

Due to lack of investments in network rehabilitation, it was assumed that the level of losses will remain constant in the following period. The evolution of the level of losses for each agglomeration is presented in the following table:

Table 1-15 Development of level of losses

Evolution of level of losses (%)	2009	2014	2018	2039
Bacau	54%	46%	46%	46%
Moinesti	51%	44%	44%	44%
Buhusi	50%	45%	45%	45%
Darmanesti	50%	47%	45%	45%
Targu Ocna	57%	50%	48%	48%
Other	50%	50%	50%	50%
Average	54%	46%	46%	46%

The evolution of losses is in line with the parallel investments performed by the ROC according to the infiltration reduction plan approved by the IDA.

(5) Development of wastewater generation

The development of the wastewater generation was estimated starting from the actual consumptions, considering the level of water consumption for each category of consumers. The evolution of the wastewater generation for each agglomeration is presented in the following table:

Table 1-16 Development of domestic and non-domestic wastewater generation (invoiced quantities)

Total wastewater invoiced (m ³ /year)	2009	2014	2018	2039
Bacau	9,926,742	8,411,687	8,704,744	9,871,047
Moinesti	746,094	690,846	713,117	800,148
Buhusi	525,307	585,516	599,850	658,035
Darmanesti	2,474	45,667	45,973	47,392
Targu Ocna	429,250	439,870	449,195	485,929
Total	11,629,867	10,173,586	10,512,880	11,862,552

(6) Development of level of infiltrations

Due to lack of investments in network rehabilitation, it was assumed that the level of infiltrations will remain constant at the level in 2009 but due to the fact that the total water production is decreasing, the percentage of infiltrations is also dropping. The evolution of the level of infiltrations for each agglomeration is presented in the following table:

Table 1-17 Development of level of infiltrations

Evolution of level of infiltrations (%)	2009	2014	2018	2039
Bacau	54%	58%	57%	54%
Moinesti	48%	49%	48%	45%
Buhusi	13%	25%	24%	22%
Darmanesti	0%	6%	6%	6%
Targu Ocna	41%	41%	40%	38%
Average	52%	56%	55%	52%

Due to lack of network rehabilitation, the infiltration levels are expected to increase in the following years.

CHAPTER 2

Project Objectives

2 PROJECT OBJECTIVES

The general objective of the project is to provide a local strategy for the development of the water and wastewater sector in order to comply with the general targets negotiated by Romania in the accession and post-accession framework.

The main objectives of the project are:

- To ensure compliance with the national and EU legislation within the transition periods agreed between Romania and EU for environmental sector:
 - Objective 1 – Implementation of the EU Directive 91/271/CEE (transposed into national legislation by NTPA 011/2002) regarding collection and treatment of the urban wastewater within the county of Bacau and to avoid discharge of untreated urban wastewater into natural body rivers;
 - Objective 2 – Compliance with EU Directive 98/83/EC on the quality of water intended for human consumption transposed into national legislation by the Law 458/2002 on drinking water quality amended by Law 311/2004;
- To ensure an optimal utilization of the EU funds;
- To assist the project promoters in developing local capacity for future project development;
- To define a long term phased investment program.

The project is targeting the rehabilitation and extension of existing water and wastewater infrastructure in order to achieve the fulfillment of the objectives of the Priority Axis 1.

The project will offer to the beneficiaries the following:

- improving drinking water quality and safeguarding public health;
- protecting the environment, in particular, water quality in natural rivers and groundwater; especially through the discharge of treated effluent from the WWTP's;
- maximizing the number of inhabitants connected to drinking water;
- increasing the collection of wastewater;
- improving service standards and increasing water supply wastewater reliability;

- optimizing the water distribution network and wastewater collection and treatment system;
- achieving energy savings and reducing operating costs generally;
- increasing the capacity of the local operator.

The project objectives are presented in more details in the Report on Technical Feasibility Study.

CHAPTER 3

Project Description and Costs

3 PROJECT DESCRIPTION AND COSTS

3.1 Description of the alternatives considered and their corresponding cost

The project consists of the rehabilitation and extension of the water supply and sewerage systems in Bacau County. The project consists of a mix of investment component for each urban area which is described in details in the Report on Technical Feasibility Study.

In order to select the most appropriate options for each investment component a detailed option analysis was conducted. Several specific options have been considered for each location of the works. Where, more detailed option analysis was required, this was performed using investment and operating costs analyses.

The options considered separately for each agglomeration and types of service are presented in the following chapter.

3.2 Financial analysis of the proposed options

3.2.1 Drinking water options

3.2.1.1 Approach and assumptions

The financial / economic comparison of the selected options is carried out by means of a "dynamic unit costs" approach that means by a comparison of the particular unit cost per m³ of water to be treated in each particular option.

The key purpose of the calculation of the "dynamic unit cost" is the comparison of different project alternatives or options with different cost cash flows, respectively different service volumes. The "dynamic unit cost" can also be considered as a first indication for an "average cost covering water price" over the determined period of evaluation.

According to standard practice, the calculation of "dynamic unit cost" is based on a present value approach, according to which the present value of the cost cash flow related to a particular option is to be divided by the present value of the corresponding flow of water sales or wastewater volumes to be treated over a determined period of evaluation.

The calculation of dynamic unit cost is carried out separately for a “capital cost component” and an “O&M cost component”. It is calculated in real terms for an evaluation period of 30 years firstly at a discount rate of 0%, which primarily considers preservation of the capital assets and at alternative discount rates of 5% and 10%, which reflect the range of opportunity cost of capital in the country.

The calculation of the “financial dynamic unit cost” is based on and takes into account:

- The actual value of the existing assets related to the particular option in 2009; (which are in this case zero for all options);
- The investment cost related to the particular option; allocated over the period of implementation in line with the respective implementation schedule and split by main works with an assumed lifetime of 40 years and plant and machinery with an assumed lifetime of 15 years;
- The residual value of the particular investment components to be used beyond the end of the evaluation period, calculated with the assumed life times;
- Appropriate repair and maintenance cost related to the particular option; calculated as a percentage (1% for main works and 3% for plant and machinery) of the investment cost;
- Appropriate energy cost related to the particular option, calculated by multiplying the average cost of the energy to the consumption;
- Personnel cost, calculated by multiplying the number of employees to the average salary of 400 euro/month (in this case equal for all options);
- Materials and chemicals cost, calculated by multiplying the annual average consumption to the unit cost for each material (in this case equal for all options);
- Raw water costs, calculated by multiplying the total volume of drinking water to the unit cost of raw water
- The anticipated volumes of water to be treated for the particular option (which are in this case equal for all options).

We considered the rehabilitation of the existing drinking water system generates positive impact to the human health by improving the quality of the drinking water which results in a higher access to drinking water and a larger number of people living in the service area.

Another category of benefits is the resource cost savings measured at customer level or at operator level. The cost savings for customers takes place when the customer does

no longer need to rely on private wells, private pumps, septic tanks, and does no longer have to buy bottled water.

As a result of the project, benefits of improved drinking water will accrue to households that have a new connection to water supply, and to households that already have water supply, but are guaranteed better quality water and more reliable supply. In practice, the benefits will relate to both new accesses to supply and to availability of improved drinking water.

Because the economic benefits are approximately equal for all the selected options, we did not include the economic benefit in the decision process.

The option with the lowest unit cost per m³ is the most favorable option from the financial point of view.

3.2.1.2 Financial analysis of the drinking water activity options

No options have been identified regarding the water activity, all the works proposed in the project being necessary for providing quality services.

3.2.2 Waste water activity

3.2.2.1 Approach and assumptions

The financial / economic comparison of the selected options is carried out by means of a "dynamic unit costs" approach that means by a comparison of the particular unit cost per m³ of wastewater to be treated in each particular option.

The key purpose of the calculation of the "dynamic unit cost" is the comparison of different project alternatives or options with different cost cash flows, respectively different service volumes. The "dynamic unit cost" can also be considered as a first indication for an "average cost covering water price" over the determined period of evaluation.

According to standard practice, the calculation of "dynamic unit cost" is based on a present value approach, according to which the present value of the cost cash flow related to a particular option is to be divided by the present value of the corresponding flow of wastewater volumes to be treated over a determined period of evaluation.

The calculation of dynamic unit cost is carried out separately for a “capital cost component” and an “O&M cost component”. It is calculated in real terms for an evaluation period of 30 years firstly at a discount rate of 0%, which primarily considers preservation of the capital assets and at alternative discount rates of 5% and 10%, which reflect the range of opportunity cost of capital in the country.

The calculation of the “financial dynamic unit cost” is based on and takes into account:

- The actual value of the existing assets related to the particular option in 2009; (which are in this case zero for all options);
- The investment cost related to the particular option; allocated over the period of implementation in line with the respective implementation schedule and split by main works with an assumed lifetime of 40 years and plant and machinery with an assumed lifetime of 15 years;
- The residual value of the particular investment components to be used beyond the end of the evaluation period, calculated with the assumed life times;
- Appropriate repair and maintenance cost related to the particular option; calculated as a percentage (3% for main works and 1% for plant and machinery) of the investment cost;
- Appropriate energy cost related to the particular option, calculated by multiplying the average cost of the energy to the consumption;
- Personnel cost, calculated by multiplying the number of employees to the average salary of 400 euro/month (in this case equal for all options);
- Materials and chemicals cost, calculated by multiplying the annual average consumption to the unit cost for each material (in this case equal for all options);
- The anticipated volumes of wastewater to be collected and treated for the particular option (which are in this case equal for all options).

We considered the rehabilitation/construction of the existing sewerage networks and WWTP will have a positive impact to the human health by improving the quality of the environment from the service area.

Another category of benefits is the resource cost savings measured at customer level or at operator level. The cost savings for customers takes place when the customer does no longer need to rely on septic tanks.

Because the economic benefits are approximately equal for all the selected options, we did not include the economic benefit in the decision process.

The option with the lowest unit cost per m³ is the most favorable option from the financial point of view.

3.2.2.2 Financial analysis of the wastewater activity options

Bacau Agglomeration

Regarding the wastewater activity, an option analysis was performed in Bacau Agglomeration. The following 2 options were analyzed:

- Option 1: WWTP 1 in Bacau for Bacau Agglomeration, WWTP 2 at Saucesti and WWTP 3 at Hemeiusi;
- Option 2: 1 central WWTP in Bacau for the whole cluster.

The following table shows the financial evaluation of compared options:

Table 3-1 Dynamic Unit Cost and Net Present Value – Bacau wastewater options (amounts in Euro)

	Option 1	Option 2
P.E.	314,862	314,862
Investment Sum	52,926,853	45,787,616
specific costs Investment Sum	168	145
	115.6%	100.0%
Operation cost	3,026,789	2,952,416
	102.5%	100.0%
Discounted Present Value	102,710,793	94,112,507
spec. NPV Euro/p.e.	326	299
	109.1%	100.0%

Following the above explained aspects the consultant recommends Option 2 as favourable solution for the Feasibility Study.

Moinesti Agglomeration

Regarding the wastewater activity, an option analysis was performed in Moinesti Agglomeration. The following 2 options were analyzed:

- Option 1: 1 central WWTP in Moinesti North with 3 PS

- Option 2: 1 WWTP in Moinesti North and 1 WWTP in Moinesti South

The following table shows the financial evaluation of compared options:

Table 3-2 Dynamic Unit Cost and Net Present Value – Moinesti wastewater options (amounts in Euro)

	Option 1	Option 2
P.E.	31,719	31,719
Investment Sum	17,814,902	17,491,511
specific costs Investment Sum	562	551
	100.0%	98.2%
Operation cost	486,833	504,638
	100.0%	103.7%
Discounted Present Value	26,646,531	26,667,953
spec. NPV Euro/p.e.	840	841
	100.0%	100.1%

Following the above explained aspects the consultant recommends Option 1 as favourable solution for the Feasibility Study.

Buhusi Agglomeration

Regarding the wastewater activity, an option analysis was performed in Buhusi Agglomeration. The following 4 options were analyzed:

- Option 1: 1 WWTP 1 in Buhusi, 1 WWTP 2 in Blagesti, 1 WWTP 3 in Racova and 1 WWTP 4 in Valea Lui Ion
- Option 2: 1 central WWTP in Buhusi

The following table shows the financial evaluation of compared options:

Table 3-3 Dynamic Unit Cost and Net Present Value – Buhusi wastewater options (amounts in Euro)

	Option 1	Option 2
P.E.	34,823	34,823
Investment Sum	23,681,501	22,620,442
specific costs Investment Sum	680	650
	104.7%	100.0%
Operation cost	602,879	497,317
	121.2%	100.0%

	Option 1	Option 2
Discounted Present Value	34,616,059	31,623,653
spec. NPV Euro/p.e.	994	908
	109.5%	100.0%

Following the above explained aspects the consultant recommends Option 2 as favourable solution for the Feasibility Study.

Darmanesti Agglomeration

There is an existing sewer network in Darmanesti and also a WWTP exists, but it does not have sufficient capacity and is located in the middle of the town. Therefore, the WWTP in Darmanesti will be dismantled and a new WWTP will be constructed in the south eastern part of the town.

Due to the position of Darmanesti Agglomeration with no proximity to other relevant settlements and no possibility to connect it to other agglomerations by gravity, no option analysis was carried out.

Targu Ocna Agglomeration

The WWTP in Targu Ocna will be rehabilitated and extended for tertiary and sludge treatment to fulfil the discharge requirements. All sewer network extensions will be implemented as separate systems.

Due to the position of Targu Ocna Agglomeration with no proximity to other relevant settlements and no possibility to connect it to other agglomerations by gravity, no option analysis was carried out.

3.3 Project investment costs

3.3.1 General

The estimate of investment costs is described and presented in detail in the respective chapter of the Feasibility Study. The investment costs are separately estimated and stated for each agglomeration. The estimated investment costs contain primarily the Project investment cost to be implemented during the period 2009 to 2013 (part of the Long Term investment plan) and in addition replacement cost and additional investment cost as required up to the design horizon 2039.

The investment costs are separately estimated for extension, replacement, rehabilitation of water supply infrastructure (production, transmission, storage, distribution) and for new construction, replacement, rehabilitation of wastewater infrastructure (collection, transmission, treatment). For the purpose of the CBA the overall cost is split by the following categories as required for the Financing Plan to be incorporated in the Application Form:

- Planning, design fees
- Land purchase
- Building and construction
- Plant and machinery / equipment /commissioning
- Contingencies
- Supervision during construction
- Technical assistance
- Publicity

The investment cost is allocated on an annual basis in line with the implementation schedule. For the cost category “plant and machinery” re-investment costs are considered after 15 years of utilization.

The residual value at the end of the evaluation period is calculated on the basis of an average useful life time of 15 years for “plant and machinery” and an average lifetime of 40 years for “buildings and constructions”. All investment cost figures are stated in EUR at constant price level.

3.3.2 Project investment costs in constant prices

The project consists of the rehabilitation and extension of the water supply and sewerage systems in Bacau County. The project consists of a mix of investment component for each urban area which is described in details in the Report on Technical Feasibility Study. The breakdown of the investment costs per agglomerations is presented in the following table:

Table 3-4 Investment costs breakdown per agglomerations (in million Euro constant prices)

Investments per agglomerations	Total	2009	2010	2011	2012	2013
Bacau	32.975	-	0.330	12.860	13.190	6.595
Moinesti	17.444	-	0.174	6.803	6.978	3.489
Buhusi	17.556	-	0.176	6.847	7.022	3.511
Darmanesti	23.516	-	0.235	9.171	9.406	4.703
Targu Ocna	13.797	-	0.138	5.381	5.519	2.759
Total	105.287	-	1.053	41.062	42.115	21.057

The breakdown of the investment costs per cost components is presented in the following table:

Table 3-5 Investment costs breakdown per cost component (in million Euro constant prices)

Investment costs	Total	2009	2010	2011	2012	2013
	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR
Water supply system						
Land	-	-	-	-	-	-
Planning / design	0.079	-	0.001	0.031	0.032	0.016
Site preparation	0.019	-	0.000	0.007	0.008	0.004
Site preparation	-	-	-	-	-	-
Costs for the completion of the works	0.019	-	0.000	0.007	0.008	0.004
Main works	2.369	-	0.024	0.924	0.948	0.474
Plant and machinery	3.249	-	0.032	1.267	1.300	0.650
TA & Training	0.100	-	0.001	0.039	0.040	0.020
TA & Training	0.060	-	0.001	0.023	0.024	0.012
Costs for the PIU salaries	0.026	-	0.000	0.010	0.010	0.005
Costs for the annually audit	0.014	-	0.000	0.005	0.006	0.003
Supervision	0.131	-	0.001	0.051	0.052	0.026
Public Relation	0.011	-	0.000	0.004	0.005	0.002
Contingencies	0.451	-	0.005	0.176	0.180	0.090
Tax/public levies	0.104	-	0.001	0.041	0.042	0.021
Total water supply system	6.513	-	0.065	2.540	2.605	1.303

Investment costs	Total	2009	2010	2011	2012	2013
	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR
Wastewater system						
Land	-	-	-	-	-	-
Planning / design	2.119	-	0.021	0.826	0.848	0.424
Site preparation	0.508	-	0.005	0.198	0.203	0.102
Site preparation	-	-	-	-	-	-
Costs for the completion of the works	0.508	-	0.005	0.198	0.203	0.102
Main works	61.625	-	0.616	24.034	24.650	12.325
Plant and machinery	19.496	-	0.195	7.603	7.798	3.899
TA & Training	2.107	-	0.021	0.822	0.843	0.421
TA & Training	1.599	-	0.016	0.624	0.640	0.320
Costs for the PIU salaries	0.397	-	0.004	0.155	0.159	0.079
Costs for the annually audit	0.111	-	0.001	0.043	0.044	0.022
Supervision	3.490	-	0.035	1.361	1.396	0.698
Public Relation	0.305	-	0.003	0.119	0.122	0.061
Contingencies	7.132	-	0.071	2.782	2.853	1.426
Tax/public levies	1.994	-	0.020	0.778	0.798	0.399
Total wastewater system	98.774	-	0.988	38.522	39.510	19.755
Total	105.287	-	1.053	41.062	42.115	21.057

Replacement cost

Replacement costs are detailed in Annex 1-3. They amount to EUR 22.7 million (in real terms) for water and wastewater systems. The replacement costs refer to the “re-investment” cost associated with the replacement of plant and machinery at the end of its assumed 15 year lifetime.

3.3.3 Eligible project cost

All Project investment costs as determined in the Feasibility Study are considered as eligible cost for Cohesion Fund support.

3.3.4 Project investment cost in current prices

The estimate of the project investment cost actually to be spent at the time of implementation has to take into account the anticipated price increases (inflation) according to the macroeconomic scenario.

Table 3-6: Adjustment factors for investment translation (amounts in Euro)

Investment in constant prices	Total	2009	2010	2011	2012	2013
Water activity	6,513,434	-	65,134	2,540,239	2,605,373	1,302,687
Wastewater activity	98,773,807	-	987,738	38,521,785	39,509,523	19,754,761
Total	105,287,240	-	1,052,872	41,062,024	42,114,896	21,057,448
Investment in current prices						
Water activity	7,296,996	-	69,210	2,785,577	2,936,998	1,505,211
Wastewater activity	110,656,240	-	1,049,549	42,242,237	44,538,482	22,825,972
Total	117,953,237	-	1,118,759	45,027,814	47,475,480	24,331,183
Adjustment factor water	12.03%	2.7%	6.3%	9.7%	12.7%	15.5%
Adjustment factor wastewater	12.03%	2.7%	6.3%	9.7%	12.7%	15.5%
Average adjustment factor	12.03%	2.7%	6.3%	9.7%	12.7%	15.5%

The breakdown of the investment costs per agglomerations in current prices is presented in the following table:

Table 3-7 Investment costs breakdown per agglomerations (in million Euro current prices)

Investments per agglomerations	Total	2009	2010	2011	2012	2013
Bacau	36.941	-	0.350	14.102	14.869	7.620
Moinesti	19.543	-	0.185	7.460	7.866	4.031
Buhusi	19.668	-	0.187	7.508	7.916	4.057
Darmanesti	26.345	-	0.250	10.057	10.604	5.434
Targu Ocna	15.457	-	0.147	5.900	6.221	3.188
Total	117.953	-	1.119	45.028	47.475	24.331

The breakdown of the investment costs per cost components is presented in the following table:

Table 3-8: Investment costs breakdown per cost component (in million Euro current prices)

Investment costs	Total	2009	2010	2011	2012	2013
	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR
Water supply system						
Land	-	-	-	-	-	-
Planning / design	0.089	-	0.001	0.034	0.036	0.018
Site preparation	0.021	-	0.000	0.008	0.009	0.004
Site preparation	-	-	-	-	-	-

Investment costs	Total	2009	2010	2011	2012	2013
	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR	Mill. EUR
Costs for the completion of the works	0.021	-	0.000	0.008	0.009	0.004
Main works	2.654	-	0.025	1.013	1.068	0.548
Plant and machinery	3.640	-	0.035	1.389	1.465	0.751
TA & Training	0.112	-	0.001	0.043	0.045	0.023
TA & Training	0.067	-	0.001	0.026	0.027	0.014
Costs for the PIU salaries	0.029	-	0.000	0.011	0.012	0.006
Costs for the annually audit	0.016	-	0.000	0.006	0.006	0.003
Supervision	0.146	-	0.001	0.056	0.059	0.030
Public Relation	0.013	-	0.000	0.005	0.005	0.003
Contingencies	0.505	-	0.005	0.193	0.203	0.104
Tax/public levies	0.117	-	0.001	0.044	0.047	0.024
Total water supply system	7.297	-	0.069	2.786	2.937	1.505
Wastewater system						
Land	-	-	-	-	-	-
Planning / design	2.374	-	0.023	0.906	0.956	0.490
Site preparation	0.569	-	0.005	0.217	0.229	0.117
Site preparation	-	-	-	-	-	-
Costs for the completion of the works	0.569	-	0.005	0.217	0.229	0.117
Main works	69.038	-	0.655	26.355	27.787	14.241
Plant and machinery	21.841	-	0.207	8.338	8.791	4.505
TA & Training	2.360	-	0.022	0.901	0.950	0.487
TA & Training	1.791	-	0.017	0.684	0.721	0.369
Costs for the PIU salaries	0.445	-	0.004	0.170	0.179	0.092
Costs for the annually audit	0.124	-	0.001	0.047	0.050	0.026
Supervision	3.909	-	0.037	1.492	1.574	0.806
Public Relation	0.341	-	0.003	0.130	0.137	0.070
Contingencies	7.990	-	0.076	3.050	3.216	1.648
Tax/public levies	2.234	-	0.021	0.853	0.899	0.461
Total wastewater system	110.656	-	1.050	42.242	44.538	22.826
Total	117.953	-	1.119	45.028	47.475	24.331

CHAPTER 4

Financial analysis

4 FINANCIAL ANALYSIS

4.1 General Framework and Background

For a better understanding of the context of the financial analysis to be prepared in the framework of the Cohesion Fund application process, the following background and framework conditions are presented prior to the presentation of the intrinsic financial analysis:

- Socio-economic situation and conditions of Bacau County, focusing mainly on household income and expenditures;
- The financial status of the actual operators;

4.1.1 Socio-economic assessment of Bacau County

The socio-economic situation of Romania has known a spectacular evolution during the transition period. The population decreased from 23.2 million people in 1990 to 21.54 million in 2007. That is an annual average shrinkage of -0.42% . Reasons for the decline of the population are the decreasing fertility rate and the migration of the fertile age groups to foreign countries.

The macro economy also has an extraordinary development due to the transition phase in the 1990's and the beginning of this decade and the subsequent cohesion phase which has started in the last years. During this phase the average annual growth rate of the real GDP was 4.6% . The prices during that period increased in the range of 30% to 50% in the first half of the 1990's. In 2007 the GDP growth was 6.0% in real terms and the inflation rate was 4.84% . This development is also shown in the currency rate.

