

8.3 Disposal Expenditures 1996 - 2010 including the Project Costs

Estimated disposal expenditures for the period 1996 - 2010 are shown in the following table.

**Table 8.3-1 Estimated Disposal Expenditures 1996 - 2010
(Including Contingency and Value Added Tax)
Unit: US dollar in 1995 price**

Items	Price
A. Pre Project Expenditures	
A1. Immediate improvement of the Glina site	52,081
A2. Purchase of bulldozers of Glina site	105,000
A3. Operation and maintenance of the Glina site 1996 - 1998 before the 3 sites open	662,129
Total of Item A	819,210
B. Project Expenditures Covered by the Feasibility Study	
B1. Engineering services for B3 & B4	1,807,170
B2. Technical assistance	86,140
B3. Construction work	19,919,580
B4. Equipment procurement	1,270,860
B5. Total of Project Investment (B1+B2+ B3+ B4)	23,083,750
B6. Operation & maintenance of landfill sites (1999 - Mid 2007)	3,003,555
Total of Item B	26,087,305
C. Post Project Expenditures	
C1. Additional civil works for the 3 sites (Construction of embankments)	1,939,920
C2. Construction of other landfill sites in Afumati, Berceni & Jilava(2004-2006) including engineering costs-	16,702,600
C3. Operation and maintenance of Afumati Berceni & Jilava sites (Mid 2006 - 2010)	2,253,231
Total of Item C	20,895,751
Grand Total (A + B + C)	47,802,266

Annual disposal expenditures are shown in Table 8.3-2

Table 8.3-2-a Annual Disposal Expenditures
(Investments include value added tax)

Unit: US dollar in 1995 price

Year	Projects Costs (See Table 8.2.4 for details) (a)	Pre Project & Post Project Expenditure (See Table 8.3-2-b for details) (b)	Total (a + b) = (c)
1996	7,080	302,804	309,884
1997	1,081,456	254,996	1,336,452
1998	16,343,635	261,410	16,605,045
1999	6,317,126	0	6,317,126
2000	409,260	716,260	1,125,520
2001	414,700	607,700	1,022,400
2002	420,295	0	420,295
2003	426,044	0	426,044
2004	431,956	4,422,310	4,854,266
2005	438,033	8,753,506	9,191,539
2006	137,546	4,464,810	4,602,356
2007	0	462,980	462,980
2008	0	475,944	475,944
2009	0	489,271	489,271
2010	0	502,970	502,970
Total	26,087,305	21,714,961	47,802,266

Table 8.3-2-b Annual Disposal Expenditures Details for Pre Project and Post Project Period (Investments include value added tax)
 Unit: US dollar in 1995 price

Year	Pre-Project Expenditures				Post Project Expenditures				Grand Total of Items A4 & C4
	Im-mediate improve-ment (A1)	Bulldozer purchase (A2)	Site operation & mainte-nance (A3)	Sub total of Item A (A4)	Additional civil woks (C1)	Other 3 sites construction (C2)	Operation & Mainte-nance (C3)	Sub-total of Item C (C4)	
1996	52,081	35,000	215,723	302,804	0	0	0	0	302,804
1997	0	35,000	219,996	254,996	0	0	0	0	254,996
1998	0	35,000	226,410	261,410	0	0	0	0	261,410
1999	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	716,260	0	0	716,260	716,260
2001	0	0	0	0	607,700	0	0	607,700	607,700
2002	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	615,960	3,806,350	0	4,422,310	4,422,310
2005	0	0	0	0	0	8,753,506	0	8,753,506	8,753,506
2006	0	0	0	0	0	4,142,744	322,066	4,464,810	4,464,810
2007	0	0	0	0	0	0	462,980	462,980	462,980
2008	0	0	0	0	0	0	475,944	475,944	475,944
2009	0	0	0	0	0	0	489,271	489,271	489,271
2010	0	0	0	0	0	0	502,970	502,970	502,970
Total	52,081	105,000	662,129	819,210	1,939,920	16,702,600	2,253,231	20,895,751	21,714,961

Chapter 9

Institutional Arrangements

CHAPTER 9 INSTITUTIONAL ARRANGEMENTS

9.1 Municipal Waste Disposal

9.1.1 Introduction and Background

The Bucharest Municipality (MB) is institutionally and financially restructuring its municipal solid waste services for which it is ultimately responsible.

Under the proposed restructuring, the Municipality is required to transform RASUB under GoR Ordinance No 69, 1994 and Government Decision 135, 1994, and intends to split RASUB's disposal and collection activities. MB intends that disposal will be subsumed as an Administration under the Municipality and that RASUB's collection services will be provided by a new commercial enterprise called SALUB.

However, until this happens the Municipality intends to contract with the current service providers RASUB (collection and disposal) and RGR (collection), which will no longer collect tariffs but instead will be remunerated under contracts. RASUB will continue to provide collection, disposal services and also street sweeping, which will be transferred to RASUB from the ADPs.

9.1.2 The Institutional Options for Disposal

What is the most appropriate way of providing disposal services? The disposal service can be provided in 6 ways. These options are:

1. a Municipal Waste Disposal Administration (MWDA), subsumed under the Municipality;
2. SALUB (a commercial enterprise);
3. a joint venture with a foreign company (FJVC);
4. contracting out;
5. concession; or
6. franchise.

Option 2 assumes that RASUB is transformed into SALUB. If it is not transformed then option 2 would be RASUB.

By contracting out is meant the contracting of the operation and maintenance of the disposal service, ie the operation of the landfill site, to a private sector contractor. The contractor has no capital investment responsibilities except for plant and equipment. MB continues to collect revenues from the waste tax and the contractor is remunerated under a contract in two ways:

Firstly, according to physical parameters such as quantity of waste disposed, the number of customers, or a combination of them; or

Secondly, a lump sum based on full costings, with a price formula to absorb uncontrollable cost increases for, e.g. utilities and collective pay increases.

It is usual for the contractor to levy and collect tipping fees from generators of non municipal waste, eg demolition for waste. Under this arrangement the financial risks and the administrative costs of collection are passed to the contractor. The contract price takes account of the tipping revenues which the contractor earns.

By concession is meant that MB not only contracts out operation and maintenance but also the financing and construction of the landfill site to the private sector. The "concessionaire" finances, constructs, or sub-contracts the construction of, and operates at its own risk, the landfill site. The concession would cover the lifetime of the site and also after care. At the end of the concession, the facilities and the site would be returned to MB.

The Concessionaire also levies and collects the tariffs, and bears the revenue collection risk. The responsibility for setting the tariff could remain with MB after negotiation with the Provider and is set in the contract.

By franchise is meant the awarding of monopoly rights to provide the disposal service to a designated area, eg all or part of Bucharest. The Franchiser assumes full operational and financial responsibility for the service. Its responsibilities include and go beyond those of the Concessionaire as it freely sets its own tariffs and has title to the site and fixed assets.

MB's role is reduced to exercising control through the franchise agreement which might include some form of tariff regulation. Site land assets and service responsibility are not usually transferred back to government.

The overriding objective for MB is to ensure that waste is safely disposed of so that public health and the environment are protected. This is the key consideration for selecting the appropriate institutional option. Secondary factors to consider are the feasibility of implementing the institutional option, and its efficiency and effectiveness. The preferred option should ensure that the service operates productively and economically, and that investments are made at least cost.

Based on these criteria, we recommend that MB form a joint venture with a foreign company. The joint venture company would initially manage Glina site and later Balaceanca and Cretuleasca sites. Ownership of the landfill sites and facilities would remain with the Municipality or the relevant beneficiary.

However, as an option the foreign partner might be offered the right of purchase or lease of the site for commercial development after its closure. This might be a good way to attract a foreign partner.

If a foreign partner cannot be found, then we recommend that MB set up a Municipal Waste Disposal Administration (MWDA), subsumed under it, which would manage the disposal services at Glina site. We also recommend that, Balaceanca and Cretuleasca sites are independently managed under operational contracts, or by a foreign joint venture company, since it is assumed that the Municipality will have sufficient contracting capabilities by the time these sites become operational. Similarly, Glina could be eventually be contracted out rather than managed under the MWDA.

We also recommend that the maintenance service is contracted out by the FJVC or the MWDA.

These options are recommended because:

Firstly, at the present time, disposal is too risky to contract out to the private sector (options 4 to 6) because the private sector has little experience of managing landfill sites and is largely motivated by market forces, ie it has a direct incentive to reduce costs in order to maximise profits. These motives are not necessarily compatible with public or environmental values for which local government is responsible.

Furthermore, MB is not yet able to effectively manage and control a private sector contractor. Private sector provision of disposal might become viable when the Municipality has:

1. gained considerable knowledge and understanding of how to manage the disposal service; and
2. a strong contract management capability.

At the present time MB has neither of these and, therefore, the private sector options are rejected on the grounds of the possible risk to public health and environmental protection. When the above conditions are met, it would make sense for MB to gain the benefits of private sector involvement, ie improved efficiency, cost effective investment, etc.

Secondly, a joint venture with a foreign company is a secure way of benefiting from private sector involvement and it gives MB:

1. access to foreign expertise, experience and efficiency which local contractors lack at the present time; and
2. more involvement and control because it co-owns the joint venture company.

Likewise, the MWDA option is less risky than contracting out, since MB is directly responsible for managing the service. However, this option lacks the benefits of efficiency and expertise which a foreign company would provide.

Thirdly, the SALUB option, is rejected for a number of reasons:

1. the new SALUB would inherit a workforce, operational practices and an organisation structure similar to RASUB's, which has been unable to properly manage Glina landfill site;
2. it is MB's intention to contract out more of Bucharest's collection and haulage services and therefore the future of SALUB is uncertain; and
3. one of the objectives of setting up SALUB is to eventually privatise it.

Organisational arrangements for both options are now considered.

9.1.2 Organisational Arrangements

1) Foreign Joint Venture Company

The foreign joint venture company (FJVC) would be set up by a Local Government Decision and should be established with the following institutional arrangements.

The Municipality would agree a performance contract with the FJVC for operating the disposal services. The performance contract would be monitored by a waste administration set up within the Municipality specifically for this purpose.

The organisational structure of the company is given in Fig. 9.1-1 below. This is indicative only and may be subject to amendment.

The FJVC has a Board of Directors with representation from both the Municipality and the foreign partner. It is headed by a director who reports to the Board.

The structure includes a technical section, a small personnel section and financial accounting and purchasing sections. Operations are organised by site teams. Team composition is described in section 3) below.

The technical section would have responsibility for operational planning, environmental monitoring, equipment maintenance, preparing an equipment purchase plan and data management and reporting.

The purchasing section would be responsible for making all purchases, as well as, eg contracting out the equipment maintenance. The section head will need to have efficient purchasing authority delegated to him to enable him to purchase on a timely basis.

2) Organisational Arrangements for Municipal Waste Disposal

The MWDA is set up by the Local Government Decision which transforms RASUB into the commercial enterprise SALUB. The following organisational arrangements should be established:

a. Organisational structure

The MWDA is structured in the same way as the FJVC. Fig. 9.1-2 below gives the proposed organisation structure for the MWDA. This is an indicative structure and may be subject to amendment.

The MWDA is headed by a director who reports to the Vice Mayor who is responsible for this activity and the Public Services Department.

Operations are organised by site teams. The organisation structure only includes Glina since Balaceanca and Cretuleasca sites are to be independently contracted out.

