

2011

**Energy Audit of Water and Wastewater
Utilities in 6 towns of Moldova**



**Final Report
Bill of Quantities**

Tehno Consulting & Design

December 2011

TABLE OF CONTENTS

TABLE OF CONTENTS.....	ii
1. INTRODUCTION.....	3
2. CAUSENI - Replacement of submersible pump in the well no. 2.....	4
3. FLORESTI - Replacement of submersible pump in the wells nos. 5,7,10,12.....	5
4. BALTI - Optimization of pumping scheme Decebal – Upper reservoirs – Baza.....	6
5. ORHEI - Modifications of Jeloboc Water Main and PS6.....	7
6. CAHUL - Hydraulic optimization of PS 3:.....	8
6.1 Spirin pumping zone.....	8
6.2 City pumping zone.....	9
7. CAUSENI - Water supply distribution network optimization.....	11
8. CAUSENI - Replacement of submersible pump in the well no. 1.....	13
9. FLORESTI - Replacement of pumps at PS 2.....	14
10. UNGHENI - Modification of pumping at PS 1.....	15
11. FLORESTI - Replacement of pump at PS 3.....	16
12. FLORESTI - Sewage pump for SPS Main.....	17
13. FLORESTI - Replacement of damaged disk aerators at WWTP.....	18
14. ORHEI – SCADA System for Orhei Water Utilities.....	19

1. INTRODUCTION

The IDA provided financing in the amount of 0.9 mln USD which will be used for investments to raise energy efficiency in 6 (six) water and wastewater utilities of Moldova. The EEP is expected to demonstrate and disseminate through energy audits and following investments the potential for increasing energy efficiency in municipal water and wastewater operations.

The program finances energy audits, hydraulic regime optimizations, and the selective rehabilitation of electromechanical equipment (equipment replacement) which are expected to increase energy efficiency in municipal water and wastewater operations in the cities Balti, Cahul, Orhei, Causeni, Floresti and Ungheni.

This part includes Bill of Quantities for the proposed ECMs included in the Energy Management Plan. The BoQ are prepared for the following investments:

Town	The proposed ECM
Balti	Optimization of existing water supply scheme from Soroca-Balti reservoirs
Causeni	Replacement of submersible pump in the well no. 2
Floresti	Replacement of submersible pump in the wells nos. 5,7,10,12
Balti	Optimization of pumping scheme Decebal – Upper reservoirs - Baza
Orhei	Modifications of Jeloboc Water Main and PS6
Cahul	Hydraulic optimization of PS 3: - Spirin pumping zone - city pumping zone
Causeni	Water supply distribution network optimization
Causeni	Replacement of submersible pump in the well no. 1
Floresti	Replacement of pumps at PS 2
Ungheni	Modification of pumping at PS 1
Orhei	Implementation of SCADA system
Floresti	Replacement of pump at PS 3
Floresti	Sewage pump for SPS Main
Floresti	Replacement of damaged disk aerators at WWTP

2. CAUSENI - Replacement of submersible pump in the well no. 2

N o.	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Submersible pump/motor set Q=95 m ³ /h H=36 m including submerged cable	pcs	1	3,600	3,600
2	Rising pipe 5"	m	50	50	2,500
3	Piping in the wellhead building DN150	set	1	300	300
4	Gate valve DN150	pcs	2	200	400
5	Check valve DN150	pcs	1	300	300
6	Water meter DN150	pcs	1	800	800
7	Pressure gauge mechanical	pcs	1	100	100
Electrical					
8	Pump control unit	pcs	1	1,200	1,200
9	Earthing and cable connection	set	1	600	600
Auxillary					
10	Installation	Lump sum			1,000
11	Tools	set	1	200	200
12	Consumables	set	1	140	140
13	Mandatory spare parts	set	1	800	800
14	O&M manuals	set	1	100	100
Grand total					12,040

3. FLORESTI - Replacement of submersible pump in the wells nos. 5,7,10,12

N o.	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Submersible pump/motor set Q=45 m ³ /h H=50 m including submerged cable	pcs	4	3,000	12,000
2	Rising pipe 4" 50 m each well	m	200	40	8,000
3	Piping in the wellhead building DN100	set	4	200	800
4	Gate valve DN100	pcs	8	150	1,200
5	Check valve DN100	pcs	4	200	800
6	Water meter DN100	pcs	4	600	2,400
7	Pressure gauge mechanical	pcs	4	100	400
Electrical					
8	Pump control unit	pcs	4	1,200	4,800
9	Earthing and cable connection	set	4	600	2,400
Auxillary					
10	Installation	Lump sum	4	1,000	4,000
11	Tools	set	1	200	200
12	Consumables	set	4	140	560
13	Mandatory spare parts	set	4	800	3,200
14	O&M manuals	set	1	100	100
Grand total					40,860