The employment situation in Romania during this was marked by a strong discrepancy between the labor resources and the active population.

4.1.1.1 Demographic Development

4.1.1.1.1 Population of Romania

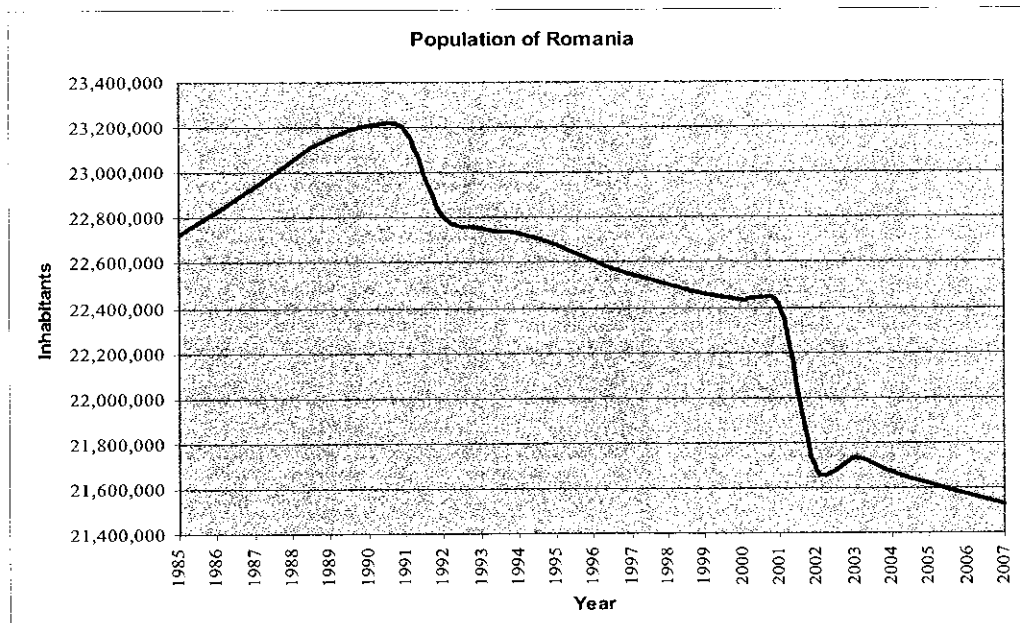
According to the Statistical Yearbook published by the National Institute of Statistics, Romania had a population of 21,537,563 people on July 1st 2007. 10.5 million inhabitants are male and 11.04 million are female which is a distribution of 48.7% to 51.3% .

The recent demographic development in Romania has been deeply marked by the process of social and economic transformation initiated with the political changes of the beginning of the 1990s. Figure 1 shows that Romania's population reached its highest value in the year 1990 with 23.2 million people. The jumps in the diagram below result from the census in the years 1992 and 2002, which have shown the real demographic situation in the country.

According to the census figures, Romania's number of inhabitants decreased by 5.5% between 1992 and 2002, inverting the demographic trend observed until 1992. During the period 2002-2007 Romania's population has decreased with an annual average growth rate of -0.24% p.a. (-1.18% for the whole period of time).

Other East European countries have had similar problems after 1990. In Romania this was mainly a consequence of negative natural growth (continuously negative since 1992) and a negative balance of international migration.

Figure 4-1 Evolution of the population in Romania 1985–2007



Source: The National Institute for Statistics, 2008

In 2007, urban population accounted for 55.1% of the total and rural population accounted for 44.9%. Since 1990 (53.2% to 46.8%) this relationship is more or less stable, which can be seen in figure 2.

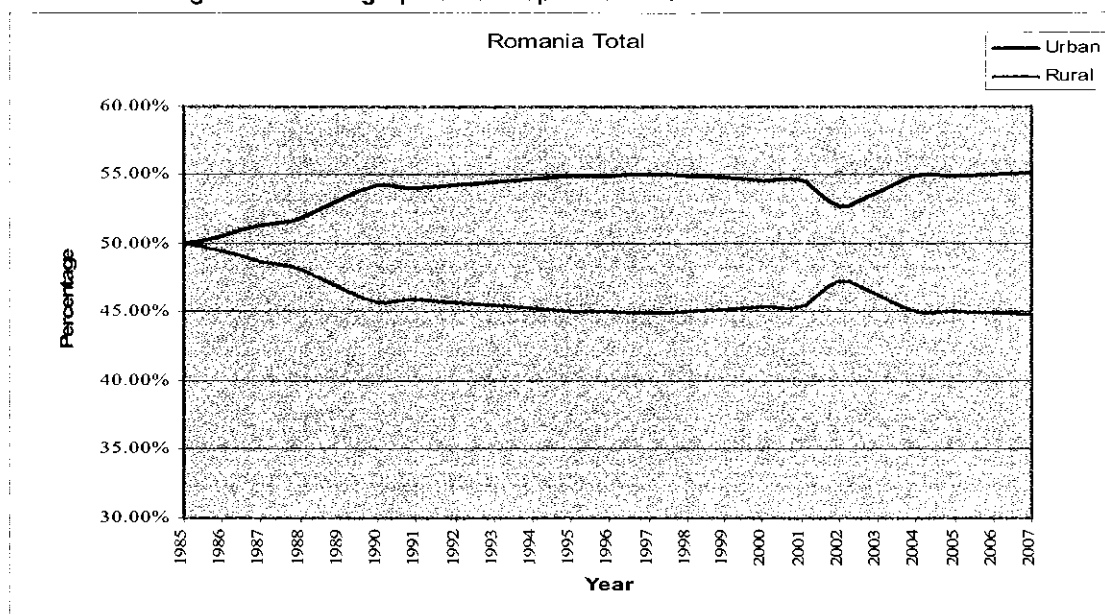
The increase in 2002 results again from the census whereas the enlargement in 2005 results from changes of the status of some population units. Some changed their status from communes to towns or municipalities. These changes of status increase the share of urban population.

The developments of the shares of urban and rural areas result from three different overlaying processes. These are firstly the natural population changes from births and deaths, which are different in urban and rural areas.

The differences are: the birth rates in the rural areas are higher compared to the urban area, but in urban areas live more women of fertile age than in rural areas. Another difference is that older people live mostly in the rural areas rather than in the urban areas of the country.

Secondly the migration inside Romania (from rural to urban and vice versa) affects the proportion. At last the international migration with other countries is different between urban and rural population. The main part of the emigrants are from urban areas.

Figure 4-2 Demographic Development in Romania from 1985 to 2007

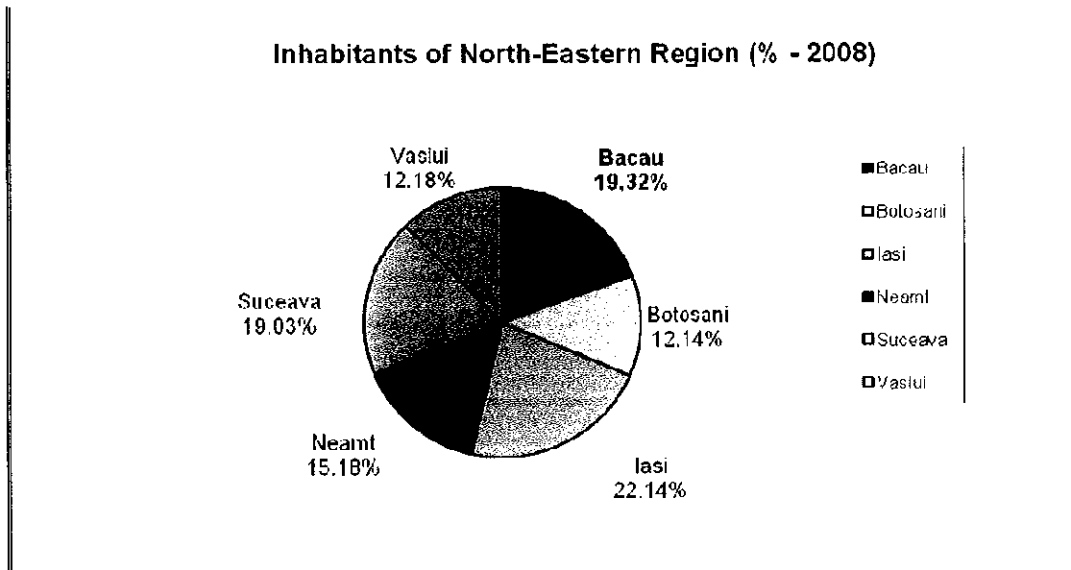


Source: The National Institute for Statistics, 2008

4.1.1.1.2 Population in the North Eastern Region

According to the INS, the total population of the North Eastern Region counted 3.73 million people in 2009, which was 17.29% of the population of Romania. In addition to Bacau, the other counties in the region are: Botosani, Iasi, Neamt, Suceava, and Vaslui.

Figure 4-3 Inhabitants of North Eastern Region of Romania

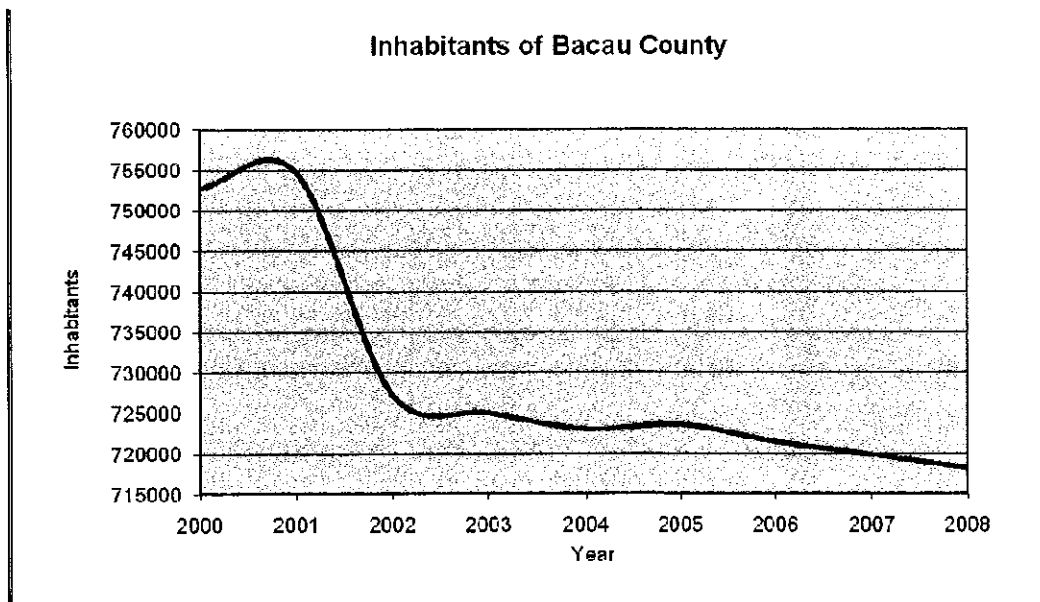


Source: The National Institute for Statistics, 2008

4.1.1.1.3 Population in Bacau County

The population in Bacau County was 716.260 inhabitants on the 1st of July 2009. The population of Bacau County represents 3.3% of the total population of the country and 19.3% of the North Eastern Region according to the 2009 figures.

Figure 4-4 Inhabitants of Bacau County 2000 – 2008



Source: The National Institute for Statistics, 2008

The county is the second largest in its region (6621 km²), the county with a larger surface than it being Suceava (8553 km²). The population in Bacau has decreased with an annual average of 0.58% since 2000 when it counted 752,761 inhabitants. The local average is higher than the one at national level (0.53%). In 2002 it was recorded a decreasing rate at national level of 2.2%, while at local level the population decreased by 3.65%. A decreasing tendency has been recorded for the following years, but with lower levels of the shrinkage rate (except for 2005).

In 2009 Bacau county had three municipalities: its residence city – Bacau with 178.203 inhabitants, Moinesti (23.863 inhabitants) and Onesti (50.820 inhabitants) and five cities: Buhusi, Comanesti, Darmanesti, Targu Ocna and Slanic Moldova with a total population of about 76.000 inhabitants. The county has a number of 85 communes, in which more than 450.000 people live.

4.1.1.2 Household Characteristics

Data on household incomes and expenditures, respectively consumption at local level are not available on county level, so the analyses start from the national and regional level. The following step is the estimation of the household revenues and incomes at county and local level derived from the national level.

4.1.1.2.1 Household Characteristics at National Level

Household size at National Level

The average number of persons in a household at national and regional level, grouped by the main occupation of the household members is presented in the following tables, as provided by the National Institute for Statistics.

The level of this indicator at regional level is 0.24% higher than at national level.

Regarding the structure of the household members' occupations, at regional level there is a higher number of people involved in wage activities probably due to the fact that the percentage of young people is higher than at national level.

Table 4-1 Average Number of Persons/Household grouped by the Main Occupation of the Household Members – at national level in 2008

	Total
Employee	3.182
Agriculture	3.412
Unemployed	3.225
Pensioner	2.445
Total	2.918

Source: The National Institute for Statistics, "Revenues and consumption of the population", Bucharest, 2008

Household Incomes at National Level

The average household revenues at national level as presented by the National Institute for Statistics is structured in the following table for the 3rd quarter of 2008 and 3rd quarter of 2009.

Table 4-2 Structure of Household Revenues at National Level 2008 & 2009 – RON/month

Elements	3 rd quarter 2008		3 rd quarter 2009	
	Urban	Rural	Urban	Rural
I. Total revenues (A+B)	2,357.14	1,696.00	2,599.9	1,840.3
A. Monetary revenues	2,139.18	1,181.35	2,407.0	1,359.9
Gross salaries	1,534.97	495.29	1,674.3	547.9
Revenues from agriculture	8.56	112.68	13.2	133.0
Revenues from independent non-agricultural activities	58.37	67.99	60.5	72.6
Social revenues	464.09	413.46	584.2	515.9
Revenues from properties	10.76	1.38	9.2	2.0
Revenues from selling assets	29.74	55.07	32.9	61.7
Other revenues	32.69	35.48	32.7	26.8
B. Revenues in-kind	217.96	514.65	192.9	480.3
Revenues in kind from social related activities	84.80	33.23	72.5	27.2
The equivalent of product consumption from own sources	133.16	481.42	120.4	453.1
II. Loans	48.61	31.89	34.5	20.0
III Beginning balance	316.68	218.45	318.3	228.9
Total revenues (I+II+III)	2,722.43	1,946.33	2,952.6	2,089.2

Source: The National Institute for Statistics, "Revenues and consumption of the population", Bucharest, 2009

The structure of the household incomes at national level in % is presented in the following table for the 3rd quarter of 2008 and 3rd quarter of 2009:

Table 4-3 Structure of Household Incomes at National Level 2008 & 2009 – %

Elements	3 rd quarter 2008		3 rd quarter 2009	
	Urban	Rural	Urban	Rural
I. Total revenues (A+B)	86.58%	87.14%	88.1%	88.1%
A. Monetary revenues	78.58%	60.70%	81.5%	65.1%

Elements	3 rd quarter 2008		3 rd quarter 2009	
	Urban	Rural	Urban	Rural
Gross salaries	56.38%	25.45%	56.7%	26.2%
Revenues from agriculture	0.31%	5.79%	0.4%	6.4%
Revenues from independent non-agricultural activities	2.14%	3.49%	2.0%	3.5%
Social revenues	17.05%	21.24%	19.8%	24.7%
Revenues from properties	0.40%	0.07%	0.3%	0.1%
Revenues from selling assets	1.09%	2.83%	1.1%	3.0%
Other revenues	1.20%	1.82%	1.1%	1.3%
B. Revenues in-kind	8.01%	26.44%	6.5%	23.0%
Revenues in kind from social related activities	3.11%	1.71%	2.5%	1.3%
The equivalent of product consumption from own sources	4.89%	24.73%	4.1%	21.7%
II. Loans	1.79%	1.64%	1.2%	1.0%
III Beginning balance	11.63%	11.22%	10.8%	11.0%
Total revenues (I+II+III)	100.00%	100.00%	100.0%	100.0%

Source: the National Institute for Statistics, "Revenues and consumption of the population", Bucharest, 2009

The level of total revenue in 2009 is 41% higher in urban areas and its structure is also significantly different for the 2 areas.

The monetary revenues in urban areas account for 81.5% and the main revenue category is represented by the salaries which account 56.7% of the total revenue. The equivalent of product consumption from own sources represents only 4.1% of the total revenue, in contrast to the same indicator in the rural area which accounts 21.7%.

In compensation, the salaries account only 26.2% of the total revenue in the rural area.

Household Expenditures at National Level

The average household expenditures at national level as presented by the National Institute for Statistics is structured in the following table for the year 2008 and 2009 (3rd quarters).

Table 4-4 Structure of Household Expenditures at National Level 2008 & 2009 – RON/month

Elements	3 rd quarter 2008		3 rd quarter 2009	
	Urban	Rural	Urban	Rural
I. Total expenditures (A+B)	2,085.26	1,567.44	2,247.5	1,667.9
A. Monetary expenditures	1,952.09	1,086.02	2,127.1	1,214.8
Consumption, out of which:	1,423.91	801.75	1,545.9	924.9
Food and beverages	501.10	310.07	552.4	339.2
Non-food products	479.49	314.73	547.1	394.5
Services	443.32	176.94	446.5	191.2

Elements	3 rd quarter 2008		3 rd quarter 2009	
	Urban	Rural	Urban	Rural
Expenditures for food and beverages not consumed	39.00	30.54	49.8	37.5
Taxes, fees and related contributions	422.08	131.79	470.1	147.1
Other monetary expenditures	67.11	121.95	61.3	105.3
B. Equivalence of consumption from own sources	133.16	481.42	120.4	453.1
II. Loan payments	127.70	54.35	150.6	68.7
III Beginning balance	509.47	324.54	554.6	352.6
Total expenditures (I+II+III)	2,722.43	1,946.33	2,952.6	2,089.2

Source: the National Institute for Statistics, "Revenues and consumption of the population", Bucharest, 2009

The structure of the household expenditures at national level in % is presented in the following table for the 3rd quarter of 2008 and 3rd quarter of 2009:

Table 4-5 Structure of Household Expenditures at National Level 2008 & 2009 - %

Elements	3 rd quarter 2008		3 rd quarter 2009	
	Urban	Rural	Urban	Rural
I. Total expenditures (A+B)	76.60%	80.53%	76.1%	79.8%
A. Monetary expenditures	71.70%	55.80%	72.0%	58.1%
Consumption, out of which:	52.30%	41.19%	52.4%	44.3%
Food and beverages	18.41%	15.93%	18.7%	16.2%
Non-food products	17.61%	16.17%	18.5%	18.9%
Services	16.28%	9.09%	15.1%	9.2%
Expenditures for food and beverages not consumed	1.43%	1.57%	1.7%	1.8%
Taxes, fees and related contributions	15.50%	6.77%	15.9%	7.0%
Other monetary expenditures	2.47%	6.27%	2.1%	5.0%
B. Equivalence of consumption from own sources	4.89%	24.73%	4.1%	21.7%
II. Loan payments	4.69%	2.79%	5.1%	3.3%
III Beginning balance	18.71%	16.67%	18.8%	16.9%
Total expenditures (I+II+III)	100.00%	100.00%	100.0%	100.0%

Source: the National Institute for Statistics, "Revenues and consumption of the population", Bucharest, 2009

The monetary expenditures account for 71.7% in 2008 and 72.0% in 2009 in the urban areas and 55.8% in 2008 and 58.1% in 2009 of the total expenditures in the rural areas. The most important category both in urban and rural household expenditures is represented by the consumption which accounts for 52.4% in the urban and 44.3% of the total expenditures in the rural households in 2009.

In the urban areas there has to be considered the "tax, fees and related contributions" category which holds 15.9% of the total expenditures.

In the rural areas the following most representative category is the "equivalence of consumption from own sources" which accounts 21.7% of the total expenditures.

The "tax, fees and related contribution" category holds only 7.0% of the total expenditures in the rural area.

Household expenditures for Services at National and Regional Level

A relevant category of expenditure for this study is the level and structure of expenditures for services.

Regarding the potential affordability level of each service category, the following table shows expenditure for each service item in percent of the total average income at national level for the 3rd quarter of 2008 and 2009.

Table 4-6 Expenditures for services in % of average household income at National level

Expenditure item Amounts in RON	3 rd quarter 2008		3 rd quarter 2009	
	Urban	Rural	Urban	Rural
Electricity	3.29%	3.52%	3.20%	3.34%
Heating	0.16%	0.00%	0.10%	0.00%
Natural gas	1.25%	0.30%	1.34%	0.30%
Water, wastewater and solid waste management	2.80%	0.40%	2.97%	0.46%
Transport	1.34%	1.46%	1.26%	1.33%
Telecommunication	4.74%	2.59%	4.67%	2.57%
Radio and TV	1.26%	1.03%	1.24%	1.10%
Education	0.57%	0.20%	0.65%	0.21%
Other	5.56%	2.00%	5.54%	1.98%
Total	20.98%	11.49%	20.96%	11.29%

Source: the National Institute for Statistics, "Revenues and consumption of the population", Bucharest, 2008

At national level, the ratio of expenditures for water, wastewater and solid waste management was 2.80% in urban areas for 2008 and 2.97% in 2009. According to the international norms and according to the national strategy for municipal services in Romania a level of 5% for this category of services can be considered acceptable. This leads to the conclusion that the tariffs for these services can be increased substantially especially if required to co-finance investment projects in the environmental sector.

More relevant for the project would be presenting the expenditure for services in percentage of average household revenues for the North Eastern region in Romania:

Table 4-7 Expenditure for services in % of average household income for North Eastern region

Expenditure item Amounts in RON	3 rd quarter of 2008	3 rd quarter of 2009
	Total	Total
Electricity	3.27%	3.19%
Heating	0.13%	0.05%
Natural gas	0.65%	0.68%
Water, wastewater and solid waste management	1.24%	1.53%
Transport	1.56%	1.49%

Expenditure item Amounts in RON	3rd quarter of 2008	3rd quarter of 2009
	Total	Total
Telecommunication	3.18%	3.26%
Radio and TV	1.20%	1.22%
Education	0.40%	0.82%
Other	4.52%	4.13%
Total	16.15%	16.37%

Source: the National Institute for Statistics, "Revenues and consumption of the population", Bucharest, 2009

The table above shows that the level of the expenditures for water, wastewater and solid waste management is lower than the national average, which allows the possibility of increasing the tariffs for the specified services.

4.1.1.2.2 Household Characteristics in Bacau County

The National Institute for Statistics does not provide figures for the average household income and household expenditures on county, respectively local level. In order to obtain a reasonable basis for the affordability assessment the Consultant had to estimate the average household income for Bacau County.

The average household income for Bacau County is derived from the national average household income by applying a correction factor which is calculated from the ratio between the average national salary and the average salary in Bacau County. This is a relatively schematic approach, but especially for urban settlement areas fully satisfying for the purpose of affordability assessment.