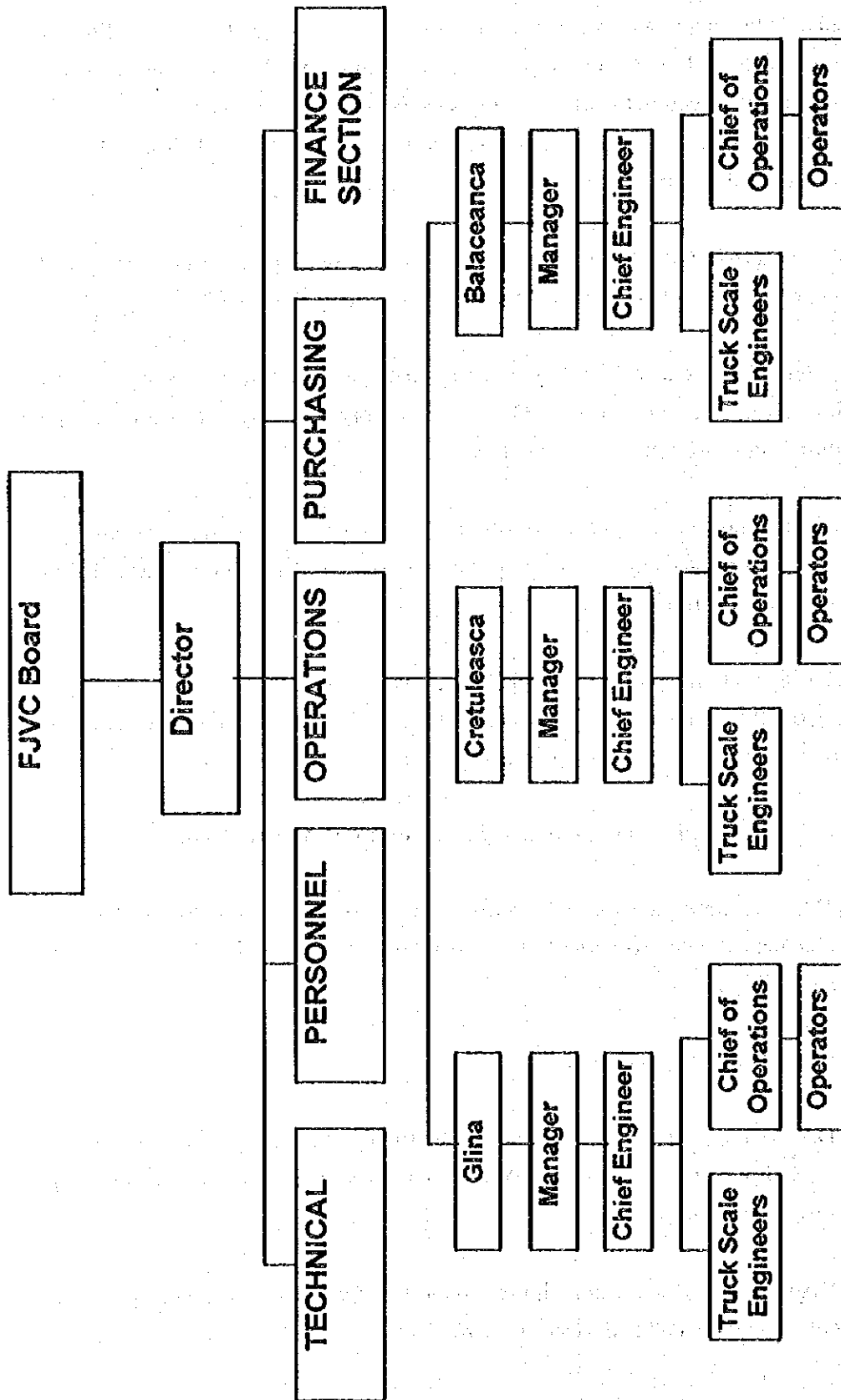
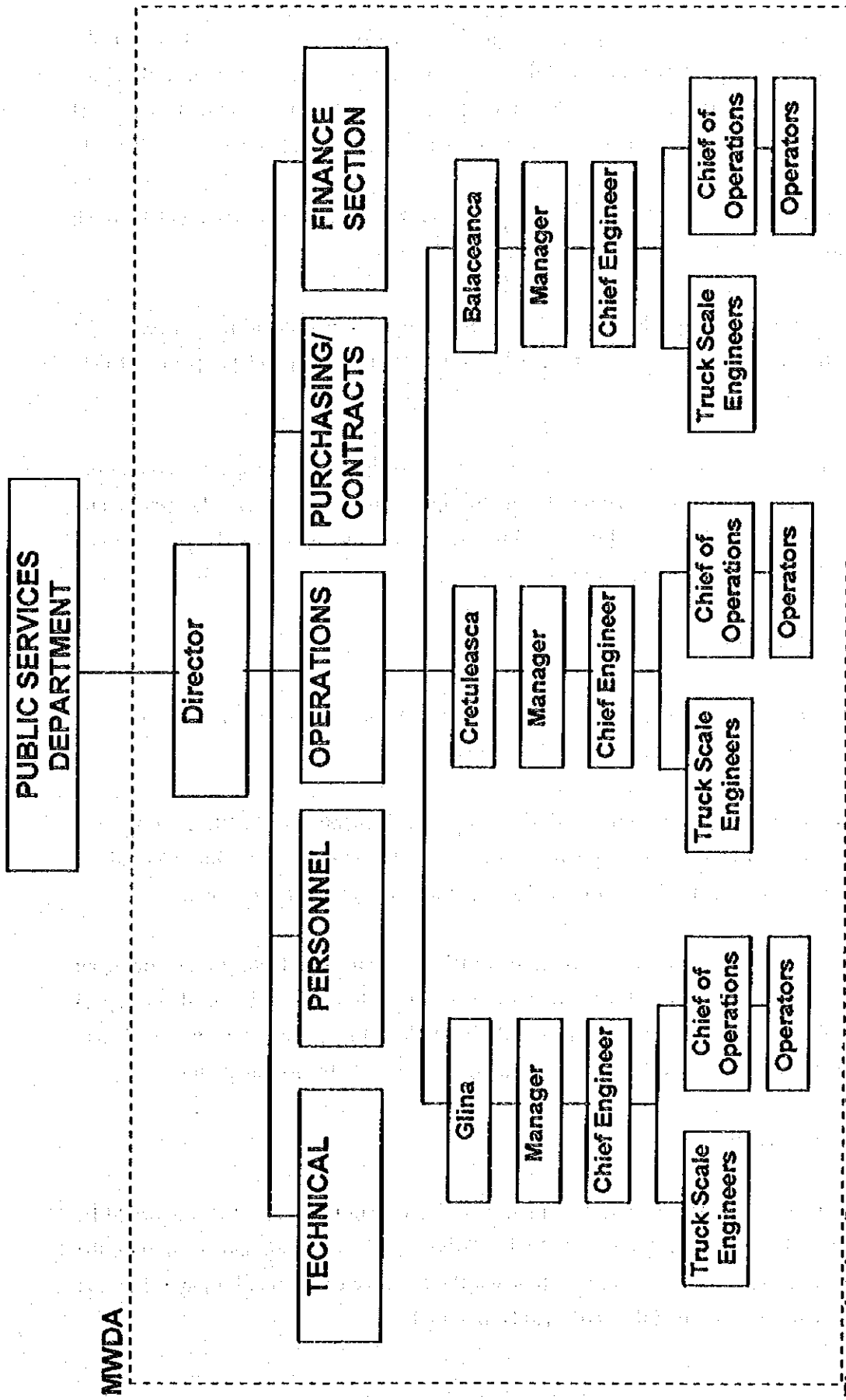


Figure 9.1-1 Proposed Organisational Structure of the Foreign Joint Venture Company



MWDA

Figure 9.1-2 Proposed Organisational Structure of the Municipal Waste Disposal Administration (MWDA)

Contracts will be monitored by the "Purchasing and Contracts" section shown in the chart. Team composition for each of the sites is described in section 3) below. Like the FJVC, the MWDA's organisation also includes a technical section, a small personnel section, a financial accounting function and a purchasing section. These sections are required since MB's central departments, eg personnel and economics, have insufficient capacity to support the MWDA. Similarly, MB's other 9 Administrations which are all subsumed under the PSD, have their own support sections.

The technical section would have responsibility for operational planning, environmental monitoring, equipment maintenance, preparing an equipment purchase plan and data management and reporting.

The purchasing section would be responsible for making all purchases, contracting out the equipment maintenance and monitoring the operational contracts for Balaceanca and Cretuleasca. The section head will need to have purchasing authority delegated to him to enable him to purchase on a timely basis.

b. Financing

The MWDA must be properly financed. In particular the Municipality needs to set a policy on how disposal investment will be financed.

Under the Municipality's proposed financing arrangements the MWDA's operating costs will be recovered through the waste tax. Investment expenditure could be financed from either the Municipal budget, the State budget or the waste tax.

Any investment from the waste tax needs to take account of budgetary regulations, eg the need to create an investment fund from the tax before it can be used for capital expenditure. These financing issues will be dealt with in the waste tax Technical Assistance which the World Bank is intending to provide to the Municipality.

c. Staffing

Staffing up the MWDA may be difficult because salaries in the administration would be considerably lower than those in RASUB. A bonus scheme or an agreement with the Ministry of Labour and Social Protection and the Ministry of Finance to pay salaries at the same level as those in RASUB, will be required.

3) Operational Organisation at the Landfill Sites

Table 9.1-1 below shows the detailed staffing and composition of the teams of each landfill site. These are appropriate for both the MWDA and the FJVC option.

Table 9.1-1 Site Team Composition

Site	Staffing	Total numbers of site staff
Glina	-Site Manager (1) -Secretary (1) -Chief of engineering section (1) -Truck scale engineer (2) -Chief operator (1) -Operator (9)	15
Cretuleasca	-Site Manager (1) -Secretary (1) -Chief of engineering section (1) -Truck scale engineer (2) -Chief operator (1) -Operator (7)	13
Balaceanca	-Site Manager (1) -Secretary (1) -Chief of engineering section (1) -Truck scale engineer (2) -Chief operator (1) -Operator (14)	20

Note

1. Number of operator is included one shift person.
2. Security guard should be contracted out.

The defined responsibilities of the landfill site team are:

Site Manager: all the responsibility of handling the site, and contact and reporting to the MWDA's Director.

Secretary: controls and regulates the schedule of Director, registers income and outlay of daily management;

Chief of engineering section: responsible for all engineering matters, planning and conduct suitable landfill operation method;

Truck scale engineer: operates truck scale to measure the waste quantity and quality; and directs trucks to designated landfill area;

Chief operator: controls daily operator's work and directs trucks to the designated landfill area in site; and

Operator: landfills the waste.

9.2 The Project Management Unit

The Municipality will be the project's executing agency and it needs to establish an effective project management capability to ensure that the project is properly executed. Therefore, it is recommended that a Project Management Unit (PMU) is established within MB which is responsible for project management and implementation. The PMU is subsumed under the Public Services Department and the Economic Department in the limits of the authority given by the General Mayor. The PMU's responsibilities and activities would include:

1. overseeing the whole process of project execution from design to project completion;
2. the PMU is the main point of contact for all aspects of project execution between the Municipality and the:
 - International Lending Agency;
 - Romanian Ministry of Finance;
 - International Engineering Services Consultants;
 - Construction Supervisor;
 - Construction Contractors; and
 - other ministries, eg MLPAT and MoE.

It is important to establish a responsible and accountable point of contact at MB to facilitate communication and the resolution of any problems. Suitable reporting mechanisms should be established between the PMU and the International Lending Agency, the Engineering Services Consultants and the Construction Supervisor;

3. the PMU would not be responsible for tendering and contracting the engineering services and the site construction contracts. This would be jointly carried out, under the usual arrangements, by the Legal, Economics, Technical and Public Service Departments. The tendering committee would be appointed in the usual way to evaluate and select tenders.

The Engineering Services Consultant will assist the Municipality in the preparation of contract documentation for the site construction and in the tendering of that contract.

However, the PMU should participate, but without decision responsibility, in the tendering and contract award process, eg in the prequalification, representation on the tendering committee and post tender negotiation. This will be a good opportunity for the PMU staff to be trained in contracting.

4. the PMU monitors the engineering and site construction contracts post award, for compliance with contract terms and conditions;
5. requesting disbursements of the loan. All disbursements will be approved by the Economics Department and the Ministry of Finance;
6. provide logistical support for any technical assistance which is part of the project.;
7. collecting and maintaining all records and information relevant to the execution of the project; and
8. preparation of a project management plan.

The PMU's responsibilities should be included in the loan agreement or possibly under a procurement agreement between the International Lending Agency and the Romanian side. Early establishment of the PMU is necessary.

The PMU should also be provided with one international consultant who is engaged to provide short term technical assistance (TA) to set up the PMU. This would cover:

1. training in project management including the International Lending Agency's project management method;
2. familiarisation with International Lending Agency procurement rules for contracting;
3. set up reporting lines with Ministries;
4. assist in the preparation of the project management plan.

The PMU would be headed by a senior executive from the Municipality and be supported by one Municipal employee and by one local consultant over the 38 months of the project.

Chapter 10

Engineering Services and Technical Assistance Needed

CHAPTER 10 ENGINEERING SERVICES AND TECHNICAL ASSISTANCE NEEDED

10.1 Engineering Services Needed

10.1.1 Type and Description of Engineering Services Needed

The following engineering services are required:

- a. Topographic surveys,
- b. Preparation of tender documents including detail design,
- c. Assistance for tender evaluation,
- d. Construction supervision,
- e. Preparation of operation manuals,
- f. Training of municipal personnel for management and operation of landfill,
- g. Diffusion of landfill technology to other localities.

The detail contents of services is described bellow.

a. Topographic Survey

Topographic surveys are necessary for detail design. The use of an international consulting firm is advisable because Romanian consultants have almost no experience in the sanitary landfill. It is also advisable that a selected international consulting firm will use Romanian consultants in view of technology transfer and cost saving.

(1) Glina site

All areas (120 ha, Scale = 1:1,000) covering 1) the existing Glina site, 2) the surrounding area within 50m from the site boundary, 3) an area from the northern new access road to the connection point of the existing road, and 4) a part of road from the existing control office to the Glina sewage treatment facilities. The Glina site will change its landscape from time to time by daily landfill operation.

(2) Balaccanca

From the new access road to the joint point of the sewage treatment facility (Length = 200 m, width = 5 m, Scale = 1:1,000).

(3) Cretulcasca

From the new access road to the joint point of the sewage pipeline (Length = 3,500 m, width = 8 m, Scale = 1:1,000).

b. Preparation of tender documents including detail design

Tender documents include conditions of contract, detail drawings, design calculation for structure, quantity calculation; technical specifications, and bill of quantity. Detail contents of each items are described bellow.

Conditions of contract	Both general and special conditions will be prepared.
Detail drawings	Plan drawings (including ultimate land use and leachte pipeline), Cross sections (100 m pitch of the site and leachte pipeline), structure drawings of each facility (include electric and water supply system for control office) etc..
Design calculation for structure	Foundation and building strength of control office, stability of embankment, diameter of collection pipe and storage pond capacity for leachate, pump and water tank capacity of pump capacity, diameter of leachate pipeline, foundation of truck scale, pavement structure of road, cross section of rainwater drainage ditch and etc..
Quantity calculation	Site area, site capacity, area of pavement, distance of pipeline, embankment material, excavation soil, other construction material, electricity and water demand, heavy equipment and etc..
Technical specifications	Quality of construction materials, construction methods, quality control and management method, time for completion, standard and particular specification, defect liability and etc..

