The European Union's Tacis programme for Ukraine

CAPACITY BUILDING IN DONETSK OBLAST FOR WASTE MANAGEMENT - UKRAINE

Guideline

Standard Local Action Plan for Solid Household Waste Management of the City of …

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Glossary

ZHEK	
SHWM	Solid Household Waste
SHWM	Solid Household Waste Management
WTE	Waste-To-Energy; a politically correct expression for incineration of waste

1. Introduction

1.1. Why a Local Action Plan?

Biblio 2 According to the International Council for Local Environmental Initiatives,

Sustainable development can be defined as development that delivers basic environmental, social, and economic services to all residents of a community without threatening the viability of the natural, built, and social systems.

In 1992, sustainable development received a major boost when representatives from 140 countries joined together for the United Nations Conference on Environment and Development and adopted "Agenda 21" - a sustainable development action plan for the 21st century. Among other features, Agenda 21 encourages local governments in each country to work closely with their citizens to develop a "Local Agenda 21 (LA21)." Under LA21, local governments are encouraged to:

- Learn from citizens and from local, civic, community, business, and industrial organizations about their priorities, values, and proposed solutions;
- Acquire information needed for formulating the best implementation strategies, and to implement appropriate policies, laws, and regulations to move toward sustainable development in their communities; and,
- Develop local sustainable development action plans in cooperation with their citizens.

The present Local Action Plan for Solid Household Waste Management has been established by the City of XXX as a key element of its sustainable development.

Biblio 1 Waste management practices are continually changing. Public and private activities at the local, regional, state, and even international levels are having major impacts on community waste management programmes. Technical requirements for siting and operating waste management facilities are becoming more stringent. State laws require that landfills have engineered safeguards such as liners, leachate collection systems, gas management, and environmental monitoring. New laws require that waste-to-energy facilities have special technology for capturing emissions and that ash residues be specially managed. Standards for work place safety and working conditions are likely for waste management facilities such as recycling centres and composting operations. These new technical requirements will probably increase the cost and the public scrutiny of proposed methods for managing waste.

New state and federal guidelines requiring that governments procure products made from recycled materials are stimulating development of recycling markets. Procurement laws should spur the development of new capacity for recycling a variety of products, especially paper. Market development is expected to increase worldwide, since the sale of recyclable material constitutes a major international market.

In contrast, the true cost of alternative waste collection, processing and disposal options is not yet well understood by most communities and citizens. As these costs become clearer, source reduction and recycling efforts are likely to be more attractive options. Establishing and operating successful solid waste management programs requires the existence of steady markets for recycled products, compost, and the energy produced from WTE plants. This in turn may require increasing the demand for such products. Communities may also need to consider looking for alternative funding sources to support source reduction, recycling, and other programs. How much voters and waste generators are willing to pay for integrated waste management programs has not yet been widely determined.

In Donetsk Oblast, the Region asked for assistance for the improvement of the waste management. In 2003-2004 the Tacis Programme studied the situation and proposed solution. On February 2005, the Regional Council adopted the Regional Strategic Plan for SHWM.

For the SHWM there's a universal hierarchy of the management of the waste, in order of priority:

1. To avoid to produce waste (also called "source reduction " or "waste minimization")
2. To reuse
3. To recycle
4. To recover energy

5. To inert.

But if within a country where the waste is seriously managed for decades, it's today possible to work out according to these priorities, the first step is to implement solutions in the reverse order. Recycling, reuse and so extract the cream of the waste: their potential is around 10% and what to do with the 90% remaining? It's common sense that before to optimise these 10%, it's better to safely manage the 90%.

The 2003 situation of the whole Oblast has been assessed as 35% SHW collected, 40% fees regularly paid, less than 10% SHW safely disposed by recycling. So the objectives of the Region are: 100% SHW collected in 2009, 100% fees regularly paid in 2009, 100% SHW safely disposed in 2014.

1.2. Democratic process

Ukraine has ratified the Aarhus Convention of the United Nations.

Biblio 2 **Aarhus Convention on Public Participation**

In June 1998, delegates from 36 European countries signed the Convention on Access to Information, Public Participation in Decision-Making, and Access to Justice in Environmental Matters. The Convention, pending approval by each country's respective parliaments, binds the signatory countries to abide by a set of principles and practices pertaining to the public's rights to environmental information, decision-making, and justice. The Convention lays out procedures for public participation in decisions related to specific development activities, plans, programs and policies, executive regulations, and other legally binding regulatory instruments. This Convention is significant because it establishes a uniform set of standards for involving citizens in environmental decision-making and emphasizes the importance of fully integrating environmental considerations in governmental decisions. It recognizes that each person has the right to live in an environment adequate to his or her health and well-being. It recognizes that, in order for citizens to be able to assert this right and observe this duty, citizens must have access to information, be entitled to participate in decision-making, and have access to justice in environmental matters. The Convention states that improved access to information and public participation in decision-making means better environmental decisions and greater public awareness.

Source: Convention on Access to Information, Public Participation in Decision-Making, and Access to Justice in Environmental Matters, June 1998. Fourth Ministerial Conference on Environment for Europe, Aarhus, Denmark.

So the present LAP is an open and transparent procedure involving all the inhabitants of the city. The first publishing is available to anybody. A yearly report will be presented and submitted to the citizens.

1.3. Stakeholders Group

This first Local Action Plan has been elaborated help to a Stakeholders Group representing a large part of the population and the natural partners that are the administrations and the enterprises. This Stakeholders Group includes:

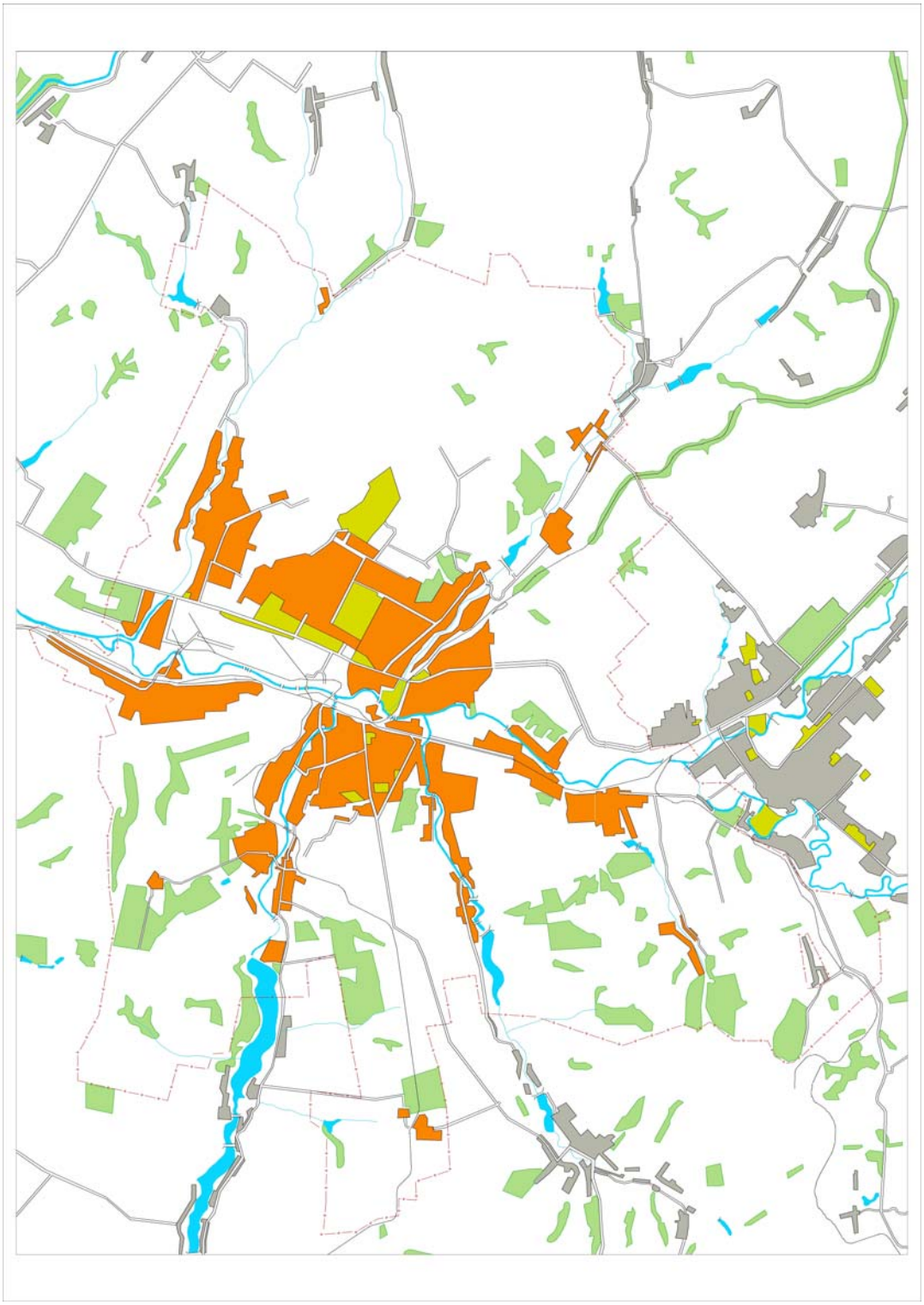
Name	Organisation

The Stakeholders Group met xxx times. It was chaired by MMMMMMMMM. The Municipality thanks a lot all people who gave their time for the preparation of the LAP.

2. Existing situation

2.1. Mission

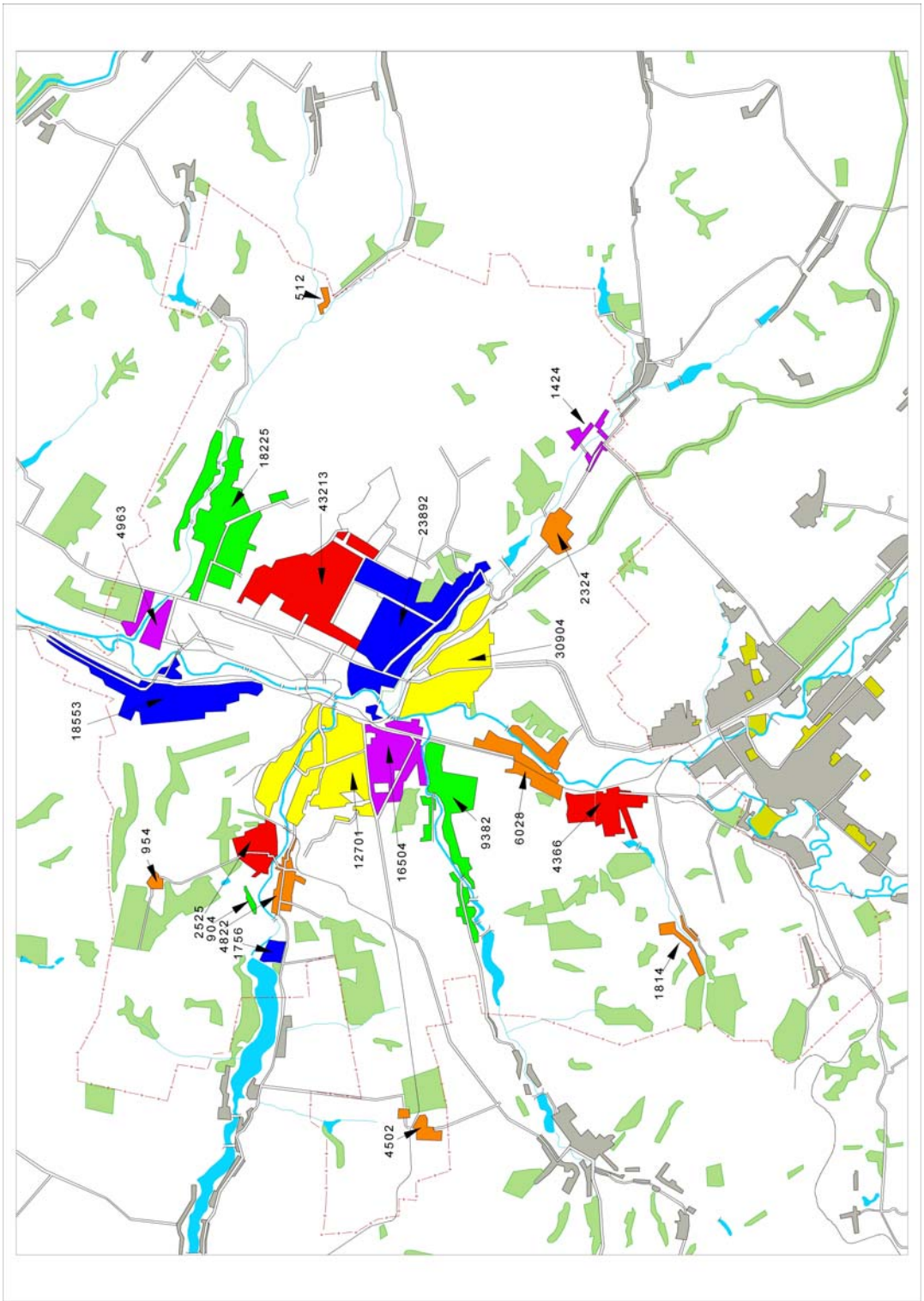
The territory of the city to be deserved includes the centre and villages as on Map 1.