The average household income at national level is presented in the following table for the 3rd quarter of 2008 and the 3rd quarter of 2009 in nominal terms:

Table 4-8 Average household income at national level (2008 & 2009) – RON/month

Household total income	3 rd Quarter of 2008	3 rd Quarter of 2009
Average household income	2,136.4	2,268.0
Urban area	2,428.6	2,599.9
Rural area	1,757.4	1,840.3

Source: National Institute for Statistics

As required for the calculation of the disposable household income, the amounts paid from the household budget for taxes, fees and similar items are presented in the following table for the 3rd quarter of 2008 and the 3rd quarter of 2009 in nominal terms:

Table 4-9 Average taxes, fees and similar items at national level – RON/month

Household total income	3 rd Quarter of 2008	3 rd Quarter of 2009
Average household income	305.6	329.0
Urban area	435.7	470.1
Rural area	136.8	147.1

Source: National Institute for Statistics

The average disposable household income at national level is presented in the following table for the 3rd quarter of 2008 and the 3rd quarter of 2009 in nominal terms:

Table 4-10 Average disposable household income at national level – RON/month

Household total income	3 rd Quarter of 2008	3 rd Quarter of 2009
Average household income	1,830.8	1,939.0
Urban area	1,992.9	2,129.8
Rural area	1,620.6	1,693.1

Source: National Institute for Statistics

The following table shows the estimation of the correction factors for Bacau County derived from the ratio between the average national and the average county salaries:

Table 4-11 Correction factors for average disposable household income in Bacau County

Household total income	2008	2009
National average salary	1,282.0	1,381.1
Bacau average salary	1,232.0	1,254.0
Annual correction factor	96.1%	90.8%

Source of data used for calculation: National Institute of Statistics

Because the trend is decreasing and the difference is significant we calculated and decided to use an average conversion factor of 84.2% (correction factor for the month of March 2010).

The following table shows the average disposable household incomes in Bacau County with the correction factor for each year applied both for urban and rural areas:

Table 4-12 Average disposable household income in Bacau County – RON/month

Household disposable revenues	2007	2008	2009
Average household income	1,515	1,678	1,807
Urban area	1,530	1,695	1,825
Rural area	1,470	1,628	1,753

Source of data used for calculation: National Institute of Statistics

Inside Bacau County there are different household incomes in the different urban areas. Based on the discussions with the local beneficiaries the Consultant used the following assumptions for the estimation of the average household income in the different urban areas:

- For the larger Municipalities the average household income is assumed to be 1% higher than the average for the County;
- For the remaining urban area the average household income is assumed to be 3% lower than the average for the County.

4.1.1.3 Economic Situation in Bacau County

The evolution of the main macroeconomic indicator in Bacau County compared to the dynamic of the same indicator at national level is presented in the following table for the period 2002-2006:

Table 4-13 Evolution of the GDP at National and Local Levels

GDP Evolution	2002	2003	2004	2005	2006
National level					
GDP (Billion Current ROL)	1,520,170	1,974,276	2,473,680	2,889,546	3,446,506
GDP (increase in nominal terms %)	30.2%	29.9%	25.3%	16.8%	19.3%
Inflation (%)	17.8%	14.1%	9.3%	8.6%	4.9%
Average exchange rate (ROL/Euro)	31,258	37,541	40,526	36,249	35,245
GDP per capita (Euro)	2,231	2,420	2,816	3,686	4,530
Bacau County					
GDP (Billion Constant ROL)	26,562	32,842	42,330	49,524	58,527
GDP (increase %)	22.0%	23.6%	28.9%	17.0%	18.2%
GDP per capita (Euro)	1,168	1,207	1,445	1,888	2,302
Weight in national level (%)	1.75%	1.66%	1.71%	1.71%	1.70%

Source: the National Institute for Statistics, "Territorial statistics", Bucharest, 2007

The data in the table shows the GDP per capita in Bacau County is lower than the level of the same indicator at national level in all the years of the analysis. In 2005 the GDP growing rate in Bacau County was lower than the year before (the opposite thing happened at national level). In the same year the weight of GDP at local level in the GDP at national level was equal to the one registered the year before.

The next table contains figures of the import and export carried out in Bacau county:

Table 4-14 Exports and Imports in Bacau county 2009 – thousand Euros

	2009												2010
	Jan	Feb	Mar	Apr	Mai	Iun	Iul	Aug	Sept	Oct	Nov	Dec	Jan
Total exports FOB	18,955	23,951	19,311	20,666	20,509	21,666	24,820	17,019	17,638	22,424	22,506	18,238	20,695
Total imports CIF	19,812	23,158	22,651	25,273	28,900	26,438	26,454	19,102	26,803	24,515	24,521	21,078	17,008
Sold FOB/CIF	-857	793	-3,340	-4,607	-8,391	-4,772	-1,634	-2,083	-9,165	-2,091	-2,015	-2,840	3,687

Source: the National Institute for Statistics

Both the export and the import values show unstable evolutions which lead to big discrepancies in the trade balance from one month to another.

4.1.2 Socio-Economic Projections

The socio-economic projections are taking into consideration the official forecast issued by the National Commission for Prognosis for the period 2008-2013 (spring edition), the recommendations from the CBA Guide prepared by the Ministry of Environment and Sustainable Development and JASPERS and the Consultants own estimations and professional judgment.

4.1.2.1 Macroeconomic trends and outlooks

The forecasts at national level is based on the latest available prognosis of the Comisia Nationala de Prognostica (CNP) regarding the macroeconomic elements issued in April 2009 ("Forecast of the main macro-economic indicators for the period 2008-2013").

The synthesis of the main indicators until 2011 is presented in the following table:

Table 4-15 Evolution of macro-economic indicators – national level

National level	2008	2009	2010	2011
GDP Growth in real terms (%)	7.1%	-4.0%	0.1%	2.4%
Average inflation (%)	7.85%	5.8%	3.5%	3.2%
Average exchange rate (RON/Euro)	3.68	4.25	4.20	4.17
Unemployment rate (%)	4.4%	6.8%	6.4%	6.0%
Nominal increase of salaries (%)	20.9%	5.2%	3.6%	4.5%

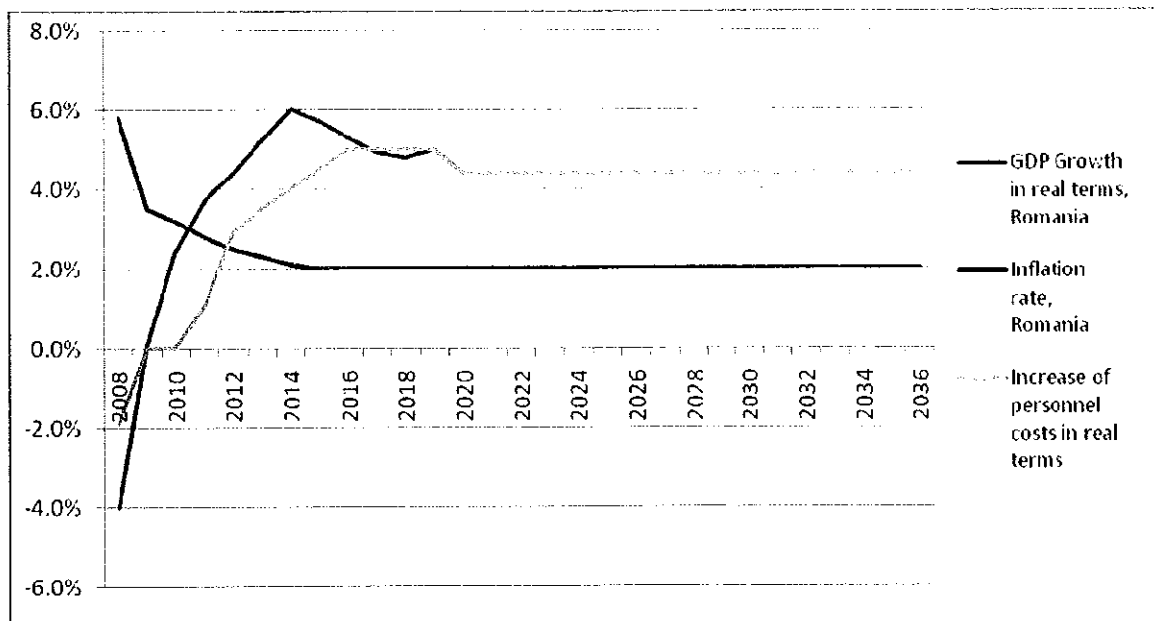
Source: The National Commission for Prognosis, "Forecast of the main macro-economic indicators for the period 2008-2013" – April 2009.

The main assumptions used are the following:

- The GDP in real terms will decrease from 7.1% growth in 2008 to -4.0% in 2009. After 2009 the GDP will register smaller growth percentages.
- The average inflation will continue its decreasing trend from 2009 to 2011. It is envisaged that Romania will adopt Euro in 2014 and afterwards the inflation will be equal with the inflation from the Euro Zone. The average inflation starting with 2015 will be 2%.
- The average exchange rate will record a decreasing trend highlighting the appreciation of the RON against the Euro. It is envisaged that Romania will adopt Euro in 2014 and afterwards the exchange rate will be constant against the Euro.
- The real term increase of salaries will slow down in the following years mainly as a result of the international financial crises. Starting with 2016, it is assumed that the salaries increase in real terms will be correlated with the increase of productivity and will increase in line with the real term growth of the GDP.

The evolution of the main macro-economic indicators for the entire period of analysis is presented in the following chart:

Figure 4-5 Evolution of the main macro-economic indicators

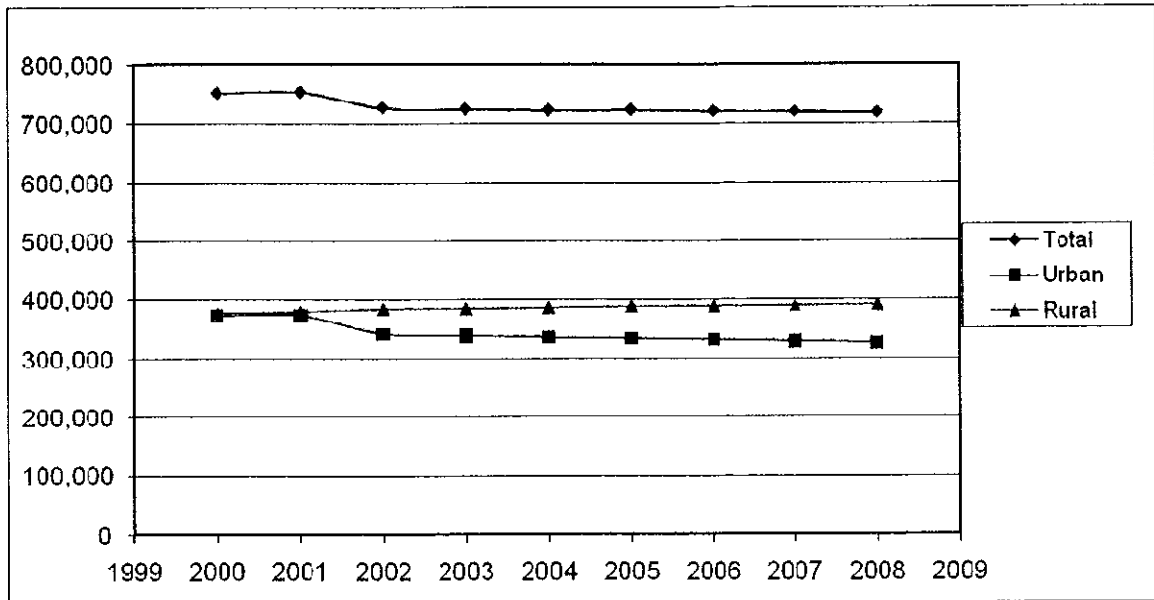


Source: The National Institute for Statistics, 2009

4.1.2.2 Demographic projections

The evolution of population in Bacau County in the last 9 years is presented in the following chart:

Figure 4-6 Evolution of the population in Bacau County (2000- 2009)



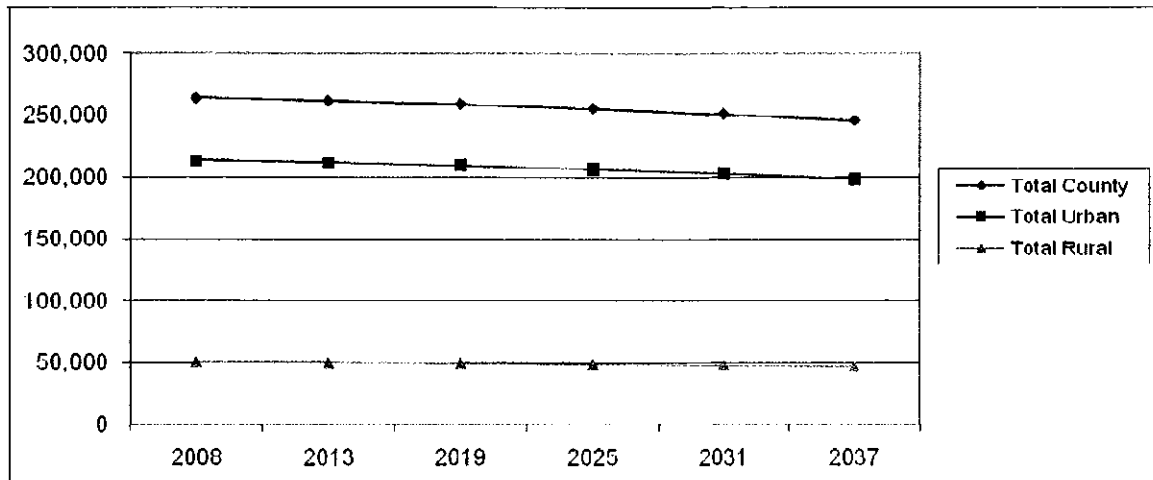
Source: The National Institute for Statistics, 2008

The population both in urban and rural areas shows a decreasing trend. The main characteristic of the population evolution in the last 5 years are the following:

- The urban population has decreased with an average factor of 0.82% per year;
- The rural population has increased with an average factor of 0.24% per year;
- The total population has decreased with an average factor of 0.58% per year;

The evolution of population is presented in the following chart:

Figure 4-7 Evolution of the population in Bacau County (2009-2039)



Source: Technical Feasibility Study

The population evolution considering the assumptions presented above was estimated for all urban and rural agglomeration. The detailed forecasts are presented in the Technical Feasibility Study.

4.1.2.3 Household income projections

In order to obtain a reasonable basis for the affordability assessment, the Consultant had to estimate the average household income for Bacau County at urban and rural level. The average household income for Bacau County is derived from the national average household income by applying a correction factor which is calculated from the ratio between the average national salary and the average salary in Bacau County. This is a relatively schematic approach, but fully sufficient for the purpose of affordability assessment. The estimation of the average household disposable income at Bacau County level is presented in details in the previous chapters.

For the forecast of the average household disposable income the following assumptions were used:

- The household incomes are going to increase in line with the real GDP growth correlating the increase of productivity and the increase of revenues;
- In order to calculate the affordability ratio for low income households the Consultant carried out an analysis for households of the three lowest deciles of household income. As the data on deciles level are just available at national level, the Consultant has applied the following correction factors:

Table 4-16 Correction factors for calculation of the household incomes for lowest deciles of income Bacau- 2009

Household income	RON /month	(%)
Total average household income	2,004	
Total maximum household income - Decile 1	930	46,42%
Total maximum household income - Decile 2	1,138	56,80%
Total maximum household income - Decile 3	1,279	63,79%

Source: The National Institute for Statistics, 2009

The evolution of the average household revenues is presented in the following table:

Table 4-17 Evolution of average household revenues

Service area	Average HH	2009	2014	2018	2039
Average County	Euro/month	425	526	644	1,532
Large Cities	Euro/month	429	531	650	1,547
Small Cities	Euro/month	412	510	624	1,486

The increase of the average household revenues is in accordance with the assumption presented in the macro-economic scenario.

The evolution of the Decile 1 household revenues is presented in the following table:

Table 4-18 Evolution of Decile 1 household revenues

Service area	Average HH	2009	2014	2018	2039
Average County	Euro/month	197	244	299	711
Large Cities	Euro/month	199	247	302	718
Small Cities	Euro/month	191	237	290	690

4.1.3 The Financial Status of the operator

The company is still in the process of consolidation and implementation of economies of scale after the regionalization process. The Regional Operator improved its financial performances in the last years. The following table shows the operating performances from the last 2 years consolidated at central level:

Table 4-19 Operating results – 2008 and 2009 (amounts in nominal RON)

Operating activity	RAGC - Bacau				Apa Serv			
	2008	2009	2008	2009	2008	2009	2008	2009
	RON	RON	%	%	RON	RON	%	%
Revenues from water activity	22,747,027	21,326,673	68.0%	66.9%	7,768,775	7,468,091	77.6%	75.1%
Revenues from sewerage activity	8,887,390	8,524,652	26.5%	26.8%	2,138	5,207	0.0%	0.1%
Revenues from penalties	640,456	462,685	1.9%	1.5%	897,783	1,344,379	9.0%	13.5%
Sales of fixed assets	-	-	-	-	-	-	-	-
Other revenues	-	283,600	-	0.9%	305,376	-	3.0%	-
Other operating revenues	1,201,152	1,262,904	3.6%	4.0%	1,040,510	1,130,445	10.4%	11.4%
Total revenues	33,476,025	31,860,514	100.0%	100.0%	10,014,582	9,948,122	100.0%	100.0%
Operating costs								
Water activity	20,236,181	20,462,414	100.0%	100.0%	8,793,722	9,989,445	100.0%	100.0%
Raw water	2,675,217	2,846,025	13.2%	13.9%	1,488,976	1,853,665	16.9%	18.6%
Materials	1,075,091	883,731	5.3%	4.3%	631,323	798,371	7.2%	8.0%
Electric Energy	2,121,052	2,368,313	10.5%	11.6%	1,514,049	1,608,582	17.2%	16.1%
Gross Salaries	7,380,544	7,135,599	36.5%	34.9%	2,578,583	2,523,067	29.3%	25.3%
Salary contributions	1,924,672	2,160,659	9.5%	10.6%	739,151	762,366	8.4%	7.6%
Depreciation	1,185,062	1,274,049	5.9%	6.2%	434,910	443,584	4.9%	4.4%
Maintenance and repairs	764,101	632,630	3.8%	3.1%	-	517,615	-	5.2%
Concession fee	-	100,517	-	0.5%	52,938	108,133	0.6%	1.1%
Other costs	3,110,442	3,060,891	15.4%	15.0%	1,353,792	1,374,062	15.4%	13.8%
Sewerage activity	9,609,049	9,862,285	100.0%	100.0%	0	0	0	0
Materials	604,738	681,750	6.3%	6.9%	-	-	-	-
Electric Energy	908,676	484,980	9.5%	4.9%	-	-	-	-
Gross Salaries	4,201,824	4,170,024	43.7%	42.3%	-	-	-	-
Salary contributions	1,097,474	1,262,683	11.4%	12.8%	-	-	-	-
Depreciation	666,597	708,986	6.9%	7.2%	-	-	-	-
Maintenance and repairs	330,309	250,133	3.4%	2.5%	-	-	-	-
Concession fee	-	52,787	0.0%	0.5%	-	-	-	-
Other costs	1,799,431	2,250,942	18.7%	22.8%	-	-	-	-
Operating result	3,630,795	1,535,815	10.8%	4.8%	1,220,860	(41,323)	12.2%	-0.4%

The main conclusions are the following:

- No important change in the weight of revenues from water tariffs took place in the activity of either one of the companies in the reference period: For RAGC it decreased from 68% to 67% and the weight of revenues from wastewater treatment tariff increased only by 0.3% to 26.8%. In the same period, for Apaserv it was noticed a small increase of 4% in revenues from penalties.
- The main categories of operating costs for the water activity are:

For RAGC:

- The personnel costs (salaries and taxes) which weight on average 46% of water costs;
- Other costs which represent 15% of the total water costs.
- The raw water costs (14%) and electric energy costs which weight around 12% in total water costs;

For Apa Serv:

- Other costs which represent over 33% of the total water costs.
- The raw water costs which weight around 19% and the electric energy costs which represent 16% of the total water costs.

- The main categories of operating costs for the sewerage activity are:

For RAGC:

- The personnel costs (salaries and taxes) which weight on average 55% of sewerage costs.
- Other costs which represent on average 23% of the sewerage costs;

Apa Serv does not provide wastewater services in the area it operates.

- The operating profit margin decreased by 6% for RAGC Bacau and by 12% for Apa Serv in 2009 (Apa Serv recorded operating loss).

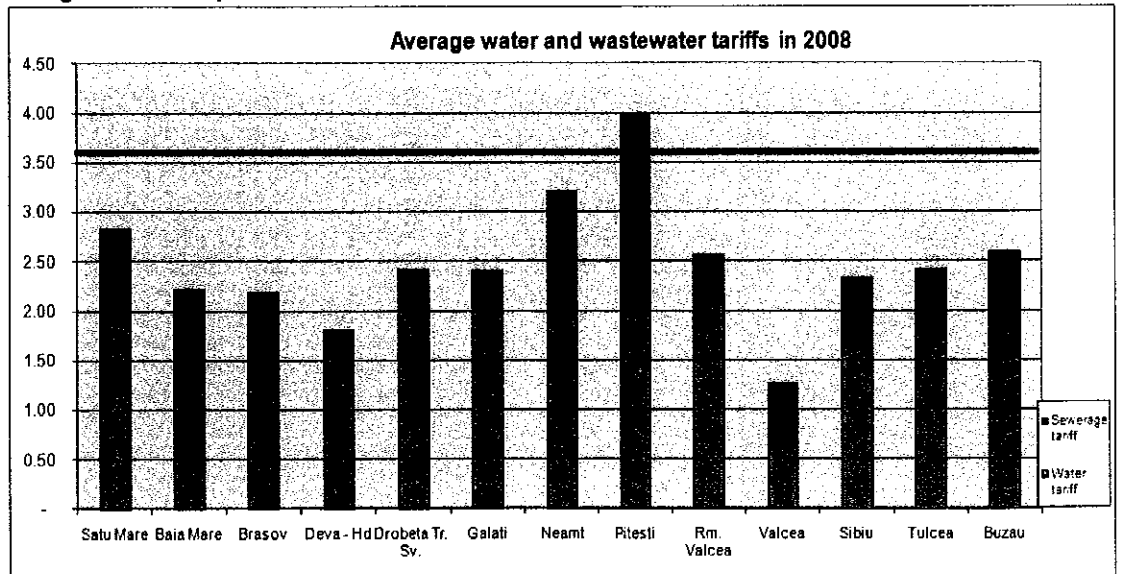
At present, the operators in the assessed localities charge the following tariffs (excluding VAT):

Table 4-20 Existing tariffs at January 1st 2010

Town	Water RON/m ³	Sewerage RON/m ³	Cumulated RON/m ³
Bacau	2.62	1.00	3.62
Buhusi	2.62	0.75	3.37
Moinesti	2.57	0.77	3.34
Darmanesti	1.06	0.43	1.49
Targu Ocna	2.05	0.87	2.92

The actual tariff levels are relatively higher than the industry average. In the following charts it is presented the comparison of the average water and wastewater tariffs for Bacau with the tariffs recorded by the FOPIP I beneficiaries in 2008.

Figure 4-8 Comparison of actual tariff with the tariffs of FOPIP I Beneficiaries



4.2 Methodology and General Assumptions

The Financial Analysis (FA) to be prepared within the application process takes into account:

- the requirements laid down in the TORs for the present project (preparation of the cohesion funds application);
- “The New Programming Period 2007-2013: Guidance on the Methodology for carrying out Cost-Benefit Analysis (Working Document no. 4) (August 2006)”

- “Guidelines for Cost Benefit Analysis of Water and Wastewater projects to be supported by the Cohesion Fund and the European Regional Development Fund in 2007-2013” prepared by the Ministry of Environment and JASPERS for the Romanian Water Sector Projects.

The objective of the Financial Analysis (FA) is to assess the financial viability and sustainability of the Project over the entire project lifetime.

In general terms the FA takes into account all relevant data and information made available from the various sources and especially the reports, financial statements and production / service data provided by the three former water utilities for the years 2007 and 2008. It takes further into account the socio-economic data and background information presented in the Master Plan Report and the technical concepts, demand projections and cost estimates, as detailed in the respective chapters of the Feasibility Study.

According to EU standards the CBA, and thus also the financial analysis has to use the “incremental method”: that means, the project is evaluated on the basis of the differences between the scenario “with the project” and an alternative scenario “without the project”. For the “with project” scenario cost and revenues considered must be those of a scenario of efficient operation. For the “without project” scenario cost and revenues considered are those of a “business as usual” without any major new investments or replacements.