Table 10.1-1 Number of Engineers Required

Type of Services	International Engineer			Local Engineer		
	Number	Period (Month)	Man month	Number	Period (Month)	Man month
a. Topographic Survey	(1)	(1.0)	(1.0)	(1)	(1.0)	(1.0)
b. Detail Design	4	6	17.5	7	6	30
c. Tender Evaluation	1	1	1	3	1	3
d. Supervision	3	18	24.0	7	18	105
e. Manual	(2)	(3)	(6)	(3)	(2)	(6)
f. Training	(1)	(3)	(3)	0	0	0
g. Diffusion	(2)	(3)	(6)	(3)	(3)	(9)
Total			42.5			138

* () is included other services period.

Engineering Services schedule include engineers assignment is shown in Table 10.1-2.

10.1.3 Cost of Engineering Services

Costs of Engineering Services are estimated in Table 10.1-3, 10.1-4 and 10.1-5.

The total engineering service cost is estimated to be \$1.8 million, of which \$0.7 million is for detail design, and topographic survey; and \$1.1 million is for supervision, tender evaluation, manual preparation, training and technology that will be provided during construction period. The ratios of the services costs to the construction cost including equipment cost are 3.2% and 5.3% respectively. The total is 8.5%.

Table 10.1-2 Engineering Services Schedule

Item	Year, Month	1st Year			2nd Year			3rd Year					
		3	6	9	12	15	18	21	24	27	30	33	36
Implementation Schedule													
		Announce Prequalification Bidding			Engineering Services (Detail Design) (Tender Evaluation)			(Surparvision)					
		Announce Prequalification Bidding			Announce Prequalification Bidding			Construction					
International Consultant	Project Manager (1st Class) 2nd Class Engineer 3rd Class Engineer(A) 3rd Class Engineer(B)	1.0 6.0 6.0 4.0	0.5 6.0 6.0 4.0	0.5 1.0 2.5 4.0	0.5 1.0 2.5 4.0	0.5 3.0 2.5 4.0	0.5 2.0 3.0 4.0	0.5 2.0 3.0 4.0	0.5 6.0 6.0 4.0	0.5 6.0 6.0 4.0	0.5 6.0 6.0 4.0	0.5 6.0 6.0 4.0	
Local Consultant	1st Class Engineer 2nd Class Engineer (A) 2nd Class Engineer (B) 2nd Class Engineer (C) 3rd Class Engineer (A) 3rd Class Engineer (B) 3rd Class Engineer (C)	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	1.0 6.0 6.0 4.0 4.0 4.0 4.0	

Table 10.1-3 Approximate Total Cost of Engineering Services

Item	Cost (\$)	% to Construction Cost
Detail Design (See Table 10.1-4 for details)	686,170	3.2 %
Supervision (See Table 10.1-5 for details)	1,121,000	5.3 %
Total	1,807,170	8.5 %

Note : Total Construction Cost is \$21,190,440 including equipment procurement cost.

**Table 10.1-4 Cost of Engineering Services
(Topography Survey & Detail Design)**

	Item	Rank	Unit Cost (\$/Month)	Quantity (Month)	Cost (\$)
Inter-national	Engineering Cost	1st	30,000	1.5	45,000
		2nd	25,000	6.0	150,000
		3rd	20,000	10.0	200,000
	Daily allowance		3,000	17.5	52,500
	Travel Expenses		5,000	5 times	25,000
	Car		20,000	1 unit	20,000
	Subtotal				504,500
Local	Engineering Cost	1st	2,000	2.0	4,000
		2nd	1,500	16.0	24,000
		3rd	1,000	12.0	12,000
	Secretary		500	6.0	3,000
	Operator		500	12.0	6,000
	Technician		500	18.0	9,000
	Driver		500	18.0	9,000
	Car		5,000	2.0	10,000
Subtotal				77,000	
Total				581,500	
VAT			Total x 18%	104,670	
Grand Total				686,170	

Note:

- 1st class consultants have consulting experience of 20 years or more.
- 2nd class consultants have consulting experience of 13 years or more.
- 3rd class consultants have consulting experience of 8 years or more.

**Table 10.1-5 Approximate Cost of Engineering Services
(Tender Evaluation, Supervision Manual
Preparation, Training & Technology
Diffusion)**

	Item	Rank	Unit Cost (\$/Month)	Quantity (Month)	Cost (\$)
Inter- national	Engineering Cost	1st	30,000	1.5	45,000
		2nd	25,000	12.0	300,000
		3rd	20,000	11.5	230,000
	Daily allowance	-	3,000	25.0	75,000
	Travel Expenses	-	5,000	9 times	45,000
	Office	-	2,000	18 month	36,000
	Subtotal	-			731,000
	Training & Diffusing	-	-	Subtotal x about 5%	36,000
Total				767,000	
Local	Engineering Cost	1st	2,000	7.0	14,000
		2nd	1,500	49.0	73,500
		3rd	1,000	49.0	49,000
	Secretary	-	500	20.0	10,000
	Driver	-	500	40.0	20,000
	Subtotal	-			166,500
	Training & Diffusing	-	-	Subtotal x about 10%	16,500
	Total				183,000
Total				950,000	
VAT			Total x 18%	171,000	
Grand Total				1,121,000	

10.2 Technical Assistance Needed

Technical assistance (TA) is required for the establishment of both the new waste disposal organisation and the Project Management Unit.

10.2.1 Institutional Strengthening of the Waste Disposal Organisation

1) Description of TA Needed

It is recommended that MB form a joint venture with a foreign company (FJVC) to manage disposal services, or, if a foreign partner cannot be found, that, alternatively, MB set up a Municipal Waste Disposal Administration (MWDA).

In the case of the FJVC it is assumed that the foreign partner would assist in the establishment of the FJVC's organisation.

However, in the case of the MWDA, MB lacks organisation and management expertise to establish an efficient and effective disposal organisation.

Therefore, it is recommended that the MWDA, receive TA for institutional set up and strengthening. The disposal organisation is not a complex organisation and is relatively small. Therefore, it is intended that the scope of the TA is kept simple but effective for its needs.

It is recommended that the disposal organisation receive the following TA to assist it to implement:

A Planning Capability: This would include the establishment of objectives, policies and performance targets, and assistance to prepare an annual operational plan, including a financial plan.

Financial Management and Financial Systems: The accounting requirement is not complicated. It comprises setting up a simple computerised accounting system, including hardware and a software package, and a budgetary planning and control system under which recurrent and capital budgets are established.

The consultant would also recommend the appropriate organisation of the accounting functions. A one week training course for managers and supervisors in basic financial skills would also be provided.

Simple Management Information Systems (MIS): The focus of the MIS would be on the management of the disposal operation. The MIS would be a simple system providing information and performance indicators to managers/supervisors on outputs, productivity, and service and environmental quality. Another focus of the MIS is to provide information for monitoring the performance contract with MB.

Good MIS enables managers to improve their decision making and to carry out their responsibilities more efficiently.

Objective Setting and Performance Measurement: A simple system of assessing managers performance against agreed performance targets and objectives would be set up. The consultant would assist in the selection of targets and objectives and the design of the appraisal framework.

2) Consultant Inputs, Costs and Scheduling

The TA would be provided by two international consultants. A Financial Consultant would provide the TA for financial management and financial systems, including the financial training course. An Institutional Consultant would provide the TA for the planning capability, the MIS and objective setting and performance measurement.

Table 10.2-1 below shows indicative consultant inputs and costs, and computer software and hardware costs.

Table 10.2-1 Consultant Inputs and Costs

	Man Months	Cost US\$
Financial Consultant	1.75months	70,000
Institutional Consultant	1.5months	60,000
Computer hardware and software	-	10,000
Total	3.25months	140,000

Note: costs include travel and daily allowances

The specification for computerisation of the accounting function is for two networked computers and an accounting and budgeting software package. It must be stressed that these cost estimates are only indicative.

Indicative scheduling of the TA is for implementation in September 1996.

10.2.2 The Project Management Unit (PMU)

1) Description of TA Needed

The PMU is established within MB which is responsible for project management and implementation.

It is recommended that the PMU is provided with one international consultant who is engaged to provide short term technical assistance (TA) to set up the PMU. In addition the PMU would be supported by one local consultant for 38 months of the project. The TA would cover:

1. training in project management including the International Lending Agency's project management method and project cost management;
2. familiarisation with International Lending Agency procurement rules for contracting;
3. set up reporting lines with Ministries;
4. assist in the preparation of the project management plan.

2) Consultant Inputs, Costs and Scheduling

Table 10.2-2 below shows indicative consultant inputs and costs. The TA would be supplied in July 1996 when the PMU is scheduled to be set up.

Table 10.2-2 Consultant Inputs and Costs

	Man Months	Cost US\$
International Consultant	1month	41,000
Local Consultant	38months	45,000
Total		86,000

Note: costs include travel and daily allowances, and TVA

Chapter 11

Project Evaluation

CHAPTER 11 PROJECT EVALUATION

The project evaluation made in this chapter include the following:

1. financial and economic evaluation:
 - forecasts of SWM expenditures
 - affordability of the project by the Bucharest Municipality
 - citizen's affordability;
2. environmental evaluation;
3. technical evaluation;
4. local citizens' acceptability;
5. benefits of using land for landfill; and
6. relative importance of the project.

11.1 Financial and Economic Evaluation

A brief financial and economic evaluation of the project is presented below. The project period is 1996 to 2006. The chapter presents forecasts of total SWM expenditures including the landfill project, and a consideration of the Project's affordability by the Municipality and Bucharest's citizens.

11.1.1 Forecast of Total SWM Expenditures Including Landfill Project

This section presents a financial forecast of total solid waste management expenditures made by the Municipality of Bucharest. Although the project period is 1996 to 2006, the forecasts are given for the 15 year period from 1996 to 2010, ie covering the Master Planning period. Expenditures are defined as incurred on a cash and not an accruals basis and are given in US\$.

All amounts are stated in the 1995 price base and are projected in real terms, i.e. without accounting for inflation. MB's costs of administering SWM are not included. Forecast expenditures are also analysed between those costs related to households, those costs related to businesses and those related to non municipal waste generators. Total expenditures are apportioned on the basis of the forecast quantities collected for each category. Table 11.1-1 below gives forecasts of total solid waste management expenditures for Bucharest for the period 1996 to 2010.

Table 11.1-1 Forecast Total Expenditures for Solid Waste Management in Bucharest 1996 to 2010

unit: US\$'000

Year	Total Disposal Cost	Payment to Contractors for Collection and Haulage	Payment to Contractors for Street Sweeping	Total Solid Waste Management Cost = (2)+(3)+(4)	Total SWM Costs apportioned to households	Total SWM Costs apportioned to businesses	Total SWM Costs apportioned to non municipal Waste generators
(1)	(2)	(3)	(4)	(5)			
1996	310	4,485	1,314	6,109	4,899	1,148	62
1997	1,336	4,251	1,216	6,803	5,297	1,239	267
1998	16,605	4,067	1,223	21,895	15,045	3,529	4,465
1999	6,317	3,877	1,058	11,252	8,091	1,898	3,521
2000	1,125	4,113	962	6,200	4,842	1,133	1,263
2001	1,023	4,224	955	6,202	4,860	1,137	205
2002	420	4,342	947	5,709	4,557	1,068	84
2003	426	4,464	938	5,828	4,653	1,090	85
2004	4,854	4,589	929	10,372	7,625	1,777	971
2005	9,192	4,717	921	14,830	10,542	2,450	1,838
2006	4,602	4,849	926	10,377	7,669	1,788	920
2007	463	4,985	901	6,349	5,069	1,188	93
2008	476	5,125	893	6,494	5,184	1,215	95
2009	489	5,268	883	6,640	5,300	1,242	98
2010	503	5,416	887	6,806	5,432	1,273	101
Total	47,802	68,772	14,953	131,527	99,064	23,175	9,627
Ave	3,187	4,585	997	8,768	6,604	1,545	642

The total expenditure has three main cost components: disposal, collection and haulage and street sweeping.

The total costs are then apportioned between those associated with municipal wastes, i.e. for households and businesses, and those costs related to non municipal waste generators. The apportionment is shown to illustrate the differences in cost burden on the three categories.

The table shows that the costs of SWM total \$132m over the 15 year period, averaging \$8.8 m per annum. In real terms total costs in 2010, \$6.8m, are 11% higher than total

costs in 1996 of \$6.1m. Between these years costs fluctuate quite significantly with a high of \$21.9m in 1998 and a low of \$5.7m in 2002.

Figure 11.1-1 below illustrates how total forecast SWM expenditures move over the 15 year period. The expenditures are analysed between households, businesses and generators of non municipal waste, for illustrative purposes only. The peak between 1997 and 1999 shows the impact of project investment on total costs which peak at US\$21.9m in 1998.

The peak between 2004 and 2006 shows the large post project investment costs of constructing additional embankments for Balaceanca and Cretuleasca sites and three new disposal sites at Berceni, Afumati and Jilava.