Map 1 Administrative territory

The housing areas are in orange for the City and in grey for other administrative territories. The limit of the territory of the City is the red line. Woods and parks are in green. Surface waters are in blue.

The number of inhabitants to be deserved for each district and settlement is as on



Map 2 Population per area

2.2. SHW production

2.2.1. Household waste

Frankly speaking, for the moment, the production of SHW by the inhabitants of … is largely unknown. Nevertheless the LAP will assess this production.

The SHW production of a household depends on the composition of the family (in extended sense) and their way of life. Ukraine has established norms of production per capita depending on the type of housing. These norms are expressed in volume (m^3/y). The official figures are:

Groups of residences	Facility	Norm of SDW generation per inhabitant				Density of waste, kg/m^3
		Average daily		Average annual		
		kg	litres	kg	m^3	
Building with all modern conveniences (gas supply, centralized heating system, water supply, sewerage)						
1-2		0.64	3.07	235	1.12	210
3-5		0.67	3.00	245	1.09	225
Building with no modern conveniences (without water supply and sewerage)						
1-5	with gas heating	0.88	3.52	321	1.28	250
	with coal heating	1.07	3.56	390	1.30	300
Private sector houses with homestead land, including those in rural areas						
1-5	with gas heating	1.27	3.53	452	1.29	350
	with coal heating	1.59	3.86	580	1.41	410

Notes:
1. Norms are given for SDW without extraction of food waste. In case of extraction of food waste norms decrease by 15%.
2. For high-level facilities buildings with refuse chute norms of SDW generation are 10% higher than the same for buildings without refuse chute
3. Density of waste corresponds to its state in waste collectors before loading into waste collection vehicles.

Table 1 Average norms of solid domestic waste generation for residential buildings

(1995, State Committee of Ukraine for Housing and Public Utility Services)

But the quantities in m^3 are not very significant. The same waste will not have the same density in the container, in the truck, in the landfill, because it is progressively compacted. On the other hand, 1 m^3 of paper, of ashes, of autumn leaves, of kitchen remains, and so, has not the same weight. It's why at international level and in many countries the figures of waste are expressed in tonnes.

Several studies have been done in Donetsk Oblast and their general conclusion is that the production of household waste is more or less 1 kg per inhabitant per day. Some other waste must be added to these quantities because they are municipal waste and they must be managed by the city. These are the waste of: organisations (schools, hospitals, canteens, …), municipal services (parks and gardens, cemeteries, street cleansing, sludge from wastewater treatment), commerce and crafts, cafés and restaurants, small and medium enterprises.

So for each area of the territory the quantity of SHW yearly produced can be assessed as on Table 9.

2.2.2. Commercial waste

The economical activities produce waste that are similar to household waste. According to the norms, their production may be assessed as Table 2.

Waste Source	Unit	Average daily rate, m^3	Average annual rate, m^3	Number	Tonnage
Hotel	bed	0,00159	0,582		
Hostel	bed	0,00143	0,524		
Hospital	bed	0,00250	0,915		
Polyclinic	patient	0,00063	0,019		
Sanatorium, holiday hotel	bed	0,00274	1,000		
Preschool institutions	bed	0,00117	0,292		
Higher and vocational educational institutions	student	0,00047	0,116		
School	pupil	0,00038	0,095		
Boarding school	pupil	0,00208	0,520		

Professional school	student	0,00190	0,476		
Manufactured goods shop	m²	0,00083	0,251		
Grocery	m²	0,0058	0,475		
Outdoor retail outlets (holiday season)	m²	0,0070			
Market	m²	0,00030	0,109		
Restaurant	dish/day	0,00033	0,120		
Café, canteen	dish/day	0,00018	0,077		
Outdoor café (holiday season)	seat	0,01			
Warehouse	m²	0,00022	0,055		
Administrative and public institutions/organisations	workplace	0,00124	0,310		
Entertainment sites	seat	0,00046	0,166		
Consumer services enterprises	workplace	0,0028	0,924		
Railway station, airport, bus/coach station	m² of passenger area	0,00168	0,614		
Camping, parking lots	parking cell	0,0066	2,408		
Beach (holiday season)	m²	0,00019			

Table 2 SHW production rates by the public, administrative, and cultural institutions

2.2.3. Other municipal waste

The City has also to collect and dispose the following waste ():

Origin / Activity	Volume m^3/y	Tonnage t/y
Markets		
Parks and gardens		
Cemeteries		
Street cleansing		
Autumn leaves		
Wastewater treatment sludge		
Sewage cleansing		
TOTAL		

Table 3 Other Municipal Waste

2.3. Means of the Municipal Company

Waste collection and removal in the town is carried out by one enterprise – waste transportation company #052810 – by means of direct transporting to the SHW landfill. Total number of people employed at the enterprise is 89.

Fleet of vehicles consists of 21 trucks, including 17 waste trucks: KO-413 GAZ-53 (11 units), KO-431 ZIL -130 (6 units) and 4 tipping vehicles ZIL-431410 and GAZ-53:

Type of vehicle	Vehicle model	Year of manufacture	Volume of the body,m^3	Deterioration coefficient, %	Compression coefficient
Transport company #052810, Kramatorsk					
Total	**21**		**169.5**	**70**	
Waste truck	KO-413 GAZ-53	1988	7.5	80	1.5
Waste truck	KO-413 GAZ-53	1990	7.5	80	1.5
Waste truck	KO-413 GAZ-53	2000	7.5	80	1.5
Waste truck	KO-413 GAZ-53	2000	7.5	80	1.5
Waste truck	KO-413 GAZ-53	1989	7.5	80	1.5
Waste truck	KO-413 GAZ-53	1991	7.5	80	1.5
Waste truck	KO-413 GAZ-53	1991	7.5	80	1.5

Type of vehicle	Vehicle model	Year of manufacture	Volume of the body,m^3	Deterioration coefficient, %	Compression coefficient
Waste truck	KO-413 GAZ-53	1992	7.5	80	1.5
Waste truck	KO-413 GAZ-53	1992	7.5	80	1.5
Waste truck	KO-413 GAZ-53	1992	7.5	80	1.5
Waste truck	KO-413 GAZ-53	2005	7.5	80	1.5
Waste truck	KO-431 ZIL-130	2004	10	20	1.8
Waste truck	KO-431 ZIL-130	2004	10	20	1.8
Waste truck	KO-431 ZIL-130	2004	10	20	1.8
Waste truck	KO-431 ZIL-130	2004	10	20	1.8
Waste truck	KO-431 ZIL-130	2004	10	20	1.8
Waste truck	KO-431 ZIL-130	2004	10	20	1.8
Tipping truck	GAZ-53	1990	6	***	
Tipping truck	ZIL–431410	1987	7	***	
Tipping truck	ZIL–431410	1987	7	***	
Tipping truck	ZIL-431410	1987	7	***	

Table 4 Park of vehicles of the Municipal Company

Vehicle use coefficient at the company makes 0.67. Average level of vehicle deterioration at the enterprise makes 70.0%.