The FA contains the following components:

- Projection of basic project relevant development data: (i) population, (ii) service levels, (iii) water production, (iv) water sales, (v) volumes of wastewater generation, collection and treatment; as estimated in the Feasibility Study for the period 2010 –2039; estimate and projection of corresponding development data for the “without project case”;
- Projection and allocation of overall investment and reinvestment cost for the proposed water and wastewater project measures and cost of additional further investment measures required; as estimated in the Feasibility Study for the period 2010 –2039;
- Contracting and Procurement Strategy as requested by Romanian Regulations;
- Projection of annual O&M cost as required for adequate operation and maintenance of the rehabilitated and extended water and wastewater systems of the recently established ROC, to assure the envisaged service standards and the full technical lifetimes of the investment under the prevailing conditions in the study area; as estimated in the Feasibility Study for the period 2009 –2039;

estimate and projection of appropriate annual O&M cost for the “without project case”;

- Tariff strategy for the development of appropriate water and wastewater tariffs, taking into account both cost coverage and affordability issues; appropriate assumptions for tariff development in the “without project case”;
- Projection of revenues from water sales and wastewater services to the connected domestic and non-domestic customers in the project area for both “with project case” and “without project case”;
- Projection of the financial performance of the ROC over the evaluation period 2010 to 2039;
- Determination of the EU intervention level required (in line with the “EC Guidance on the methodology for carrying out Cost Benefit Analysis”);
- Elaboration of an appropriate Financing Plan.

The FA is based on the data of the base year 2008 and is carried out for the period 2009 to 2039 which comprises the envisaged project implementation period 2010 to 2013 and an operation period of 26 years from 2014 to 2039.

4.3 Projection of Operation Cost

4.3.1 General Considerations and Assumptions

The O&M cost are separately estimated for the particular service area of each agglomeration and then aggregated for the service area of the ROC.

The O&M cost are based on the O&M cost as provided by the water utility for the years 2007 and 2008 (in RON) and then projected on an annual basis in line with the implementation schedule for the period 2010 to 2039 in Euro (constant prices).

Starting with 2012-2014 (the first years of operation of the new equipments), the operating and maintenance costs take into account the impact of the new Project measure. The detailed assessment of the impact of operating costs is presented in the Annexes 1-4.

As outlined in the general approach the particular O&M cost categories are assumed to increase in real terms with the annual increase rates as presented in Annex 1-1. With the assumed increase rates the different cost categories will increase in real terms over the period 2009 to 2039 as follows:

Table 4-21 Increase factors for different O&M cost categories in real terms

No	Cost categories	Increase factor (in real terms) 2009-2039
(1)	Staff cost	3.30
(2)	Energy cost	1.59
(3)	Cost of materials, maintenance, etc	1.38

4.3.2 Projection of operation cost for "With Project Case"

4.3.2.1 Water activity

The forecast of operating cost is presented separately for each cost category by presenting the main assumptions used and the results obtained.

4.3.2.1.1 Raw water costs

The raw water costs were calculated considering the following 2 main elements:

- The raw water quantity: calculated considering the evolution of the water production resulted from the evolution of water consumption and from the level of losses;
- The raw water tariff: starting from the actual raw water tariff and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);

The forecast of the raw water costs is presented in the following table:

Table 4-22: Forecast of raw water costs per agglomerations – "With Project Scenario"

Raw water costs	2009	2014	2018	2039
Bacau				
Quantity (m3)	19,996,671	16,958,025	17,690,020	20,811,172
Value (Euro)	673,770	193,423	209,965	304,413
Moinesti				
Quantity (m3)	1,894,405	1,562,316	1,620,162	1,854,660
Value (Euro)	211,326	-	-	-
Buhusi				
Quantity (m3)	730,195	1,097,861	1,145,284	1,337,306
Value (Euro)	8,591	13,914	15,104	21,735

Raw water costs	2009	2014	2018	2039
Darmanesti				
Quantity (m3)	538,384	674,737	675,479	772,031
Value (Euro)	-	-	-	-
Targu Ocna				
Quantity (m3)	1,392,899	1,265,418	1,250,903	1,386,676
Value (Euro)	122,936	-	-	-
Caraboiaia				
Quantity (m3)	34,097,480	15,553,644	18,741,328	23,025,584
Value (Euro)	457,307	180,164	225,903	342,044
Other				
Quantity (m3)	708,925	601,772	627,637	745,632
Value (Euro)	7,506	-	-	-
Total				
Quantity (m3)	59,358,960	37,713,774	41,750,812	49,933,062
Value (Euro)	1,481,436	387,501	450,972	668,192

The raw water quantity records a decrease on medium term (2009-2014) due to the cumulated effect of decrease of consumption and decrease of level of water losses.

The detailed forecasts of the raw water costs for each agglomeration are presented in Annex 1.4.

4.3.2.1.2 Material costs

The material costs were calculated considering the following assumptions:

- Proportionally with the evolution of the water production considering the level of losses and the level of water consumption (variable costs);
- Starting from the actual levels and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);
- Split on 2 categories:
 - Costs related to the existing systems;
 - Costs as result of measure implementation;

The forecast of the material costs is presented in the following table:

Table 4-23: Forecast of materials costs per agglomerations – “With Project Scenario”

Materials cost	2009	2014	2018	2039
Bacau	207,937	179,689	195,056	282,798

Materials cost	2009	2014	2018	2039
Moinesti	7,728	6,866	7,409	10,452
Buhusi	4,224	7,728	8,390	12,073
Darmanesti	3,392	4,579	4,770	6,719
Targu Ocna	4,528	4,431	4,558	6,227
Caraboaia	150,282	169,044	211,960	303,259
Other	3,263	3,515	3,658	4,508
Total	381,353	375,852	435,800	626,036

The detailed forecasts of the material costs for each agglomeration are presented in Annex 1.4.

4.3.2.1.3 Electricity costs

The electricity costs were calculated considering the following assumptions:

- Proportionally with the evolution of the water production considering the level of losses and the level of water consumption (variable cost);
- Starting from the actual levels and considering a real term increase for electricity costs as presented in the macroeconomic scenario (factor 2);
- Split on 2 categories:
 - Costs related to the existing systems;
 - Costs as result of measure implementation;
- Considering the individual consumption per m3 of produced water as a benchmark.

The forecast of the electricity costs is presented in the following table:

Table 4-24 Forecast of electricity costs per agglomerations – “With Project Scenario”

Electricity costs	2009	2014	2018	2039
Bacau				
Quantity (KwH)	7,805,911	5,191,601	5,415,697	6,371,220
Value (Euro)	557,250	407,159	450,797	724,996
Moinesti				
Quantity (KwH)	1,340,907	844,091	875,344	1,002,039
Value (Euro)	100,331	69,385	76,369	119,511
Buhusi				
Quantity (KwH)	820,824	1,234,123	1,287,432	1,503,287
Value (Euro)	80,344	96,788	107,164	171,063
Darmanesti				

Electricity costs	2009	2014	2018	2039
Quantity (KwH)	14,285	17,903	17,923	20,484
Value (Euro)	1,318	1,404	1,492	2,331
Targu Ocna				
Quantity (KwH)	45,158	41,025	40,554	44,956
Value (Euro)	4,601	3,217	3,376	5,116
Caraboaia				
Quantity (KwH)	4,793,367	2,333,047	2,811,199	3,453,838
Value (Euro)	342,190	182,972	234,001	393,020
Other				
Quantity (KwH)	51,360	43,597	45,471	54,020
Value (Euro)	4,847	4,432	4,811	7,043
Total				
Quantity (KwH)	14,871,813	9,705,388	10,493,620	12,449,844
Value (Euro)	1,090,881	765,357	878,009	1,423,081

4.3.2.1.4 Personnel costs

The personnel costs were calculated considering the following assumptions:

- Starting from the actual number of personnel and considering the impact of the investment project implementation on the number of personnel (increase or decrease).
- The average salary was forecasted starting from the actual salaries considering a real term increase for personnel costs as presented in the macroeconomic scenario (factor 1).

The forecast of the personnel costs is presented in the following table:

Table 4-25 Forecast of personnel costs per agglomerations – “With Project Scenario”

Personnel costs	2009	2014	2018	2039
Bacau				
Number (no.)	353	353	353	353
Total costs (Euro)	2,197,736	2,423,162	2,903,425	7,254,354
Moinesti				
Number (no.)	36	36	36	36
Total costs (Euro)	138,895	153,141	183,493	458,467
Buhusi				
Number (no.)	23	23	23	23
Total costs (Euro)	112,803	124,373	149,024	372,343
Darmanesti				
Number (no.)	7	7	7	7
Total costs (Euro)	29,232	32,230	38,618	96,490
Targu Ocna				

Personnel costs	2009	2014	2018	2039
Number (no.)	26	26	26	26
Total costs (Euro)	95,729	105,548	126,467	315,985
Caraboaia				
Number (no.)	75	40	40	40
Total costs (Euro)	466,941	274,579	329,000	822,023
Other				
Number (no.)	15	15	15	15
Total costs (Euro)	72,296	79,712	95,511	238,638
Total				
Number (no.)	535	500	500	500
Total costs (Euro)	3,113,632	3,192,746	3,825,539	9,558,301

4.3.2.1.5 Maintenance costs

The maintenance costs were calculated considering the following assumptions:

- Starting from the actual levels and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);
- Split on 2 categories:
 - Costs related to the existing systems;
 - Costs as result of measure implementation;
- Cost of maintenance related to investments (cost of materials and services from outside; 3% of plant and machinery; 1% of main works);

The forecast of the maintenance costs is presented in the following table (amounts in Euro):

Table 4-26 Forecast of maintenance costs per agglomerations – “With Project Scenario”

Maintenance costs	2009	2014	2018	2039
Bacau	148,854	260,014	270,572	333,451
Moinesti	29,167	38,133	40,680	55,121
Buhusi	428	19,275	20,060	24,678
Darmanesti	348	375	390	481
Targu Ocna	10,099	9,174	9,069	10,053
Caraboaia	9,902	10,667	11,100	13,680
Other	25,045	26,979	28,075	34,599
Total	223,843	364,619	379,946	472,063

4.3.2.1.6 Other operating costs

The other operating costs were calculated considering the following assumptions:

- **Depreciation** allowance for existing assets is taken into account starting from the actual levels; the depreciation for new assets is not included in the O&M cost but calculated separately and included in the financial statements;
- **Concession fee:** The level of concession fee is source of the MRD fund. The concession fee was calculated in order to cover debt service repayment related to the EBRD loans contracted as co-financing by the Local Authorities for the MUDP and ISPA programs and considering also the actual concession fee which is calculated considering the equivalent depreciation for the public assets (used for performing investments);
- **General Administration:** starting from the actual level which are adjusted considering the impact of investment project and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3)

4.3.2.1.7 Cumulated operating costs

The projection of the O&M cost in EUR (constant prices) can be summarized as follows:

Table 4-27: Forecast of O&M Costs – “With Project Scenario” (amounts in Euro)

O&M water activity	2009	2014	2018	2039
Raw water costs	1,481,436	387,501	450,972	668,192
Materials and chemicals	381,353	375,852	435,800	626,036
Electricity	1,090,881	765,357	878,009	1,423,081
Personnel Costs	3,113,632	3,192,746	3,825,539	9,558,301
Maintenance / repair	223,843	364,619	379,946	472,063
Depreciation	430,459	430,459	430,459	430,459
Concession fee	50,273	1,252,278	26,622	26,622
General Administration	1,674,761	1,441,244	1,510,151	1,861,098
Total	8,446,639	8,210,055	7,937,498	15,065,851

In the “With Project Case” the O&M cost for water activity are anticipated to decrease from EUR 8.4 million in 2009 to a level of EUR 7.9 million in 2018 and then to increase to a level of EUR 15.1 million by the year 2039.

4.3.2.2 Wastewater activity

The forecast of operating cost is presented separately for each cost category by presenting the main assumptions used and the results obtained.

4.3.2.2.1 Material costs

The material costs were calculated considering the following assumptions:

- Proportionally with the evolution of the wastewater generation considering the level of infiltrations and the level of wastewater generation (variable costs);
- Starting from the actual levels and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);
- Split on 2 categories:
 - Costs related to the existing systems;
 - Costs as result of measure implementation;

The forecast of the material costs is presented in the following table:

Table 4-28 Forecast of material costs per agglomerations – “With Project Scenario”

Material costs	2009	2014	2018	2039
Bacau	160,412	545,090	573,050	477,148
Moinesti	476	74,545	78,356	82,503
Buhusi	4,333	48,701	51,233	48,506
Darmanesti	-	24,536	28,522	12,529
Targu Ocna	1,997	29,631	30,930	23,224
Total	167,218	722,503	762,090	643,910

The detailed forecasts of the material costs for each agglomeration are presented in Annex 1.4.

4.3.2.2.2 Electricity costs

The electricity costs were calculated considering the following assumptions:

- Proportionally with the evolution of the wastewater generation considering the level of infiltrations and the level of wastewater generation (variable cost);
- Starting from the actual levels and considering a real term increase for electricity costs as presented in the macroeconomic scenario (factor 2);

- Split on 2 categories:
 - Costs related to the existing systems;
 - Costs as result of measure implementation;
- Considering the individual generation per m³ of generated wastewater as a benchmark.

The forecast of the electricity costs is presented in the following table:

Table 4-29 Forecast of electricity costs per agglomerations – “With Project Scenario”

Electricity costs	2009	2014	2018	2039
Bacau				
Quantity (KwH)	1,598,486	5,055,955	5,131,355	5,401,976
Value (Euro)	114,113	396,520	427,128	614,704
Moinesti				
Quantity (KwH)	53,806	578,505	596,489	3,095,388
Value (Euro)	5,368	63,404	69,387	492,242
Buhusi				
Quantity (KwH)	150,880	171,706	203,631	340,298
Value (Euro)	16,132	20,168	25,386	57,996
Darmanesti				
Quantity (KwH)	-	129,875	147,113	192,549
Value (Euro)	-	16,232	19,515	34,917
Targu Ocna				
Quantity (KwH)	14,081	357,536	371,068	413,869
Value (Euro)	1,435	28,040	30,887	47,095
Total				
Quantity (KwH)	1,817,253	6,293,577	6,449,656	9,444,080
Value (Euro)	137,047	524,365	572,303	1,246,953

4.3.2.2.3 Personnel costs

The personnel costs were calculated considering the following assumptions:

- Starting from the actual number of personnel and considering the impact of the investment project implementation on the number of personnel (increase or decrease).
- The average salary was forecasted starting from the actual salaries considering a real term increase for personnel costs as presented in the macroeconomic scenario (factor 1).

The forecast of the personnel costs is presented in the following table:

Table 4-30: Forecast of personnel costs per agglomerations – “With Project Scenario”

Personnel costs	2009	2014	2018	2039
Bacau				
Quantity (KwH)	200	160	160	160
Value (Euro)	1,278,494	1,127,705	1,351,213	3,376,073
Moinesti				
Quantity (KwH)	18	14	14	14
Value (Euro)	69,292	59,422	71,199	177,894
Buhusi				
Quantity (KwH)	20	16	16	16
Value (Euro)	97,638	86,122	103,191	257,828
Darmanesti				
Quantity (KwH)	-	9	9	9
Value (Euro)	-	38,200	45,771	114,360
Targu Ocna				
Quantity (KwH)	6	6	6	6
Value (Euro)	21,464	23,666	28,357	70,851
Total				
Quantity (KwH)	244	205	205	205
Value (Euro)	1,466,888	1,335,114	1,599,730	3,997,006

4.3.2.2.4 Maintenance costs

The maintenance costs were calculated considering the following assumptions:

- Starting from the actual levels and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);
- Split on 2 categories:
 - Costs related to the existing systems;
 - Costs as result of measure implementation;
- Cost of maintenance related to investments (cost of materials and services from outside; 3% of plant and machinery; 1% of main works);

The forecast of the maintenance costs is presented in the following table (amounts in Euro):

Table 4-31 Forecast of maintenance costs per agglomerations – “With Project Scenario”

Maintenance costs	2009	2014	2018	2039
Bacau	58,855	463,161	481,967	593,972
Moinesti	143	232,678	242,126	298,394
Buhusi	29	225,727	234,892	289,479

Darmanesti	-	267,245	278,096	342,723
Targu Ocna	2,383	171,534	178,437	219,438
Total	61,410	1,360,345	1,415,518	1,744,006

4.3.2.2.5 Sludge disposal costs

The sludge disposal costs were calculated considering the following assumptions:

- Proportionally with the evolution of the sludge quantity considering the level of wastewater generation (variable cost);
- Considering the individual sludge disposal costs calculated based on the sludge disposal strategy and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);

The forecast of the sludge disposal costs is presented in the following table (amounts in Euro):

Table 4-32 Forecast of sludge disposal costs per agglomerations – “With Project Scenario”

Sludge disposal costs	2009	2014	2018	2039
Bacau	-	376,135	176,394	801,606
Quantity (t)	-	3,857	3,838	3,672
Average costs (Euro/t)	90.5	97.5	46.0	218.3
Moinesti	-	33,426	34,586	132,591
Quantity (t)	-	641	637	607
Average costs (Euro/t)	48.4	52.1	54.3	218.3
Buhusi	-	29,714	30,768	126,178
Quantity (t)	-	608	605	580
Average costs (Euro/t)	45.4	48.9	50.9	217.6
Darmanesti	-	23,998	24,874	93,820
Quantity (t)	-	445	443	428
Average costs (Euro/t)	50.1	54.0	56.2	219.0
Targu Ocna	-	16,927	17,512	65,984
Quantity (t)	-	317	316	300
Average costs (Euro/t)	49.5	53.3	55.5	219.7
Total (Euro)	-	480,199	284,135	1,220,180

4.3.2.2.6 Other operating costs

The other operating costs were calculated considering the following assumptions:

- **Depreciation** allowance for existing assets is taken into account starting from the actual levels; the depreciation for new assets is not included in the O&M cost but calculated separately and included in the financial statements;

- **Concession fee:** The level of concession fee is source of the MRD fund. The concession fee was calculated in order to cover debt service repayment related to the EBRD loans contracted by the Local Authorities as co-financing for the MUDP and ISPA programs and considering also the actual concession fee which is calculated considering the equivalent depreciation for the public assets (used for performing investments);
- **General Administration:** starting from the actual level which are adjusted considering the impact of investment project and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3).

4.3.2.2.7 Cumulated operating costs

The projection of the O&M cost in EUR (constant prices) can be summarized as follows:

Table 4-33 Forecast of O&M Costs – “With Project Scenario” (amounts in Euro)

O&M wastewater activity	2009	2014	2018	2039
Materials and chemicals	167,218	722,503	762,090	643,910
Electricity	137,047	524,365	572,303	1,246,953
Personnel Costs	1,466,888	1,335,114	1,599,730	3,997,006
Maintenance / repair	61,410	1,360,345	1,415,518	1,744,006
Cost of sludge disposal	-	480,199	284,135	1,220,180
Depreciation	166,858	166,858	166,858	166,858
Concession fee	13,005	1,117,532	525,584	584
General Administration	581,186	626,072	651,493	802,895
Total	2,593,612	6,332,989	5,977,712	9,822,394

In the “With Project Case” the O&M cost for wastewater activity are anticipated to increase from EUR 2.6 million in 2009 to a level of EUR 5.9 million in 2018 and to a level of EUR 9.8 million by the year 2039.

4.3.3 Projection of operation cost for “Without Project Case”

4.3.3.1 Water activity

The forecast of operating cost is presented separately for each cost category by presenting the main assumptions used and the results obtained.

4.3.3.1.1 Raw water costs

The raw water costs were calculated considering the following 2 main elements:

- The raw water quantity: calculated considering the evolution of the water production resulted from the evolution of water consumption and from the level of losses;
- The raw water tariff: starting from the actual raw water tariff and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);

The forecast of the raw water costs is presented in the following table:

Table 4-34 Forecast of raw water costs per agglomerations – “Without Project Scenario”

Raw water costs	2009	2014	2018	2039
Bacau				
Quantity (m3)	19,996,671	17,250,779	17,966,972	21,126,989
Value (Euro)	673,770	196,762	213,252	309,033
Moinesti				
Quantity (m3)	1,894,405	1,485,582	1,534,778	1,726,386
Value (Euro)	211,326	-	-	-
Buhusi				
Quantity (m3)	730,195	913,478	948,096	1,080,708
Value (Euro)	8,591	11,577	12,503	17,564
Darmanesti				
Quantity (m3)	538,384	618,280	618,359	704,078
Value (Euro)	-	-	-	-
Targu Ocna				
Quantity (m3)	1,392,899	1,232,025	1,215,238	1,334,015
Value (Euro)	122,936	-	-	-
Caraboiaia				
Quantity (m3)	34,097,480	11,165,276	11,692,976	13,313,624
Value (Euro)	457,307	129,332	140,944	197,773
Other				
Quantity (m3)	708,925	611,416	637,710	757,328
Value (Euro)	7,506	-	-	-
Total				
Quantity (m3)	59,358,960	33,276,837	34,614,128	40,043,127
Value (Euro)	1,481,436	337,671	366,700	524,370

The raw water quantity records an increase on medium and long-term due to the increase of level of water losses as result of limited investments in network rehabilitation.

The detailed forecasts of the raw water costs for each agglomeration are presented in Annex 1.4.

4.3.3.1.2 Material costs

The material costs were calculated considering the following assumptions:

- Proportionally with the evolution of the water production considering the level of losses and the level of water consumption (variable costs);
- Starting from the actual levels and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);

The forecast of the material costs is presented in the following table:

Table 4-35 Forecast of materials costs per agglomerations – “Without Project Scenario”

Materials cost	2009	2014	2018	2039
Bacau	207,937	211,169	235,410	287,491
Moinesti	7,728	7,771	8,728	10,651
Buhusi	4,224	4,786	4,775	5,817
Darmanesti	3,392	3,799	3,834	4,670
Targu Ocna	4,528	4,431	4,558	6,227
Caraboaia	150,282	-	-	-
Other	3,263	3,515	3,658	4,508
Total	381,353	235,472	260,964	319,365

The detailed forecasts of the operating costs for each agglomeration are presented in Annex 1.4.

4.3.3.1.3 Electricity costs

The electricity costs were calculated considering the following assumptions:

- Proportionally with the evolution of the water production considering the level of losses and the level of water consumption (variable cost);
- Starting from the actual levels and considering a real term increase for electricity costs as presented in the macroeconomic scenario (factor 2);
- Considering the individual consumption per m³ of produced water as a benchmark.

The forecast of the electricity costs is presented in the following table:

Table 4-36 Forecast of electricity costs per agglomerations – “Without Project Scenario”

Electricity costs	2009	2014	2018	2039
Bacau				
Quantity (KwH)	7,805,911	6,734,023	7,013,597	8,247,143
Value (Euro)	557,250	528,125	583,804	938,462

Electricity costs	2009	2019	2018	2039
Moinesti				
Quantity (KwH)	1,340,907	1,051,532	1,086,354	1,221,979
Value (Euro)	100,331	86,436	94,778	145,743
Buhusi				
Quantity (KwH)	820,824	1,026,855	1,065,770	1,214,841
Value (Euro)	80,344	80,533	88,714	138,240
Darmanesti				
Quantity (KwH)	14,285	16,405	16,407	18,681
Value (Euro)	1,318	1,287	1,366	2,126
Targu Ocna				
Quantity (KwH)	45,158	39,942	39,398	43,249
Value (Euro)	4,601	3,133	3,279	4,921
Caraboaia				
Quantity (KwH)	4,793,367	1,569,596	1,643,779	1,871,607
Value (Euro)	342,190	123,098	136,826	212,975
Other				
Quantity (KwH)	51,360	47,120	46,279	45,880
Value (Euro)	4,847	4,503	4,888	7,153
Total				
Quantity (KwH)	14,871,813	10,485,473	10,911,583	12,663,381
Value (Euro)	1,090,881	827,114	913,655	1,449,620

The detailed forecasts of the operating costs for each agglomeration are presented in Annex 1.4.