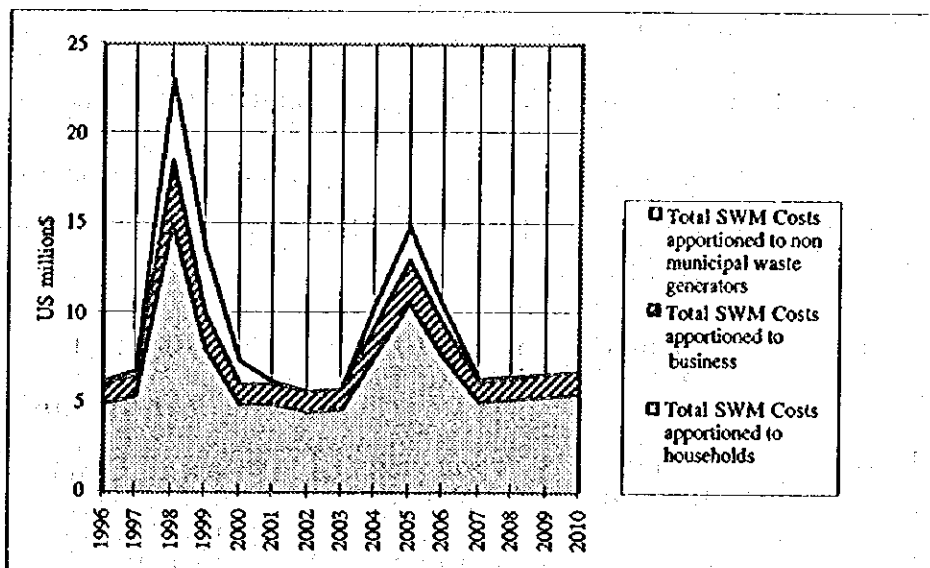


Figure 11.1-1 Forecast Total Expenditures for Solid Waste Management In Bucharest 1996 to 2010

If the project and post project investment expenditures are excluded from the forecasts, then total SWM expenditures increase reasonably smoothly over the period, in line with population and economic growth.

As the figure illustrates the proportion of household costs averages about 75% of the total SWM costs over the 15 year period.

11.1.2 The Affordability of the Project by the Bucharest Municipality

A brief evaluation of the affordability of the project by the Municipality is presented below. Three cost comparisons are evaluated over the project period 1996 to 2006 which are:

1. comparison of total disposal costs to total SWM costs;
2. comparison of total SWM costs to total municipal expenditures; and
3. comparison of project investment costs to total municipal investment expenditures.

Expenditures are defined as incurred on a cash and not an accruals basis and are given in US\$. All amounts are stated in the 1995 price base and are projected in real terms, i.e. without accounting for inflation.

1) Comparison of Total Disposal Costs to Total SWM Costs

Table 11.1-2 gives the comparison of total disposal costs to total SWM costs. The table shows that disposal costs total \$ 46.2m over the 11 year period and are 49% of the total SWM expenditures of \$105m for the project period.

Table 11.1-2 Comparison of Total Disposal Costs to Total SWM Costs 1996 to 2006
US\$'000

Year	Total Disposal Costs	Total Solid Waste Management Costs	Disposal Costs as a % of Total SWM Costs
1996	310	6,109	5%
1997	1,336	6,803	20%
1998	16,605	21,895	76%
1999	6,317	11,252	56%
2000	1,125	6,200	18%
2001	1,022	6,202	16%
2002	420	5,709	7%
2003	426	5,828	7%
2004	4,854	10,372	47%
2005	9,192	14,830	62%
2006	4,603	10,377	44%
Total	46,210	105,577	44%
Average	4,201	9,598	44%

This percentage is very high. Typically we would expect disposal costs to be between 5-10% of total SWM costs in a developing country. In developed countries this is much higher, eg 50% in Tokyo. If a sanitary landfill of a minimal level and the recommended collection and haulage system is applied to Bucharest we estimate that disposal costs would be about 33% of the total SWM costs.

The disposal costs fluctuate significantly reflecting the large project and post project investment expenditures in the years 1997 to 1999 and 2004 to 2006, respectively. In the project period disposal costs reach 76% (1998) and 56% (1999) of total SWM costs.

Obviously the Municipality will find it very difficult to finance the project expenditure solely from the waste tax in 1998 and 1999 and ensure full cost recovery of SWM expenditures. This would require an increase in the waste tax of approximately 230% for households, to ensure full cost recovery. This is clearly too large to implement.

Figure 11.1-2 below gives total SWM costs split between disposal and collection and haulage and street sweeping. The figure illustrates the burden the project investment costs would impose on Municipality.

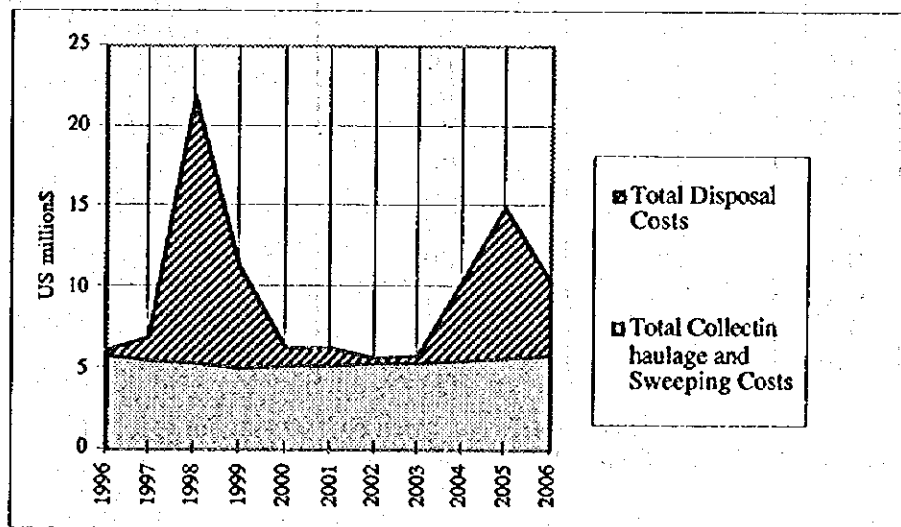


Figure 11.1-2 Comparison of Total Disposal Costs to Total SWM Costs 1996 to 2006

As the Municipality's general tax base is financially constrained it has no alternative but to seek financing from external loans and/or the state budget. The affordability of financing an OECF loan is considered in Chapter 12.

The conclusion is that the project investment is unlikely to be affordable by the Municipality unless it is financed from a project loan and /or State financing.

2) Comparison of Total SWM Costs to Total Municipal Expenditures

Table 11.1-3 gives the comparison of total SWM costs with total Bucharest municipal expenditures over the project period. All expenditures include operational and capital costs. Total municipal expenditures are defined as the total expenditures of MB and the 5 Regii Autonomes. They also include RADET's and RATB's operating expenditures which are financed by GoR's price subsidies, and state budget capex subventions which the Regii and MB receive.

Table 11.1-3 Comparison of Total SWM Costs to Total Municipal Expenditures 1996 to 2006
US\$ million

	Total Solid Waste Management Costs	Total Municipal Expenditures	Total Solid Waste Management Costs as a % of Total Municipal Expenditures
1996	6	546	1.10%
1997	7	561	1.25%
1998	22	600	3.67%
1999	11	613	1.79%
2000	6	630	0.95%
2001	6	655	0.92%
2002	6	681	0.88%
2003	6	708	0.85%
2004	10	741	1.35%
2005	15	775	1.94%
2006	10	801	1.25%
Total	105	7,311	
Ave Total	9.5	665	1.44%

Note: Forecast municipal expenditures are based on 1995 amounts which are projected at World Bank GDP growth rates.

Total municipal expenditures, therefore, represent the total amount spent on municipal public services in Bucharest, as they are defined in Romania, i.e. SWM, public transportation, heating, water and sewerage, as well as Municipal Administration services, e.g. streets, parks, etc.

The table shows that SWM costs total \$105m over the 11 year period and are 1.6% of total Municipal Expenditures of \$7,311m for the period, peaking at 3.67% in 1998.

These percentages are low when compared to other cities in developing countries. Some comparators are given in Table 11.1.4 below. Comparisons with these cities should be made very broadly, since there are considerable variations between the types of public services each city provides.

Table 11.1-4 Total SWM Cost as a Percentage of Total Municipal Expenditures SWM

City/Country	Total SWM Cost as a Percentage of Total Municipal Expenditures SWM
All Japan	3.1%
Tokyo	3.1%
Bangkok, Thailand	15.3%
Surabaya, Indonesia	10%
Penang, Malaysia	24.7%
Sebrang Prai, Malaysia	24.9%

Figure 11.1-3 below gives the comparison of total SWM costs to total Bucharest municipal expenditures over the project period. The figure illustrates that SWM costs are small compared to total municipal spend.

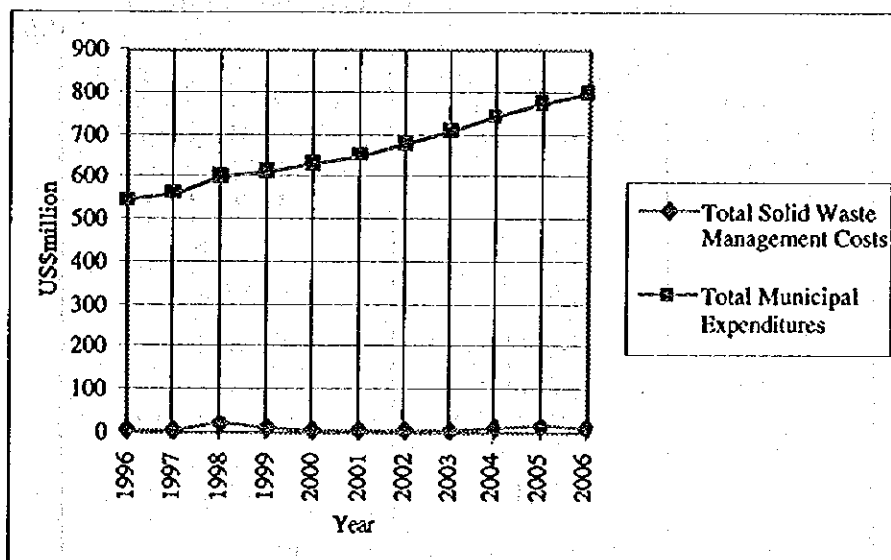


Figure 11.1-3 Comparison of Total SWM Costs to Total Municipal Expenditures 1996 to 2006

The results indicate that in general terms total SWM expenditures, including the project costs, are affordable by the Municipality when they are compared to total municipal expenditures.

3) Comparison of Project Investment Costs to Total Municipal Investment Expenditures 1996 to 1999

Table 11.1-5 gives a comparison of project investment costs with forecast total municipal investment expenditures (including the project costs) over the project investment period 1996 to 1999.

Project investment costs total \$23m for the period, average 4% of total municipal investment expenditures and peak at 10.4% in 1998. These percentages are quite large given the large amount of municipal investment in capital intensive public services, eg public transportation, water and sewerage and district heating.

Obviously the Municipality will find it very difficult to finance the project investment expenditure solely from the waste tax in 1998 and 1999 and at the same time ensure full cost recovery of its SWM expenditures. To do so would require large increases in the waste tax which are clearly difficult to implement.

Table 11.1-5 Comparison of Project Investment Costs to Total Municipal Investment Expenditures
US\$'000

Year	Total Project Investment Costs	Total Municipal Investment Expenditures	Project Investment Costs as a % of Total Municipal Investment Expenditures
1996	7	130,928	0.0%
1997	742	134,987	0.5%
1998	16,344	157,706	10.4%
1999	5,991	152,897	3.9%
Total	23,084	576,518	
Ave Total	5,771	144,129	4.0%

Figure 11.1-4 below compares project investment costs with total municipal investment expenditures and illustrates the investment burden which MB would face from the project investment costs in 1998 and 1999.

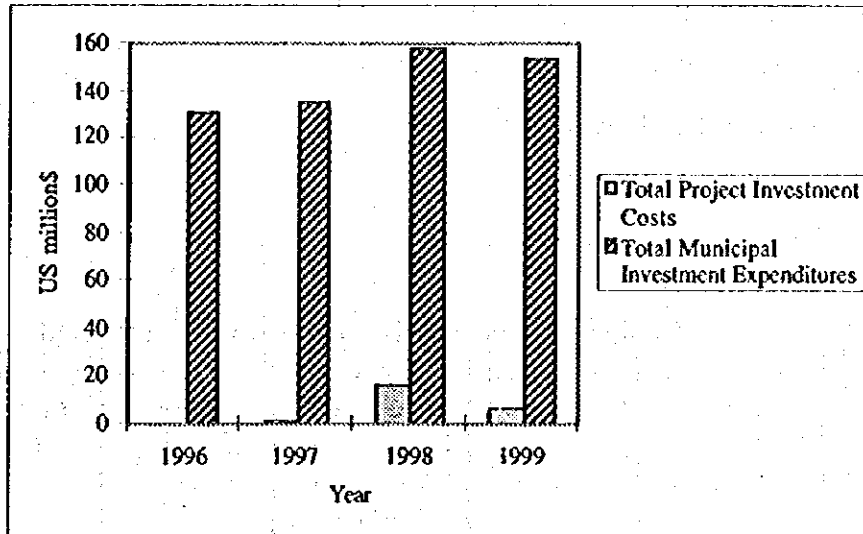


Figure 11.1-4 Comparison of Project Investment Costs to Total Municipal Investment Expenditures 1996 to 1999

The results demonstrate that the Municipality will need financial support to finance the project.

11.1.3 Citizens' Affordability: Comparison of Total SWM Costs to per Capita GDP

To assess whether the proposed project is affordable by citizens, the per capita SWM costs over the project period are calculated as a percentage of per capita GDP and compared with international indicators. Table 11.1.6 below shows the calculated percentages. The average percentage for Bucharest over the project period is 0.37%; peaking at 0.94% in 1998.

