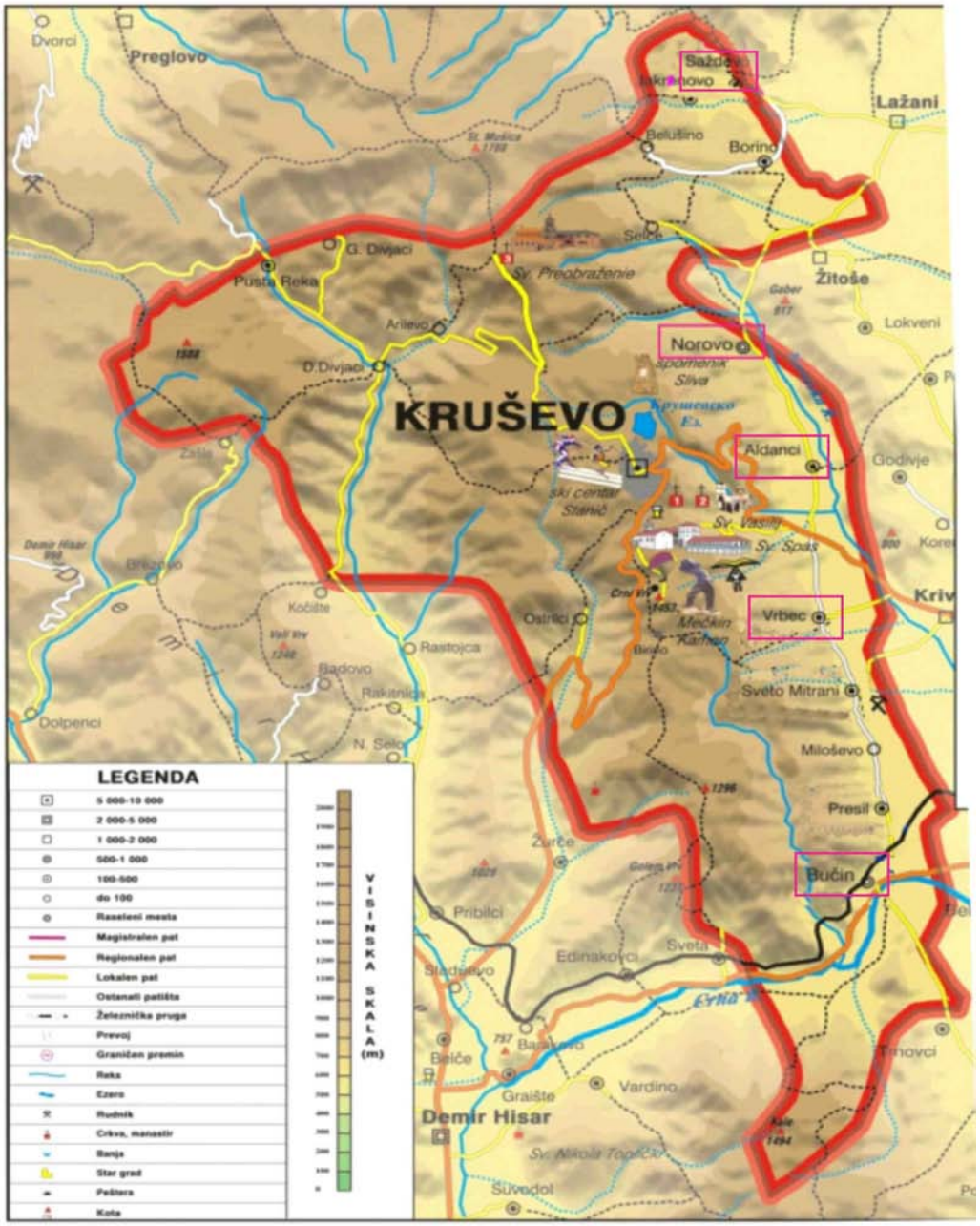
Table 4: Total population and households in the villages Aldanci, Norovo and Sazdevo

Settlement	Households no.	Population
Aldanci	96	417
Norovo	144	599
Sazdevo	69	393
	TOTAL	**1409**

Source: 2002 Census

The villages Aldanci, Norovo and Sazdevo are provided with drinking water from the Regional System "Studencica".

The location of the settlements is presented in the picture below.



D. GENERAL DESCRIPTION OF THE PROJECT

This project assumes installation of 255 water meters in 3 villages in the Krusevo municipality. The water meters will be installed on a public area on the border with the yards of the households. The action will be performed in the settlements Aldanci, Norovo and Sazdevo.

According to Article 22 of the "Law on Local Self Government" – the municipality is responsible for providing the population with drinking water. This obligation is delegated to the communal state enterprise (CSE) "Komuna" Krusevo. The main registered occupation of CSE is collecting, processing and supplying citizens in the municipality with drinking water.

The town Krusevo is provided with drinking water from two sources:

- Gravitational sources within the mountains surrounding Krusevo with nonsufficient quantities and;
- Studencica regional water supply system, which provides drinking water for the citizens in 8 municipalities, including the Krusevo municipality.

The amount of water that is consumed from either system varies throughout the year and depends on water levels, annual rain fall and water consumption in the town.

The villages Aldanci, Norovo and Sazdevo located on the right side on the regional road Prilep-Krusevo are provided with drinking water from the Regional System “Studencica”.

In summer months, because of the reduced water quantities from the sources and increased water consumption by the citizens CSE Komuna faces shortage of available drinking water quantities and is forced to restrict the water supply. Due to poor supply of drinking water in the reservoirs in the villages, frequent water restrictions, and also the obsolete pipeline, defects in the water supply system are common in Krusevo, which affects the quality of drinking water.

Aside from the real problems above mentioned, the abuse of the drinking water for irrigation of the agricultural land with irregular connections on the waterline before the water meters in the houses in order to avoid the measurement of the real water consumption presents additional problem affecting the municipality, the CSE, as well as the citizens from the higher parts of the villages facing no drinking water for days.