4.3.3.1.4 Personnel costs

The personnel costs were calculated considering the following assumptions:

- Maintaining the actual number of personnel.
- The average salary was forecasted starting from the actual salaries considering a real term increase for personnel costs as presented in the macroeconomic scenario (factor 1);

The forecast of the personnel costs is presented in the following table:

Table 4-37: Forecast of personnel costs per agglomerations – “Without Project Scenario”

Personnel costs	2008	2014	2018	2039
Bacau				
Number (no.)	353	353	353	353
Total costs (Euro)	2,197,736	2,423,162	2,903,425	7,254,354
Moinesti				

Personnel costs	2008	2014	2018	2039
Number (no.)	36	36	36	36
Total costs (Euro)	138,895	153,141	183,493	458,467
Buhusi				
Number (no.)	23	23	23	23
Total costs (Euro)	112,803	124,373	149,024	372,343
Darmanesti				
Number (no.)	7	7	7	7
Total costs (Euro)	29,232	32,230	38,618	96,490
Targu Ocna				
Number (no.)	26	26	26	26
Total costs (Euro)	95,729	105,548	126,467	315,985
Caraboaia				
Number (no.)	75	40	40	40
Total costs (Euro)	466,941	274,579	329,000	822,023
Other				
Number (no.)	15	15	15	15
Total costs (Euro)	72,296	79,712	95,511	238,638
Total				
Number (no.)	535	500	500	500
Total costs (Euro)	3,113,632	3,192,746	3,825,539	9,558,301

4.3.3.1.5 Maintenance costs

The maintenance costs were calculated considering the following assumptions:

- Starting from the actual levels and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);

The forecast of the maintenance costs is presented in the following table (amounts in Euro):

Table 4-38 Forecast of maintenance costs per agglomerations – “Without Project Scenario”

Maintenance costs	2009	2014	2018	2039
Bacau	148,854	160,350	166,861	205,638
Moinesti	29,167	31,420	32,695	40,294
Buhusi	428	461	479	591
Darmanesti	348	375	390	481
Targu Ocna	10,099	10,879	11,320	13,951
Caraboaia	9,902	10,667	11,100	13,680
Other	25,045	26,979	28,075	34,599
Total	223,843	241,130	250,921	309,233

4.3.3.1.6 Other operating costs

The other operating costs were calculated considering the following assumptions:

- **Depreciation** allowance for existing assets is taken into account starting from the actual levels.
- **Concession fee:** The level of concession fee is source of the MRD fund. The concession fee was calculated in order to cover debt service repayment related to the EBRD loans contracted by the Local Authorities as co-financing for the MUDP and ISPA programs and considering also the actual concession fee which is calculated considering the equivalent depreciation for the public assets (used for performing investments);
- **General Administration:** starting from the actual level and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3)

4.3.3.1.7 Cumulated operating costs

The projection of the O&M cost in EUR (constant prices) can be summarized as follows:

Table 4-39 Forecast of O&M Costs – “Without Project Scenario” (amounts in Euro)

O&M water activity	2009	2014	2018	2039
Raw water costs	1,481,436	337,671	366,700	524,370
Materials and chemicals	381,353	235,472	260,964	319,365
Electricity	1,090,881	827,114	913,655	1,449,620
Personnel Costs	3,113,632	3,192,746	3,825,539	9,558,301
Maintenance / repair	223,843	241,130	250,921	309,233
Depreciation	430,459	430,459	430,459	430,459
Concession fee	50,273	1,252,278	26,622	26,622
General Administration	1,674,761	1,441,244	1,499,764	1,848,298
Total	8,446,639	7,958,114	7,574,624	14,466,268

In the “Without Project Case” the O&M cost for water activity are anticipated to decrease from EUR 8.4 million in 2009 to a level of EUR 7.6 million in 2018 and then to increase to a level of EUR 14.5 million by the year 2039.

4.3.3.2 Wastewater activity

The forecast of operating cost is presented separately for each cost category by presenting the main assumptions used and the results obtained.

4.3.3.2.1 Material costs

The material costs were calculated considering the following assumptions:

- Proportionally with the evolution of the wastewater generation considering the level of infiltrations and the level of wastewater generation (variable costs);
- Starting from the actual levels and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);

The forecast of the material costs is presented in the following table:

Table 4-40 Forecast of materials costs per agglomerations – “Without Project Scenario”

Material costs	2009	2014	2018	2039
Bacau	160,412	160,684	169,647	221,034
Moinesti	476	505	536	657
Buhusi	4,333	6,013	6,373	8,432
Darmanesti	-	-	-	-
Targu Ocna	1,997	2,157	2,245	2,757
Total	167,218	169,359	178,801	232,879

The detailed forecasts of the operating costs for each agglomeration are presented in Annex 1.4.

4.3.3.2.2 Electricity costs

The electricity costs were calculated considering the following assumptions:

- Proportionally with the evolution of the wastewater generation considering the level of infiltrations and the level of wastewater generation (variable cost);
- Starting from the actual levels and considering a real term increase for electricity costs as presented in the macroeconomic scenario (factor 2);
- Considering the individual generation per m3 of generated wastewater as a benchmark.

The forecast of the electricity costs is presented in the following table:

Table 4-41 Forecast of electricity costs per agglomerations – “Without Project Scenario”

Electricity costs	2009	2014	2018	2039
Bacau				

Electricity costs	2009	2014	2018	2039
Quantity (KwH)	1,598,486	1,454,707	1,475,925	1,560,369
Value (Euro)	114,113	114,087	122,854	177,558
Moinesti				
Quantity (KwH)	53,806	49,887	50,714	53,946
Value (Euro)	5,368	5,468	5,899	8,579
Buhusi				
Quantity (KwH)	150,880	194,371	197,960	212,526
Value (Euro)	16,132	22,831	24,679	36,220
Darmanesti				
Quantity (KwH)	-	-	-	-
Value (Euro)	-	-	-	-
Targu Ocna				
Quantity (KwH)	14,081	14,469	14,651	15,367
Value (Euro)	1,435	1,135	1,220	1,749
Total				
Quantity (KwH)	1,817,253	1,713,434	1,739,250	1,842,209
Value (Euro)	137,047	143,520	154,652	224,106

The detailed forecasts of the operating costs for each agglomeration are presented in Annex 1.4.

4.3.3.2.3 Personnel costs

The personnel costs were calculated considering the following assumptions:

- Maintaining the actual number of personnel.
- The average salary was forecasted starting from the actual salaries considering a real term increase for personnel costs as presented in the macroeconomic scenario (factor 1);

The forecast of the personnel costs is presented in the following table:

Table 4-42 Forecast of personnel costs per agglomerations – “Without Project Scenario”

Personnel costs	2009	2014	2018	2039
Bacau				
Number (no.)	200	200	200	200
Total costs (Euro)	1,278,494	1,409,631	1,689,016	4,220,092
Moinesti				
Number (no.)	18	18	18	18
Total costs (Euro)	69,292	76,399	91,541	228,720
Buhusi				
Number (no.)	20	20	20	20

Personnel costs	2009	2014	2018	2039
Total costs (Euro)	97,638	107,653	128,989	322,285
Darmanesti				
Number (no.)	-	-	-	-
Total costs (Euro)	-	-	-	-
Targu Ocna				
Number (no.)	6	6	6	6
Total costs (Euro)	21,464	23,666	28,357	70,851
Total				
Number (no.)	244	244	244	244
Total costs (Euro)	1,466,888	1,617,349	1,937,903	4,841,948

The detailed forecasts of the operating costs for each agglomeration are presented in Annex 1.4.

4.3.3.2.4 Maintenance costs

The maintenance costs were calculated considering the following assumptions:

- Starting from the actual levels and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);

The forecast of the maintenance costs is presented in the following table (amounts in Euro):

Table 4-43 Forecast of maintenance costs per agglomerations – “Without Project Scenario”

Maintenance costs	2009	2014	2018	2039
Bacau	58,855	110,319	114,799	141,477
Moinesti	143	154	160	198
Buhusi	29	31	32	40
Darmanesti	-	-	-	-
Targu Ocna	2,383	2,567	2,672	3,292
Total	61,410	113,072	117,663	145,007

The detailed forecasts of the operating costs for each agglomeration are presented in Annex 1.4.

4.3.3.2.5 Sludge disposal costs

The sludge disposal costs were calculated considering the following assumptions:

- Proportionally with the evolution of the sludge quantity considering the level of wastewater generation (variable cost);
- Considering the individual sludge disposal costs calculated based on the sludge disposal strategy and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3);

The unitary sludge disposal costs is similar with the one for the „With Project“ Scenario.

The forecast of the sludge disposal costs is presented in the following table (amounts in Euro):

Table 4-44 Forecast of sludge disposal costs per agglomerations – “Without Project Scenario”

Sludge disposal costs	2009	2014	2018	2039
Bacau	-	357,328	167,575	761,526
Quantity (t)	-	3,664	3,646	3,489
Average costs (Euro/t)	90.5	97.5	46.0	218.3
Moinesti	-	20,055	14,216	64,173
Quantity (t)	-	385	262	294
Average costs (Euro/t)	48.4	52.1	54.3	218.3
Buhusi	-	26,742	27,691	113,561
Quantity (t)	-	547	544	522
Average costs (Euro/t)	45.4	48.9	50.9	217.6
Darmanesti	-	-	-	-
Quantity (t)	-	-	-	-
Average costs (Euro/t)	50.1	54.0	56.2	219.0
Targu Ocna	-	8,463	8,756	32,992
Quantity (t)	-	159	158	150
Average costs (Euro/t)	49.5	53.3	55.5	219.7
Total	-	412,589	218,238	972,252

4.3.3.2.6 Other operating costs

The other operating costs were calculated considering the following assumptions:

- **Depreciation** allowance for existing assets is taken into account starting from the actual levels;
- **Concession fee:** The level of concession fee is source of the MRD fund. The concession fee was calculated in order to cover debt service repayment related to the EBRD loans contracted by the Local Authorities as co-financing for the MUDP and ISPA programs and considering also the actual concession fee which is calculated considering the equivalent depreciation for the public assets (used for performing investments);

- **General Administration:** starting from the actual level which are adjusted considering the impact of investment project and considering a real term increase for material costs as presented in the macroeconomic scenario (factor 3). Under this costs category we also recorded the costs with penalties due to non-compliance of the treated wastewater. The penalties are calculated based on the volumes of wastewater discharged and fees applied. The following table shows the level of the expenditures with penalties included in the analysis:

Penalties for non-compliance		2014	2018	2039
Bacau	Euro/year	198,535	205,452	232,979
Moinesti	Euro/year	14,922	15,403	17,283
Buhusi	Euro/year	10,632	10,763	11,807
Darmanesti	Euro/year	49	50	51
Targu Ocna	Euro/year	8,459	8,643	8,909
Total	Euro/year	232,597	240,310	271,030

4.3.3.2.7 Cumulated operating costs

The projection of the O&M cost in EUR (constant prices) can be summarized as follows:

Table 4-45 Forecast of O&M Costs – “Without Project Scenario” (amounts in Euro)

O&M wastewater activity	2009	2014	2018	2039
Materials and chemicals	167,218	169,359	178,801	232,879
Electricity	137,047	143,520	154,652	224,106
Personnel Costs	1,466,888	1,617,349	1,937,903	4,841,948
Maintenance / repair	61,410	113,072	117,663	145,007
Cost of sludge disposal	-	412,589	218,238	972,252
Depreciation	166,858	166,858	166,858	166,858
Concession fee	13,005	1,117,532	525,584	584
General Administration	581,186	858,620	891,754	1,073,873
Total	2,593,612	4,598,899	4,191,453	7,657,508

In the “Without Project Case” the O&M cost for wastewater activity are anticipated to increase from EUR 2.6 million in 2009 to a level of EUR 4.2 million in 2018 and to a level of EUR 7.6 million by the year 2039.

The detailed forecasts of the operating costs for each agglomeration are presented in Annex 1.4.

4.4 Water and Wastewater Tariffs

4.4.1 Regulatory Framework

4.4.1.1 Legal Basis and Current Methodology for Water Pricing in Romania

The methodology for setting, adjusting and changing the tariffs for water and wastewater services is in force since February 2007 and was published in the Official Gazette in March 20 2007.

The methodology issued by ANRSC, dated 28 February 2007, defines the procedures and standards, through which the Regulatory Authority will establish, approve, modify or reject fees and tariffs, length of service and conditions for all water sales and other services performed by every licensee.

The main elements of the methodology are the following:

- The tariffs should assure the economic viability of the operators, should meet the interest of the customers including the issues related to affordability and should create the premises for environment protection and conservation of water resources.
- The tariffs set should consider the following elements:
 - Production and operating expenses;
 - Maintenance expenses;
 - Depreciation;
 - Costs for environmental protection;
 - Financial costs;
 - Costs related to concession contract;
 - Development costs (financial resources for development and investments);
 - Profit share.
- In case of international financed programs, for which the Government has set special tariff calculations or formulas other than the ones provided by the methodology of ANRSC, the level and evolution of tariffs will be based on that special methodology;

- The regional operators, part of an investment program financed from external sources, will unify the tariffs for the entire area of operation according to the concession contract and/or the provisions of the international financing documents.

4.4.1.2 European Water Management Policy Regarding Water Pricing

Directive 2000/60/EC of the European Parliament and of the Council of 23rd October 2000 establishing a framework for Community action in the field of water policy (Article 9) advises as follows:

- Member States shall take account of the principle of recovery of costs of water services, including environmental and resource costs, based on economic analysis, and taking account of the polluter pays principle;
- Member States shall ensure by 2010 that water-pricing policies provide adequate incentives for users to use water resources efficiently, and thereby contribute to the environmental objectives of this Directive; and an adequate contribution of the different water uses, disaggregated into at least industry, households and agriculture, to the recovery of the costs of water services, based on economic analysis and taking account of the polluter pays principle;
- Member States may in doing so take into account social, environmental and economic effects of the requested cost recovery as well as the geographic and climatic conditions of the region;
- Relevant economic analysis shall take account of the volumes, prices and costs associated with water services, as well as estimates of relevant investment including forecasts of such investments;
- While the EU guidelines are reasonably flexible in general, they do clearly highlight the desire to fully recover the costs of supplying water services. Pricing of water should be such as to promote the efficient use of water. The guidelines do not appear to specifically “prohibit” cross subsidies per se, but they do indicate that different classes of water users should each make an “adequate” contribution to the recovery of the costs of water services, which might be interpreted to mean that cross subsidies are discouraged.

4.4.1.3 Approach, Objectives and Principles for Water Pricing in Romania

(1) Approach

There are basically two different regulatory approaches to the economic regulation of water pricing:

- Firstly, it is possible to do this by the procedure of “price capping”, whereby increases to existing tariff schedules are “justified” using one or another “escalation factor”, such as general price inflation; increases in fuel costs; etc. This approach is not considered to be suitable for Romania.
- The more common approach to the regulation of water tariffs is by adopting the “cost of service” procedure, whereby the water utilities prepare estimates of the costs of providing their services, and calculate the consequent revenues required to cover their costs. This approach is also referred to as the “revenue requirements” procedure. This is the approach recommended for Romania, which also is clearly in line with EU policy.

(2) Objectives

Commonly accepted objectives for water pricing are:

- financial viability and sustainability of water and waste water service provision;
- production, operation and administrative efficiency of providing water and wastewater services;
- equity; and
- social affordability.

(3) Principles

An appropriate water and wastewater tariff system should consequently take into account the following principles and issues:

- Establish a tariff system which enables the owner / operator to finance its operations, and any required replacement and new investment, so that it can adequately operate into the future to provide sound quality service at reasonable costs.
- The tariff design should take care in encouraging production, operational and administrative efficiency;
- The applied tariff system has to take into account the customers' ability and willingness-to-pay for the provided services.

4.4.2 Appropriate Tariff System for Bacau County

4.4.2.1 Existing Tariff System

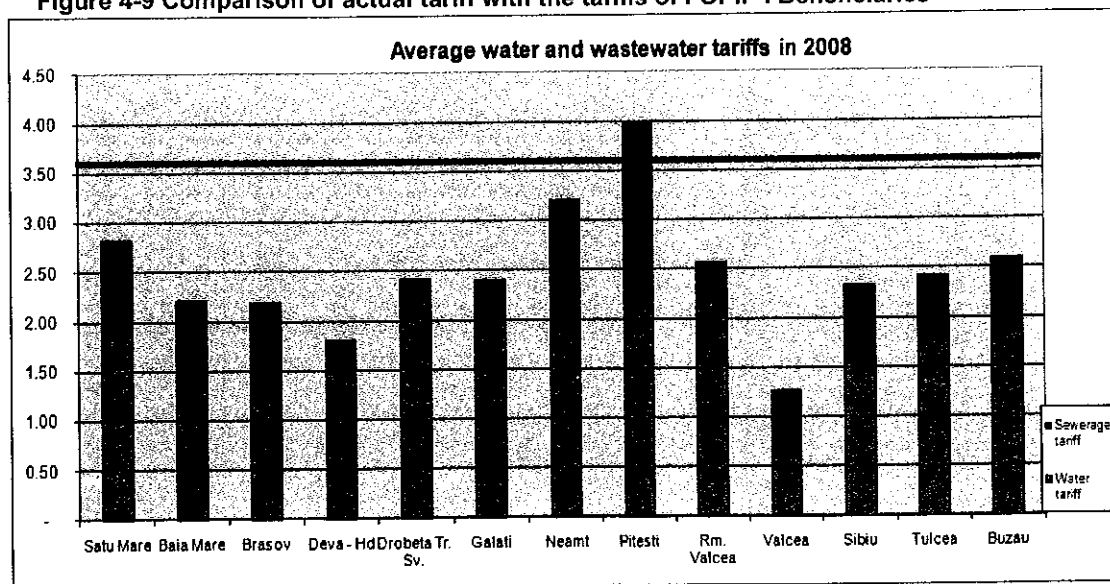
In the last years the Regional Operator recorded tariff increases in real terms and adjustments to inflation. At present, the operator in the assessed localities charge the following unified tariffs (excluding VAT):

Table 4-46 Existing tariffs in 2009

Town	Water RON/m3	Sewerage RON/m3	Cumulated RON/m3
Bacau	2.62	1.00	3.62
Buhusi	2.62	0.75	3.37
Moinesti	2.57	0.77	3.34
Darmanesti	1.06	0.43	1.49
Targu Ocna	2.05	0.87	2.92

The actual tariffs levels are above to the industry average. In the following charts is presented the comparison of the average water and wastewater tariffs for Bacau with the tariffs recorded by the FOPIP I beneficiaries in 2008.

Figure 4-9 Comparison of actual tariff with the tariffs of FOPIP I Beneficiaries



4.4.2.2 Principles of an Appropriate Tariff System

Based on the preceding considerations a mid-term water supply and wastewater tariff scheme for the ROC Bacau should be based on and take into account the following issues:

- In general terms water and wastewater tariffs should be derived on the “cost of service” approach.
- In the mid-term the tariff scheme should be suited to achieve full coverage of operation and maintenance cost plus depreciation allowances for existing and new investments plus debt service for loans (considering grant money provided by Cohesion Fund).
- Cost recovery shall be enhanced by systematic efforts to reduce service costs through greater management and technical efficiencies: (i) reducing water losses in the system; (ii) reducing illegal connections; (iii) increasing revenues through improved collection efficiency.
- Measurable progress in the improvement of technical and financial performance of the water utility shall be considered before an application for increase of tariffs is approved.
- The tariff schedules should clearly identify the range and details of all ancillary rates and charges of the water utilities, such as connection fees etc.
- The costs of wastewater services shall be allocated between the different user groups based on the volume of water consumed. In this context the ROC should aim to sell water to an utmost extent on a metered basis, which needs major effort by all concerned customers to install new meters and support repair of existing meters where in case of failure.
- A wastewater pollution charge shall be added for heavy polluters, taking into account both volumes and pollution load of wastewater discharged.

4.4.2.3 Tariff unification strategy for the “With Project Scenario”

The tariff unification led to the following advantages in the area:

- The application of a unified tariff scheme, made it much easier for the ROC to manage the tariff issues (calculation, approvals, etc);

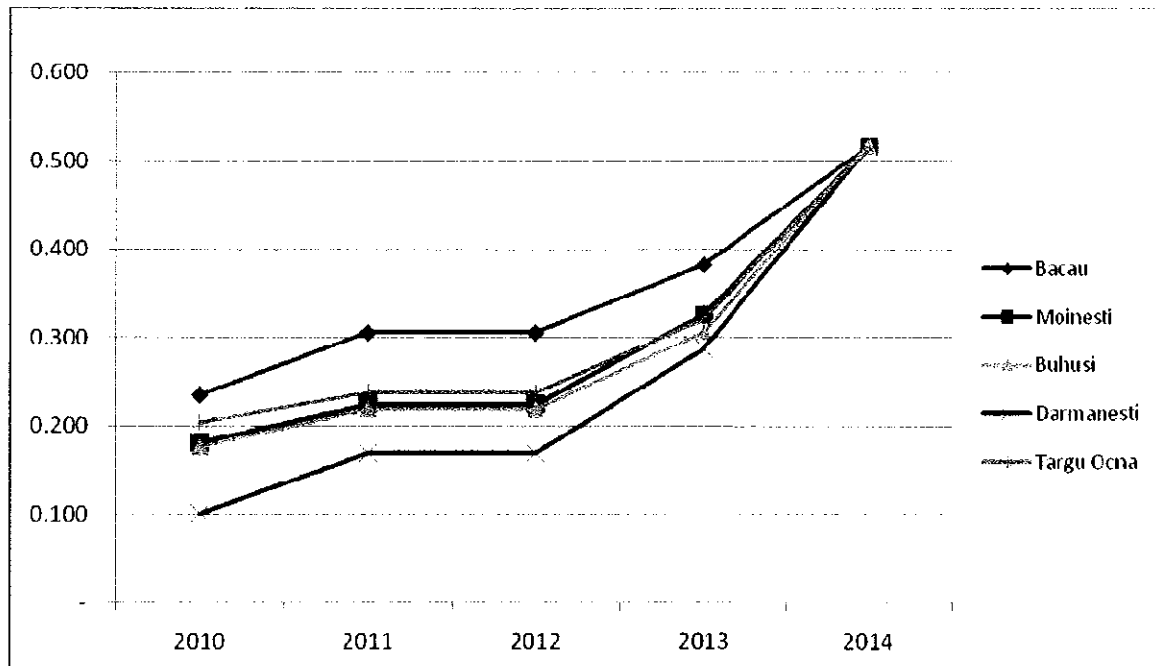
- o The unification of tariff is considered an essential prerequisite for applying the solidarity principle in the service area of the ROC.

The evolution of the average unified tariffs for water and wastewater on medium term presented in the following charts:

Figure 4-10 Evolution of the average unified water tariffs (EUR – in real terms)



Figure 4-11 Evolution of the average unified wastewater tariffs (EUR – in real terms)



According to the budget planning of the ROC and considering that the first tariff increase will not be in force before 01 January 2011, the following tariffs and increase of tariffs (in real terms) are required in the following years in order to assure a sustainable development of the operator and reasonable levels of affordability ratio.