For general comparative purposes it might be assumed that SWM costs as a percentage of per capita GDP or income are:

- 0.5% to 2.2% - for low income developing countries;
- 0.5% to 1.2% - for middle income developing countries; and
- 0.3% to 0.5% - for high income industrial countries

Particular country and city example are:

- Japan - 0.31%
- Tokyo - 0.38%
- Penang City, Malaysia - 0.67%
- Bangkok, Thailand - 0.62%
- Surabaya, Indonesia - 0.5%

Table 11.1-6 Comparison of Total SWM Costs to per Capita GDP

Year	Total Solid Waste Management Costs US\$'000	Population US\$'000	Total Solid Waste Management Costs Per Capita Per Annum US\$	Per Capita GDP US\$	Per Capita SWM Costs as a % of Per Capita GDP
1996	6,109	2,065	3	1,060	0.28%
1997	6,803	2,080	3	1,079	0.30%
1998	21,895	2,095	10	1,114	0.94%
1999	11,252	2,110	5	1,150	0.46%
2000	6,200	2,125	3	1,187	0.25%
2001	6,202	2,141	3	1,226	0.24%
2002	5,709	2,156	3	1,266	0.21%
2003	5,828	2,172	3	1,307	0.21%
2004	10,372	2,188	5	1,350	0.35%
2005	14,830	2,203	7	1,394	0.48%
2006	10,377	2,219	5	1,439	0.32%
Total	105,577				
Average	9,598		4.5	1,234	0.37%

Notes

1. Per Capita GDP based on 1993 per capita GDP inflated by World Bank estimates of growth in GDP

Bucharest's average percentage of 0.37% compares favourably with these comparators, and although the peak of 0.94% in 1998 is much higher than the average, the results indicate that the project is affordable by citizens.

However, if the project is affordable, are citizens willing to pay?

A survey of Bucharest's citizens carried out by MB in 1995 clearly indicates that citizens are willing to pay higher tariffs for solid waste services but only after the quality of collection and street sweeping services have improved.

In addition to this government at both MB and central levels have expressed reluctance to impose a waste tax much higher than current tariff levels.

Given citizens unwillingness to pay and government's reluctance, it may be difficult to set a waste tax at a level which enables capital investment in disposal landfill sites to be financed.

Only two further options are available. Either GoR finances it through capex subventions or MB takes an external loan from donor agencies.

11.1.4 Conclusion

The analysis demonstrates that in general terms project and total SWM expenditures appear to be at reasonable levels when measured against total municipal expenditures.

However, the analysis also demonstrates that it would be difficult for MB to finance the project from the proposed waste tax. Furthermore, as the Municipality's general tax base is constrained, it has no alternative but to seek external financing in the form of loans and/or state budget subventions.

It has been proposed that the best solution is for MB to obtain an OECF loan. This is considered in Chapter 12.

11.2 Environmental Evaluation

11.2.1 Evaluation of Each Site Development Plan

1) Landfill Plan in Cretuleasca

It is judged that the planned landfill facilities include facilities necessary for prevention of contamination of surface and ground water, part of which is used by the local residents for drinking water through wells. The proposed operation and monitoring plan are considered sufficient to prevent the generation of smoke, odor and flies that can be nuisance to the local residents.

No traffic troubles due to waste trucks are anticipated because it is planned that all the waste trucks will use an access road that will directly lead to the site from the ring road without passing through the village.

2) Landfill Plan in Balaceanca

It is judged that the proposed plan includes the adequate design and operation plan for the prevention of contamination of ground and surface water as well as the prevention of generation of smoke, odor, and flies. Planned access road will be useful not only for waste trucks but also for local residents. The landfill plan also take into consideration 1) protection of the archeological site that exists adjacent to the planned landfill site, and 2) the harmony with the surrounding landscape.

3) Improvement Plan for Glina Site

It is judged that the sanitary conditions of the site will be improved through the planned improvements which include provision of embankment, rainwater drainage around the site, leachate collection system, leachate transmission through pipes to the existing Glina sewage plant where leachate is treated.

Embankment for the newly developed area of the site will be provided about 50 m away from the site boundary to keep a distance from the nearest houses.

Over 50 % of the Glina site area has been so far filled with waste, and it is not possible to provide the artificial lining on the bottom of the existing dumping area. Risks of the pollution of ground water may not be eliminated. Considering this situation, the

provision of water supply and sewage system for local residents living in Poposti-Leordeni village is included in the project.

11.2.1 Conclusion

It is evaluated that the measures for minimizing the public health risks and environmental protection are adequately considered in the proposed landfill plan. It is judged that the planned landfill development is environmentally sound and acceptable in terms of both facility design and operation which include plans for monitoring and control of hazardous waste. The facility design for the new landfill sites satisfies the EU Disposal Standards.

It is advised that the Bucharest Municipality will prepare, during the detail design stage, plans for provision of some facilities for the benefits of the surrounding villages as well as post-closure land use plans in consultation with the villages.

11.3 Technical Evaluation

The design and technology used for the landfill project are shown in Chapter 5. The proposed design and technology are evaluated to be reliable and appropriate in view of the following:

1. The proposed landfill design and technology are those generally used by many local governments in the world, and therefore proved to be reliable.
2. The design of new landfill sites in Balaceanca and Cretuleasca follows EU Council Directives.

Note:

Although, the existing Glina landfill sites cannot be provided with the lining, it is evaluated that the improvement plan for the Glina site with leachate collection system will contribute to substantial reduction of risks of contamination of water.

3. Materials for the lining were selected considering costs and quality of waste to be disposed of.

4. For treatment of leachate collected, the off-site treatment (transmission of collected leachate to the nearest public sewer line, and treatment at the existing sewage treatment facility in Glina) is planned instead of on-site treatment which is more costly.
5. Local residents will not be suffered from the traffic of waste trucks because the project will provide access roads which do not pass through the local villages. The access roads are wide enough so that there will be no traffic jams created.
6. For operation of landfill, the fill-up and cell method are proposed. This method is appropriate in terms of efficiency of landfill and minimization of public nuisance such as smoke and odor that may affect local residents. Procurement of adequate quantity of bulldozers and other necessary equipment are included in the plan.
7. The site facilities include offices and other facilities which are useful for creating safe, efficient and comfortable working conditions.
8. Most equipment and materials needed for the planned landfill are locally available and therefore economical.
9. All the facilities are locally manageable through the training which will be included in the engineering services.

11.4 Local Citizens' Acceptability

The officials of the Municipality of Bucharest had meetings with all the 3 concerned village councils concerning the project.

Glina Site

The mayor of Popesti-leordeni village expressed that the village council would accept the Improvement Project of the existing Glina landfill site. This village owns 90 % of the existing Glina site.

Balaceanca Site

Cernica village council, in the previous meeting with MB, expressed also that the landfill project in Balaceanca is acceptable to the village in principle.

Cretuleasca Site

In the meeting with MB, the mayor of Stefanesti de Jos village council expressed that he would be supportive of the landfill project in Cretuleasca. However, MB will have to have some more discussions with the village council before the village council accept the project. Bucharest Municipality is confident that it can reach to an agreement with Stefanesti de Jos.

Supports by All the Concerned Authorities

The concerned authorities including, Prefect, Sub Prefect, Ministry of Finance, Ministry of Public Works, Department of Local Public Administration, and Inter Ministerial Council for Large Investments of National Interest expressed their support of the Project.

Transfer of Land Ownership

Ownership of the land of the planned sites are not necessary clarified till now because in Romania land ownership is supposed to be returned from the State to former (pre-communism) landowners according to the Romanian laws. Romania is now in the middle of this process, and it would take some years to complete this process.

Finalization of Conditions of Acceptance Needed

MB will have to have meetings with the concerned 3 village councils to discuss conditions of acceptance including compensation, form of land acquisition, and form of management of new landfill sites.

It is likely that MB will form an association with the concerned village council to acquire the land necessary for the project.

In view of the current situation mentioned above, it is considered very likely that the Project will be officially accepted by the 3 villages without affecting the project implementation schedule.

11.5 Benefits of Using Post Closure Landfill Sites

11.5.1 Possible Future Use of Sites in Balaceanca, Glina and Cretuleasca

Needless to mention, use of land for landfill brings enormous benefits - not quantifiable though, in terms of urban sanitation and public health. It is this benefit that justifies investments in the landfill. In addition to these prime benefits, the landfill, in many cases, brings about side benefits - increases in economic value of land. This is true for the current project.

In many countries, landfill sites, after closure, have been used for various purposes including green parks, sports facilities, commercial and industrial sites, and housing.

Type of facilities to be constructed on post closure landfill sites must be considered from both economic and engineering view points. Landfill sites, after closure, still generate gases due to continued decomposition of waste, and land would sink due to settlement. From engineering point of view, types of facilities that can be constructed depends on stability of the landfill sites which depends on length of period after closing sites. For example, green parks can be developed soon after the closing sites. A golf course may be developed after about 5 years time. Building structures may be constructed after 10 - 15 years after closing sites.

A possible post closure use of the landfill site in Balaceanca is a green park considering the fact that this place is an archeological site. It might be a good idea to develop a golf course in the Glina site, and some sports facilities in the Cretuleasca site.

11.5.2 Benefits Deriving from the Use of the Post Closure Landfill Sites

This section shows benefits that may possibly derive from using the land before and after landfill operation.

As shown in the table below, the economic values of land in terms of value of crops (corn) that could be harvested are greater after the landfill operation is completed than before. In case of Glina, the site was a swampy land before landfill started, therefore no crops were grown. After the site is filled with waste in the future, 90 % of the site could be used as an agricultural field. The value of crop (corn) harvested is estimated to be \$ 25,740/year. (Net value of the harvested crop is estimated to be \$18,018, 70 % of

the value of the crop assuming that the cost of production and other costs such as transportation is 30 % of the market price.)

Currently, it is estimated that 35 % of the planned Balaceanca site is used for agriculture. The remaining part of the land is not used for agriculture because there is water on the surface of the area. After the site is filled with waste in future, 90 % of the site may be used as agricultural field. Thus, the harvest of corn would increase to over 2.5 times in the Balaceanca site.

As a conclusion, the use of the land for landfill in Glina, Balaceanca and Cretuleasca is helpful to increase the value of the land in terms of agriculture (production of crops) and other business; golf course or green parks for example.

Table 11.5-1 Benefits of Using Landfill Sites in Glina, Balaceanca and Cretuleasca Under Different Situations

Unit: US dollar in 1995 price

	Glina Landfill Site (104 ha)	Balaceanca (40 ha)	Cretuleasca (28 ha)
1. Economic value of the land before using site for landfill = Rent = value of crops (corn) that could grow.	\$ 0/year (The land was not possibly used as agricultural land because it was a swampy land.)	\$ 2,695/year (Index: 100) (At present, about 14 ha or 35 % of the land is used as agricultural land. Other part of the land cannot be used as there is water. \$ 275/ha x 14 ha x 70 %* = \$ 2,695.)	\$ 4,235/year (Index: 100) (At present, about 22 ha or 80 % of the land is used as agricultural land. \$ 275/ha x 22 ha x 70 % = \$4,235 .)
2. Economic value of land if used as agricultural land after closing the site	\$ 18,018/year (93.6 ha or 90 % of the land can be used as agricultural land after filling the site with waste. \$275/ha x 93.6 ha x 70 % = \$ 18,018)	\$ 6,930/year (Index: 257) (36 ha or 90 % of the land can be used as agricultural land after filling the site with waste. \$275/ha x 36 ha x 70 % = \$ 6,930)	\$ 4,813/year (Index: 114) (25 ha or 90 % of the land can be used as agricultural land after filling the site with waste. \$275/ha x 25 ha x 70 % = \$ 4,813)

Note: It is assumed that cost of production would be 30 % of the market price of the harvest (corn).

11.6 Relative Importance of the Project

What is the relative importance of the project? Although the project is very small in amount relative to other investment projects in Romania, it nevertheless has substantial "visibility".

The project is relatively small because most investment is being carried out on large national sectoral programs. These are primarily being financed by the World Bank (IBRD) and the EBRD. The two largest investment programs are in rail and energy, approximately \$400 million and \$500 million respectively. Other sectoral investment programs are underway in the agricultural sector (a number of credit lines have been set up) and telecommunications. There is also an industrial development program.

The project has visibility because:

Firstly, the project is in Bucharest which, as the nation's capital, is a window to Romania. Therefore, the project has national focus.

Secondly, the project will be the first solid waste management project financed by an international donor agency (IDA) in Romania.

Thirdly, the project will become the model for other solid waste projects for other Romanian cities. Therefore, again it is of national importance.

Investment by IDAs other than in the large national sectors is small. There are very few environmental projects.

Table 11.6-1 summarises the Ministry of Finance's external debt by direct loans and guarantees and by major financing source. The number of contracts are shown in brackets.

**Table 11.6-1 Ministry of Finance's Direct Loans and Guarantees
as of July 1995**

Unit: Million US Dollar

	IBRD	EBI	EBRD	US CCC	Total
1. Loan	856 (7)	223 (5)	25 (1)	10 (1)	1,114 (14)
2. Guarantee	0	0	314 (4)	156 (4)	470 (8)
3. (1+2)	856 (7)	223 (5)	339 (5)	166 (5)	1,584 (22)

Source: Ministry of Finance

Abbreviations:

IBRD: International Bank for Reconstruction and Development

EBI: European Bank for Investments

EBRD: European Bank for Reconstruction and Development

US CCC: US Commodity Credit Corporation

Table 11.6-2 below gives a list by sector of the loans and guarantees from Table 11.6-

1.

