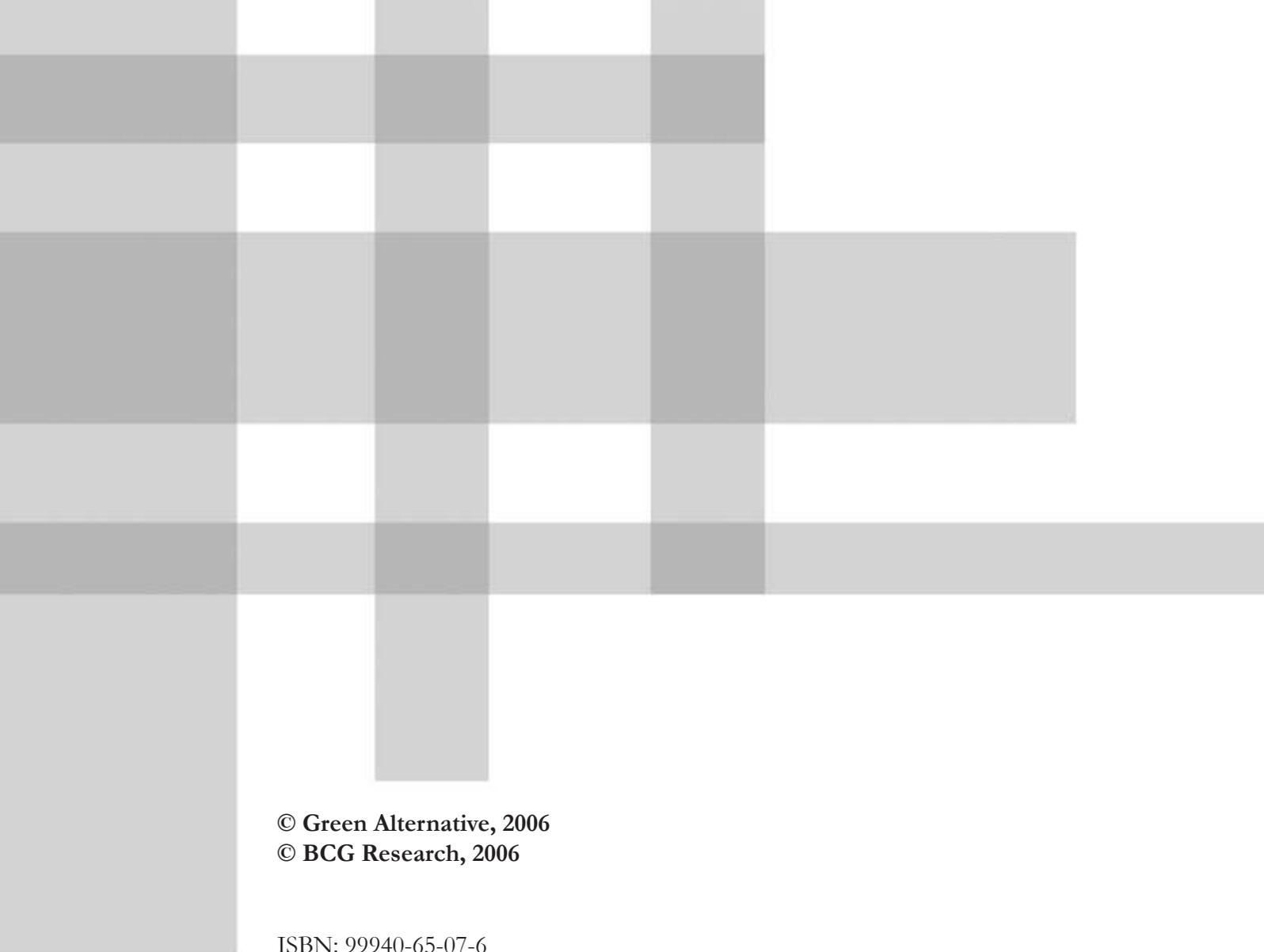


Tbilisi Municipal Waste Management System Research Report

Tbilisi, July-August 2006





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Edited by Carl Linich

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PREFACE

Waste management is one of the most pressing issues in the world today. Developed countries started to implement sustainable methods of waste management in the 1970s. These methods are primarily directed at decreasing waste volume and ensuring safe management of waste. In this respect, Georgia is only at the initial stage of development. Despite the fact that waste management is also an important issue for Georgia today, there are a number of things that remain to be solved.

The sociological study presented below, which is mainly based on the opinions expressed by state and private organizations involved in the waste management system, and on the opinions of ordinary citizens, aims to reveal both positive and negative aspects of waste management in Tbilisi, studying current and anticipated processes, and identifying opportunities for introduction of alternative methods for waste management. It is our hope that, this study will enable us to find out current and future directions of work in this sphere.