In view of the current situation in the CSE, i.e. the lack of adequate water supplying of the citizens in the municipality, the CSE Komuna is not in the position to fulfill this task, therefore, the municipality and the CSE face many - justified - complaints and criticisms issued by the citizens.

The adequate water supply problem has been clearly defined a long time ago, but still remains current, primarily due to the financial constrains of the CSE. The installation of new water meters on a public area measuring the real water consumption will rapidly decrease the drinking water abuse, and thus allow the municipality meeting its legal obligations.

Under the Law on supply with drinking water and disposal of urban waste water (Official Gazette of Macedonia no.68 from 10/05/2004), Article 28, line 1, in residential buildings and residential - commercial buildings with different categories of users of services, as well as more commercial and industrial facilities with multiple users, each user is obliged to have a separate water meter.

This project addresses only the most critical households with regard to irrational water consumption in Sazdevo village i.e. those in the lowest part of the settlement, what results in lower water supply pressure for the upper part of the settlement. However, at the same time CSE is going to implement other measures to improve water supply in this village. In order to increase the pressure of the water supply, CSE work program for 2014 assumes replacement of the existing water supply pipeline in Sazdevo – with a length of 2300m with pipe Φ90 and 16bars and installation of additional 16bars regulator at the connection between the main water supply system and the existing reservoir. In the next stage, the remaining households will also be provided with water meters. Therefore, this project is only one of numerous measures applied by CSE to improve water supply services.

E. OBJECTIVES

The general objective of this project is to improve the quality of the public municipal services and strengthen municipal capacity and functions regulated by the Law on Local Self-Government (Article 22), and the Law on supply with drinking water and disposal of urban waste water.

The specific objective of the project is improving the quality of life of local population by regulating the distribution and consumption of drinking water that will result in improved water supply in the above mentioned settlements.

Inadequate water supplying of the population is identified in Local Environmental Action Plan of the municipality.

The municipality has revised the Strategy for Economic Development (2009-2014), which improvement of the quality of life of local population identifies as a strategic goal.

1. Current situation

1.1 Current situation in the water supply in the settlements Aldanci, Norovo and Sazdevo

The settlements Aldanci, Norovo and Sazdevo are supplied with drinking water from the regional water supply system "Studencica" gravitationally. The distributed and consumed water in those villages has not been measured since regional system "Studencica" started with operation.

Measuring of the water delivered by the regional water supply system to the settlements Aldanci and Norovo started from October 2012. The installation of measuring instruments by regional system "Studencica" in September 2012 on the intake pipe to the settlements Aldanci and Norovo provides insight into the quantity of water that is distributed to these settlements, thereby providing insight into the difference between distributed and invoiced drinking water in these settlements.

In these villages some households have water meters, many do not, and some water meters are defective. That is why consumed drinking water by the households has been charged as a lump sum.

The table presented below clearly indicates huge differences between distributed and invoiced water in these villages, after a measuring instrument for distributed drinking water to the villages has been installed by the Regional water supply system "Studencica".

Table 5: Distributed and invoiced drinking water in m^3 for the villages connected to the regional water supply system "Studencica" in **2011**

	Distributed water lump sum	Invoiced water lump sum	Difference
Aldanci	11184	12973	1789
Norovo	11477	17301	5824
Sazdevo	10549	12330	1781
TOTAL:	**33210**	**42604**	**9394**

Note: The amounts of distributed water before introducing measuring on the intake are based on invoices provided from "Studencica" system

Table 6: Distributed and invoiced drinking water in m^3 for the villages connected to the regional water supply system "Studencica" in **2012**

	ALDANCI			**NOROVO**			**SAZDEVO**		
Month	Distributed water (lump sum by September 2012)	Invoiced water lump (sum by September 2012)	Difference	Distributed water (lump sum by September 2012)	Invoiced water lump (sum by September 2012)	Difference	Distributed water lump sum	Invoiced water lump sum	Difference
I	950	919	-31	975	1283	308	896	897	1
II	889	790	-99	912	1326	414	838	839	1
III	950	985	35	975	1370	395	896	950	54
IV	919	1350	431	943	1397	454	867	901	34
V	950	1002	52	975	1420	445	896	1045	149
VI	919	1043	124	943	1598	655	867	1052	185
VII	950	1240	290	975	1632	657	896	1155	259
VIII	950	1021	71	975	1930	955	896	1290	394
IX	920	2670	1750	943	3985	3042	867	1180	313
X	***19000***	***1097***	***-17903***	***20367***	***1380***	***-18987***	896	958	62
XI	***17485***	***970***	***-16515***	***18950***	***1169***	***-17781***	867	973	106
XII	***16764***	***702***	***-16062***	***16150***	***865***	***-15285***	896	980	84
Total:	**61646**	**13789**	**-47857**	**64083**	**19355**	**-44728**	**10578**	**12220**	**1642**

The water distributed to the villages Aldanci and Norovo has been measured since October 2012 (data marked bold in the table). The data show huge differences in the quantities of potable water distributed to the population living in those villages before and after the measuring instrument has been installed to the main supplying pipe to the villages of Aldanci and Norovo, resulting as well in a huge difference between the distributed and invoiced water.

Delivery of drinking water by the regional water supplying system "Studencica" to the village Sazdevo in 2012 has not been measured, and the consumed water has been charged as a lump sum.