The enterprise has a garage with 8 members of maintenance staff at its disposal.

In the multi-storey housing sector the system of “irremovable” containers is used for waste collection. Residents unload the waste into the SHW containers located on the waste container platforms with a solid surface. In the houses equipped with refuse chutes manual overloading of waste from little storage bins into waste containers is used. Waste container platforms do not have special fences.

SHW collection is regularly carried out according to the schedule; it is performed daily in the state sector. The enterprise concluded contracts for waste removal with all the Housing Maintenance and Utility (ZHEKs) authorities in the town. Payment by the population for the provided service is made through the municipal public utility “United Payment Service”.

In the private sector the “bucket” or curb-side system of waste collection is used: the population puts the waste into the buckets (waste bags) which are placed at the curb of the street for further overloading into the waste collection vehicles. Such collection is carried out once a week on the basis of receipts of payment for the service by population billed by the enterprise.

In 2005, 914 contracts for waste removal were concluded with enterprises and organizations of the town, according to these contracts 70.4 thousand m^3 of waste or 37.0% of the total annual volume was removed. At the same time only 800 private enterprises out of 3500 ones functioning in the town concluded contracts for SHW removal with the waste transportation company. Separate private enterprises just dispose SHW into the containers for residents’ waste at the closest platforms, with the aim of minimizing the costs.

Conclusion of contracts between the waste transportation company and such enterprises will improve the quality of cleaning the town territory and increase the income of the transportation company.

Factual volumes of removed SHW are accounted on the basis of the following factors: volume of waste truck body, waste compression coefficient and the number of rounds of the waste trucks to SHW landfill (landfill control).

For waste collection 1581 metal containers with the capacity 0.75 m^3 are used, which are on balance-sheets (i.e. owned by) of Housing Maintenance and Utility (ZHEKs). According to the data provided by the enterprise 350 containers more are needed, or 22% of the number of containers already available. Current situation results in the enterprise’s necessity to increase the number of rounds which leads to extra costs for SHW collection (consumption of fuel, equipment depreciation etc.).

Open metal waste containers with the capacity rating from 0.5 to 1.1 m^3 are used for SHW collection. They are placed on the special platforms in the yards of dwelling houses, schools, kindergartens and

other organizations and institutions. Waste containers are mostly owned by ZHEKs with which waste collection companies conclude contracts for waste collection services for the population.

Due to the use of imperfect unloading mechanism and excessive time of waste containers operation (over 10 years) certain part of them need to be replaced.

Before 2005 waste transportation by the collection vehicles was carried out according to the orders of ZHEKs which defined the routes of waste trucks, signed drivers' sheets, confirming factual volumes of removed SHW. However this approach didn't stimulate the work of the enterprise and didn't foster improvement of the situation in the waste management sphere in the town.

At the beginning of the last year the administration of the enterprise revised and optimised the routes of waste collection vehicles. It also made up a detailed characteristics of the facilities subject to the service according to the volumes of the accumulated waste, number of houses and population living in the residential sector, number and capacity of the containers, places of their setting, quarter and yard territory planning, street traffic intensity as well as its running regime. The residential territory of the town has been divided into the service sectors.

On the basis of this revision and analysis 13 schedules of waste truck routes have been developed (in the graphic and text form for each truck according to the days of week), the daily number of truck rounds has been defined, as well as volumes of waste removed during one round taking into consideration technical characteristics of the vehicles.

Detailed additional schedules of the vehicle traffic are not devised in addition to the mentioned itineraries.

The enterprise is equipped with four computers, two of which are located in the Accounting Department and are used as terminals for accounting data bases and for the information exchange with the savings bank that receives payments from all the consumers covered by the services provided by the enterprise. The third one is in the Contracts Department, and the fourth one is used for all types of office work.

To optimise the work of the enterprise in terms of production of itineraries of waste collection vehicles traffic, tracing changes in the quantity of the population living in the area, calculating the volumes of removed SHW it is necessary to equip the operation department with the computer equipment, and all the sections with appropriate software for the work in the waste management sphere.

However the enterprise has no means to make necessary investments.

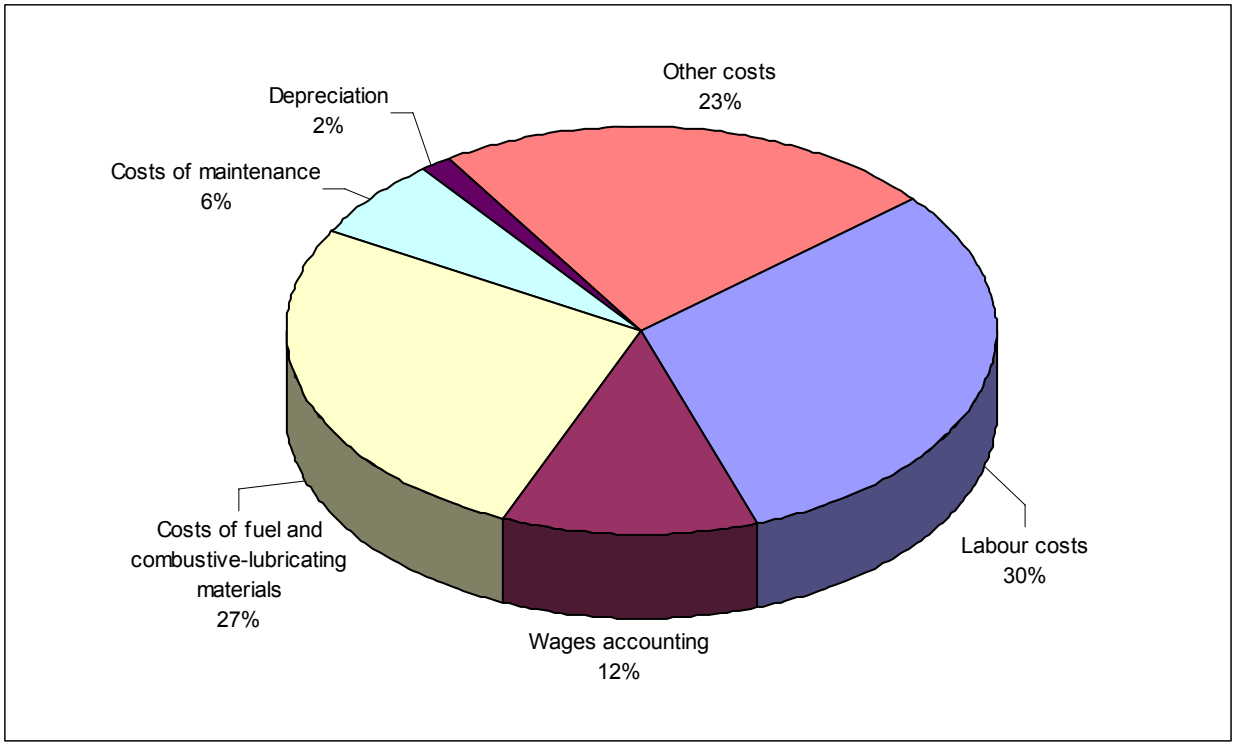
Financial performance of the waste collection companies for 2004-2005 is characterized by the following data:

Name of the enterprise	Received income, 1000 UAH		Financial result, income(+), loss (-), 1000 UAH		Profitability, %	
	2004	2005	2004	2005	2004	2005
Transport company #052810, Kramatorsk	1264.5	1659.4	46.1	166.0	4.0	11.1

Table 5 Financial results

Total volume of waste removed	198.1	1000 m^3	
	Amount	Share	for 1 m^3
	1000 UAH	%	UAH
Total costs	1493.4	100.0	7.54
Labour costs	460.2	30.8	2.32
Wages accounting	174.9	11.7	0.88
Costs of fuel and combustive-lubricating materials	400.4	26.8	2.02
Costs of maintenance	92.4	6.2	0.47
Depreciation	21.8	1.5	0.11
Other costs	343.7	23.0	1.73

Table 6 Structure of factual cost price broken down by different cost items



Graph 1 Structure of factual cost price broken down by different cost items

2.4. SHW collection

Total volume of the waste removed in 2005 made 198.1 thousand m^3 which exceeds the indicator for 2004 by 13.0%. The level of coverage of the state sector population by the mechanized collection made 68.0%, that of the private sector – 26.0%.

Name of the enterprise	Volume of removed waste, thousand m^3		2005 / 2004,%	Rate of coverage of the population with mechanized collection, %		Vehicle use coefficient
	2004	2005		Total	including private sector	
Transport company #052810 Kramatorsk	174.6	198.1	113.0	68.0	26.0	0.67

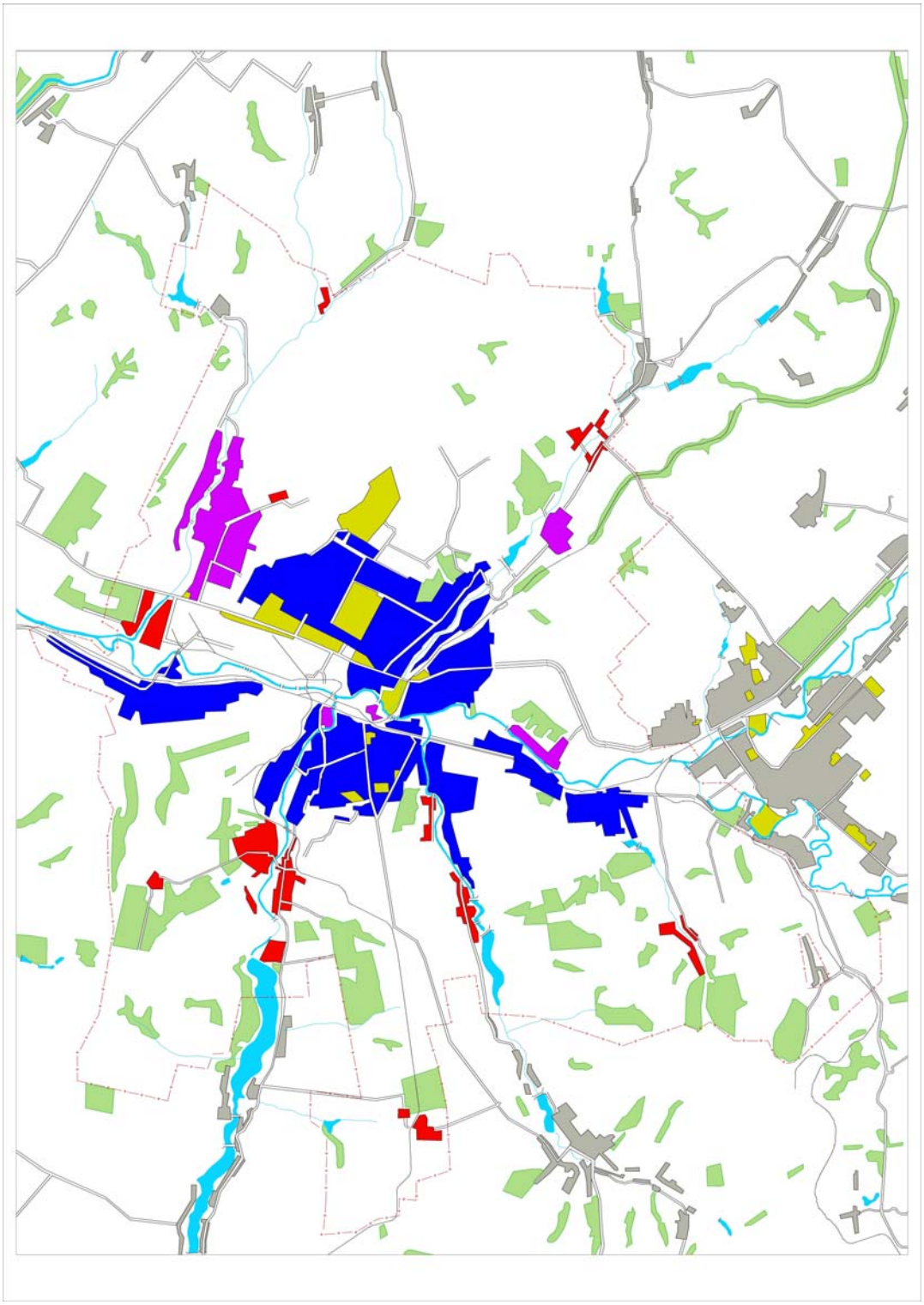
Table 7 Volume collected 2004/2005

A high rate of waste collection per waste truck a day (52.4 m^3) was achieved in comparison with other cities of the Oblast.