Table 11.6-2 List of Ministry of Finance's Direct Loans & Guarantees as of July 1995

Unit: Million US Dollars

Loans & Guarantees	IBRD (1)	EBI (2)	EBRD (3)	US CCC (4)	Total (1+2+3+4) = 5
Loans (1 - 14)					
1. Rehabilitation of the energetically system		28			28
2. Rehabilitation of the sanitary system	150				150
3. Technical assistance and crucial imports	180				180
4. Supporting private farmers	100				100
5. Rehabilitation of national roads		72			72
6. Modernizing of transport sector	120				120
7. Rehabilitation of national roads	80				80
8. CCC 93 P.L. 480				10	10
9. Rehabilitation of petrol sector	176				176
10. Preuniversity education	50				50
11. Bucharest wholesale market			25		25
12. Rehabilitation of petrol and gas sector		68			68
13. Rehabilitation of air traffic (I: installment)		33			33
14. Rehabilitation of air traffic (II: installment)		22			22
Loan Total (1 ~ 14)	856	223	25	10	1114
Guarantees Provided by MoF (15 - 22)					
15. ROM TELECOM R.A.			158		158
16. PETROM R.A.			28		28
17. Agriculture			70		70
18. GSM 102/1993				32	32
19. GSM 102/1993				15	15
20. GSM 102/1994				59	59
21. GSM 102/1992				50	50
22. Computing Systems for Romanian Bank for Development			58		58
Guarantee Total (15 ~ 22)	-	-	314	156	470
Grand Total	856	223	339	166	1584

At the municipal level there are very few investment projects for municipal service or utilities. Currently, the only municipal projects covered by IDAs are:

1. the forthcoming World Bank Bucharest water supply project; and
2. the EBRD's water supply project for 5 cities which was implemented as part of the EBRD's Municipal Utility Development Program (MUDP).

The amounts which have been agreed by the IDAs for these projects are \$46m for the Bucharest water supply and \$28m for the MUDP. The project is smaller compared to these projects but it has visibility since there are only two extant projects.

The following are the major investment projects which the Bucharest Municipality is currently executing:

1) Development of Water Supply System for Bucharest

Description: The objective of the project is to improve water supply service. This project is divided into 3 stages. In the first stage which started in 1989, North Pumping Station was constructed; in the second phase, during 1992 - 1995, large reserves for night time was created with investment of 5 million dollars; in the third phase (1994 - 1995) 1,200 mm pipe lines between Stefan cel Mare and Calea Mosilor is being constructed with investment of 2.3 million dollars. As of August 1995, the rates of completion of each stage are as follows: 100 % of the 1st stage, 99 % of the 2nd stage, and 20 % of the third stage. Source of the finance for the project is the central government.

2) Improvement of Heat Supply System

a. Improvement of Heat Supply for Ferentari (an area in Sector 5 of Bucharest)

Description: The objective of the project is to improve the heat supply system by constructing a heat supply pipe line which transmits 180c degree hot water from Progresul Heat Plant to Ferentari area which has a population of 200,000. Project period is 1992 - 1995. Investment is 5.7 million dollar. The project was financed by the central government.

b. Provision of Heat Counters

Description: Through the project counters for 600 heat changing points are provided. It is expected that the project will be helpful in improving the relationship between the service recipients and RADET (the heat supply company). The project started in 1994. Estimated project cost is 50 million dollar. So far, the central government provided 0.5 million dollar, and Bucharest municipality added 0.2 million dollars.

3) Development of Urban Transport System

Description: The objective of the project is to provide public buses to alleviate over crowded buses. An indicator of crowd will be reduced from 8.5 to 6.5 through the project. The total estimated project cost is 120 million dollar for the period 1994 - 2000. The Bucharest Municipality purchased already 150 Dutch buses (worth 20 million). Each bus cost 135,000 dollars. The source of finance is the central government. In 1995, the municipality did not receive any budget for the project.

11.7 Conclusion

This Project is vital for the Municipality of Bucharest and the citizens in view of;

- 1) demand and necessity to have sanitary landfill sites to dispose of generated waste,
- 2) improving MB's solid waste management to a level compatible with the nation's capital city.
- 3) serving as a national model in terms of landfill design and democratic process for acquisition of local citizens' consent to the project

As demonstrated in the previous section, it is judged that the Project is feasible from all aspects including financial, economic, environmental, and technical aspects as well as the local citizens' acceptability.

MB is required to make its best efforts to finalize conditions of the project acceptance through negotiations with the concerned village councils as early as possible.

Chapter 12

Financial Plan

CHAPTER 12 FINANCIAL PLAN

This chapter considers the proposed financing of the project, and its affordability.

12.1 Proposed Financing Plan

It is proposed that the Bucharest municipality should acquire a soft loan from an international donor agency to finance a major portion of the project investment. If an official loan of the Japanese government (Overseas Economic Cooperation Fund - OECF) is available, 75 % of the project investment cost may be financed. The Romanian side will finance the remaining part (25 %) of the project investment and all the operation and maintenance costs related to the project.

Table 12.1-1 Project Financing Plan

Unit: US dollar in 1995 price

	Project Expenditures (1)	To be Financed by OECF Loan (2)	To be Financed by the Romanian Side (1) - (2) = (3)
1. Investment	23,083,000 (100 %)	17,312,250 (75 %)	5,770,750 (25 %)
2. Operation & maintenance	3,004,000 (100 %)	0 (0 %)	3,004,000 (100 %)
3. Total	26,087,000	17,312,250	8,774,750

It is crucial for the success of the project that the Municipality arranges the financing of the remaining part of the project investment. Substantial portions which remain to be financed by the Romanian side, are \$ 4.1 million in 1998 and \$ 1.5 million in 1999. It is advisable that the Romanian government should provide subventions from the state budget to finance that portion of the project investment not financed by the loan.

Table 12.1-2 shows aggregate waste disposal expenditures including the current project for the period 1996 to 2025. The costings were prepared on the assumption that the OECF loan will be available to cover 75 % of the project investments, and all other costs will be financed by the Romanian side.

Unit: dollar in 1995

Table 12.1-2 Project Loan Schedule and Cash Flow Related to Waste Disposal

Year (a)	Project Investments (b)	Annual Borrowing (75 % of Item b) (c)	Remaining Balance at the Year End (d)	Repayment of Principal (e)	Interest Payment (f)	Total Repayment (e+f) = (g)	Own Funding (25 % of Item b) (b-c) = (h)	Project O & M Expendi- ture (i)	Total Project Expenditure (g+h+i) = (j)	Other Disposal Expenditure (k)	Total Disposal Expenditure (j+k) = (l)
1 1996	7,080	5,310	5,310	0	0	0	1,770	0	1,770	302,804	304,574
2 1997	741,630	556,222	561,532	0	143	143	185,408	0	185,551	254,996	440,547
3 1998	16,343,635	12,257,726	12,819,258	0	15,161	15,161	4,085,909	0	4,101,070	261,410	4,362,480
4 1999	5,991,405	4,493,553	17,312,811	0	346,120	346,120	1,497,852	325,721	2,169,693	0	2,169,693
5 2000	0	0	17,312,811	0	467,446	467,446	0	409,260	876,706	716,260	1,592,966
6 2001	0	0	17,312,811	0	467,446	467,446	0	414,700	882,146	607,700	1,489,846
7 2002	0	0	17,312,811	0	467,446	467,446	0	420,295	887,741	0	887,741
8 2003	0	0	17,312,811	0	467,446	467,446	0	426,044	893,490	0	893,490
9 2004	0	0	17,312,811	0	467,446	467,446	0	431,956	899,402	4,422,310	5,321,712
10 2005	0	0	17,312,811	0	467,446	467,446	0	438,033	905,479	8,753,506	9,658,985
11 2006	0	0	16,447,170	865,641	467,446	1,333,086	0	137,546	1,470,632	4,464,810	5,935,442
12 2007	0	0	15,581,530	865,641	444,074	1,309,714	0	0	1,309,714	462,980	1,772,694
13 2008	0	0	14,715,889	865,641	420,701	1,286,342	0	0	1,286,342	475,944	1,762,286
14 2009	0	0	13,850,249	865,641	397,329	1,262,970	0	0	1,262,970	489,271	1,752,241
15 2010	0	0	12,984,608	865,641	373,957	1,239,597	0	0	1,239,597	502,970	1,742,567
16 2011	0	0	12,118,968	865,641	350,584	1,216,225	0	0	1,216,225	0	1,216,225
17 2012	0	0	11,253,327	865,641	327,212	1,192,853	0	0	1,192,853	0	1,192,853
18 2013	0	0	10,387,687	865,641	303,840	1,169,480	0	0	1,169,480	0	1,169,480
19 2014	0	0	9,522,046	865,641	280,468	1,146,108	0	0	1,146,108	0	1,146,108
20 2015	0	0	8,656,405	865,641	257,095	1,122,736	0	0	1,122,736	0	1,122,736
21 2016	0	0	7,790,765	865,641	233,723	1,099,363	0	0	1,099,363	0	1,099,363
22 2017	0	0	6,925,124	865,641	210,351	1,075,991	0	0	1,075,991	0	1,075,991
23 2018	0	0	6,059,484	865,641	186,978	1,052,619	0	0	1,052,619	0	1,052,619
24 2019	0	0	5,193,843	865,641	163,606	1,029,247	0	0	1,029,247	0	1,029,247
25 2020	0	0	4,328,203	865,641	140,234	1,005,874	0	0	1,005,874	0	1,005,874
26 2021	0	0	3,462,562	865,641	116,861	982,502	0	0	982,502	0	982,502
27 2022	0	0	2,596,922	865,641	93,489	959,130	0	0	959,130	0	959,130
28 2023	0	0	1,731,281	865,641	70,117	935,757	0	0	935,757	0	935,757
29 2024	0	0	865,641	865,641	46,745	912,385	0	0	912,385	0	912,385
30 2025	0	0	0	865,641	23,372	889,013	0	0	889,013	0	889,013
Total	23,083,750	17,312,811		17,312,811	8,074,282	25,387,093	5,770,939	3,003,555	34,161,587	21,714,961	55,876,548

Because of the soft conditions possibly applied to the loan, the repayment of the loan will not be hard for the borrower. The maximum amount of annual repayment of the loan is estimated to be \$ 1.3 million in 2006, in which year the borrower has to start paying back the principal. Annual repayments will gradually decrease thereafter. The repayment will be about \$ 0.9 million in the final repayment year of 2025.

In the near future, the Bucharest Municipality should set the waste tax high enough to recover not only the costs of waste collection, haulage and street sweeping services but also the disposal costs of the repayment of the project loan all operation and maintenance costs of disposal facilities.

During the period 2004 - 2006 large investments (about \$ 18 million for 3 years in total in 1995 price) will be needed to construct additional embankments for the project sites in Balaceanca and Cretuleasca and other 3 more new disposal sites in Berceni, Afumati and Jilava. It is preferable for the Municipality to acquire another soft loans to finance these investments.

12.1.1 Assumptions Used for Preparation of the Project Costing

The assumptions used for preparing the project costings shown in Table 12.1-2 are summarized as follows:

1. An OECF loan is available for the project to finance 75 % of the total costs of project investments.
2. Major loan conditions are as follows:
 - a. Interest rate is 2.7 %/year
 - b. Repayment period will be 30 years after the loan agreement. The first 10 years will be a grace period during which the borrower will only have to pay interest.
 - c. The loan will cover a 75 % of the total cost of the project investments which comprise of the following components:
 - (1) engineering service,
 - (2) technical assistance,
 - (3) site construction,
 - (4) procurement of heavy equipment (bulldozers, etc.)
 - (5) construction of water supply and sewage for Popesti-Leordeni village and
 - (6) engineering service for the item (5).

The investment costs include 18 % Romanian value added tax.

3. The Romanian side will finance all the remaining part of the disposal expenditures which will include:

- (1) 25 % of the project investment costs
- (2) All operation and maintenance costs
- (3) All other capital expenditures related to the waste disposal which include:
 - costs of immediate improvement that need to be done in 1995 and 1996
 - procurement of 3 bulldozers which are needed to improve the current disposal operation.
 - costs of construction of additional embankments in the disposal sites in Balaceanca and Cretuleasca which will be needed in the year 2004.
 - costs of construction (2004 - 2006) and operation (2006 -) of 3 more new disposal sites in Berceni, Afumati and Jilava

12.2 Affordability of the Project Financed with an OECF Loan

An evaluation of the affordability of the project financed with an OECF Loan is presented below. The evaluation is made for the Master Planning period, ie 1996 to 2010.

12.2.1 Forecast SWM Expenditures including the Landfill Project

Table 12.2-1 below gives forecasts of total solid waste management expenditures for Bucharest. Forecast disposal expenditures assume that the project is financed from an OECF loan and are obtained from Table 12.1-2, Section 12.1 above.

The table shows that the costs of SWM total \$132m over the 15 year period, averaging \$8.8m per annum. In real terms total costs in 2010, \$8.7m, are 43% higher than total costs in 1996 of \$6.1m. Between these years costs rise to high of \$15.6m in 2005 and are lowest in 1997 at \$6.0m.

Table 12.2-1 Forecast Total Expenditures for Solid Waste Management in Bucharest 1996 - 2010

Unit: thousand dollar

Year	Total Disposal Cost (2)	Payment to Contractors for Collection & Haulage (3)	Payment to Contractors for Street Sweeping (4)	Total Solid Waste management Cost = (2)+(3)+(4) = (5)	Total SWM Costs Appor-tioned to House-holds (6)	Total SWM Costs Appor-tioned to Business (7)	Total SWM Costs Appor-tioned to non-municipal generators (8)
1996	305	4,485	1,314	6,104	4,895	1,148	61
1997	441	4,251	1,216	5,908	4,714	1,106	88
1998	4,362	4,067	1,223	9,652	7,112	1,668	872
1999	2,170	3,877	1,058	7,105	5,403	1,267	434
2000	1,593	4,113	962	6,668	5,143	1,206	319
2001	1,490	4,224	955	6,669	5,160	1,210	298
2002	888	4,342	947	6,177	4,859	1,140	178
2003	893	4,464	938	6,295	4,955	1,162	179
2004	5,322	4,589	929	10,840	7,918	1,857	1,064
2005	9,659	4,717	921	15,297	10,826	2,539	1,932
2006	5,935	4,849	926	11,710	8,524	1,999	1,187
2007	1,773	4,985	901	7,659	5,916	1,388	355
2008	1,762	5,125	893	7,780	6,017	1,411	352
2009	1,752	5,268	883	7,903	6,118	1,435	350
2010	1,743	5,416	887	8,046	6,235	1,462	349
Total	40,087	68,772	14,953	123,812	93,794	22,001	8,017
Average	2,672	4,585	997	8,254	6,253	1,467	534

Figure 12.2-1 below illustrates how total forecast SWM expenditures, analysed between households, businesses and non municipal waste generators, move over the 15 year period. The first peak between 1997 and 1999 shows the impact of the project investment on total costs.