Table 7: Distributed and invoiced drinking water in m^3 for the villages connected to the regional water supply system "Studencica" in **2013**

	ALDANCI			**NOROVO**			**SAZDEVO**		
Month	Distributed water measured	Invoiced water lump sum	Difference	Distributed water measured	Invoiced water lump sum	Difference	Distributed water lump sum till X2013	Invoiced water lump sum	Difference
I	22207	1080	-21127	24262	1605	-22657	896	995	99
II	14402	1000	-13402	15401	1540	-13861	809	1005	196
III	20220	1375	-18845	21770	2055	-19715	896	1315	419
IV	19000	1228	-17772	21000	1850	-19150	867	1105	238
V	21311	1352	-19959	22342	1865	-20477	896	1133	237
VI	16645	1190	-15455	18890	1765	-17125	896	1115	219
VII	20112	1165	-18947	21157	1792	-19365	867	1190	323
VIII	20102	1505	-18597	22710	2403	-20307	896	1340	444
IX	16008	1270	-14738	16700	1875	-14825	867	1140	273
X	19413	1185	-18228	20000	1705	-18295	896	1070	174
XI	17562	1085	-16477	19000	1625	-17375	***8000***	***1010***	***-6990***
XII	15100	1039	-14061	20014	1605	-18409	***4124***	***1100***	***-3024***
Total:	**222082**	**14474**	**-207608**	**243246**	**21685**	**-221561**	**20910**	**13518**	**-7392**

Delivery of drinking water by the regional water supplying system "Studencica" to the village of Sazdevo has been measured since November 2013 indicating the same situation like in the villages of Aldanci and Norovo, exactly huge difference in the quantities of potable water distributed before and after installation of the measuring instrument and huge difference between the distributed and invoiced quantities of drinking water.

The column "difference" in the table refers to difference between the invoiced and distributed drinking water and loss in drinking water including leakages in the potable network.

Losses in drinking water are result of irrational spending of the water, or the use of potable water for irrigation of arable agricultural land and meadows. On the other hand there are losses in drinking water as a result of the leakages in the potable network and defects in the supplying network. Public company constantly works on timely removal of the defects emerging in the water system, but because the households generally do not have water meters to measure the consumed water, an analysis of the loss of drinking water results due to leakages and defects in the supply network cannot be done. The CSE assumes that the leakages of potable water due to defects in the potable network go up to 20% of the difference between the distributed and invoiced drinking water. According to the findings of the public enterprise and on-site inspections losses of drinking water mainly result to its use as industrial water for irrigation of the agricultural land.

Irrational consumption of drinking water in these places, inappropriate dimensions the water supply network in the settlements lead to interruption of water supply to the households of the villages located in the higher parts especially during the summer or water supplying with very weak pressure insufficient for normal operation of the washing machines.

Because of these reasons, the municipality as well as the public enterprise is exposed to many, justified criticisms from the population in these settlements requiring quality drinking water and regular water supply.

1.2 Current situation in the water supply in the settlements Buchin and Vrboec

Water supply system "Buchin", which supplies drinking water to villages Buchin, Presil, Sv.Mitrani and Vrboec was built and put into operation in 1999. Accepted alternative was: pumping the water from wells in the Black River to reservoir above the village of Buchin and its gravitational water supply. The water from the same reservoir is pumped to the village reservoirs in Presil, Sv.Mitrani and Vrboec.

Pumping the water in the Regional Water Supply System "Buchin" generates electricity costs that significantly increase the cost of water per m^3.

1.3 Consumption of electricity by water supply system Buchin

Table 8: Electricity consumption in MKD by water supply system Buchin including the reservoir and the pump station

Month	2011	2012	2013
I	129223	166793	177107
II	124443	206323	181773
III	144428	194198	203656
IV	149483	191636	209188
V	170769	185532	215612
VI	195345	190752	205974
VII	201607	187124	193260
VIII	206173	236559	221633
IX	190901	235746	209249
X	192990	207698	195718
XI	183102	224131	194555
XII	166794	215384	182353
Total:	**2,055,258**	**2,441,876**	**2,390,078**

As presented in the table above the electricity consumption has been increasing rapidly in summer and autumn months respectively to the increased water consumption, what suggests that drinking water is used as technical water for irrigation of agricultural land.

In order to reduce the cost of electricity and control the consumption of drinking water CSE Komuna Krusevo started to install water meters on final consumers in the village of Sv.Mitrani and Presil. In these settlements the drinking water is charged according to its consumption. This activity resulted in significant reduction in the consumption of drinking water. These two settlements Sv.Mitrani and Presil are not subject to this project.

The table bellow presents the water consumption in these villages before and after installation of the water meters. The water meters on a public area to all households in the village of Sv.Mitrani were installed in 2012 and in the village of Presil in 2013.

Table 9: Distributed and invoiced water in the village Sv.Mitrani in 2012 (m^3)

	Distributed water	Invoiced water	Difference
January	2200	835	-1365
February	2310	770	-1540
March	2630	970	-1660
April	3770	1360	-2410
May	3643	1250	-2393
June	3620	1845	-1775
July	2835	1900	-935
August	1927	1580	-347
September	1852	1531	-321
October	1550	1244	-306
November	1635	1170	-465
December	1220	1005	-215
Total:	**29192**	**15460**	**-13732**

Note: Water maters were installed in June and July 2012 by the CSE Komuna

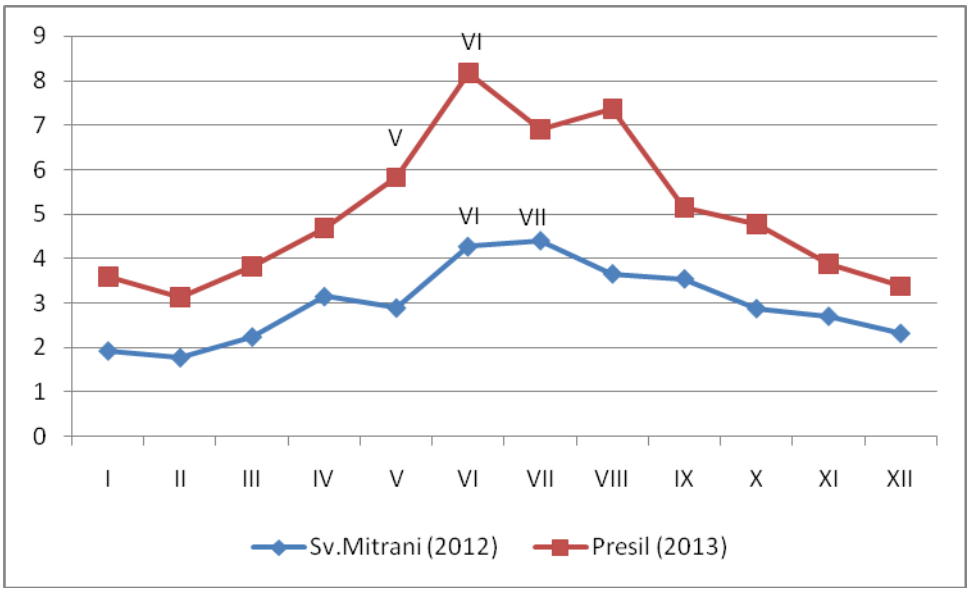
Table 10: Distributed and invoiced water in the village of Presil in 2013 (m^3)