	Number of vehicles working during the year	Number of working days of vehicles /year	Total volume of removed waste				Av. daily op. efficiency of vehicle, m^3/day	Number of rounds made			Total mileage	
			m^3 /day	1000 m^3 /month	1000 m^3 /year	m^3 /round		/day	/month	/year	1000 km/year	km /round
General data at the enterprise	21	180	1101.0	16.5	198.1	14.4	52.4	76.2	1143	13,710	461.0	33.6
Including waste trucks	17	180	1067.0	16.0	192.0	14.6	62.8	73.0	1095	13,140	407.2	31.0
KO-413 GAZ-53	11	180	510.0	7.6	91.8	12.1	46.4	42.0	633	7,600	203.4	26.8
KO-431 ZIL-130	6	180	557.0	8.4	100.2	18.0	92.8	31.0	462	5,540	203.8	36.8
Tipping trucks	4	180	34.0	0.5	6.1	10.7	8.5	3.2	48	570	53.8	94.4
ZIL-431410 (3 u), GAZ-53 (1 u)												

Table 8 Efficiency f the trucks

With these means, the SHW collection is organised depending the housing areas: once a day, twice a week, never. On the following Map 3 are the frequencies of SHW collection.



Map 3 Frequency of SHW collection

Blue: once a day – Violet: twice a week – Red: never

The following summarizes the problem. For each area of the territory are calculated the theoretical production of SHW by the inhabitants and the quantities collected.

District, settlement, village	Frequency of collection	Inhabitants	SHW produced t/y	SHW collected t/y
Andreyevka	2/w	23 812	8 350	2 182
TOTAL				

Table 9 Waste collection per area

2.5. Landfilling

Till now the city uses its municipal landfill.

Photo 1 General view of the landfill

Dump operation

The dump is owned and operated by the public motor-transport utility №052810 (CATP 052810).

It is protected during 24 hours per day by 4 watchmen working by shifts. The watchmen are equipped with a telephone line. The waste is brought to the dump by waste collection trucks and lorries from the

city of Kramatorsk. There is a bulldozer working at the dump that levels the waste at the upper part of the dump.


Photo 2 Landfill

The access road to the dump has an asphalt covering. Some waste is sorted at the dump with about 20 persons involved in that. There are small household premises there. Near the dump there is an asphalt road Slaviansk – Donetsk.

The dump is located at the place of a former clay carrier.

Problems

There are some burning points at the dump. The slopes of the dump are quite dangerous for the vehicles delivering waste.


Photo 3 Pollution from the landfill

There is no fence round the dump and hence it is opened for unauthorised visitors and nothing prevents light fractions (paper, polyethylene, etc.) from propagation. At the bottom of the dump there is a big puddle of rainfall water and leachate.

2.6. Recycling

In 2002 the city decided to build a sorting plant. It bought premises from a former concrete blocks factory.

Photo 4 Premises in March 2003

The project has been studied by PKI «UzhtransNiiproekt» of Kharkiv. It's mainly a sorting line of rough waste. The SHW are downloaded in a hopper. They pass throughout a sieve eliminating the small pieces. Then they are hand sorted for the recovery of recyclables. The ultimate waste is reloaded in trucks for the landfilling. The recyclables are pressed in bales for the specialised industries.

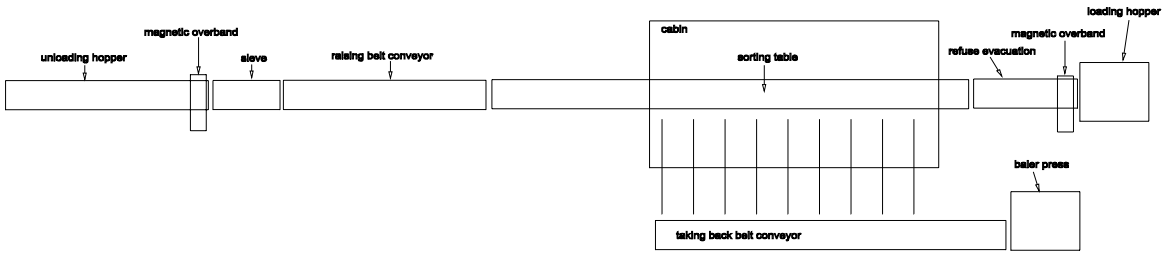


Figure 1 Scheme of the sorting plant

The first Tacis Programme helped to the investment by funding the weighbridge and the baler press.

At the end of 2006, the plant was completely equipped and had done the tests.

Photo 5 Weighbridge

Photo 6 Baler Press

2.7. Fees and tariffs

Decision of Kramatorsk Executive Committee of the City Council as of 07.07.2004 # 287 detached payment for SHW collection from apartment rent and set a fixed waste collection tariff of 1.00 UAH per capita a month (for all types of housing).

From 1st January 2006 the tariff was raised to 1.50 UAH (13.81 UAH for 1m^3) by the Decision of Kramatorsk Executive Committee of the City Council as of 21.12.2005 # 571. For other groups of consumers a tariff of 15,06 UAH for 1 m^3 was set.

In 2005 in the following cities tariffs were revised and raised by 1.4-1.5 times for state-owned institutions and by 1.8 times for the businesses.

Cities	Tariffs for 1 m^3, UAH		
	Population	Other consumers	
		Public institutions	Businesses
Kramatorsk	13.81	15.06	15.06

Table 10 2005 Tariffs

2.8. Previous actions and investments

As already said, the City has built a sorting plant. This investment was initiated by the City Hall in association with the cities of Slaviansk and Drujkovka. The total investment is NN mln UAH. The funding has been done by the State budget and in 2005 the ownership of the plant has been transferred to the Regional Council. Today, the plant belongs to the Donetsk Regional Waste Centre company.

The principle of this plant is to receive the collected SHW of the City. The waste are sorted in aim to recover the recyclables: glass, PET bottles, paper and cardboard, metals. The remaining waste is reloaded in trucks for landfilling.

The Tacis Programme has offered the containers for selective collection of recyclables for a part of the City. The containers will deserved around 25,000 inhabitants. The containers should be delivered at the beginning of 2007. The City has already prepared the platforms for the implementation of the containers.

2.9. Forecasts

2.9.1. Criteria and factors

The quantity of SHW will mechanically increase with the extension of the collection but other factors must be taken into account.

2.9.1.1. Psychological effect

The City has undertaken to seriously manage the SHW. The progressive improvement will generate some side effects. The apparent production per capita will increase: when there's no collection, people use to limit their production of waste (for instance, some organic waste are evacuated in wastewater, some waste are burnt at home, etc.). It's usual to notice an apparent increasing of 10-20% only because the service is more efficient.