4. BALTI - Optimization of pumping scheme Decebal – Upper reservoirs – Baza

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Pumping booster set of 2 pumps Q=60 m ³ /h H=25 m	set	1	16,000	16,000
2	Piping and fittings	set	1	700	700
3	Gate valve DN100	pcs	2	150	300
4	Gate valve DN150	pcs	2	200	400
5	Check valve DN100	pcs	2	200	400
6	Pressure gauge mechanical	pcs	1	100	100
Electrical					
7	Pump control unit with frequency converter	pcs	1	5,000	5,000
8	Earthing and cables	set	1	500	500
Construction					
9	PS building	Lump sum			30,000
Pipeworks					
10	Construction of 2 km HDPE 160 mm pipeline	Lump sum			80,000
Auxillary					
11	Installation	Lump sum			1,500
12	Tools	set	1	200	200
13	Consumables	set	1	150	150
14	Mandatory spare parts	set	1	200	200
15	O&M manuals	set	1	100	100
Grand total EUR					135,550

5. ORHEI - Modifications of Jeloboc Water Main and PS6

No.	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Pump/motor set Q=110 m ³ /h H=80 m	pcs	2	12,000	24,000
2	Expansion joints DN125	pcs	2	200	400
3	Expansion joints DN100	pcs	2	160	320
4	Gate valve DN200	pcs	2	200	400
5	Gate valve DN250	pcs	2	400	800
6	Check valve DN200	pcs	2	200	400
7	Pipework and fittings	set	2	1,700	3,400
8	Pressure transducer	pcs	1	1,500	1,500
9	Pressure gauge mechanical	pcs	2	100	200
Electrical					
10	Pump control unit with softstarter	pcs	1	12,000	12,000
11	Power and signal cables	set	1	2,000	2,000
12	Earthing	set	1	500	500
Auxillary					
13	Installation	Lump sum			2,300
14	Tools	set	1	200	200
15	Consumables	set	1	140	140
16	Mandatory spare parts	set	1	500	500
17	O&M manuals	set	1	100	100
Pipeworks					
18	Construction of 1,620 m HDPE 355 mm pipeline	Lump sum			81,000
19	Construction of 340 m HDPE 225 mm pipeline	Lump sum			9,180
Grand total EUR					139,340

6. CAHUL - Hydraulic optimization of PS 3:

6.1 Spirin pumping zone

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Pumping booster set of 3 pumps Q=60 m ³ /h H=55 m	set	1	16,000	16,000
2	Piping and fittings	set	1	800	800
3	Gate valve DN100	pcs	3	150	450
4	Gate valve DN150	pcs	3	200	600
5	Check valve DN100	pcs	3	200	600
6	Pressure gauge mechanical	pcs	1	100	100
Electrical					
7	Control panel + Frequency converter (Included in item 1)	pcs			
8	Earthing and cable connection	set	1	1,000	1,000
Auxillary					
9	Installation	Lump sum			2,000
10	Tools	set	1	200	200
11	Consumables	set	1	150	150
12	Mandatory spare parts	set	1	200	200
13	O&M manuals	set	1	100	100
Sub-total EUR					22,200

Boosting sets for two 9 story blocks

No	Description	Unit	Qty	Unitprice, EUR	Totalprice, EUR
Mechanical					
1	Boosting pump set Q=3 m ³ /h H=20 m with hydrophore	pcs	2	320	640
2	Piping, fittings and connection to the block plumbing	set	2	500	1,000
3	Ball valve DN50	pcs	4	40	160
Electrical					
4	Electrical connection to the internal block grid, power meter	set	2	400	800
5	Earthing	set	2	100	200
Auxillary					
6	Installation	Lump sum	2	300	600
7	Mandatory spare parts	set	2	100	200
8	O&M manuals	set	1	100	100