We truly believe that the information contained in the research will be interesting and useful for the state agencies involved in waste management, and for other stakeholders and organizations.

The sociological research was conducted by the BCG Research company at the request of the Green Alternative Association. BCG Research consulted with Green Alternative expert Tamar Gugushvili, who is also the author of the introductory and final parts of the report.

Green Alternative would like to thank the OSCE Mission to Georgia for its financial support, and also BCG Research and Ms. Tamar Gugushvili for their excellent work, and all those organizations and individuals who invested their time and energy to provide us with the information necessary for this research.

Green Alternative
August 2006.

EXECUTIVE SUMMARY

As a result of the changes made in Tbilisi's waste management system in July-August 2006, the main volume of work in the sphere is now carried out by the City Cleaning Service, which has assumed the functions formerly under the jurisdiction of Tbilisi district administrations. The Service commissions various limited liability companies (LLCs) to collect and dispose of waste, and monitors the activities of these outside contractors. Respondents welcomed the establishment of the City Cleaning Service, commenting that a centralized body increased coordination among the units that comprise it, and that "the sphere now has somebody to look after it."

The main problem that LLCs face is poor conditions of their vehicles and lack of workforce. These problems are caused by insufficient financing. During our research the City Municipality gave the organizations new vehicles, which enabled the LLCs to renew their fleets. As of August 1, 2006, the salaries of employees involved in collection and disposal of waste were increased, and this should effectively solve the lack of workforce problem. It should be noted that this problem is due not only to insufficient salaries, but also to the fact that the profession is not considered prestigious.

The calculation methods for employee reimbursement and cost of waste disposal are subject to approval by the Tbilisi Sakrebulo (elected municipal council) and thus, they apply to all organizations. The LLCs are financed partly by the state and partly through fees paid by the population. State financing is a more stable source of funding, as a certain portion of the population has not paid these fees for years. The organizations have no means of influencing these people, as they cannot segregate the waste of non-payers from that of the payers.

Cooperation with the Telasi electricity distribution company in collecting fees has significantly improved payment volume collected from the population, and in many cases the population "simply learned to pay for the service." None-the-less, payments collected rarely exceed 50% of what the city should be getting (even though, according to a survey of Tbilisi residents, 80% of them claim to pay for waste disposal service).

The situation with businesses is even more difficult. These companies have to sign contracts for garbage disposal with the LLCs that work in the district in which their business is located, and these companies are supposed to pay monthly fees for the service. However, most businesses do not pay the fees, and the state does not subsidize the LLCs to serve businesses; this means that the LLCs are actually serving them free of charge. Furthermore, there is no scheme according to which any given business' fees are to be calculated. The tariff is based less upon volume or type of waste produced by a particular company, and more upon mutual agreement between the business company and the LLC, even though this agreement is rarely observed. Probably due to the absence of a fixed tariff, many businesses do not realize that they should be paying for the service and therefore do not take their agreements with the LLCs seriously.

According to respondents, the City Municipality plans to start collecting fees from the public and from businesses; non-payers (especially businesses) will have to pay huge fines. LLCs will receive full funding according to the volume of waste they deposit in landfills.

The City Cleaning Service also manages the Tbilisi landfills (Gldani and Iaghluja). These landfills are managed by private companies. The landfills suffer from various problems, the greatest of which are: lack of equipment; outdated drainage systems; the Gldani landfill is constantly burning and small fires cannot be extinguished because the waste there has been stored improperly for years, and also because the landfill has no water supply; Iaghluja landfill cannot be fully sprinkled with water; the landfills are not properly disinfected and their operation falls short of international standards.

Generally speaking, there is no competition in the waste management system. Both Georgian and foreign companies periodically express interest in getting involved in the system; however, eventually all of them back out, as poor fee collection and the lack of management in the system results in low revenue. There have been no tenders or biddings conducted in the system. For example, the above-mentioned LLCs that clean various districts of Tbilisi have been doing it for years. The City Municipality simply extends their contracts from time to time because these companies have the most experience in the existing conditions.

Apart from any difficulties that companies involved in waste management system have to face, public attitudes towards accumulation of waste and its disposal must be noted separately. According to respondents, the negligent attitude of the population towards garbage disposal is much more damaging than the fact that most of them do not pay the appropriate garbage fees. Very often the people dump garbage in the streets, sometimes near garbage dumpsters, but not in them. Despite the fact that the streets are regularly cleaned and swept, they are polluted very quickly, as the streets are littered not only by passers-by, but by drivers, as well. Additionally, the public demands that the LLCs dispose of both domestic and construction waste. This requires additional equipment, workforce, etc. (as one vehicle cannot pick up all the garbage left near the dumpster). Most construction waste are dumped in the streets at night. When a resident asks the LLC to dispose of his or her construction waste for a certain fee, the LLC is ready to do it; however, most of the time the residents just dump this garbage or demand that the LLC dispose of it for free. Respondents also note that public negligence may create additional problems for the new vehicles purchased by the City Municipality, as each of these vehicles has compactor that is intended for domestic garbage rather than construction waste, and so these vehicles could soon be damaged.