	Distributed water	Invoiced water	Difference
January	3320	1240	-2080
February	2980	1080	-1900
March	3565	1320	-2245
April	4485	1615	-2870
May	5245	2005	-3240
June	4420	2810	-1610
July	3085	2375	-710
August	3187	2530	-657
September	2214	1775	-439
October	2145	1645	-500
November	1701	1340	-361
December	1550	1165	-385
Total:	**37897**	**20900**	**-16997**

Note: Water maters were installed in May and June 2013 by the CSE Komuna

Installation of water meters revealed the real consumption level, which appeared to be much higher than estimated by the JKP and charged with the lump sum. Household immediately adjusted water consumption and introduced some rational behavior practices. As a result, the consumption was systematically decreasing. Hence, installation of water meters in Sveto Mitrani in 2012 resulted in drop of electricity costs by 2% in 2013. The average monthly water consumption billed based on water meters in these two villages was $3m^3$ per capita.

Graph: Water billed in m^3 to households before and after introduction of water meters



Note: Water meters in Sveto Mitrani were installed in VI and VII 2012, and in Presil in V and VI 2013

In the villages Buchin and Vrboec due to lack of funds the public enterprise has not set new water meters, and existing ones are insufficient, some of the households have

operational water meters, some are defective, so the drinking water is charged as a lump sum. Due to limited finances water meters in these two villages will be installed in the next step.

1.4 Water tariff

Current tariff set by the municipal Council applies from 1.01.2010 (previous tariff change was in force from 1.01.2007).

Table 11: Previous water tariff (MKD per m^3) in force from 2007 till 2010

	Regional System Buchin	Regional System Studencica
Water component for households in MKD without taxes	26	15
Water component for industry in MKD without taxes	30	30

Table 12: Current water tariff (MKD per m^3) for Buchin and Vrboec, regional system "Buchin"

	Households	Industry
(A) Water component	27.5	50
(B) Wastewater component	0	0
Tax 1 (water fund 1%):	0.27	0.5
VAT 5%	1.375	2.5
Total tariff per m^3	**29.15**	**53**

Source: CSE "Komuna" Krusevo

Table 13: Current water tariff (MKD per m^3) for Aldanci, Norovo and Sazdevo, Regional System "Studencica"

	Households	Industry
(A) Water component	18	30
(B) Wastewater component	0	0
Tax 1 (water fund 1%):	0.18	0.3
VAT 5%	0.9	1.5
Total tariff per m^3	**19.08**	**31.80**

Source: CSE "Komuna" Krusevo

Despite the fact that Council decision indicates price per m^3, due to lack of water meters the CSE was charging the lump-sum amount of $5m^3$ per person, or $20m^3$ per household. In case the water meters are installed, there is no need to revise the Council decision, but only to implement it in line with original intention.

1.5 Financial situation of CSE "Komuna" Krusevo

CSE "Komuna" Krusevo provides the following services: water supply, sewage, public hygiene (including solid waste collection), maintenance of cemetery, market, and parking. CSE manages water supply networks in 7 villages: Aldanci, Norovo, Sazdevo, Sv.Mitrani, Vrboec, Presil and Buchin. Out of 38 employees (2013), 14 deal with water supply.

In the last few years the CSE was generating losses. Water supply services provide about 50% of revenues and 60% of total expenditures; therefore its functioning is a key to the operations of CSE. The losses are covered with irregular transfers from the municipal budget approved by the Council, but also with accumulated debts to the electricity provider. As of end 2013 the total debt to EVN was equal to MKD 12,376,620 (EUR 201,246). The accrued debt was restructured, but the CSE is not servicing it regularly, as the installments are too high. The biggest energy consumer is the pump in Norovo village (600 m.a.s.l.) and pumps for Krusevo (1250-1300 m.a.s.l.).

Water supply sector operates with losses, however, these are decreasing. Some adjustment has been made to correct for shortcomings in bookkeeping of revenues in 2010-2012.

Table 14: Financial results of CSE

	Total			
	2010	2011	2012	2013
Revenues	18,423,111	23,323,615	19,043,427	19,079,507
Expenditures	19,903,088	25,232,159	23,426,194	22,101,474
Financial result:	-1,479,977	-1,908,544	-4,382,767	-3,021,967
	Water supply			
	2010	2011	2012	2013
Revenues	9,449,405	9,379,109	8,884,679	9,235,537
Expenditures	12,656,315	16,249,364	14,542,678	13,066,226
Financial result:	-3,206,910	-6,870,255	-5,657,999	-3,830,689

Source: CSE

Note: Only in 2013 the CSE introduced category of other revenues, which do not refer to any specific communal activity. In the previous years, these revenues were distributed among all activities, which blurred the financial results of the water supply sector.

1.6 Collection rates for water by settlements

Collection rates by settlements being the subject of this project indicate on-going improvements and discrepancies between villages. There is a room for further improvements.

Table 15: Collection rates in %

	2011	**2012**	**2013**
Aldanci	56	56	77
Norovo	39	36	45
Sazdevo	48	72	59

Source: CSE

1.7 Consumption of drinking water per capita

The following table presents some estimations of monthly water consumption per capita. Distributed water for Aldanci, Norovo and Sazdevo is measured, whereas the consumed water is calculated under the assumption that technical leakages comprise 20% of water provided.