The second peak between 2004 and 2006 shows the large post project investment costs of constructing additional embankments for Balaceanca and Cretuleasca sites and three new disposal sites at Berceni, Afumati and Jilava.

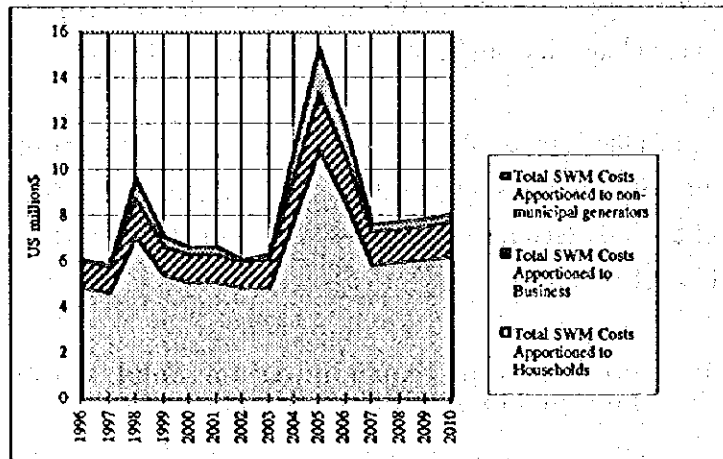


Figure 12.2-1 Forecast Total Expenditures for Solid Waste Management in Bucharest with an OECF Loan

Figure 12.2-2 below gives total forecast SWM expenditures where the project is not financed by an OECF loan. A comparison of the two charts shows how financing the project with the OECF loan significantly smooths the cost profile over the project period 1996 to 1999.

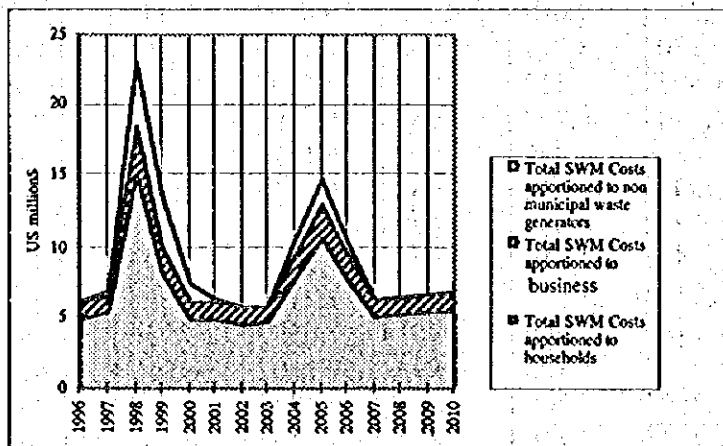


Figure 12.2-2 Forecast Total Expenditures for Solid Waste Management in Bucharest without OECF Loan

In Figure 12.2-1 the second peak between 2004 and 2006, is slightly larger than in figure 12.1-2 because of the additional loan repayments.

12.2.2 Affordability of the Project by the Bucharest Municipality

Affordability by MB is compared in 3 ways.

1) Comparison of Total Disposal Costs to Total SWM Costs

Table 12.2-2 gives a comparison of total disposal costs (based on the assumption that the project is financed from an OECF loan) to total SWM costs. The table shows that disposal costs total \$47.9m over the 15 year period and are 36% of total SWM expenditures of \$132m for the period.

Table 12.2-2 Comparison of Total Disposal Costs to Total SWM Costs 1996 to 2006

US\$'000			
Year	Total Disposal Costs	Total Solid Waste Management Costs	Disposal Costs as a % of Total SWM Costs
1996	305	6,104	5%
1997	441	5,908	7%
1998	4,362	9,652	45%
1999	2,170	7,105	31%
2000	1,593	6,668	24%
2001	1,490	6,669	22%
2002	888	6,177	14%
2003	893	6,295	14%
2004	5,322	10,840	49%
2005	9,659	15,297	63%
2006	5,935	11,710	51%
2007	1,773	7,659	23%
2008	1,762	7,780	23%
2009	1,752	7,903	22%
2010	1,742	8,046	22%
Total	40,087	123,812	32%
Ave	2,672	8,254	32%

In the years 1997 to 1999 disposal costs of \$10m are much lower than in the case without OECF financing (\$35.7m). In 1998 they reach 52 % of total SWM costs.

This is illustrated in Figures 12.2-3 and 12.2-4 below which show total SWM costs split between disposal, collection and haulage and street sweeping. Figure 12.1-3 gives forecasts with OECF financing and Figure 12.2-4 without the loan.

The burden of the project costs on Municipality is much less with the OECF financing.

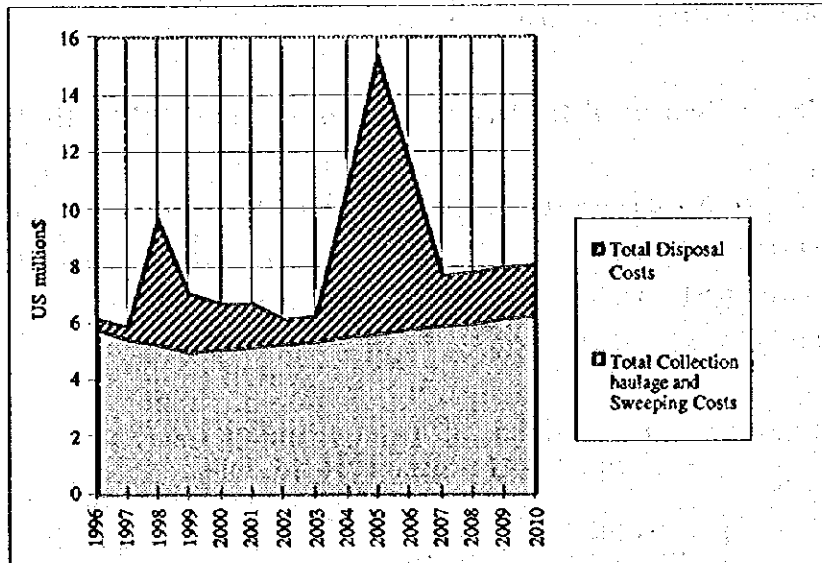


Figure 12.2-3 Comparison of Total Disposal Costs to Total SWM Costs with OECF Loan

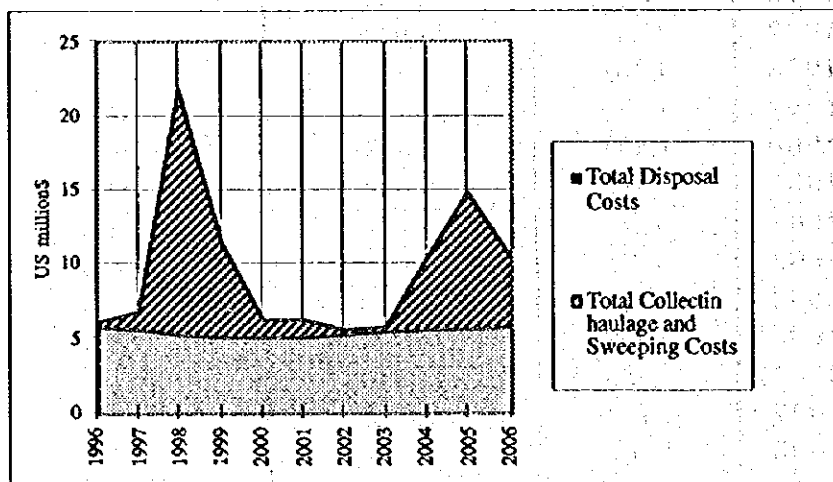


Figure 12.2-4 Comparison of Total Disposal Costs to Total SWM Costs without OECF Loan

To finance the project from the waste tax would require an increase of approximately 40% in the households waste tax over two years (compared to 230% without the OECF loan), which, although large, is much more feasible. The increase in the waste tax could be softened if GoR financed a portion of the project costs from the State Budget. Therefore, it can be concluded that MB can afford the loan.

2) **Comparison of Total SWM Costs to Total Municipal Expenditures**

Table 12.2-3 gives the comparison of total SWM costs with total Bucharest municipal expenditures over the project period.

Table 12.2-3 Comparison of Total SWM Costs to Total Municipal Expenditures 1996 to 2006

US\$'000

Year	Total Solid Waste Management Costs	Total Municipal Expenditures	Total Solid Waste Management Costs as a % of Total Municipal Expenditures
1996	6,104	546,063	1.12%
1997	5,908	560,501	1.05%
1998	9,652	600,239	1.27%
1999	7,105	613,133	1.15%
2000	6,668	630,210	1.05%
2001	6,669	655,282	1.01%
2002	6,177	680,861	0.91%
2003	6,295	708,095	0.89%
2004	10,840	740,841	1.46%
2005	15,297	774,629	1.97%
2006	11,710	800,654	1.46%
Total	92,424	7,310,506	
Average	8,402	664,591	1.26%

Note: Forecast municipal expenditures are based on 1995 amounts which are projected at World Bank GDP growth rates.

The table shows that SWM costs total \$92.4m over the 11 year period and are 1.26% of total Municipal Expenditures of \$7,310m for the period, peaking at 1.97% in 2005. These percentages are low when compared to other cities in developing countries. Some comparators are given in Table 12.2-4 below. Comparisons with these cities should be made very broadly, since there are considerable variations between the types of public services each city provides.

Table 12.2-4 Total SWM Cost as a Percentage of Total Municipal Expenditures SWM

City/Country	Total SWM Cost as a Percentage of Total Municipal Expenditures SWM
All Japan	3.1%
Tokyo	3.1%
Bangkok, Thailand	15.3%
Surabaya, Indonesia	10%
Penang, Malaysia	24.7%
Sebrang Prai, Malaysia	24.9%

Figure 12.2-5 below gives the comparison of total SWM costs to total Bucharest municipal expenditures over the project period. The figure illustrates that SWM costs are small compared to total municipal spend.

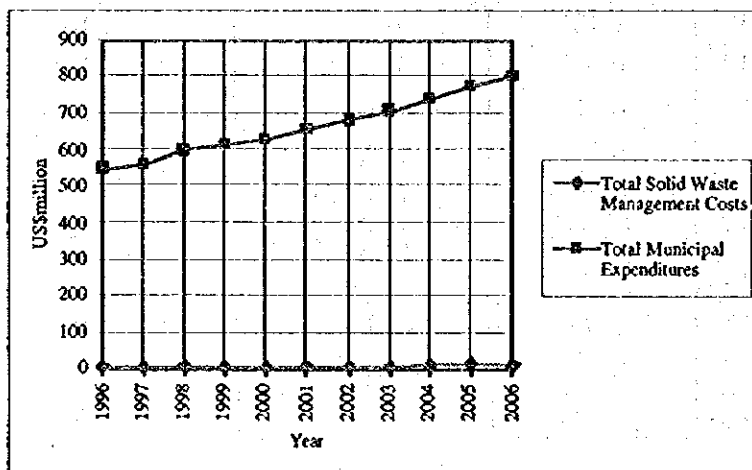


Figure 12.2-5 Comparison of Total SWM Costs to Total Municipal Expenditures 1996 to 2006

The results indicate that in general terms total SWM expenditures, including the project costs, are affordable by the Municipality when they are compared to total municipal expenditures.

3) Comparison of Project Investment Costs to Total Municipal Investment Expenditures 1996 to 1999

Table 12.2-5 gives a comparison of project investment costs with forecast total municipal investment expenditures (including the project costs) over the project investment period 1996 to 1999.

Project investment costs total \$9.5m for the period, average 2% of total municipal investment expenditures and peak at 4% in 1998. These percentages are much more acceptable and reasonable than those without OECF financing.

Table 12.2-5 Comparison of Project Investment Costs to Total Municipal Investment Expenditures

US\$'000

Year	Total Project Investment Costs	Total Municipal Investment Expenditures	Project Investment Costs as a % of Total Municipal Investment Expenditures
1996	2	130,928	0%
1997	186	134,987	0.13%
1998	4,101	157,706	2.6%
1999	2,170	152,897	1.41%
Total	6,459	576,518	
Average	1,615	144,129	1.12%

Figure 12.2-6 below compares project investment costs with total municipal investment expenditures.