Table 4-47 Tariff unification strategy

Tariff unification strategy	Actual Tariffs	2011	2012	2013	2014
Bacau					
Water	2.62	0.0%	0.0%	5.0%	8.2%
Wastewater	1.00	30.0%	0.0%	25.0%	35.0%
Moinesti					
Water	2.57	0.0%	0.0%	7.0%	8.2%
Wastewater	0.77	24.0%	0.0%	45.0%	58.5%
Buhusi					
Water	2.62	0.0%	0.0%	5.0%	8.2%
Wastewater	0.75	24.0%	0.0%	40.0%	68.5%
Darmanesti					
Water	1.06	49.0%	0.0%	33.0%	41.7%
Wastewater	0.43	67.0%	0.0%	70.0%	79.7%
Targu Ocna					
Water	2.05	9.26%	0.0%	10.0%	20.8%
Wastewater	0.87	16.0%	0.0%	35.0%	61.0%
Traian					
Water	1.66	19.3%	0.0%	20.0%	25.3%
Wastewater	-	-	0.0%	0.0%	0.0%
Filipesti					
Water	1.66	19.3%	0.0%	20.0%	25.3%
Wastewater	-	-	0.0%	0.0%	0.0%
Magiresti					
Water	1.66	19.3%	0.0%	20.0%	25.3%
Wastewater	-	-	0.0%	0.0%	0.0%
Ardeoani					
Water	1.80	15.0%	0.0%	15.5%	24.5%
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Poduri					
Water	1.61	20.5%	0.0%	22.0%	25.8%
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Tatarasti					
Water	1.71	17.5%	0.0%	20.0%	23.4%
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Prajesti					
Water	1.61	20.5%	0.0%	22.0%	25.8%

Tariff unification strategy	Actual Tariffs	2011	2012	2013	2014
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Faraoani					
Water	1.62	20.4%	0.0%	22.0%	25.1%
Wastewater	0.65	34.0%	0.0%	45.0%	73.7%
Buciumi					
Water	1.59	21.4%	0.0%	22.0%	26.4%
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Casin					
Water	1.94	11.3%	0.0%	15.0%	19.8%
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Hemeiusi					
Water	4.07	-13.4%	0.0%	-11.9%	-4.2%
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Margineni					
Water	3.42	-8.2%	0.0%	-7.3%	2.3%
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Magura					
Water	1.30	24.6%	0.0%	30.0%	41.4%
Wastewater	-	0.0%	0.0%	0.0%	0.0%
Stefan cel Mare					
Water	1.53	23.5%	0.0%	21.0%	30.2%
Wastewater	-	0.0%	0.0%	0.0%	0.0%

The financial model considers a somewhat simplified approach, by using just the average tariffs for water and wastewater.

The Local Authorities are aware of the tariff levels required for the implementation of the project and they already included them in the delegation contract.

The profit share for the project scenario is included implicitly when the affordability limit is set. The difference between the level of operating costs and the affordable tariff represents profit share.

The detailed tariffs evolutions are presented in Annex 1.5.

4.4.2.4 Tariff strategy for the "Without Project Scenario"

For the “Without Project Case” it is assumed that for each year of the evaluation period the tariffs are set at a level that the corresponding annual revenues of the ROC cover the annual O&M cost plus depreciation plus a profit share up to 10%.

In some years, the level of water tariffs are higher in the with – project scenario than in the without – project scenario. This difference is partially attenuated by the higher wastewater tariffs in the without – project scenario compared with the with – project scenario.

However, even with these differences, the affordability limits according to the policy are met in all years of the analysis.

The respective Tariffs are presented in Annex 1-5.

4.5 Projection of Revenues

4.5.1 Projection of Operation Revenues for “With Project Case”

4.5.1.1 General Considerations and Assumptions

The estimate of the operation revenues are performed considering the demand forecast and the proposed tariff scenario presented in the previous chapters.

The assumptions used for the calculation of working capital are presented in the following table:

Table 4-48 Projection of Working Capital Items for “With Project Case”

Item		2010	2011	2015	2018	2026	2039
Collections	%	94,0%	93,0%	95,0%	98,0%	98,0%	98,0%
Stocks	Days	5	5	5	5	5	5
Accounts payable	Days	170	130	70	60	60	60

The current collection rate in the larger agglomeration is 94%. The lower collection rates in the other areas have a limited effect on the overall collection results. The ROC has under implementation strong measures to increase the collection rates also in the other areas.

The decrease of collection rate from 2011 is the result of the cumulated effect of significant tariff increase for the water and wastewater tariffs as result of the unification strategy.

Even if the tariff will significantly increase in the following years it is expected that the Operator will be able to maintain relatively high collection levels.

4.5.1.2 Projection of Operating Revenues for the “With Project Case”

The projection of the operating revenues in EUR (constant prices) can be summarized as follows:

Table 4-49 Projection of Operating Revenues– With Project Case - (EUR- constant prices)

Total revenues forecasts	2009	2014	2018	2039
Water activity	6,452,280	8,353,522	9,122,647	17,315,337
Sewerage activity	2,244,586	6,235,379	6,342,997	10,422,620
Other operating revenues	2,509,012	1,557,856	1,022,110	1,022,110
Total	11,205,878	16,146,758	16,487,754	28,760,067

In the “With Project Case” the Operating Revenues for the ROC Bacau are anticipated to increase from EUR 11.2 million in 2009 to a level of EUR 16.5 million in 2018 and to a level of EUR 28.7 million by the year 2039.

4.5.2 Projection of Operation Revenues for “Without Project Case”

4.5.2.1 General Considerations and Assumptions

The estimate of the operation revenues are performed considering the demand forecast and the tariff scenario of the “Without Project Case”, as presented in the previous chapters. For this scenario the revenues are set to cover the operating and maintenance costs and the working capital requirements.

The assumptions used for the calculation of working capital are presented in the following table:

Table 4-50 Projection of Working Capital Items for “Without Project Case”

Item		2010	2011	2015	2018	2026	2036
Collections	%	94,0%	92,0%	95,0%	98,0%	98,0%	98,0%
Stocks	Days	5	5	5	5	5	5
Accounts payable	Days	170	130	70	60	60	60

The collection levels are assumed to stay at high levels due to a moderate tariff adjustment strategy (lower than in the “With Project Scenario”).

4.5.2.2 Projection of Operating Revenues for the “Without Project Case”

The tariff approach for the “Without Project Case” is based on the principle of full normal operating and maintenance cost coverage and an allowance for profit up to 10%. This profit component in the tariff is set for assuring a sustainable development of the ROC and to cover any unforeseen expenditures. This is in line with the Romanian Regulation on tariff setting that allows for a profit share of 10% on top of cost elements.

The projection of the operating revenues in EUR (constant prices) can be summarized as follows:

Table 4-51 Projection of Operating Revenues– Without Project Case - (EUR- constant prices)

Total revenues forecasts	2009	2014	2018	2039
Water activity	6,452,280	7,335,488	7,628,188	14,568,566
Sewerage activity	2,244,586	4,667,881	4,838,027	8,838,755
Other operating revenues	2,509,012	1,557,856	1,022,110	1,022,110
Total	11,205,878	13,561,225	13,488,325	24,429,431

In the “Without Project Case” the Operation Revenues for the ROC Bacau are anticipated to increase from EUR 11.2 million in 2009 to a level of EUR 13.5 million in 2018 and to a level of EUR 24.4 million by the year 2039.

4.6 Affordability Analysis

Affordability is a function of both the price of the service and the ability of households to pay for this service.

The affordability policy for the water and wastewater sector set for cohesion funds project according to the policy of the Ministry of Environment is the following:

- The affordability limit for the poorest 10% of households is set at 4% based on an assumed per capita consumption of 75 litres per day;
- This corresponds to approximately 2-2.5% of the net income of an average income household assuming an average per capita consumption of 110 litres per day.

Considering this policy, the affordability analysis is performed at 2 levels:

- Affordability analysis for low income households.

- Affordability analysis for average income households;

4.6.1 Affordability Analysis for Low Income Households

In Chapter “Socio Economic Analysis of Bacau County” the average disposable household income for Bacau County is estimated as follows:

Table 4-52 Average disposable household income in Bacau County – RON/month

Household disposable revenues	2007	2008	2009
Average household income	1,515	1,678	1,807
Urban area	1,530	1,695	1,825
Rural area	1,470	1,628	1,753

For the calculation of the affordability ratios the following issues have been considered:

- evolution of the average household income according to the macroeconomic scenario;
- individual average water and wastewater consumptions;
- average size of household;
- tariff scheme as applied for the financial analysis.

In order to calculate the affordability ratio for low income households the Consultant carried out an analysis for households of the three lowest deciles of household income. As the data on decile level are just available at national level, the Consultant has applied the following correction factors:

Table 4-53 Correction factors for calculating of household incomes for lowest deciles of income

Household income (year 2005)	(%)
Total average household income	
Average household income - Decile 1	46.4%
Average household income - Decile 2	56.8%
Average household income - Decile 3	63.8%

The correction factors were calculated by dividing the average household income for each Decile by the average household income. The correction factors should be interpreted as follows (in case of Decile 1): the household income for Decile 1 is just 46.4% of the average household income (at national level).

The average water consumption for the households of Decile 1 is assumed with 68% from the average consumption. The average household water consumptions for Decile 2

is considered to be 10% higher than for Decile 1 and the average household water consumptions for Decile 3 is considered to be 15% higher than for Decile 1.

The result of the affordability analysis for the period 2009 – 2015 is presented in the following table:

Table 4-54 Affordability ratio for households of the lowest 3 income deciles

Sub-service Area		2009	2010	2011	2012	2013	2014	2015
Average								
Decile 1	%	3.8%	4.3%	4.5%	4.4%	4.7%	5.2%	5.0%
Decile 2	%	2.7%	3.1%	3.3%	3.2%	3.4%	3.8%	3.6%
Decile 3	%	2.4%	2.7%	2.9%	2.8%	3.0%	3.3%	3.2%
Bacau								
Decile 1	%	4.2%	4.8%	5.0%	4.8%	5.0%	5.4%	5.1%
Decile 2	%	3.0%	3.5%	3.6%	3.5%	3.6%	3.9%	3.7%
Decile 3	%	2.6%	3.0%	3.2%	3.0%	3.2%	3.4%	3.3%
Moinesti								
Decile 1	%	3.8%	3.9%	3.9%	3.8%	4.2%	4.8%	4.5%
Decile 2	%	2.8%	2.8%	2.9%	2.8%	3.0%	3.5%	3.3%
Decile 3	%	2.4%	2.5%	2.5%	2.4%	2.6%	3.0%	2.9%
Buhusi								
Decile 1	%	1.7%	2.1%	2.5%	2.9%	3.6%	4.8%	4.6%
Decile 2	%	1.3%	1.5%	1.9%	2.1%	2.6%	3.5%	3.3%
Decile 3	%	1.1%	1.3%	1.6%	1.8%	2.3%	3.1%	2.9%
Darmanesti								
Decile 1	%	1.0%	1.2%	2.0%	2.1%	3.1%	4.9%	4.6%
Decile 2	%	0.7%	0.9%	1.5%	1.5%	2.3%	3.6%	3.4%
Decile 3	%	0.6%	0.8%	1.3%	1.3%	2.0%	3.1%	2.9%
Targu Ocna								
Decile 1		2.5%	3.0%	3.3%	3.3%	3.8%	4.9%	4.7%
Decile 2		1.8%	2.2%	2.4%	2.4%	2.7%	3.6%	3.4%
Decile 3		1.6%	1.9%	2.1%	2.1%	2.4%	3.1%	3.0%
Other								
Decile 1		1.6%	1.5%	1.8%	1.7%	1.9%	2.2%	2.1%
Decile 2		1.1%	1.1%	1.3%	1.3%	1.4%	1.6%	1.5%
Decile 3		1.0%	1.0%	1.1%	1.1%	1.2%	1.4%	1.3%

The average affordability ratios for average Decile 1 household is 5.2% in 2014 decreasing gradually to a level of 3.2% at the end of the evaluation period.

For the main urban area (Bacau Municipality), the affordability ratio of the lowest decile (Decile 1) is 5.4% in 2014 decreasing gradually to a level of 3.3% at the end of the evaluation period.

The tariff strategy was designed to reach the maximum affordable limits in the years 2011-2013. After this period, the affordability limit is decreasing slowly due to the following reasons:

- the investments included in the Cohesion Funds Application represents only a limited part of the total investments included in the master plan and the ROC will have to do also other investments in the area (the financing of this investments cannot be identified in this moment, this is why these amounts are not considered in the analysis). The master plan mentions the following levels of investment that need to be implemented in Bacau County in the following years (in the following years it is expected that the Bacau ROC will take over the operation in all localities from the County):
 - the investments included in the Cohesion Funds Application represents only a limited part of the total investments included in the master plan and the ROC will have to do also other investments in the area (the financing of this investments cannot be identified in this moment, this is why these amounts are not considered in the analysis). The master plan mentions the following levels of investment that need to be implemented in Bacau County in the following years (in the following years it is expected that the Bacau ROC will take over the operation in all localities from the County):
 - For the period 2014-2018: 458 million Euro;
 - For the period 2014-2038: 997 million Euro;

The above mentioned levels of investments were compared with the potential additional revenues that could be generated if the affordability level for the Decile 1 would have been kept at 4% for the entire period of analysis. The results are the following (comparing the net present values of revenues and investment costs):

- The additional revenues represents 2.8% of the total investment needs for the period 2014-2038;
- The additional revenues represents 4.9% of the total investment needs for the period 2014-2018;
- The above results show that the potential additional revenues generated can cover only a limited part of the investment needs, showing the need for grant also for the financing of the future investments.

- Considering that the additional investments will be performed mainly in rural areas (with lower cost efficiency), the above approach takes into consideration the application of the solidarity principle (the revenues generated in the “richer” area will be used to finance or co-finance investments in “poorer” areas).
- the water bill is increasing slower than the average household revenues because the households needs will become more sophisticated and the basic needs (like water and wastewater) will receive a lower percentage from the household revenues. As a general figure, the average household bill will increase, as an affordability ceiling will slowly decrease.

Even if at first sight the tariff increases seem high the local authorities committed themselves to implement this tariff increases in order to assure a sound development of the ROC in the following years and assure quality services. The management team of the ROC is aware that the tariff increases will put a high pressure on the customers but they are confident that, considering the good collection mechanism in place, they can assure a high collection rate.

4.6.2 Affordability Analysis for Average Income Households for “With Project Scenario”

The results of the affordability analysis for the period 2009 - 2015 are presented in the following table:

Table 4-55 Affordability ratios –“With Project Scenario” – for households with average household income

Sub-service Area		2009	2010	2011	2012	2013	2014	2015
Average County	%	1.7%	1.9%	2.0%	2.0%	2.1%	2.4%	2.2%
Bacau	%	1.9%	2.2%	2.2%	2.2%	2.3%	2.4%	2.3%
Moinesti	%	1.7%	1.8%	1.8%	1.7%	1.9%	2.2%	2.0%
Buhusi	%	0.8%	0.9%	1.2%	1.3%	1.6%	2.2%	2.1%
Darmanesti	%	0.4%	0.6%	0.9%	0.9%	1.4%	2.2%	2.1%
Targu Ocna		1.1%	1.3%	1.5%	1.5%	1.7%	2.2%	2.1%
Other		0.7%	0.7%	0.8%	0.8%	0.8%	1.0%	1.0%

The maximum affordability ratio for average income households, reached in 2014 is between 1.0% - 2.4%, having an average level of 2.4% (the smaller cities have lower consumption).

4.6.3 Affordability Analysis for Average Income Households for "Without Project Scenario

The results of the affordability analysis for the period 2009 - 2015 are presented in the following table:

Table 4-56 Affordability ratios –“Without Project Scenario” – for households with average household income

Sub-service Area		2009	2010	2011	2012	2013	2014	2015
Average County	%	1.7%	1.9%	2.0%	2.0%	2.0%	2.1%	2.0%
Bacau	%	1.9%	2.2%	2.2%	2.2%	2.2%	2.2%	2.1%
Moinesti	%	1.7%	1.7%	1.8%	1.7%	1.8%	1.9%	1.8%
Buhusi	%	0.8%	0.9%	1.1%	1.2%	1.3%	1.6%	1.6%
Darmanesti	%	0.4%	0.6%	0.8%	0.9%	1.2%	1.8%	1.7%
Targu Ocna		1.1%	1.3%	1.5%	1.5%	1.6%	1.9%	1.8%
Other		0.7%	0.7%	0.8%	0.8%	0.8%	1.0%	1.0%

The maximum affordability ratio for average income households, reached in 2014, is between 1.0% - 2.2%, having an average level of 2.1% (the smaller cities have lower consumption). This level indicates the ability of the majority of the population to pay their respective water and wastewater bills at high collection rates.

4.7 Projection EU Intervention Level

4.7.1 Financial Analysis Model

All issues related to "EU intervention Level" are determined and calculated with the EXCEL-based financial projection model, sheet "Financing gap" and presented in Annex 1.7.

As according to EU standards the CBA has to use the "incremental method" all data are stated as far as relevant separately for the "With Project Case", the "Without Project Case" and as "incremental data".

The cost and revenue figures related to EU Intervention are stated in Real EUR because the financing gap is to be calculated in Real Euro. The project costs are finally presented in current Euro for the purpose of Table H1 of the application form and for the presentation of the financing plan.

4.7.2 EU Intervention Level and Result of Intervention

4.7.2.1 Financing Gap

The financing gap is calculated based on the methodology as provided by the “Guidance on the Methodology for carrying out cost-benefit Analysis” for the Programming Period 2007-2013.

According to point 3.3 of the “Guidance on the Methodology for carrying out cost-benefit Analysis” it is highlighted that “the determination of the level of Community assistance is based on the “funding gap” rate of the project, i.e. “the share of the discounted cost of the initial investment not covered by the discounted net revenue of the project”. This implies an exclusion of the Working Capital and Replacement Cost as part of the Discounted Investment Cost (DIC) in the funding gap calculation.

The residual value of the investment at the end of the analysis period is treated as revenue in the calculation of the Discounted Net Revenue (DNR). This confirms that some „investment related” cost can be excluded of the DIC calculation and considered instead as cash-flow contribution to the DNR. More over in that particular example, the DIC calculation is based on the total project investment and not the eligible investment component only. This implies that recognized ineligible investment costs can be included in the value of the DIC in the calculation of the funding gap.

Finally the third paragraph of the Article 55.2 of the Council Regulation (EC) No 1083/2006 laying down the general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund the following guidance is provided. “Where not all the investment cost is eligible for co-financing, the net revenue shall be allocated pro rata to the eligible and non-eligible parts of the investment cost”.

Based on the above guidance available from the EC documentation, the following approach has been applied:

- Change of working capital is treated as operating cash flow and not as investment cash flow to be consistent with the Working Document 4 in point 2.2.2.
- Replacement costs for mechanical and electrical equipments are treated as maintenance costs which appear as operating cash-flow in the calculation of the DNR; this mainly because they are most likely to be spread over time and place (for example, replacement of pumps and ancillary equipment in projects when necessary).

- Non eligible investment is treated as non-eligible costs and included in section H.1 of the application. They are not included in the DIC in the funding gap calculation but their ineligibility are taken into account through an adjustment of the DNR pro-rata of the eligible cost (ratio of the discounted value of eligible investment over the discounted value of the total investment) in line with the Art. 55.2 of the council regulation. For the Bacau project, the non-eligible costs are 0.

The calculation of the financing gap is performed in sheet "Financing Gap".

The level of the financing gap calculated with a discount rate of 5% is **91.15%**.

According to the Operational Sectoral Program, the financing mix for financing the "financing gap" can have the following structure of financing sources:

- EU Grant for the priority axis: 85%;
- State Budget Contribution: 10-13%;
- Local Budget Contribution: 2-5%.

For setting the level of Local Budgets contribution, the following issues have been taken into account:

- The economic situation and development of Bacau County is below to the national average;
- The smaller municipalities have limited own revenues, most of their revenues being linked to the transfers from central and county budgets.

Considering these issues it is obvious that the financing revenues at local budget level are limited. Due to this reason the level of Local Budgets contribution is set to the minimum level of 2% from the financing gap and the contribution from the state budget consequently to a level of 13% from the financing gap.

The detailed results of the analysis are presented in Annex 1-7.

The assessment of risks and sensitivity of variation in key parameters is carried out in the respective Section "Risk and Sensitivity Analysis".

4.7.2.2 Co-financing of remaining portion of investment cost

Regarding the co-financing of the remaining portion of 8.85% of the total investments, the following 4 options are analyzed:

- (i) Contracting a co-financing loan from International Financial Institutions (IFI):

Pros:

- The IFIs expressed their willingness to co-finance investment projects in Romania;
- The loans will be granted without state guarantee (both EIB and EBRD case);

Cons:

- The experience from ISPA projects revealed that the implementation of projects co-financed with loans from IFIs recorded important delay in implementation.
- Some IFIs might require minimum levels of loans (ceiling);

(ii) Contracting a loan from a local bank:

Pros:

- The local commercial banks are expressing their willingness to finance investments in the water and wastewater infrastructure;
- The best option can be selected through public tender;

Cons:

- The local commercial bank might require a guarantee from the local authority. However, in the case of Bacau, the operator is operating for a number of years and might take loans without requiring the guarantee of the local authorities.

(iii) Financing with sources from Local Budgets

Pros:

- It will move the pressure from the Operator, which will have the possibility to finance from own sources other investments according to the priorities from the master plan (the proposed project covers only a certain part of the total investment needs);
- It will allow the operator to continue the regionalization process and finance the investments from own sources leading to further steps in implementation of the solidarity principle at local level.
- Strong commitment of the Local Authorities in financing investments that will assure compliance with the EU Directives.

Cons:

- The limited resources of the local budgets;
- Solution that might not be accepted by the Managing Authority;

(iv) Financing with sources from State Budget:

Pros:

- It will move the pressure from the Operator, which will have the possibility to finance from own sources other investments according to the priorities from the master plan (the proposed project covers only a small part of the total investment needs);
- It will allow the local authorities to focus on continuing the implementation of already started investment projects;

Cons:

- The Central Authorities want to see commitment from local beneficiaries and they expect that the local beneficiaries finance at least a part of the investment;
- Solution that might not be accepted by the Managing Authority;

The operator is still in process of analyzing the options for the co-financing loan. The remaining 2 options that are under analysis are the first two:

- Contract a loan from an IFI;
- Contract a loan from a commercial bank;

This process will be finalized in the following months.

The loan will be repaid by the ROC from the revenues generated by the water and wastewater activities.

4.7.2.3 Financial NPV and Rates of Return with and without community assistance

The financial NPV and the Financial Rates of Return with and without community assistance are as follows:

Table 4-57 Financial NPV and Rates of Return

Before community assistance		After community assistance			
NPV/C	FRR/C	FNPV/C	FRR/C	FNPV/K	FRR/K
(88,623,923)	-5.38%	(13,816,434)	0.2%	(11,448,837)	-0.66%

4.7.2.4 Financing Plan

Taking into account the detailed analysis from the previous chapter, the Consultants propose the following financing scheme for the project (as percentage of total eligible costs):

- EU Grant: 77.48%;
- State Budget subsidy: 11.85%;
- Local Budgets contribution: 1.82%;
- Loan contracted by the ROC: 8.85%

The financing plan for the eligible costs is presented in the following table:

Table 4-58 Financing plan for eligible cost –EUR (current prices)

Financing Plan	Total	2009	2010	2011	2012	2013
Eligible expenditures	(117,953,237)	-	(1,118,759)	(45,027,814)	(47,475,480)	(24,331,183)
EU Grant	91,391,567	-	866,828	34,888,084	36,784,565	18,852,090
State Budget Contribution	13,977,534	-	132,574	5,335,825	5,625,875	2,883,261

Financing Plan	Total	2009	2010	2011	2012	2013
Local Budget Contribution	2,150,390	-	20,396	820,896	865,519	443,579
ROC Loan	10,433,746	-	98,962	3,983,009	4,199,521	2,152,255

For the local contribution part the only possible option is the contribution by each of the agglomerations into the project

The following table presents the contribution of each local authority to the amount of EUR 2.125 million.