Table 16: Average monthly consumption of drinking water per capita in m^3 in 2013

	Distributed drinking water in m^3, monthly average	Consumed drinking water (Distributed water – leakages 20%) average monthly rate	Number of inhabitants *	Average monthly consumption of drinking water per capita in m^3	Average monthly consumption of drinking water by 4 member family in m^3
Aldanci	18 506	14 806	417	35 (consumption calculated)	142
Norovo	20 270	16 216	599	27 (consumption calculated)	108
Sazdevo	1 742	1 394	393	3.5 (lump sum by September 2013)	14

Note: * According to the 2002 population Census

One may conclude that the measurement of drinking water distributed to households in Aldanci and Norovo where there is a measuring instrument on the intake pipeline reflects the real situation regarding the consumption of drinking water. The water consumption per capita is far above the accepted standards and that it is an indicator that the potable water in not only used for drinking and satisfying domestic needs, but also for irrigation of arable land. Presented consumption of water per capita corresponds to the actual situation because water losses due to leakages and defects in the supply network are taken into consideration.

Lump-sum distributed and invoiced water in Sazdevo does not reflect the actual consumption of drinking water. In Sazdevo the minimal consumption of drinking water is a result of the lump-sum billing by September 2013.

2. Future situation

The project assumes installation of 255 meters in three villages in the Krusevo municipality. Upon completion of this activity the public company and the municipality expect to have full insight and to reduce the consumption of water, reduce the loss in water systems, reduced distributed un-paid water, but also to increase revenues. Public enterprise has sufficient staff to perform regular checking of water meters that will give the best information on the water used for domestic consumption. The realization of this project will provide a comprehensive understanding of the loss of water due to defects and

leakages, and in case of breakdown in the water supply system the intervention may be done promptly. CSE systematically is improving its knowledge on the sources of water losses. Installation of the water meters on the intake pipes to the selected villages (water delivered) was one of measures applied. Next will be installation of water meters (water consumed). The main leakage sources will be defined by fast removal of the precisely identified defects in the water supply system, which will contribute to reduction of the amount of unbilled water.

Water meters will be installed on a public area on the border with the yards. In places where the water line goes through private parcels the public company will set up a new line that will run beside footpaths, thus disabling illegal connections. This activity is not part of the project; the CSE Komuna Krusevo will do it with its own resources when needed during the project implementation.

According to the Law on supply with drinking water and disposal of urban waste water each user is obliged to have a separate water meter.

3. Goals of the project

The project will contribute to achievement of the following objectives:

• **Improved and regular water supply in 3 villages in the Krusevo municipality**. Water supply goes hampered because of the illegal connections, especially during the summer in all villages. Regularity in supplying has been disabled due to inappropriate use of potable water for irrigation of crops and agricultural land. In this period the wells' flow out is reduced resulting in lower available water quantities, which are not sufficient to meet the needs of the population in these settlements. Measuring the consumed potable water will rapidly increase the water bills affecting the citizens to reduce the water consumption to the family domestic needs.

According to the Law on supply with drinking water and disposal of urban waste water (Official Gazette of the R. Macedonia No. 68 dated 5th of October 2004), article 28, each user is required to have a separate water meter and the water meter is the only mean of determining the water consumption of the service user in terms of billing.

The village Sazdevo over a year gets irregular water supply in one part of the village, which is located on higher elevation compared to the rest of the village. Water supply system Studencica in this area provides the village with drinking water with very low pressure. When the consumption of the drinking water is controlled only to the households' needs eliminating the abuse of the potable water, the **pressure in the system will increase allowing the whole village receiving regular water supply**.

• **Improved quality of drinking water**. Because of the breakdowns in the water supply in these settlements the quality of the drinking water in summer times does not meet the required standards. Eliminating the abuse of huge quantities of drinking water for irrigation of agricultural land will result in reduced restriction in the water supplying.

When there are restrictions in the water supplying the water network remains empty without water and no pressure. Therefore, in case of defect in the water pipes, re-release of water results in appearance of short-term negative pressure and suction of dirt and other pollutants from the land into the network. When there are no restrictions, the system is

constantly under pressure and full of water and in case of failures in the network, leaching may appear, but no suction of soil and other contaminants in the pipes.

• **Financial sustainability** of water supply as public service of the CSE. After installation of water meters to each household in these settlements the CSE will charge for the provided service in accordance to the consumed water not as a lump sum.

The project does not generate revenues additional than charging for the consumed water, but will have substantial impact on cost reduction, which means that better service will be provided at lower price.

• **Raised awareness** among the local population that the potable water is restricted resource, which may not be abused for irrigation of agricultural land. Krusevo municipality with the Public Enterprise during as well as after project completion will conduct a campaign among the local population towards rational use of drinking water. By providing regular water supply and increased quality of the public service the CSE will be fully able to take legal action against irresponsible citizens.

II. SOCIAL IMPACT OF THE PROJECT

A. SOCIOLOGICAL STUDY

This appraisal document is based on the analysis and data previously collected by the CSE and Krusevo municipality, especially the Department for Local Development over a period of several years in retrospective. The problem of abuse of the potable water become an acute problem after the actions undertaken by the Regional Water Supplying System to measure the distributed potable water to the settlements where it provides the service; it is identified by the institutions and the citizens of Krusevo, as well as indicated in the strategic documents of the municipality. The problem with defective or lack of water meters in the households in the villages of Krusevo municipality is part of a wider and more complex problem with the lack of gravitational water supplying in the town of Krusevo as well as the villages and reparation of the water supplying network where needed. It has been elaborated in an extensive local environmental action plan of the Krusevo municipality, which is in accordance with the National Environmental Action Plan.

The Local Environmental Action Plan of the Krusevo municipality separately analyzes the problem of water supplying of the settlements and suggests several activities aimed at providing regularly supply of the population with drinking water, including: repair and replacement of defective water meters, practicing criminal policy procedures against illegal users, reconstruction of outdated secondary network, etc.

This research will identify the statistical data of particular relevance to this specific social assessment.