2.9.1.2. Number of deserved inhabitants

Of course, the quantity of SHW will mechanically increase with the extension of the collection and the number of deserved inhabitants.

2.9.1.3. Way of life

An increasing of the consumption of the households will automatically generate an increasing of the production of waste.

It must be noticed that it will also bring a modification of the composition of the waste: more packaging waste and less organic kitchen waste. Actually, the wave of home equipment generates a lot of furniture and home appliances waste and the renovation of the flats and houses generates a lot of construction waste.

By the contrary, when people living in the private sector replace a coal heater by a gas heater, it reduces their production of waste.

2.9.1.4. Baby boom

A baby generates a lot of waste. Only for diapers, it's between 1 and 2 kg per day. After years of low birth rate, Ukraine knows a baby boom.

2.9.2. Figures

So for the next 5 years, the expected production of SHW is:

Figures in t/y	Today	2007	2008	2009	2010	2011
Household waste						
Private sector						
Collective housing						
Commercial waste						
Other Municipal waste						
TOTAL						

Table 11 Forecasts of SHW production

3. Action Programme

3.1. A collective march for the community

The SHWM efficiency lies on 3 partners: the Municipal Company, the ZHEKs and the inhabitants. In parallel, the administrations have their own role to play.

The Local Action Plan cannot succeed without a full involvement of the 3 partners. The common objective is a clean and sound city. Everybody must bring his efforts for a collective success.

So the Action Programme will begin with a phase of information and debate with the inhabitants and the ZHEKs.

The information and the debate will be organised as following.

3.1.1. Dissemination of the project of LAP

3.1.2. Programme of meetings

3.1.3. Follow-up and information about the results

3.2. Preliminary Investments

3.2.1. Project team

The improvement of the SHWM will be a long task, if not a perpetual task. But immediately, a lot of procedures and tasks must be reorganised. The detailed studies and the implementation of new schemes of collection take time. So in parallel with the usual tasks of the service, a project team will be in charge of the studies and the preparation of the reforms and of the monitoring of the SHWM.

The project team will mainly include a "methods and organisation" engineer and two assistants.

The project team will be equipped with computers and with a car.

3.2.2. Priming

The collection means are exhausted and they cannot afford any extension of the SHW collection neither any experimentation. So immediately the Municipality will buy trucks and containers in aim to "prime the pumps" of the reorganisation of the collection.

The scheduled purchases are:

- 6 collection trucks
- 850 containers 0.8 m^3
- 8 computers

3.3. Extension of the collection

It's clear that the extension of the collection to the areas the collection trucks were absent for a long time must be done with a strong participation of the inhabitants and the ZHEKs, and that a key point of this participation is the payment of the fees.

This participation is required because the objective is to clean the yards, the streets, the land. The MC is not in charge of the cleaning resulting of bad behaviours. Each one must pay attention to his own behaviour in aim to facilitate the job of the organisations. Anyway, these organisations are paid with his money and it's rationale to facilitate their job either than to complicate it.

The Programme is to re-organise the collection street by street, district by district. The method is to analyse the situation and to organise the collection yard by yard. It will be the main role of the Project team.

For the moment, the most efficient technique stays the usual trucks and containers. Roll containers and western trucks are not fitted to the state of the platforms and the yards.

For the private sector, several solutions are possible and they will be discussed with the involved inhabitants.

The programme of the extension of the collection is the following:

	Existing park	2007	2008	2009	2010	2011
Trucks						
Containers						
Drivers						

Table 12 Means for the extension of the collection

3.4. Landfilling and Transfer

The Regional Landfill Programme is on-going of implementation. Soon, the City will have to dispose its waste to the regional sanitary landfill that will be linked to.

The task of the MC is to collect the SHW and to bring it to the landfill. Till now, the trucks accomplish the two tasks but the usual collection trucks are shaped for the "yard-to-yard" collection and not for the transportation on long distances. It's more efficient, and perhaps lest costly, to transport the waste from the city to the landfill with specialized heavy trucks that can carry 22 tones at once instead of 2-3 tonnes for collection trucks. In such a case, the waste must be downloaded from the collection trucks and reloaded in the transport trucks. This operation is done in a transfer station.

The transfer is a big investment: the premises of the transfer station, the hauling equipments, the transfer trucks. The profitability is offered by the reduction of the unit costs per tonne x km (fuel and wages) as 22 tones are carried at once.

Incidentally, the collection trucks spend 2/3 working time for the transportation to the landfill and such an operation will free time for more pure collection time. The same number of trucks will collect more waste.

With the municipal landfill we use today, the distance is short and the profitability of a transfer station is not fantastic. Nevertheless there's a profitability and the LAP proposes to invest and to build a transfer station in 200N.

The land for this implementation must be decided and a project will be fully studied in 2007.

3.5. Selective collection and recycling

Actually the most interesting recyclables are collected directly in the containers by some people. It can be assessed that around 70% of PET and glass bottles are so collected. Today, this grey economy plays its role because it's an additional income for these people. This interest will progressively disappear. The future will be the implementation of a selective collection as it's use to do in EU for more than 10 years.

The City will experiment in 2007 the selective collection for 25,000 inhabitants in the district of … The inhabitants are already associated to the preparation of this operation for one year. The collected recyclables will be sorted and prepared in the sorting plant. The experimentation aims to polish up the organisation and the implementation. Normally, the selective collection should be progressively extended to the whole territory of the City.

3.6. Universal Payment Centre

3.7. New Schemes

3.7.1. Home composting

The City is characterized by an important private sector. NNNN inhabitants live in individual houses and they dispose of a garden. Unfortunately, the more often these districts have been "abandoned" and the streets are in a very poor state. It will take several years to restore this situation. But the immediate effect is that it's not very convenient for the regular passage of collection trucks. The existence of these gardens is an opportunity for a new way of SHW management.

The principle is to help the inhabitants to compost their organic waste. They have space to put a composter outside. They can use the compost for gardening as a fertilizer. This technique is more and more spread in EU and some lessons will be applied.

The Municipality will organise experimentation in districts on a voluntary basis. Models of home composters will be selected and proposed to be purchased by the inhabitants. The Municipality will provide a technical assistance for the composting. The dry waste will be collected regularly by the MC.

3.7.2.

3.8. Monitoring and reporting

The transfer station includes a weighbridge. It will allow to manage the waste in mass instead of volume. Data in volume cannot be reliable because the compaction and the nature of the waste is too variable but the weight of the waste doesn't change all along the operations done on it.

A new system of accounting and statistics will be implemented. A key result will be to provide detailed figures on the waste management.

A yearly report will be published and communicated to the inhabitants.