Table 4-59 Financing plan for local contribution - EUR (current prices)

Local authorities contribution		Total	2009	2010	2011	2012	2013
Bacau	EUR current	458,385	0	4,348	174,985	184,497	94,555
Margineni	EUR current	31,944	0	303	12,194	12,857	6,589
Hemeius	EUR current	71,191	0	675	27,177	28,654	14,685
Letea Veche	EUR current	25,191	0	239	9,616	10,139	5,196
Consiliul Judetean	EUR current	86,762	0	823	33,121	34,921	17,897
Buhusi	EUR current	358,561	0	3,401	136,878	144,319	73,963
Moinesti	EUR current	356,277	0	3,379	136,006	143,399	73,492
Darmanesti	EUR current	480,292	0	4,555	183,348	193,315	99,074
Tg. Ocna	EUR current	281,787	0	2,673	107,570	113,417	58,126
Total	EUR current	2,150,390	0	20,396	820,896	865,519	443,579

4.8 Financial Statements

In order to assess the long-term sustainability of the Regional Operator with the Project Measure the Consultant has elaborated the following financial statements in Constant Euro.

The financial statements are presented in Annex 1-8.

(1) Balance Sheet

The Balance Sheet of the ROC for the period 2009 to 2039 is presented in constant prices (Euro) in Annex 1-8, with the following simplified structure:

- Total assets
 - Net fixed assets

- Current assets
- Total Equity and Liabilities
 - Equity
 - Liabilities

The detailed results of the analysis on an annual basis are presented in the Annex 1.8.

(2) Income Statement

The Income Statement of the ROC for the period 2009 to 2039 is presented in constant prices (Euro) in Annex 1-8, with the following simplified structure:

- Revenues;
- Operating expenditures;
- EBITDA;
- EBIT;
- EBT;
- Net income.

The detailed results of the analysis on an annual basis are presented in the Annex 1.8.

(3) Cash Flow Statement

The Cash Flow Statement of the ROC for the period 2009 to 2039 is presented in constant prices (Euro) in annex 1-8, with the following simplified structure:

- Funds from operation;
- Free cash flow;
- Cash flow before debt service;
- Surplus / deficit for the year;
- Net cash flow.

The detailed results of the analysis on an annual basis are presented in the Annex 1.8.

The closing balance of the cash flow statement show positive values for all years of the analysis.

The ROC from Bacau had a cash collection monitoring system since they started the MUDP II project in 1997 as a covenant included in the loan agreement with EBRD, monitoring system that is still in place today. The ROC succeeded to keep its collection ratio at high levels (one of the best in Romania) in the last 10 years.

The ROC will continue to have this monitoring system also in the following years (until they will have the co-financing loan agreement with EBRD for ISPA). They are in process of extension of this system also to the areas that were taken over as part of the regionalization process.

For the "Without project Scenario" a brief cash flow statement was prepared in the financial model in the sheet "Revenues". This table shows that also for this case the ending cash balance is positive for the entire period of analysis showing the sustainability of the proposed scenario.

CHAPTER 5

Economic Analysis

5 ECONOMIC ANALYSIS

5.1 Methodology and General Assumptions

5.1.1 General

According to "Guidance on the methodology for carrying out Cost-Benefit Analysis, the "Article 40(e) of Reg. 1083/2006 requires the Member State (or the managing authority) to provide the Commission with a CBA for major projects. There are two main reasons why CBA is required for major projects:

- To assess whether the project is worth co-financing;
- To assess whether the project needs co-financing.

The economic CBA addresses the first task. If the project's economic net present value (ENPV) is positive, then the society (region/country) is better off with the project because its benefits exceed its costs. Therefore, the project should receive the assistance of the Funds and be co-financed if needed.

For this purpose the financial project cost have to be transferred into economic cost by appropriate conversion factors and to be compared to the economic project benefits by means of a present value approach.

The assumptions and the method of calculating the economic indicators (ENPV, ERR and Cost/Benefit Ratio) is presented in Annex 1-9.

The economic analysis is based on the following assumptions:

- The period for the economic evaluation is 2010 to 2039;
- The base year for evaluation is 2010, the first year of project implementation;
- All cost and benefit figures are stated in constant prices;
- Discount rate used for calculation of NPV is 5.5%.

5.1.2 Economic Project Costs

The cost components considered in the economic evaluation are:

- Project investment cost;
- Replacement cost;

- Project OM&A cost.
- CO2 emissions;

Within the economic evaluation for the Project Measure in Bacau County there is only one conversion factor applied. It is a conversion factor for labor cost, used to exclude the transfer payments included in labor cost (like taxes and social security payments) and to establish a shadow price for labor considering unemployment. As suggested in the “Guidance on the methodology for carrying out Cost-Benefit Analysis”, the following factor is applied:

$$SW = FW \cdot (1-u) \cdot (1-t)$$

where SW = the shadow wage
 FW = the financial (market) wage
 u = the regional unemployment rate
 t = the rate of social security payments and relevant taxes

The conversion factor $(1-u) \cdot (1-t)$ is applied for all costs with a labor component for each year of the evaluation period.

According to the Consultant’s estimate taxes and transfers on labor components are about 44.2% of labor cost while the unemployment rate in Bacau County is 8.5%. The resulting shadow price of labor is 52.9%.

The following table shows the calculation of the shadow price for labor:

Table 5-1 Shadow price for labor

Shadow Price of Labor	Employer	Employee
Contribution to Social Security (CAS)	16.25%	8.20%
Contribution to Health Fund (CASS)	4.06%	4.30%
Unemployment fund	0.39%	0.39%
Other contributions	1.17%	0.00%
Tax on salaries	0.00%	9.65%
Total	21.88%	22.54%
Unemployment rate	8.50%	
Shadow Price of Labor = SI	52.92%	

In order to transfer financial cost into economic cost the labor cost components have to be multiplied by a factor of 0.53.

As negative externalities, the following 2 items were identified:

- 1). CO2 emissions generated by sludge digestion;

2). Transport of sludge to agricultural field or landfill;

1. CO₂ emissions generated by sludge digestion

In calculating the CO₂ emissions generated by sludge digestions the following assumptions were used:

- Specific Gas Production (in l/kg org DS): 450;
- Share of CO₂ in Digester Gas Output: 28%;
- Specific mass CO₂ (in kg/m³): 1,976;
- The value that were used to monetize the emissions of CO₂ by the project are in line with the latest EIB energy price scenario, going from 25 Euro per tone of CO₂ until 2010, and that assuming a gradual increase to 45 Euro per tone until 2030.

Considering a discount rate of 5.5% and the period of analysis 2009-2039, the NPV of the CO₂ emissions are **430,504 Euro**.

2. Transport of sludge to agricultural field or landfill

In calculating the CO₂ emissions generated by the transport the following assumptions were used:

- Yearly Dehydrated Sludge Production (in m³/a) – specific for each WWTP;
- Volume capacity of transport vehicle (in m³): 15;
- Average simple distance to agricultural fields (in km) – specific for each WWTP;
- Diesel Consumption (in l/100 km): 25;
- Specific CO₂ emission (in g/l Diesel): 2,660;
- The value that were used to monetize the emissions of CO₂ by the project are in line with the latest EIB energy price scenario, going from 25 Euro per tone of CO₂ until 2010, and that assuming a gradual increase to 45 Euro per tone until 2030.

Considering a discount rate of 5.5% and the period of analysis 2009-2038, the NPV of the CO₂ emissions are **3,286 Euro**.

The resulting economic project costs are presented in Annex 1-9.

5.1.3 Anticipated Impacts / Benefits of the Project

In order to determine the economic benefits, a comparison of the situation with and without project has been carried out for the pertinent aspects. The comparison of “without project” and “with project” scenarios differs from the comparison of the situations “before” and “after” the project, as the latter does not describe the situation which would prevail if the project was not undertaken.

The estimation of the project economic benefits involves the identification of the project benefits, which can be classified into the following three main categories:

- a) Benefits from improved access to drinking water, which translates into more water of adequate quality sold to the customers, either through increase of the coverage of the water supply service or to the increase in individual consumption due to the improvement of the quality of the service (i.e.: increase of pressure and decrease of service interruptions).
- b) Benefits from improved quality of bathing and other surface waters, which translates into an improvement in the overall conditions of water bodies in the project area as a result of pollution prevention.
- c) Resource cost savings:
 - o for the customers, which takes place (i) when the customer does no longer need to rely on private wells, private pumps, septic tanks, and does no longer have to buy bottled water
 - o for the operator, through the optimization of the system which allows for a reduced resource depletion through water abstraction as well as a reduction in emissions related to energy savings.

The summarizations of the individual benefits are presented in the following table (according to the JASPERS CBA Guide for Romania).

Table 5-2 Project unitary benefits according to CBA Guide

Project Benefits			
Type	Base for calculation	Monetary value	Comments
Access to drinking water	Nr. Of households in project service area	148 Euro/household/year (2008 value)	
Improvement of water bodies (use value)	Nr. Of people living in the project service area	20.4 Euro/person/year (2008 value)	Values for following years of projection to be increased by real GDP growth
Improvement of water bodies (non use value)	Nr. Of households in project service area	0.004 – 0.011 Euro/household/year/KM river	

Project Benefits			
Type	Base for calculation	Monetary value	Comments
Cost savings to customers – private well	Nr. Of households newly connected	315 Euro/household/year	
Cost savings to customers – sewage disposal	Nr. Of households newly connected	348 Euro/household/year	
Cost savings to operator – water abstraction	Incremental water savings (in m ₃)	Water abstraction fee (Apele Romane)	
Cost savings to operator – energy consumption	CO ₂ emission savings (in tonnes)	From 25 Euro/tonne in 2010 to 45 Euro/tonne in 2030	

5.2 Results of Economic Analysis

The assessment of the economic viability of the project is based on the assumptions outlined above and the anticipated project benefits as outlined in the previous section.

The **Benefit/Cost ratio** is **2.67**, the **ERR 18.9 %**, and the **NPV** calculated at a discount rate of 5.5% is **EURO 201.4 million**.

The project shows satisfactory economic indicators with economic benefits significantly exceeding economic cost.

The detailed calculations are presented in the Sheet “Economic Analysis” of the Financial Model (Annex 1-9).

CHAPTER 6

Sensitivity and Risk Analysis

6 SENSITIVITY AND RISK ANALYSIS

6.1 Sensitivity Analysis

The sensitivity analysis is composed of three parts:

- Analysis (1) shows the effects of variation in key parameters on the “financing mix”;
- Analysis (2) shows the effects of variation in key parameters on the “financial results”;
- Analysis (3) shows the effects of variation in key parameters on the “economic results”.

6.1.1 Sensitivity Analysis (1)

Sensitivity Analysis (1) shows the effects of variation in key parameters on the “financing mix”, that means the composition of EU Grant funds, State Budget funds, Local Budget funds and loan funds.

The analysis is carried out for variations of +/-1%; +/-5%; and +/-10% for the following parameters:

- Investment cost,
- Operating cost,
- Revenues.

6.1.1.1 Investment Costs

The results of the sensitivity analysis regarding variations in investment costs are presented in the following table:

Table 6-1 Impact of variation in investment costs

Variation in investment costs	EU Grant	Co-fin. loan	State budget	Local Budget	Total
1 Base case	77.48%	8.85%	11.85%	1.82%	100.00%
2 Sensitivity case 2 (-1%)	77.38%	8.97%	11.83%	1.82%	100.00%
3 Sensitivity case 3 (-5%)	76.94%	9.48%	11.77%	1.81%	100.00%
4 Sensitivity case 4 (-10%)	76.34%	10.19%	11.68%	1.80%	100.00%

Variation in investment costs	EU Grant	Co-fin. loan	State budget	Local Budget	Total
5 Sensitivity case 5 (+1%)	77.58%	8.73%	11.87%	1.83%	100.00%
6 Sensitivity case 6 (+5%)	77.97%	8.27%	11.93%	1.83%	100.00%
7 Sensitivity case 7 (+10%)	78.42%	7.74%	11.99%	1.85%	100.00%

The impact of variation in investment costs is not significant. A variation of the investment costs by 1% leads to a 0.13% change in the EU grant percentage. The contingencies considered for the project can easily cover any reasonable variation in investment costs.

6.1.1.2 Operating Costs

The results of the sensitivity analysis regarding variations in operating cost are presented in the following table:

Table 6-2 Impact of variation in operating costs

Variation in operating costs	EU Grant	Co-fin. loan	State budget	Local Budget	Total
1 Base case	77.5%	8.8%	11.9%	1.8%	100.0%
2 Sensitivity case 2 (-1%)	75.1%	11.6%	11.5%	1.8%	100.0%
3 Sensitivity case 3 (-5%)	65.6%	22.8%	10.0%	1.5%	100.0%
4 Sensitivity case 4 (-10%)	53.8%	36.8%	8.2%	1.3%	100.0%
5 Sensitivity case 5 (+1%)	79.9%	6.1%	12.2%	1.9%	100.0%
6 Sensitivity case 6 (+5%)	85.0%	0.0%	13.0%	2.0%	100.0%
7 Sensitivity case 7 (+10%)	85.0%	0.0%	13.0%	2.0%	100.0%

The impact of variation in operating costs is significant. A variation in operating costs by 1% leads to a 3.06% change in the EU grant percentage.

In order to mitigate the risk in the long run it is recommended that the tariff strategy should aim to respect three key criteria:

- (1) To ensure the financial sustainability of the ROC;
- (2) To ensure that there will not be recorded increases/decreases of the financing gap in the revised financial model compared to the level from the application for cohesion funds;
- (3) To ensure that affordability constraints are complied with.

Currently, the ROC has benefited of the FOPIP I Technical Assistance in the process of improving its financial and operational performances. This Technical assistance is also

assisting the operator in implementing the above mentioned criteria if there will be recorded changes in the operating costs level.

6.1.1.3 Revenues Forecast

The results of the sensitivity analysis regarding variations in revenues forecast are presented in the following table:

Table 6-3 Impact of variations in revenues

Variation in revenues	EU Grant	Co-fin. loan	State budget	Local Budget	Total
1 Base case	77.5%	8.8%	11.9%	1.8%	100.0%
2 Sensitivity case 2 (-1%)	80.0%	5.9%	12.2%	1.9%	100.0%
3 Sensitivity case 3 (-5%)	85.0%	0.0%	13.0%	2.0%	100.0%
4 Sensitivity case 4 (-10%)	85.0%	0.0%	13.0%	2.0%	100.0%
5 Sensitivity case 5 (+1%)	75.0%	11.8%	11.5%	1.8%	100.0%
6 Sensitivity case 6 (+5%)	65.0%	23.5%	9.9%	1.5%	100.0%
7 Sensitivity case 7 (+10%)	52.5%	38.2%	8.0%	1.2%	100.0%

The impact of variation in revenues is significant. A variation in revenues by 1% leads to a 3.22% change in the EU Grant percentage. In order to mitigate this risk the approach recommended for the operating costs is to be considered.

6.1.2 Sensitivity Analysis (2)

Sensitivity Analysis (2) shows the effects of the same variations for the same key parameters as outlined above on the "financial results":

- NPV/C and FIRR/C;
- NPV/K and FIRR/K;

both "before community assistance" and "after community assistance".

The analysis is also carried out for variations of +/-1%; +/-5%; and +/-10% for the following parameters:

- Investment cost,
- Operating cost,
- Revenues.

6.1.2.1 Investment Costs

The results of the sensitivity analysis regarding variations in investment costs are presented in the following table:

Table 6-4 Impact of variation in investment costs

Variation in investment costs		Before community assistance		After community assistance			
		NPV/C	FRR/C	NPV/C	FRR/C	NPV/K	FRR/K
1	Base case	-88,623,923	-5.38%	-13,816,434	0.19%	-11,448,837	-0.66%
2	Sensitivity case 2 (-1%)	-87,623,071	-5.36%	-13,662,984	0.22%	-11,323,106	-0.63%
3	Sensitivity case 3 (-5%)	-83,619,663	-5.26%	-13,048,771	0.32%	-10,819,748	-0.54%
4	Sensitivity case 4 (-10%)	-78,615,403	-5.12%	-12,280,081	0.47%	-10,189,592	-0.42%
5	Sensitivity case 5 (+1%)	-89,624,775	-5.41%	-13,969,843	0.16%	-11,574,526	-0.68%
6	Sensitivity case 6 (+5%)	-93,628,182	-5.50%	-14,583,060	0.06%	-12,076,846	-0.76%
7	Sensitivity case 7 (+10%)	-98,632,442	-5.60%	-15,348,635	-0.05%	-12,703,761	-0.86%

The impact of variation in investment costs is significant. A variation of the investment costs of 1% leads to a change of 1.13% in the NPV/C (before community assistance). This can be covered by the contingencies considered for the project.

6.1.2.2 Operating Costs

The results of the sensitivity analysis regarding variations in operating cost are presented in the following table:

Table 6-5 Impact of variation in operating costs

Variation in operating costs		Before community assistance		After community assistance			
		NPV/C	FRR/C	NPV/C	FRR/C	NPV/K	FRR/K
1	Base case	-88,623,923	-5.4%	-13,816,434	0.2%	-11,448,837	-0.66%
2	Sensitivity case 2 (-1%)	-86,123,374	-5.0%	-13,606,318	0.6%	-11,331,935	-0.42%
3	Sensitivity case 3 (-5%)	-76,121,182	-3.5%	-12,765,851	1.8%	-10,864,328	0.37%
4	Sensitivity case 4 (-10%)	-63,618,441	-1.8%	-11,715,267	2.7%	-10,279,818	1.10%
5	Sensitivity case 5 (+1%)	-91,124,471	-5.8%	-14,026,551	-0.3%	-11,565,739	-0.92%
6	Sensitivity case 6 (+5%)	-101,126,663	-7.7%	-19,059,818	-3.3%	-16,396,783	-4.12%
7	Sensitivity case 7 (+10%)	-113,629,404	n/a	-31,562,559	-8.1%	-28,899,524	n/a

The impact of variation in operating costs is significant. A variation in operating costs by 1% leads to a 2.82% change in the NPV/C (before community assistance).

In order to mitigate the risk in the long run it is recommended to apply an appropriate tariff strategy as outlined above.

6.1.2.3 Revenue Forecast

The results of the sensitivity analysis regarding variations in revenue development are presented in the following table:

Table 6-6 Impact of variation in revenues

Variation in revenues	Before community assistance		After community assistance			
	NPV/C	ERR/C	NPV/C	ERR/C	NPV/K	ERR/K
1 Base case	-88,623,923	-5.4%	-13,816,434	0.2%	-11,448,837	-0.66%
2 Sensitivity case 2 (-1%)	-91,256,914	-5.9%	-14,037,680	-0.3%	-11,571,931	-0.98%
3 Sensitivity case 3 (-5%)	-101,788,878	-7.9%	-19,722,033	-3.8%	-17,058,998	-4.86%
4 Sensitivity case 4 (-10%)	-114,953,834	n/a	-32,886,989	n/a	-30,223,954	n/a
5 Sensitivity case 5 (+1%)	-85,990,931	-4.9%	-13,595,189	0.6%	-11,325,744	-0.37%
6 Sensitivity case 6 (+5%)	-75,458,967	-3.3%	-12,710,206	1.9%	-10,833,369	0.56%
7 Sensitivity case 7 (+10%)	-62,294,011	-1.5%	-11,603,977	2.9%	-10,217,900	1.37%

The impact of variation in revenues is significant. A variation of revenues of 1% leads to a change of 2.97% for the NPV/C (before community assistance). In order to mitigate this risk the approach outlined for the operating costs is to be considered.

6.1.3 Sensitivity analysis of the cash flow statement

For the sensitivity analysis of the cash flow statement, we considered the following scenarios:

- Increase of investment costs by 10% (compared with base case);
- Increase of operating costs by 5% (compared with base case);
- Decrease of revenues by 5% (compared with base case)

The main analyzed elements are the cumulated cash for the periods 2010-2020 and 2021-2039:

Table 6-7: Sensitive variables – financial analysis

Sensitivity analysis	2009-2020	2021-2039
Base case	4.4	35.9
Sensitivity case 2 (Investment)	4.7	34.0
Sensitivity case 3 (O&M)	4.2	25.1
Sensitivity case 4 (Revenues)	4.3	22.9

All of the above mentioned variables are sensitive with significant impact on the cash position of the company. In order to mitigate these risks the following measures can be considered:

- Increase of investment costs: the Operator has the contingencies considered for this project in order to finance the unforeseen increases in the investment levels.
- Increase of O&M: The O&M costs are carefully managed by the Operator. Any significant increases in the costs elements will appear in a general economic context that will be correlated also with a higher increase in revenues of the households will allow the company to additionally increase the tariff within the affordability limits.
- Decrease of revenues: Any decrease in revenues will be determined by the decrease of consumption (mainly individual consumption) which will lead to additional tariff increases in order to reach the affordability limits.

6.1.4 Sensitive variables-financial analysis

The following table shows the sensitive variables for the results of the financial analysis:

Table 6-8 Sensitive variables – financial analysis

Financial analysis	FNPV/C variation	FRR/C variation	Sensitive (Yes/No)
Project investment cost (increase of 1%)	-1.13%	-0.44%	Yes
Project investment cost (decrease of 1%)	1.13%	0.44%	Yes
O&M costs (increase of 1%)	-2.82%	-7.84%	Yes
O&M costs (decrease of 1%)	2.82%	7.59%	Yes
Revenues development (increase of 1%)	2.97%	8.39%	Yes
Revenues development (decrease of 1%)	-2.97%	-8.72%	Yes

We considered a variable as being sensitive if 1% of its variation leads to at least 1% variation in the financial result indicator.

6.1.5 Sensitivity Analysis (3)

Sensitivity Analysis (3) shows the effects of the same variations for key parameters as outlined above on the “economic results” (NPV, EIRR and B/C).

The analysis is carried out for variations of +/- 1%; +/-5%; and +/-10% for the following parameters:

- Investment cost;
- CO2 emissions;
- Access to drinking water benefit;
- Improvement of water bodies (use value);
- Improvement of water bodies (non-use value);
- Cost saving to customers - private well
- Cost saving to customers - sewage disposal;
- Cost saving to operator water abstraction;
- Cost saving to operator - energy consumption;
- Operating costs.