Aldanci

Age	Total	Man	Woman
Total	417	219	198
0-14	132	73	59
15-59	231	122	109
15-64	243	126	117
60>	53	24	29
65>	41	20	21
Unknown	1	-	1

Norovo

Age	Total	Man	Woman
Total	599	330	269
0-14	193	105	88
15-59	354	202	152
15-64	371	209	162
60>	51	23	28
65>	34	16	18
Unknown	1	-	1

Sazdevo

Age	Total	Man	Woman
Total	393	203	190
0-14	146	74	72
15-59	218	112	106
15-64	227	116	111
60>	28	17	11
65>	19	13	6
Unknown	1	-	1

The above presented demographic data allow formulating the following conclusions:

- In total the population dominating age group ranges from 15 to 64 years,
- Men overweight women population, especially among Albanians and Vlachs,

- In terms of ethnicity, in Aldanci, Norovo and Sazdevo prevalent is the Albanian population.

1. Institutions, regulations and conduct

The implementation of the project will improve the efficiency in distribution and charging in the water supply in five villages in the Krusevo municipality, but will also affect current abuses and irresponsible behavior on the part of the population using the potable water as technical water for irrigation of agricultural land. This situation is mainly due to the irresponsible behavior of citizens, but partly caused by the CSE financial weakness to control the consumption of the potable water.

The installation of 255 water meters on a public area in three villages in the Krusevo municipality will contribute to establishing regular, efficient and financially sustainable public service, as well as practicing criminal policy procedures against citizens continuing the violation of the Law on supply with drinking water and disposal of urban waste water.

For the responsibilities of the CSE Komuna the following regulations are in force:

- Law on Local Self-Government (Official Gazette of the Republic of Macedonia 5/2002),
- Annual operational program of CSE.

According to the citizens' opinions the selected contractor must provide guarantees for the realization of the project under permanent supervision of the municipal administration – department for urbanism, communal affairs and protection of the environment. Employees from the PE Komuna will present on the project locations with instructions regarding the water supplying network.
The Municipal Council might request information from the Mayor in reference to the project's realization at any time.
In addition, based on experience with other projects the municipal administration – department for local development has experience to monitor the progress of the project.

2. Stakeholders

There are several important stakeholders concerned in regard of the project with different power and influence on its realization. The Mayor and the municipal Council are influential participants in the decision making process at the municipal level. The Mayor of Krusevo forms a team of employees in the Local Development and Urbanism, communal affairs and Environmental Protection, in cooperation with the CSE, to prepare the necessary documents for the implementation of the Municipal Services Improvement Project financed by a loan from the International Bank for Reconstruction and Development (World Bank).

The citizens, as an organized group of stakeholders, on number of working meetings during preparation of the municipal strategic documents clearly emphasized the need to improve the water supply in the villages in the Krusevo municipality.

To inform of citizens about the project as very important stakeholders regarding the project implementation the Krusevo municipality and CSE conducted public hearings on

November 4th and 5th 2013 in all villages where installation of new water meters will take place.

On the public hearings the population largely supports the project for installation of new water meters and paying for drinking water according to the quantities consumed. An important factor that influenced the positive attitude of the population in terms of support of the project implementation is the need to provide quality water to the entire population. Citizens agree with the view that each service must be charged and an effort must be taken to remove illegal connections because drinking water should only be used for the purposes of the households, not as technical water for irrigation of arable farmland. The current abuses of the drinking water bring about certain households from the higher parts of the settlements at specific times of the day not to have drinking water, and when they get water the pressure is reduced and does not allows operation of electrical appliances.

In reference to results of public hearing, the municipal Council issued a Decision on borrowing funds from the International Bank for Reconstruction and Development (World Bank), no. 07-104/5 dated 30.01.2014. The project was supported by the majority of the municipal councilors.




In line with the policy of Krusevo, as a unit of the local self-government, in order to facilitate citizens involvement in the work of the Local self government, numerous contacts with citizens of villages have been established. Since solving this problem requires provision of higher quality public services, this project is supported by the citizens. Namely, all participating citizens expressed their support for the proposed project and confirmed that these are priority investments, which will contribute to the improvement in living conditions for all inhabitants of the municipality.

The realization of this project will drastically reduce the cost of production per m^3 billed water and will affect the eventual relaxation of the social tensions from the increased price of the service to cover rising costs. The last correction of tariffs was introduced on January 1, 2010.

The nongovernmental organizations (NGOs) are influential to some degree, but are not represented in an organized manner regarding their request for the programs realization. On the other hand, NGOs are facing lack of funds for ongoing operations that limit their activities.

3. Direct and indirect beneficiaries of the project

Direct beneficiaries of the project are the citizens in these villages who expect quality and regularly supply with potable water throughout the year being ready to pay for the service according to the quantities of consumed drinking water.

Direct beneficiary is the CSE Komuna, which will gradually reduce the loss in water provision service. Direct beneficiary of the project is the municipality, as a founder of the public enterprise that bears the consequences of its inefficient operation.

Indirect beneficiaries of the project are the citizens of the Krusevo municipality who would get improved municipal services over time as a result of the financial recovery of the public company.

4. Participation

The loan will be repaid from the municipal budget in the ensuing years.

5. Social risks

High socials risks for carrying out of this project cannot be perceived.

Special obstacles and difficulties cannot be anticipated or expected.

There are no issues connected with ethnic distribution of population: the action will take place in villages with Macedonian as well as Albanian population. During the project implementation all citizens of the following settlements will have equal treatment since each household will get a new water meter installed in a public area on the border to the yard without a possibility of setting up illegal connections.

Potential success of the project depends on its efficient implementation. However, to achieve high quality of provided works citizens collaboration is necessary, as well as intensive presence of the Public Enterprise employees with advices regarding the water network.

B. RESETTLEMENT ISSUES

This project is not subject to resettlement issues.