4. Economy of the Programme

The realisation of the LAP has its finance side. These are investments, operation costs and fees to be paid. This part will describe what is expectable on the base of the today's knowledge.

4.1. Investments

The following programme of investments reflects in figures the action programme of the previous pages. It is in 2006 value for the equipments.

Amounts in 1000 UAH	2007	2008	2009	2010	2011
Transfer					
Transfer station		1,560			
Transfer trucks		4,700		1,200	1,200
Rough collection					
Collection trucks	800	800	800	800	800
Containers	750	625	325	425	500
Selective collection					
Collection trucks	1,000				
Containers		300	600	600	600
New Schemes					
Home composting	100	200	200	200	200
….					
Management					
Computers	50				
TOTAL	2,700	8,185	1,925	3,225	3,300

Table 13 Scheduled investments (in 2006 value)

4.2. Evolution of the costs

The cost of the SHWM includes several components: amortization of the investments, interests of the loans, wages, social charges, fuel, electricity, supplies, etc. they have been assessed for each task of the MC. As it is mid-term prevision, it takes into account provisional coefficients for the evolution of the inflation, the wages, the energy. The task "transport" is separated of the other charges.

	2007	2008	2009	2010	2011
Total Investment	1 738 000	3 914 735	2 207 839	2 500 944	2 761 153
Total Amortization	0	320 783	525 213	745 996	996 091
Operation					
Electricity	12 960	27 994	30 233	32 652	35 264
Phone	13 200	15 827	17 093	18 289	19 387
Water	1 760	2 110	2 279	2 439	2 585
Fuel & Gas	21 600	87 188	94 163	101 697	109 832
Supplies	13 200	21 582	23 309	24 940	26 437
Wages	555 840	733 392	937 411	1 117 401	1 387 264
Social charges	544 723	718 724	918 663	1 095 053	1 359 519
Maintenance	13 200	48 440	83 393	155 738	235 579
Toxic waste	5 500	11 990	12 949	13 856	14 687
Total direct operation	1 181 983	1 667 247	2 119 492	2 562 064	3 190 554
Interests	0	86 524	79 195	71 506	63 441
Taxes	22 000	35 970	38 848	41 567	44 061
TOTAL	1 203 983	2 110 524	2 762 748	3 421 133	4 294 147
Tonnage	72 000	95 000	110 000	130 000	155 000
Transport					
Daily amortization	623 568	1 530 724	1 805 562	2 259 159	2 818 207

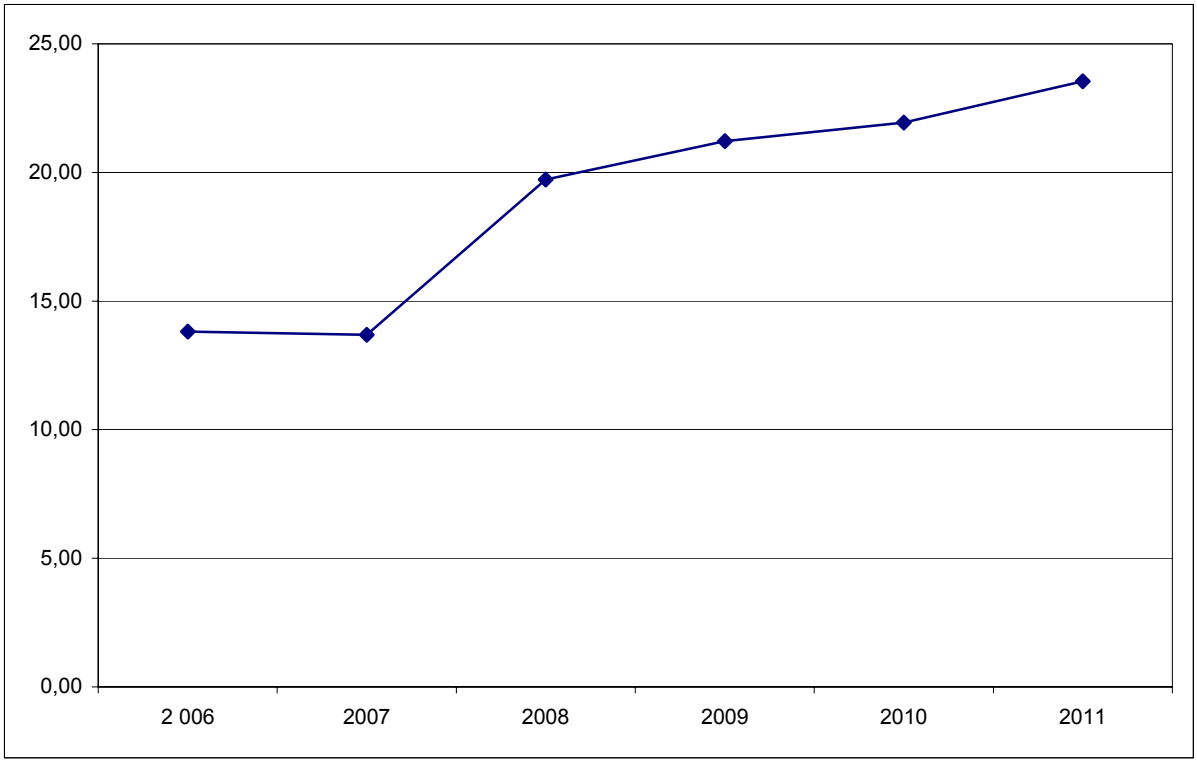
Maintenance (cleaning, repairs, oil, tyres)	375 078	825 519	1 006 573	1 258 944	1 579 485
Assurance	151 008	329 197	395 935	492 818	614 033
Financing charges	73 328	86 828	367 195	353 422	420 958
Wages	21 600	118 800	130 680	172 498	221 372
Social charges	21 168	116 424	128 066	169 048	216 945
Fuel	298 433	494 252	647 546	816 315	1 054 795
TOTAL	1 564 183	3 501 744	4 481 557	5 522 204	6 925 795
Global cost /tonne	**38,45**	**59,08**	**65,86**	**68,79**	**72,39**
TOTAL COSTS	**2 768 166**	**5 612 268**	**7 244 305**	**8 943 338**	**11 219 941**

Table 14 Prevision of total costs

4.3. Evolution of the tariffs and payments

The tariff must evolve. The following Graph 2 shows what should be the evolution of the fees within the hypotheses that: i) without inflation; ii) fair balance between the inhabitants and the organisations; iii) all the investments are funded help to loans (application of the "true costs" principle) and without State subventions.

It must be repeated that the cost of the SHWM depends a lot on the behaviour of each one. If the citizens pay attention to make easier the job of waste collection, the costs will stay under control and reasonable.



Graph 2 Evolution of the fees

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