The results of the analysis are presented in the following table:

Table 6-9 Results of the sensitivity analysis for economic results

Variation in investment costs		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.67
2	Sensitivity case 2 (-1%)	203,220,011	19.24%	2.71
3	Sensitivity case 3 (-5%)	210,323,701	20.51%	2.88
4	Sensitivity case 4 (-10%)	218,791,374	22.26%	3.12
5	Sensitivity case 5 (+1%)	199,558,315	18.65%	2.63
6	Sensitivity case 6 (+5%)	192,015,221	17.52%	2.48
7	Sensitivity case 7 (+10%)	182,174,412	16.23%	2.30

Variation in CO2 emissions		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.669
2	Sensitivity case 2 (-1%)	201,402,655	18.94%	2.669
3	Sensitivity case 3 (-5%)	201,420,007	18.94%	2.669
4	Sensitivity case 4 (-10%)	201,441,696	18.95%	2.670
5	Sensitivity case 5 (+1%)	201,393,979	18.94%	2.669
6	Sensitivity case 6 (+5%)	201,376,627	18.94%	2.668
7	Sensitivity case 7 (+10%)	201,354,938	18.94%	2.668

Variation of access to drinking water benefit		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.67
2	Sensitivity case 2 (-1%)	199,927,169	18.87%	2.66

300

3	Sensitivity case 3 (-5%)	194,042,575	18.56%	2.61
4	Sensitivity case 4 (-10%)	186,686,832	18.17%	2.55
5	Sensitivity case 5 (+1%)	202,869,466	19.02%	2.68
6	Sensitivity case 6 (+5%)	208,754,060	19.32%	2.73
7	Sensitivity case 7 (+10%)	216,109,802	19.70%	2.79

Variation of improvement of water bodies (use value)		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.67
2	Sensitivity case 2 (-1%)	200,344,625	18.90%	2.66
3	Sensitivity case 3 (-5%)	196,129,855	18.72%	2.62
4	Sensitivity case 4 (-10%)	190,861,393	18.49%	2.58
5	Sensitivity case 5 (+1%)	202,452,009	18.99%	2.68
6	Sensitivity case 6 (+5%)	206,666,779	19.17%	2.71
7	Sensitivity case 7 (+10%)	211,935,241	19.38%	2.76

Variation in improvement of water bodies (non use value)		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.67
2	Sensitivity case 2 (-1%)	201,395,179	18.94%	2.67
3	Sensitivity case 3 (-5%)	201,382,629	18.94%	2.67
4	Sensitivity case 4 (-10%)	201,366,941	18.94%	2.67
5	Sensitivity case 5 (+1%)	201,401,455	18.94%	2.67
6	Sensitivity case 6 (+5%)	201,414,005	18.94%	2.67
7	Sensitivity case 7 (+10%)	201,429,693	18.94%	2.67

Variation in cost saving to customers - private well		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.67
2	Sensitivity case 2 (-1%)	201,390,276	18.94%	2.67
3	Sensitivity case 3 (-5%)	201,358,112	18.94%	2.67
4	Sensitivity case 4 (-10%)	201,317,907	18.94%	2.67
5	Sensitivity case 5 (+1%)	201,406,358	18.94%	2.67
6	Sensitivity case 6 (+5%)	201,438,522	18.95%	2.67
7	Sensitivity case 7 (+10%)	201,478,727	18.95%	2.67

Variation in cost saving to customers - sewage disposal		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.67
2	Sensitivity case 2 (-1%)	200,724,537	18.90%	2.66
3	Sensitivity case 3 (-5%)	198,029,415	18.73%	2.64
4	Sensitivity case 4 (-10%)	194,660,513	18.51%	2.61

5	Sensitivity case 5 (+1%)	202,072,097	18.99%	2.67
6	Sensitivity case 6 (+5%)	204,767,219	19.16%	2.70
7	Sensitivity case 7 (+10%)	208,136,121	19.38%	2.72

Variation in cost saving to operator water abstraction		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.67
2	Sensitivity case 2 (-1%)	201,398,317	18.94%	2.67
3	Sensitivity case 3 (-5%)	201,398,317	18.94%	2.67
4	Sensitivity case 4 (-10%)	201,398,317	18.94%	2.67
5	Sensitivity case 5 (+1%)	201,398,317	18.94%	2.67
6	Sensitivity case 6 (+5%)	201,398,317	18.94%	2.67
7	Sensitivity case 7 (+10%)	201,398,317	18.94%	2.67

Variation in cost saving to operator - energy consumption		NPV	ERR	BCR
1	Base case	201,398,317	18.942%	2.6686
2	Sensitivity case 2 (-1%)	201,387,146	18.942%	2.6685
3	Sensitivity case 3 (-5%)	201,342,463	18.938%	2.6681
4	Sensitivity case 4 (-10%)	201,286,608	18.934%	2.6677
5	Sensitivity case 5 (+1%)	201,409,488	18.943%	2.6687
6	Sensitivity case 6 (+5%)	201,454,171	18.946%	2.6691
7	Sensitivity case 7 (+10%)	201,510,026	18.950%	2.6695

Variation in operating costs		NPV	ERR	BCR
1	Base case	201,398,317	18.94%	2.67
2	Sensitivity case 2 (-1%)	203,257,256	19.09%	2.71
3	Sensitivity case 3 (-5%)	210,693,010	19.70%	2.89
4	Sensitivity case 4 (-10%)	219,987,702	20.49%	3.15
5	Sensitivity case 5 (+1%)	199,539,379	18.79%	2.63
6	Sensitivity case 6 (+5%)	192,103,624	18.21%	2.48
7	Sensitivity case 7 (+10%)	182,808,932	17.49%	2.31

6.1.6 Sensitive variables-economic analysis

The following table shows the sensitive variables for the results of the economic analysis:

Table 6-10 Sensitive variables – economic analysis

Economic analysis	NPV variation	ERR variation	Sensitive (Yes/No)	Sensitive (Yes/No)
Variation in investment costs (increase of 1%)	-0.91%	-1.56%	Yes	Yes

Economic analysis	ENPV variation	ERR variation	Sensitive (Yes/No)	Sensitive (Yes/No)
Variation in investment costs (decrease of 1%)	0.90%	1.59%	Yes	Yes
Variation in CO2 emissions (increase of 1%)	-0.002%	-0.002%	No	No
Variation in CO2 emissions (decrease of 1%)	0.002%	0.002%	No	No
Variation of access to drinking water benefit (increase of 1%)	0.73%	0.40%	Yes	Yes
Variation of access to drinking water benefit (decrease of 1%)	-0.73%	-0.40%	Yes	Yes
Variation of improvement of water bodies (use value) (increase of 1%)	0.52%	0.24%	Yes	No
Variation of improvement of water bodies (use value) (decrease of 1%)	-0.52%	-0.24%	Yes	No
Variation in improvement of water bodies (non use value) (increase of 1%)	0.00%	0.00%	No	No
Variation in improvement of water bodies (non use value) (decrease of 1%)	0.00%	0.00%	No	No
Variation in cost saving to customers - private well (increase of 1%)	0.00%	0.00%	No	No
Variation in cost saving to customers - private well (decrease of 1%)	0.00%	0.00%	No	No
Variation in cost saving to customers - sewage disposal (increase of 1%)	0.33%	0.23%	Yes	No
Variation in cost saving to customers - sewage disposal (decrease of 1%)	-0.33%	-0.23%	Yes	No
Variation in cost saving to operator water abstraction (increase of 1%)	0.0000%	0.0000%	No	No
Variation in cost saving to operator water abstraction (decrease of 1%)	0.0000%	0.0000%	No	No
Variation in cost saving to operator - energy consumption (increase of 1%)	0.0055%	0.0042%	No	No
Variation in cost saving to operator - energy consumption (decrease of 1%)	-0.0055%	-0.0042%	No	No
Variation in operating costs (increase of 1%)	-0.92%	-0.79%	Yes	Yes
Variation in operating costs (decrease of 1%)	0.92%	0.79%	Yes	Yes

We considered a variable as being sensitive if 1% of its variation leads to at least 0.3% variation in the economic result indicator.

6.1.7 Switching Values for Critical Variables

The critical variables identified within the sensitivity analysis for the financial analysis are the following:

- Investment costs;
- Revenues;
- Operating and maintenance costs;

The critical variables identified within the sensitivity analysis for the economic analysis are the following:

- Investment costs;
- Operating and maintenance costs;
- Access to drinking water benefit;
- Improvement of water bodies (use value);

For these variables the switching values are presented in the following table:

Table 6-11 Results of the sensitivity analysis for financial and economic results

Critical variables	Switching value	
Project investment cost	Maximum increase before NPV/C equals 0 (%)	88.5%
Project investment cost	Maximum decrease before NPV/K equals 0 (%)	89.8%
Project investment cost	Maximum increase before ENPV equals 0 (%)	220.0%
Revenue scenario	Maximum increase before NPV/C equals 0 (%)	33.7%
Revenue scenario	Maximum decrease before NPV/K equals 0 (%)	3.8%
O&M costs	Maximum increase before NPV/C equals 0 (%)	35.4%
O&M costs	Maximum decrease before NPV/K equals 0 (%)	4.0%
O&M costs	Maximum increase before ENPV equals 0 (%)	108.3%
Access to drinking water benefit	Maximum increase before ENPV equals 0 (%)	136.9%
Improvement of water bodies (use value)	Maximum increase before ENPV equals 0 (%)	191.1%

The most sensitive variables are the operating and maintenance costs, as the switching values for this variable regarding the NPV/K are below 5%.

6.2 Risk Analysis

The risk analysis is conducted at 2 levels:

- For the financial analysis parameters;
- For the economic analysis parameters.

6.2.1 Risk Analysis Regarding Financial Analysis

The risk analysis regarding the financial analysis considers the following sensitive variables:

- Investment costs;

- Operating and maintenance costs;
- Revenues.

The following scenarios have been studied.

Table 6-12 Variation in key variables for scenarios – financial elements

Scenarios	Variation in Key Variables		
	Investment Cost (I)	O&M Cost (O)	Revenues (R)
Scenario O2	-10.0%	-10.0%	10.0%
Scenario O1	-5.0%	-5.0%	5.0%
Base Case	0.0%	0.0%	0.0%
Scenario P1	5.0%	5.0%	-5.0%
Scenario P2	10.0%	10.0%	-10.0%

The probabilities assigned to these scenarios are presented in the following table.

Table 6-13 Probabilities for scenarios – financial elements

		Probabilities for Key Variables / Scenarios		
		Investment Cost (I)	O&M Cost (O)	Revenues (R)
1	Optimistic Scenario 2 (O2)	1.0%	3.0%	2.0%
2	Optimistic Scenario 1 (O1)	3.0%	5.0%	4.0%
3	Base Case (BC)	70.0%	70.0%	85.0%
4	Pessimistic Scenario (P1)	19.0%	15.0%	6.0%
5	Pessimistic Scenario (P2)	7.0%	7.0%	3.0%
6	Total	100.0%	100.0%	100.0%

It is to be noted that for the two cost variables appropriate estimates have been established, based on an analysis of current market prices, their historic trends and their most probable development in the future, thus reducing the risk of unexpected variations.

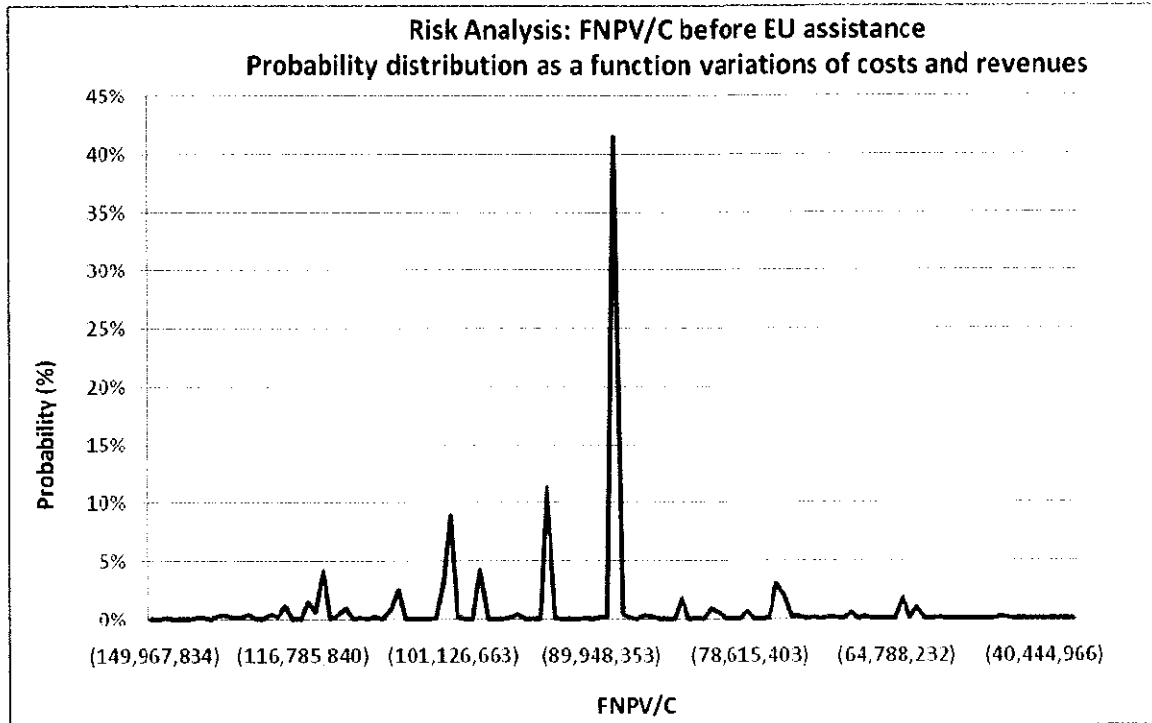
In the case of revenues, two components are considered:

- The specific water demand; the Consultant has taken into account the general trends observed in Romania as well as the experience made with other projects under similar conditions.
- The tariff development, considering the affordability constrains.

The distribution of probabilities for the different scenarios combinations are shown in detail in Annex 1-12.

The following figures show the probability and distribution of FNPV/C before community assistance as a function of the anticipated variations in investment cost, OM&A cost and revenues.

Figure 6-1 FNPV/C probability distribution



There is a probability of 41.6% that the values of the selected variables will actually achieve the base case value.

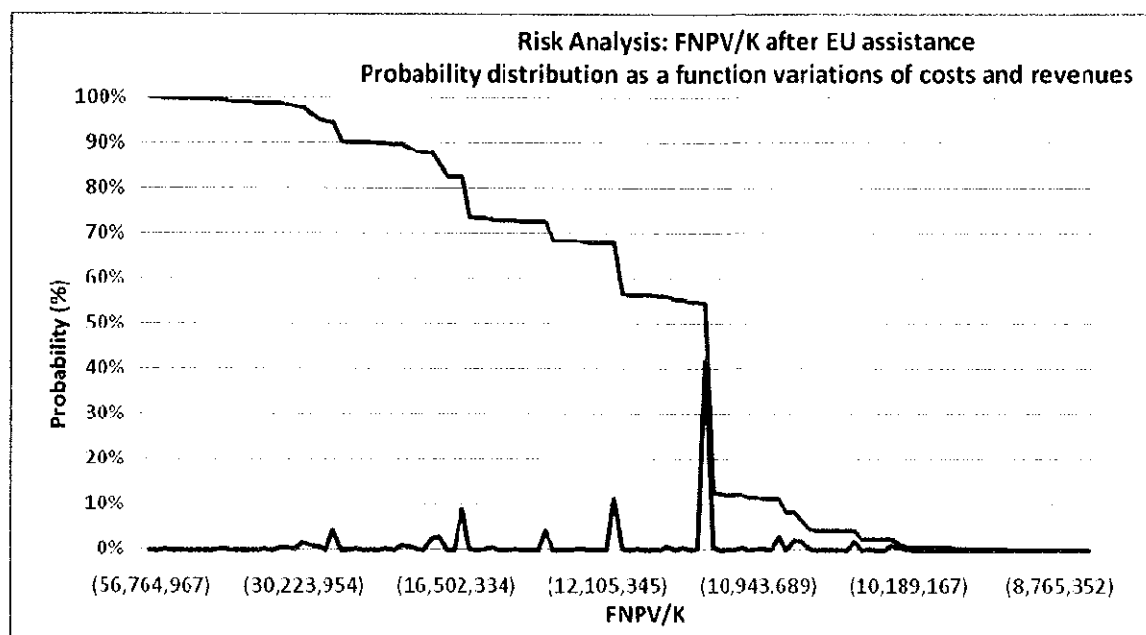
The probability of the FNPV/C falling below the base case scenario values is around 43.8%. On the other hand, the probability that the FNPV/C becomes larger than 0 (i.e. FRR/C > 5%) is 0%. The following table provides an overview of the distribution of probabilities for the FNPV/C.

Table 6-14 Distribution of probabilities for FNPV/C

	P (in %)
FNP/C < Base Case	43.4%
Base Case < FNPV/C < 0	56.6%
FNP/C > 0 (=FRR/C > 5%)	0.0%

The following figures show the probability and distribution of FNPV/K after community assistance as a function of the anticipated variations in investment cost, OM&A cost and revenues.

Figure 6-2 FNPV/K probability distribution



There is a probability of 41.6% that the values of the selected variables will actually achieve the base case value.

The probability of the FNPV/K falling below the base case scenario values is around 45.7%. On the other hand, the probability that the FNPV/K becomes larger than 0 (i.e. FRR/K > 5%) is 0%. The following table provides an overview of the distribution of probabilities for the FNPV/K.

Table 6-15 Distribution of probabilities for FNPV/K

	P in %
FNPV/K < Base Case	45.7%
Base Case < FNPV/K < 0	54.3%
FNPV/K > 0 (=FRR/K > 5%)	0.0%

The following table shows the standard deviation, the mean and the corresponding normal cumulative distribution for the FNPV/K based on the probability distribution shown above.

Table 6-16 Statistical parameters – financial analysis

	NPV/C	NPV/E
Base case	(88,623,923)	(11,448,837)
Mean	(92,802,207)	(14,382,344)
Standard deviation	26,740,886	12,429,387
Norm. cum. distribution	0.562	0.593
Std. norm. cum. distribution	0.713	0.724

6.2.2 Risk Analysis regarding Economic Evaluation

The risk analysis regarding the economic analysis considers the following sensitive variables:

- Investment costs;
- Operating and maintenance costs;
- Environmental benefits cumulating the sensitive environmental variables.

The following scenarios have been studied.

Table 6-17 Variation in key variables for scenarios – economic elements

Scenarios	Variation in Key Variables		
	Investment Cost (I)	O&M Cost (OM)	Environment. Benefits (E)
Optimistic (O)	-5.0%	-5.0%	5.0%
Base Case	0.0%	0.0%	0.0%
Pessimistic (P)	5.0%	5.0%	-5.0%

The probabilities assigned to these scenarios are presented in the following table:

Table 6-18 Variation in probabilities for scenarios – economic elements

		Probabilities for Key Variables /Scenarios		
		Investment Cost (I)	O&M Cost (OM)	Environment. Benefits (E)
1	Optimistic Scenario (O)	11.0%	3.0%	3.0%
2	Base Case (BC)	70.0%	90.0%	90.0%
3	Pessimistic Scenario (P)	19.0%	7.0%	7.0%
4	Total	100.0%	100.0%	100.0%

It is to be noted that for the two cost variables appropriate estimates have been established, based on current market prices, their historic trends and their most probable development in the future, thus reducing the risk of unexpected variations.

The distribution of probabilities for the different scenarios combinations are shown in Annex 1-11.

The following figures show the probability and distribution of ERR and ENPV as a function of the anticipated variations of investment cost, OM&A cost and environmental benefits.

Figure 6-3 ERR probability distribution

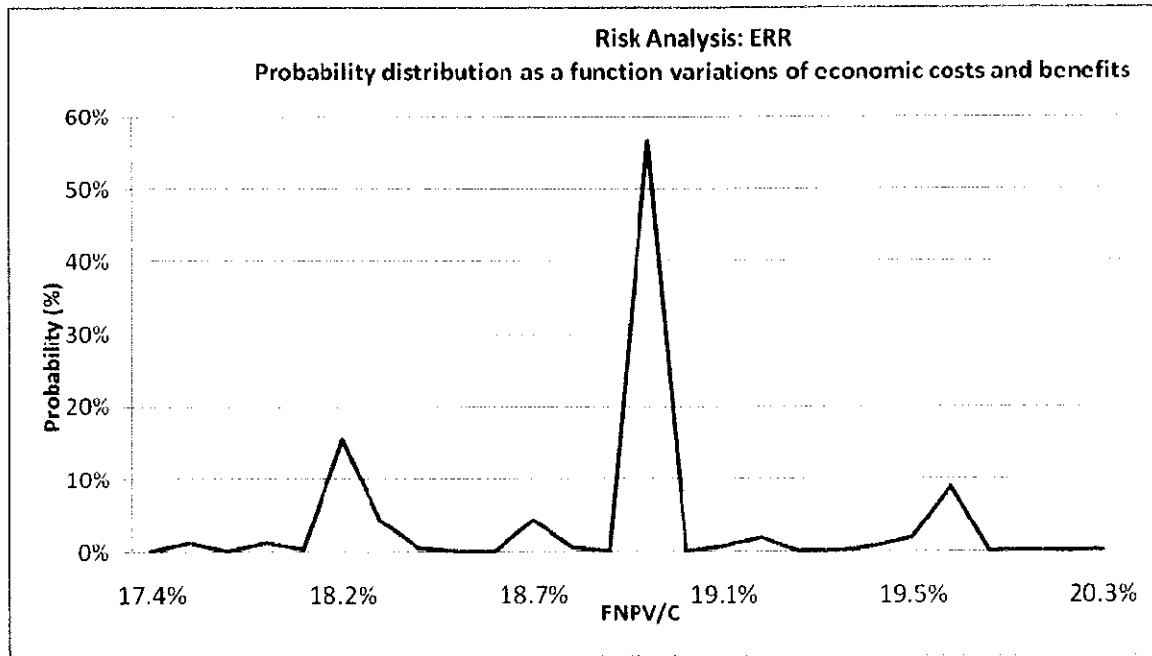
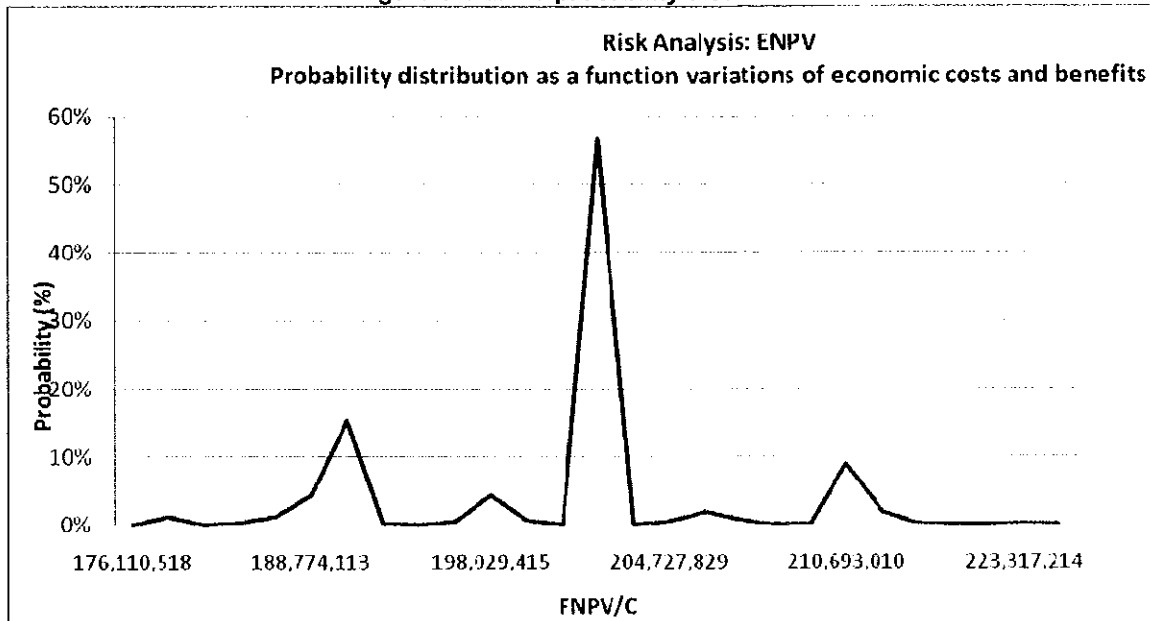


Figure 6-4 ENPV probability distribution



There is a probability of 57% that the values of the selected variables will actually achieve the base case value.

The probability that the ERR becomes lower than 5.5% (i.e. ENPV=0) is 0%. The following table provides an overview of the distribution of probabilities for the ERR.

Table 6-19 Distribution of probabilities for ERR

	P (in %)
5.5%<ERR	0,0%
5.5%<ERR<=Base Case	85,0%
Base Case<ERR	15,0%

The following table shows the standard deviation, the mean and the corresponding normal cumulative distribution for the ERR based on the probability distribution shown above.

Table 6-20 Statistical parameters – economic analysis

	ERR	ENPV
Base case	18.9%	201,398,317
Mean	18.9%	200,015,017
Standard deviation	0.82%	13,341,670
Norm. cum. distribution	0.544	0.541
Std. norm. cum. distribution	0.707	0.706

The risk analysis as presented in detail in Annex 1-11 indicates that there is no serious risk for a successful implementation and operation of the Project Measure.