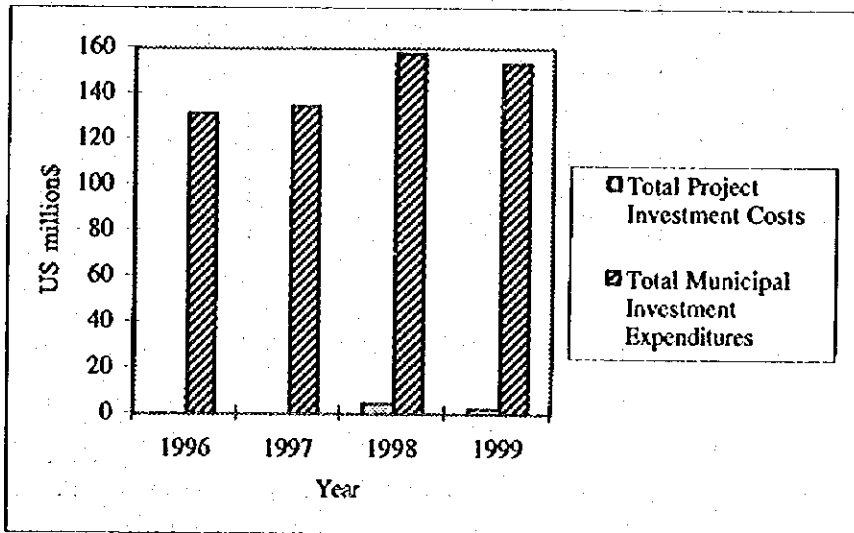


Figure 12.2-6 Comparison of Project Investment Costs to Total Municipal Investment Expenditures 1996 to 1999

12.2.3 Citizens' Affordability: Comparison of Total SWM Costs to per Capita GDP

To assess whether the proposed project is affordable by citizens, the per capita SWM costs over the project period are calculated as a percentage of per capita GDP. Table 12.2-6 below shows the calculated percentages. The average percentage for Bucharest over the project period is 0.23%; peaking at 0.50% in 2005.

Table 12.2-6 Comparison of Total SWM Costs to per Capita GDP

Year	Total Solid Waste Management Costs US\$'000	Population '000	Total Solid Waste Management Costs Per Capita Per Annum US\$	Per Capita GDP US\$	Per Capita SWM Costs as a % of Per Capita GDP
1996	6,104	2,065	2.97	1,060	0.28%
1997	5,908	2,080	2.84	1,079	0.26%
1998	9,652	2,095	4.61	1,114	0.41%
1999	7,105	2,110	3.37	1,150	0.29%
2000	6,668	2,125	3.14	1,187	0.26%
2001	6,669	2,141	3.11	1,226	0.25%
2002	6,177	2,156	2.86	1,266	0.23%
2003	6,295	2,172	2.89	1,307	0.22%
2004	10,840	2,188	4.95	1,350	0.37%
2005	15,297	2,203	6.94	1,394	0.50%
2006	11,710	2,219	5.28	1,439	0.37%
2007	7,659	2,235	3.43	1,486	0.23%
2008	7,780	2,251	3.46	1,534	0.23%
2009	7,903	2,268	3.48	1,584	0.22%
2010	8,046	2,284	3.52	1,636	0.21%
Total	123,813		3.79	1,321	0.23%

Notes

1. Per Capita GDP based on 1993 per capita GDP inflated by World Bank estimates of growth in GDP.

These percentages compare very favourably with international comparators and the results indicate that the project is affordable by citizens. To assess the impact on citizens forecasts of the waste tax are presented in Section 12.2.4 below.

12.2.4 Forecast Waste Tax

Table 12.2-7 gives the forecast monthly waste tax in both US\$ and Lei over the Master Planning period. The tax is estimated by dividing total monthly SWM expenditures apportioned to households by Bucharest's population. This assumes that the same per capita tax is levied on all citizens regardless of age or household income.

Table 12.2-7 Estimated Monthly Solid Waste Tax 1996 to 2010

Year	Total SWM Costs Apportioned to Households US\$'000	Total Population '000	Estimated Tariff US\$/month	Estimated Monthly Waste Tax Lei
(1)	(2)	(3)	(4)	(5)
1996	4,895	2,065	0.20	395
1997	4,714	2,080	0.19	380
1998	7,112	2,095	0.28	560
1999	5,403	2,110	0.21	420
2000	5,143	2,125	0.20	400
2001	5,160	2,141	0.20	400
2002	4,859	2,156	0.19	380
2003	4,955	2,172	0.19	380
2004	7,918	2,188	0.30	600
2005	10,826	2,203	0.41	820
2006	8,524	2,219	0.32	640
2007	5,916	2,235	0.22	440
2008	6,017	2,251	0.22	440
2009	6,118	2,268	0.22	440
2010	6,235	2,284	0.23	460
Total	93,794	32,592		
Average	6,253	2,173	0.24	480

Notes

1. a Lei/US\$ rate of 2000 was used for conversion
2. population data was based on the 1994 population of 2,035,660 - was obtained from the Statistical General Division of Bucharest Municipality. The base year population was assumed to grow at a annual rate of 0.722% until 2010.

The table gives a waste tax of Lei 560 in 1998 and an average monthly waste tax of Lei 480 over the period. The current monthly waste tariffs of Lei 450 (RASUB) and Lei 550 (RGR) are about 80% and 98% of the forecast 1998 waste tax of Lei 560, and 94% and 115% of the average waste tariff of Lei 480 respectively.

Figure 12.2-7 below illustrates how the monthly household tax moves over the 15 year period.

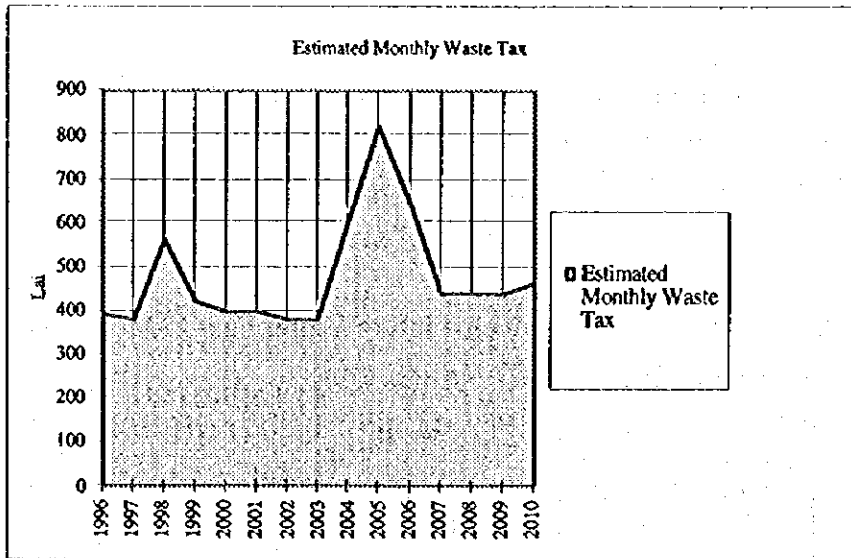


Figure 12.2-7 Estimated Monthly Solid Waste Tax (Households) 1996 to 2010

The results suggest that raising the tax to Lei 560 from RASUB's current levels, a 42% increase over two years, is very feasible and would be acceptable to both citizens and government.

12.2.5 Conclusion

The analysis of SWM costs demonstrates that the costs of financing the project with an OECF loan are affordable by both the Municipality and citizens, and that the Municipality would appear to be able to finance this through the proposed waste tax.

Chapter 13

Project Implementation Schedule and the Municipality's Actions Required

CHAPTER 13 PROJECT IMPLEMENTATION SCHEDULE AND THE MUNICIPALITY'S ACTIONS REQUIRED

13.1 Project Implementation Schedule

A likely schedule for the project implementation is shown in the following table:

Table 13.1-1 Project Preparation and Implementation Schedule

Actions	Date
1. Establishment of Project Management Unit (PMU) within the Municipality of Bucharest (MB)	December 1995
2. MB's submission of request for the project budget to the central government	January 1996
3. The central government's approval of the project	February 1996
4. Loan request by Romanian Government	February 1996
5. Establish Municipal Waste Disposal Administration	By March 1996
6. Conclusion of Loan Agreement (I/A)	July 1996
7. Set up Project Management Unit	July 1996
8. Selection of Consultants for PMU	July 1996
9. Announcement of tender for engineering services	August 1996
10. Selection of consultants for the engineering services	December 1996
11. Commencement of the engineering services	January 1997
12. Announcement of tender for construction	July 1997
13. Selection of a contractor	December 1997
14. Commencement of improvement work for Glina landfill site and construction of 2 landfill sites in Balaceanca and Cretuleasca	January 1998
15. Completion of improvement work in Glina	December 1998
16. Completion of construction of landfill sites in Balaceanca and Cretuleasca	June 1999
17. Commencement of waste receiving at Balaceanca and Cretuleasca landfill sites	July 1999
18. Closure of Glina landfill site	2005
19. Closure of Cretuleasca landfill site	2006
20. Closure of Balaceanca landfill site	2006

13.2 Actions of the Bucharest Municipality Required

The following is a list of actions that the Bucharest Municipality must carry out for the project preparation and implementation.

1. **Negotiation and Agreement with the involved village councils of Cernica, Stefanesti de Jos, and Leordini-Popesiti concerning:**
 - 1) **Land acquisition**
 - 2) **Form of management of the landfill sites**
 - 3) **Compensation**
2. **Make an application for an international loan to Ministry of Finance with necessary documents including a loan application and a project implementation plan.**
3. **Seek and get approval of the locally financed portion of the project not financed by an international loan (assuming that an international loan will finance 75 % of the project cost, local financing component is estimated to be 6 million US dollar (25 % of a total project cost of 27 million US dollar).**
4. **Obtaining permissions and approvals for the project from relevant authorities which may include:**
 - (1) **Water Department, Strategy and Quantity and Quality Water Resources Regulations Directorate, Ministry of Environment (MAPPM)**
 - (2) **Environment Department, Strategy, Legislation for Environmental protection, Evaluation and Approvals Department (MAPPM)**
 - (3) **Bucharest Branch (MAPPM)**
 - (4) **Sanitary and Medical Police Inspectorate of Bucharest Branch of Ministry of Health**
 - (5) **Autonomous Regle of Romanian Waters**
 - (6) **Bucharest Railway, Ministry of Transport (if necessary)**
 - (7) **Relevant river authority (if necessary)**

5. Revision of Bucharest Sanitation Norm (BSN)

BSN should be revised so as to include the following articles:

- 1) an article stipulating that the Municipality is responsible for management of waste disposal.
- 2) an article stipulating that the Municipality can refuse acceptance of waste that the Municipality judged to be inappropriate.
- 3) The municipality will be responsible for financing the costs of waste disposal. The municipality can collect disposal tipping fees from users who bring waste to the municipal sites

6. Institutional arrangements

(1) Establishment of a Foreign Joint Venture Comapny (FJVC)

- a seek a foreign company for the FJVC
- b. Local Government Decision to establish the FJVC
- c. establish a performance contract with the FJVC

If a FJVC cannot be established a Municipal Solid Waste Disposal Administration (MSWDA) should be set up. This will require

- a. Local Government Decision to establish the FJVC
- b. Staffing the Administration with a Director, site managers, engineers, technicians, supervisors and workers

(2) Establishment of a Project Management Unit (PMU) within the municipality:

- a. Organizing PMU with technical assistance for setup from 1 international consultant
- b. Recruit 1 local consultant who will support PMU

(3) Establishment of a system to prevent hazardous waste from coming to the site:

- a. Inspection and control of hazardous waste
- b. Periodical inspection of hazardous waste treatment facilities
- c. Enforcement of a regulation which requires generators of hazardous waste to report to the municipality on details of hazardous waste generated

7. Selection of 2 consultants who will assist PMU as explained in Chapter 10

8. Selection of an international consulting firm which will provide the engineering services as explained in Chapter 10.

9. Selection of a contractor for site construction and procurement of equipment

The municipality should carry out the following activities:

- (1) Preparation of announcement for tender
- (2) Preparation of tender document
- (3) Evaluation of the tenders submitted by contractors
- (4) Negotiations with a possible firm
- (5) Making a contract
- (6) Monitoring of construct execution progress

Engineers of a selected international consulting firms will assist the Municipality in the selection process.

10. Periodical reporting to Ministry of Finance and an international lending institution regarding progress of the contract execution

Chapter 14

Contract Packaging

CHAPTER 14 CONTRACT PACKAGING

It is proposed that the Bucharest Municipality will make the following 6 contracts for the execution of the project.

1. Contract with 2 consultants (one international and one local) who will assist PMU
2. Contract for engineering services related to the below item 3
3. Contract for construction of landfill sites in Balaceanca and Cretuleasca and improvement work for the existing Glina site.
4. Procurement of heavy equipment (bulldozers)

Note:

As shown above, it is advisable that the site construction works will be executed under one contract because construction works in the 3 sites are related. For example, a part of soil excavated in Cretuleasca site will be used for construction of embankments and roads in Balaceanca site. This work may be well coordinated by a single contractor. Cost of the construction will be lower under one contract than cases where the works are divided into a few contracts. It is also advisable that the provision of truck scales will be included in the construction contract because the installation of truck scales needs coordination with the site construction work.

Expected contract amount and period and bidding methods are shown in the following table:

Table 14.1-1 Expected Contact Packages

Contract Package	Tender announcement	Amount (US dollar)	Bidding Method	Executing Agency
1. Use of 2 consultants for PMU	July 1996	86,140		MB
2. Engineering services (related to Item 3)	August 1996	1,807,170	International tender	MB & MLPAT*
3. Construction of the 3 sites	July 1997	19,919,580	International tender	MB
4. Procurement of heavy equipment (See Section 1.4)	January 1998	1,270,860	Local tender	MB
Total		23,083,750		

Abbreviations:

MB: The Bucharest Municipality

MLPAT: Ministry of Public Works and Regional Planning

* A part of the engineering services is the diffusion of landfill technology to other localities. This part should be executed by MLPAT. Cost of this part of the engineering service is estimated to be US \$ 30,000.

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