Respondents believe that waste separation has considerable economic potential, as landfills accumulate various resources (discarded glass, plastic, paper, nonferrous metals, etc.) that could be used by certain individuals and organizations. Two LLCs, “Vake” and “Tbilservisi,” are pressing and selling paper and plastic. Some other private companies buy and sell various materials. The following aspects must be taken into consideration in establishing a system for separation and processing/recycling of waste:

- Considerable time will be required before the public gets used to separating waste, as “first of all they have to learn to put their garbage into garbage bins.” The public also needs moral (reduction of pollution) or monetary incentives for which an appropriate advertising campaign is necessary;
- Construction of a waste processing factory requires both considerable funding and exact information as to what type and amount of waste is generated in the country. (The Ministry of Environmental Protection and Natural Resources of Georgia is now working on the waste inventory project);
- Most importantly, waste collection and processing/recycling requires appropriate legislation; certain prospective investors have thus far refrained from investing due to the literal legal chaos and absence of regulations in this sphere.

On the other hand, there are several enterprises in Georgia (Ksani Glass Factory, Tbilisi Paper Factory) that are currently processing the secondary materials, and they could use much more. Together with waste reduction, waste separation will encourage the development of various businesses, increasing state budget revenue and decreasing street pollution (waste reduction will be unwelcomed only by the LLCs that collect and dispose of it, as their income is based on waste volume). All respondents agree that the City Municipality must take responsibility of coordinating of waste separation, and must give incentives to private companies to participate in the waste management system (the Municipality should encourage their activities, offering them certain privileges, etc.).

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1. Introduction

Waste disposal is an acute problem all over the world today, and environmental problems caused by improper waste management have attracted worldwide attention over the past few decades. However, waste management has been practically ignored in Georgia until recently. This could be due to problems in waste management planning and environment protection, lack of administrative and financial resources, the overall socio-economic and political situation in Georgia, and insufficient public interest in environmental issues.

Since the second half of the 20th century, when waste volume reached catastrophic proportions due to population increase and industrial development, many countries realized that alternative methods of waste management had to be established. The limited resources of the earth for storing waste combined with the high toxicity of landfills (due to technical innovations and increased production) predisposed everyone to the use of landfills as the cheapest option for waste disposal. Unfortunately, the social and economic costs to repair the damage inflicted on the environment and on human health have turned out to be much greater than expected. Therefore, it has become necessary to pursue alternate methods of waste management that are directed at reducing both waste volume and its effects on the environment. A so-called “waste hierarchy” was formed, according to which the highest priority in the waste management system was given to waste prevention and such methods of waste reduction as recycling, composting and reuse. The second place in this hierarchy was given to incineration of waste for energy recovery. Finally, the lowest priority was given to dumping waste in landfills. This “waste hierarchy” establishes the basis for waste management systems in all developed countries and their waste management planning and methods have been developed based on it. The main goal is to dump as little waste in landfills as possible.

Many countries have developed their own specific methods and mechanisms for implementing the “waste hierarchy”. There are various ways to decrease waste volume. For example, recycling and reuse of waste, decreasing the volume of production, increasing the tax on waste, taxation of landfills, etc. Very often state subsidies or taxes are directed at encouraging recycling. Sometimes recycling is mandatory; in this case, anyone who places recyclable waste with other non-recyclable garbage may be fined. Other methods directed at decreasing waste volume influence the production process itself. For example, taxation of each item produced, or taxation of packaging materials, which significantly reduces portion of packaging waste in the overall waste volume. Producers are sometimes taxed because their product prices usually do not incorporate the cost of disposal after the product has been discarded, and so the costs of disposal and neutralization of this waste must be bared by the state and the public. By taxing the producer it is possible to restore this upset market balance.

Despite the fact that landfills are considered the lowest priority in the “waste hierarchy,” as this option inflicts the greatest damage to the environment, some waste must still go to landfills. Therefore, the proper arrangement of a landfill is a very important issue. Modern landfills - also called “sanitary landfills” - are arranged in a way to prevent leachate leaks and to collect methane and carbon dioxide to minimize air pollution. Waste is stored in layers and they are periodically covered with insulation materials. As a result the problems that landfills had posed in the first half of the 20th century, such as burning of waste, air pollution, pollution of underground and surface waters and soil due to leachate leaks, spreading of rodents, foul odors and dust have largely been resolved.