C. CONCLUSION ON THE PROJECT POTENTIAL SUCCESS

The project will be socially successful for the following reasons:

- It is considered both cost-efficient and cost-effective over a long run contributing to the improvement of the living conditions in the villages subject to the project;
- The project is a part of the municipal and citizens priorities;
- Most of the stakeholders are motivated by this project;
- None of the ethnicities is concentrated so to prevent the project realization in case of their discontent;
- The project does not impose high financial burden on the budget.

III. ENVIRONMENTAL IMPACT OF THE PROJECT

The main aim of the project is to improve the access to drinking water in Krusevo municipality ensuring sustainability of water consumption and better operational and financial work of Communal Service Provider/ Enterprise "Komuna" through installation of 255 water meters in villages of Aldanci, Norovo and Sazdevo.

The village Aldanci is located 13 km from the City of Krusevo, on the road leading to Prilep. The village Norovo is located northeast of Krusevo at a distance of 15 km from the town. The village Sazdevo is located 32 km north east of Krusevo, on the left side of the regional road Prilep-Makedonski Brod. All three villages have been supplied with drinking water from the Regional water supply system "Studencica". The main aim of the regional hydro system (the water supply network has 715km^2 in the southwestern part of Macedonia) is to provide drinking water for 8 municipalities including Krusevo municipality, water for irrigation and industrial purposes.

The water has been used by local households for drinking, sanitation and irrigation purposes and general remark is that till 2012 no water measurement units were installed at all in these three settlements, so no information about real water consumption per household was provided and no difference between distributed and revenue/invoiced water could be calculated. In October 2012 the Regional Water supply system "Studencica" installed measuring units on the intake pipe to the villages Aldanci and Norovo and in 2013 in the village Sazdevo providing insight into the quantity of water that is distributed to these settlements, so very high differences were identified between distributed and revenue/ invoiced water.

There is a huge loss in drinking water due to leakages in the water supply network and very frequent defects in the water supply system. The households have used the drinking water for irrigation purposes to their agricultural land and it has been used on very unsustainable way. Also, there are illegal connections especially during the summer period and part of village Sazdevo (on higher elevation) has been limited with water supply due to low water pressure. As there are no water meters installed in each household in these three villages, the real water consumption could not be billed, so currently the households pay the lump sum.

In order to overcome the water sustainability supply and consumption problems, the project assumes installation of 255 water meters in these three villages: Aldanci (110 water meters), Norovo (135 water meters) and 10 water meters in village Sazdevo. The water meters will be installed on a public area where the water pipes pass through on the boundaries with the private properties, which will make possible creating access to the meter by a supervisor from the CSE "Komuna" Krusevo in order to measure the water.

The main project activities will include: a) manual excavation of soil (IV category) for a trench for the water meter manhole with dimensions: 1.45x1.25x1.30 m; b) construction of reinforced-concrete walls and top slab for water meter manholes, c) construction of stairs, d) procurement and installation of valves, water meters and adapter joints. It is expected that the excess soil coming from the construction of manholes will be 1.14m^3 and it will be transported to the municipal landfill far away 15km.

The **positive environmental impact** is expected after the installation of water meters in regard of efficient water consumption, preservation of natural water resources, decrease of energy consumption due to restriction of usage the drinking water for irrigation purposes, supply of good quality drinking water to more citizens in Municipality of Krusevo and increase of collection rate (currently it is approx. 60%) ensuring financial sustainability of the CSE in order to improve its communal services to the citizens.

No major adverse environmental impacts are expected during the installation of the water meters neither during the regular operation period. The regular OH&S measures need to be applied to protect the workers of injury during the construction of manholes and installation the water meters.

The water meters should be verified by the national Bureau of Metrology before the installation start.

The good construction practices need to be performed during the preparation of site for construction the reinforced-concrete walls and top slab for water meter manholes. The calibrated meters should be installed following the manufacturer's installation instructions and good construction practice should be follow in regard to waste collection and proper waste disposal after completion of installation work. Just in time information and announcement should be released to all households informing them about several hours' restriction of water supply due to the installation of water meters in order to ensure that the households will make proper water reserves.

During the operation period the water meters should be verified on regular time basis due to the higher or lower flows than designed for, debris in the water, scale build up to minerals in the water, high/low temperature and wear. According the national legislation (Rulebook on verification time period for different measurement units – Official Gazette of RM no. 102/2007) the water meters should be verified on each 5 years to overcome the fail to register the correct water flow through them.

A. MITIGATION PLAN

Project activity	Potential impact	Impact scale	Proposed mitigation measures	Responsibility
Excavation of soil, construction of reinforced-concrete walls and top slab for water meters manholes Cut the water supply pipe, make thread, installation of water meters and if it is necessary installation of valve. Marking the	Possible negative social and health impacts for: • Workers • Local households due to: Not compliance with occupational health and safety at work No proper and on time water supply during the installation work	Local/within the villages: Aldinci, Norovo and Sazdevo short term/minor	**<u>OH&S measures</u>** • Marking the construction site for the water meter manholes; • Health and Safety measures should be applied: a) Maintain a good level of personal hygiene-have on site installations for washing, cleaning; b) Health protection-fist aid kits and medical service on sites; c) Apply the emergency and normal first aid procedure for any injury if such occur through construction work; d) Installation should be done following the manufacturer's instructions. **<u>Water supply during installation works</u>** • Announcement of start-up of installation water meters through local radio, notice boards in the Municipality and leaflets distributed among the citizens; • Informing the impacted population/households about the necessity of water reserve during the restriction of water supply when the installation works start; • CSE "Komuna" Krusevo needs to provide drinking water reserve by road tankers each day in each village during the installation period; • Review the Calibration/Validation Certificate issued by the manufacturer of the meter units according the technical specifications	Contractor – Bidder Supervisor Environmental/ Communal inspector CSE "Komuna" Krusevo