Sub-total EUR	3,700
Grand total EUR	25,900

6.2 City pumping zone

Costache-Negruzzi

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Pumping booster set of 3 pumps Q=30 m ³ /h H=35 m	set	1	12,000	12,000
2	Piping and fittings	set	1	800	800
3	Gate valve DN100	pcs	2	150	300
4	Gate valve DN80	pcs	2	100	200
5	Check valve DN100	pcs	2	200	400
6	Pressure gauge mechanical	pcs	1	100	100
Electrical					
7	Control panel + Frequency converter (Included in item 1)				
8	Earthing and cable connection	set	1	1,000	1,000
Auxillary					
9	Installation	Lump sum			1,000
10	Tools	set	1	200	200
11	Consumables	set	1	150	150
12	Mandatory spare parts	set	1	200	200
13	O&M manuals	set	1	100	100
Grand total EUR					16,450

Stefan cel Mare

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Boosting pump set Q=3 m ³ /h H=20 m with hydrophore	pcs	11	320	3,520
2	Piping, fittings and connection to the block plumbing	set	11	500	5,500
3	Ball valve DN50	pcs	22	40	880
Electrical					
4	Electrical connection to the internal block grid, power meter	set	11	400	4,400
5	Earthing	set	11	100	1,100
Auxillary					
6	Installation	Lump sum	11	300	3,300

7	Mandatory spare parts	set	11	100	1,100
8	O&M manuals	set	1	100	100
Grand total EUR					19,900

7. CAUSENI - Water supply distribution network optimization

BPS Valul lui Traian

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Pumping booster set of 2 pumps Q=7 m ³ /h H=26 m each pump	pcs	1	1,500	1,500
2	Gate valve DN50	pcs	4	50	200
3	Check valve DN50	pcs	2	80	160
4	Water meter DN50	pcs	1	200	200
5	Pressure gauge mechanical	pcs	1	100	100
Electrical					
6	Pump control unit with frequency converter	pcs	1	1,000	1,000
7	Earthing and cables	set	1	400	400
Construction					
8	PS module housing	Lump sum			2,000
Auxillary					
9	Installation	Lump sum			800
10	Tools	set	1	100	100
11	Consumables	set	1	100	100
12	Mandatory spare parts	set	1	200	200
13	O&M manuals	set	1	100	100
Grand total EUR					6,860

BPS Micro

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Pumping booster set of 3 pumps Q=17 m ³ /h H=20 m each pump	pcs	1	4,000	4,000
2	Gate valve DN100	pcs	6	150	900
3	Check valve DN100	pcs	3	200	600
4	Water meter DN100	pcs	1	600	600
5	Pressure gauge mechanical	pcs	1	100	100
Electrical					
6	Pump control unit with frequency converter	pcs	1	2,000	2,000
7	Earthing and cables	set	1	500	500
Construction					

8	PS building	pcs	1	15,000	15,000
Pipeworks					
9	HDPE OD225 mm pipeline 1250 m length	Lump sum			33,000
Auxillary					
10	Installation	Lump sum			1,000
11	Tools	set	1	200	200
12	Consumables	set	1	140	140
13	Mandatory spare parts	set	1	500	500
14	O&M manuals	set	1	100	100
Grand total					58,640

8. CAUSENI - Replacement of submersible pump in the well no. 1

No.	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Submersible pump/motor set Q=25 m ³ /h H=43 m including submerged cable	pcs	1	2,000	2,000
2	Rising pipe 4"	m	50	40	2,000
3	Piping in the wellhead building DN100	set	1	200	200
4	Gate valve DN100	pcs	2	150	300
5	Check valve DN100	pcs	1	200	200
6	Water meter DN100	pcs	1	600	600
7	Pressure gauge mechanical	pcs	1	100	100
Electrical					
8	Pump control unit	pcs	1	1,000	1,000
9	Earthing and cable connection	set	1	500	500
Auxillary					
10	Installation	Lump sum			1,000
11	Tools	set	1	200	200
12	Consumables	set	1	140	140
13	Mandatory spare parts	set	1	500	500
14	O&M manuals	set	1	100	100
Grand total					8,840

9. FLORESTI - Replacement of pumps at PS 2

No.	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Pump/motor set Q=140 m ³ /h H=63 m	pcs	2	12,000	24,000
2	Expansion joints DN125	pcs	2	200	400
3	Expansion joints DN100	pcs	2	160	320
4	Gate valve DN200	pcs	2	200	400
5	Gate valve DN250	pcs	2	400	800
6	Check valve DN200	pcs	1	200	200
7	Pipework and fittings	set	2	1,700	3,400
8	Pressure transducer	pcs	1	1,500	1,500
9	Pressure gauge mechanical	pcs	2	100	200
Electrical					
10	Pump control unit with softstarter	pcs	1	12,000	12,000
11	Power and signal cables	set	1	2,000	2,000
12	Earthing	set	1	500	500
Auxillary					
13	Installation	Lump sum			2,300
14	Tools	set	1	200	450
15	Consumables	set	1	140	220
16	Mandatory spare parts	set	1	500	700
17	O&M manuals	set	1	100	100
Grand total EUR					49,490

10. UNGHENI - Modification of pumping at PS 1

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Horizontal dry installation pump Q=515 m ³ /h, H=19 m	pcs	1	18,500	18,500
2	Piping and fittings	set	1	1,000	1,000
3	Gate valve DN200	pcs	1	200	200
4	Gate valve DN250	pcs	1	400	400
5	Check valve DN250	pcs	1	500	500
Electrical					
6	Pump control	pcs	1	2,000	2,000
7	Cables	set	1	1,500	1,500
Auxillary					
8	Installation	Lump sum			2,000
9	Tools	set	1	200	200
10	Consumables	set	1	200	200
11	Mandatory spare parts	set	1	300	300
12	O&M manuals	set	1	100	100
Grand total EUR					26,900

11. FLORESTI - Replacement of pump at PS 3

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Pumping booster set of 2 pumps Q=60 m ³ /h H=25 m	pcs	2	8,000	16,000
2	Piping and fittings	set	1	700	700
3	Gate valve DN100	pcs	2	150	300
4	Gate valve DN150	pcs	2	200	400
5	Check valve DN100	pcs	2	200	400
6	Pressure gauge mechanical	pcs	1	100	100
Electrical					
7	Pump control unit with frequency converter	pcs	1	5,000	5,000
8	Earthing and cable connection	set	1	500	500
Auxillary					
9	Installation	Lump sum			1,500
10	Tools	set	1	200	200
11	Consumables	set	1	150	150
12	Mandatory spare parts	set	1	200	200
13	O&M manuals	set	1	100	100
Grand total EUR					25,550

12. FLORESTI - Sewage pump for SPS Main

No	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Mechanical					
1	Horizontal dry installation pump Q=180 m ³ /h, H=46 m	pcs	1	20,000	20,000
2	Piping and fittings	set	1	1,500	1,500
3	Gate valve DN200	pcs	1	200	200
4	Gate valve DN250	pcs	1	400	400
5	Check valve DN250	pcs	1	500	500
Electrical					
6	Pump control	pcs	1	3,000	3,000
7	Cables and float control	set	1	2,200	2,200
Auxillary					
8	Installation	Lump sum			2,000
9	Tools	set	1	200	200
10	Consumables	set	1	300	300
11	Mandatory spare parts	set	1	500	500
12	O&M manuals	set	1	100	100
Grand total EUR					30,900

13. FLORESTI - Replacement of damaged disk aerators at WWTP

No.	Description	Unit	Qty	Unit price, EUR	Total price, EUR
1	Supply of membrane disc aerators	pcs	500	35	17,500
Grand total EUR					17,500

14. ORHEI – SCADA System for Orhei Water Utilities

No.	Description	Unit	Qty	Unit price, EUR	Total price, EUR
Sensors and meters					
1	Electricity Power Meters	set	12	500	5,500
2	Electromagnetic flow Meters				
2.1	DN250 Qn=250m3/h	set	4	4,500	18,000
2.2	DN150 Qn=150m3/h	set	4	2,700	10,800
2.3	DN100 Qn=100m3/h	set	4	2,300	9,200
3	Ultrasonic flow Meters				
3.1	DN80 Qn=40m3/h	set	2	1,800	3,600
3.2	DN65 Qn=25m3/h	set	8	1,500	20,000
3.3	DN50 Qn=15m3/h	set	2	1,200	2,400
4	Pressure gauge	set	38	250	9 500
5	Gas Meters	set	4	100	400
SUB-TOTAL:					79,400
Control and data acquisition equipment					
6	Controller (with GPRS)	set	13	250	3,250
7	Module discrete Input (8DI)	set	13	150	1,950
8	Module discrete Output (8DO)	set	13	150	1,950
9	Module analog input (8AI)	set	13	200	2,600
10	Accessories	set	13	150	1,950
11	Control equipment configuration Software	set	13	500	6,500
SUB-TOTAL:					18,200
Central Server (dispatch office equipment)					
12	Server PC compatible	set	1	2,000	2,000
13	SCADA software	set	1	12,000	12,000
SUB-TOTAL:					14,000
14	Installation and start-up	Lump sum			6,000
Grand total EUR					117,600