Project activity	Potential impact	Impact scale	Proposed mitigation measures	Responsibility
installation site	No proper waste management		required; • Marking the installation site at each household; • Adequate warning tapes and signage need to be provided; • Forbidden of entrance of unemployed persons within the fence. **<u>Waste management</u>** The good waste management practice should be applied including: • Identification of the different waste types that could be generated at the construction site and its classification according the national List of Waste (Official Gazette no.100/05); • The main waste streams (in very, very small quantities) that are expected are: soil (1.14m^3) , steel pipe, plastic pipe and paper; • Small amount of solid municipal waste could be found as well (food, beverages), as well as packaging waste (paper, bottles, glass); • The contract with the company for waste collection and transportation should be signed for collection and transport of waste; • The waste should be promptly removed from the installation site.	
Operational phase	No adverse environmental risks are expected. The Plan for verification of water meters should be prepared in order to perform the regular verification of measurement units and to ensure correct registration results. The legal requirement is to perform the verification of this type of measurement units (water meters) on regular basis each 5 years. The Plan for preventive and regular maintenance of the whole water supply network including the water meters should be developed by the CSE "Komuna" Krusevo and regular checks should be performed. The public awareness campaign should be organized with main aim is to increase awareness of the local population about the efficient water consumption, preservation of natural resources, good status of water, usage of storm waters, savings of water, etc.			

B. MONITORING PLAN

What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency of measurement)?	Why is the parameter to be monitored?	Cost		Responsibility	
					Construction	Operations	Installation of water meters	Operations of the drinking water supply system
Project stage: Start-up of the construction and installation work								
The safety protection measures applied for the workers	On the installation site in all three villages	Visual checks	At the beginning of each working day during the project activities	To prevent health and safety risks – mechanical injuries To be in compliance with national communal health regulation and OH&S standards			Contractor - Bidder Supervisor	
Information announced about start-up of installation works and restrictions of water	Before the installation start	Review the information for radio, local newspaper or printed and distributed leaflets	At the beginning of the installation work	To prevent shortage of water supply			Contractor -Bidder Supervisor CSE ”Komuna” Krusevo	
Review the validation/calibra	Before the installation	Review the calibration	At the beginning of the installation work	To provide correct water flow			CSE ”Komuna”	

What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency of measurement)?	Why is the parameter to be monitored?	Cost		Responsibility	
					Construction	Operations	Installation of water meters	Operations of the drinking water supply system
tion certificate issued by the water meters manufacturer and Decision issued by the national Bureau of Metrology	start	certificate and technical specifications		registration			Krusevo	
Project stage: Installation of water meters								
Supply enough quantity of drinking water for local population	On the site-in each village during the installation period	Visual monitoring the road tanker with water in each village	During the installation period	To ensure water supply and proper water consumption by local population			Contractor -Bidder Supervisor CSE ”Komuna” Krusevo	
Primary selection of the waste streams as they are generated at the spot and proper waste	On the site	Review the documentation – identification of the waste type according the List of	At the beginning of work with new material/s	To separate hazardous from the non-hazardous waste as well as inert from biodegradable waste			Contractor – Bidder Supervisor CSE ”Komuna”	

What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored (frequency of measurement)?	Why is the parameter to be monitored?	Cost		Responsibility	
					Construction	Operations	Installation of water meters	Operations of the drinking water supply system
disposal		waste					Krusevo	
Operational phase								
The Plan for preventive and regular maintenance of the whole water supply network including the Plan for verification of water meters	At the CSE "Komuna" Krusevo	Review the documentation	On annual basis	To ensure proper water meters operation and continuous supply of water to the local population				CSE "Komuna" Krusevo Municipality
Public awareness campaign for water saving and sustainable water consumption including regular water bills payment	During the public awareness events	Review the minutes of meeting after the completion of the event/number of participants on the event, etc.	At the end of the public awareness event	To monitor the awareness about the necessity of efficient water consumption, environmental and health benefits by sustainable water usage, etc.				CSE "Komuna" Krusevo Municipality Environmental NGOs

LOCAL ENVIRONMENTAL ACTION PLAN

The preparation of the Local Environmental Action Plan (LEAP) for each municipality has been obligatory according to the Law on environment (Official Gazette no. 53/05, 81/05 24/07, 159/08, 83/09 and 124/10). The LEAP is the main strategic planning document on local level focused on the driving forces, pressures to the environment, state of environment, impact on the biodiversity and human health and response that local/regional and national relevant institutions provide to overcome those environmental challenges. The LEAP also presents the priorities among all identified key problems and proposes the efficient actions and resources to solve these problems.

The first Local Environmental Action Plan for Municipality of Krusevo was prepared in 2006 according the new DPSIR methodology.

Krusevo Municipality is a municipality with a relatively low income and relatively small budget, which simply does not allow large investments in environmental protection. Based on the assessment of environmental conditions by defining whether a condition is a problem or not, whether it is a problem of greater or less extent, the Municipality have prepared a list of all the problems in the area of the environment.

Defining priorities depends on its impact on human health, then the impact on the environment, impact on quality of life, its intensity, public opinion and other legal and regulatory requirements and standards.

The water quality, supply with drinking water while providing a continuous supply of the inhabitants of the municipality with quality drinking water is among the top priorities. In order to achieve this priority the municipality has implemented several projects in the area of water supply but still there are many others that need urgently to be implemented, like reconstruction of the old secondary network in the town, disconnection of the illegal water connections, repair and change of defective water meters. These problems were pointed in the LEAP with dynamic 2006-2010, but due to lack of financial sources in the Municipality, the appropriate solution has not been achieved yet.

The need for improvement of water supply in the municipality was pointed out by the citizens of Krusevo during the identification of main economic, social and environment challenges at the Forum for Municipality sessions in 2008.

CONCLUSIONS AND RECOMMENDATIONS

The following indicators support the successful implementation of the project:

- The project is beneficial to the health of citizens as will contribute to improvement of the living conditions1T;
- Currently it is among the first priorities of the municipality and the majority of citizens;
- The interested parties are informed, motivated and support realization of the project;
- Given the financial capacity of the municipality, the repayment of the loan will not significantly burden the municipal budget;
- Capacity and extensive experience in project management of the team tasked to work on this project;
- A clear economic, financial and social benefit from the project;
- The project will definitively improve the efficiency of CSE leading to increase in revenues.