Despite worldwide tendencies, waste management in Georgia is limited to technical service and nominal sanitary-hygienic functions. The main form of waste management used remains disposal of waste on landfills. These landfills are not well organized, they do not comply with any international standards, and they are a source of constant pollution. Their operation period is limited and they should be closed down in a few years. There are also problems with waste collection: waste collection is very often delayed, the equipment is very old, dumpsters and containers are in disrepair, and streets are littered by uncovered in-transit garbage trucks.

Fortunately, over the past few years waste management become an important issue in Georgian politics. Currently, a state waste management strategy and concept is being drafted and waste management agencies are being reorganized. However, socio-economic problems, low public motivation, lack of administrative-financial resources, and other issues still create certain obstacles in the development of this field. Therefore, it is imperative to conduct research to identify the faults in the current system and the opportunities for introduction of alternative methods for waste management. Interviewing potential stakeholders and other parties involved in the waste management makes possible to determine their roles in the future waste management system. The research coincided with important changes made in the city waste management, which, to a certain extent, enables us to analyze the future directions of the sphere's development. However, many issues are still in transition, as the state waste management strategy has yet to be developed.

1.1 Aim of the Research

The aim of the research was to study the municipal waste management system, its advantages and deficiencies, anticipated changes, and activities carried out by various state and private organizations involved in the field; also to study and identify opportunities for introduction of alternative environmentally-sound waste management methods. The following structures and processes were targeted during the research:

- Agencies involved in the municipal waste management system and their hierarchy;
- The rights and obligations of the above-mentioned agencies;
- Key problems existing in the municipal waste management system;
- Existing fees set for waste collection, problems with setting and collection of fees, and tariff policy;
- Competition in the waste collection, transportation and disposal;
- Opportunities for separation and recycling of waste;
- Evaluation of current and possible changes in the field.

1.2 Scope of the Research

Research was carried out only in Tbilisi (where almost half of Georgia's population resides), and does not include data on waste management system from other regions and towns in Georgia.

The research was also limited to studying the domestic or municipal waste management system, and did not cover the management of other types of waste (domestic waste is that produced by physical and legal entities while cleaning their place of residence. This does not include industrial waste derived from construction activities carried out by physical persons).

The research coincided with important changes in Tbilisi's waste management system, as relations among various agencies had changed but new protocols were not in place yet. Because of this, the opinions expressed by respondents were mostly their presumptions; some of their comments described old relations and experience, while some of them expressed their views on what changes they expected to take place. These difficulties were reflected in the research.

1.3 Methodology

During research we utilized both qualitative and quantitative approaches.

Qualitative research included 23 in-depth interviews with representatives of the Cleaning Services of various Tbilisi districts, Tbilisi City Hall's City Service and Supervision Service, the Ministry of Environmental Protection and Natural Resources, and various private companies. Several homeless

people living in various districts of Tbilisi were also interviewed. Quantitative research included around 600 interviews with Tbilisi residents.

Respondents for qualitative research were selected based on the following criteria:

Eight people representing LLCs that clean various districts of Tbilisi (Didube-Chughureti, Isani-Samgori, Mtatsminda, Krtsanisi, Vake, Saburatio, Nadzaladevi and Gldani districts) were interviewed. Individuals working at two landfills (Gldani and Iaghluja), and representatives of the City Cleaning Services and the Ministry of Environment Protection and Natural Resources who are involved in Tbilisi municipal waste management system were also interviewed.

Our research covered enterprises that use secondary materials in their production: the Ksani Glass Factory, the Tbilisi Paper Factory, the Metaloplastic Plastic Processing Company, and companies that may be interested in recycling: Coca-Cola, Kazbegi, the Georgian Glass and Mineral Water Company, Nabeghlavi, Europe Plus Trading, Tao+ and Elkana.

In all of the above-mentioned state and private structures managers were interviewed. The only criterion for selection of homeless people was their activity in various districts of Tbilisi.

Respondents for quantitative research were selected based on the following principles: the first selection cluster was the specific district of Tbilisi. Districts were selected based on the Probability Proportional to Size (PPS) method. The second cluster was the family; Families were selected randomly. The final cluster was the individual respondent. Respondents in families were selected based on the last birthdates.

2. The Tbilisi Municipal Waste Management System and Agencies Involved in Waste Management

2.1 Agencies Involved in the Waste Management System, Their Hierarchy and Obligations

Tbilisi City Hall Cleaning Service

The main agency coordinating the Tbilisi municipal waste management system is the City Hall Cleaning Service, which was formed on January 1, 2006. Its functions include overseeing the removal of municipal waste and the management of landfills. In this respect, the City Cleaning Service has assumed the functions formerly carried out by the Public Works divisions of the city's district administrations and City Hall. The City Hall Cleaning Service hires limited liability companies (LLCs) to serve various districts of Tbilisi, performing various works necessary for cleaning the districts under their jurisdiction. These hired LLCs transport, store and neutralize accumulated waste at the city's Gldani and Iaghluja landfills.

Tbilisi City Hall Supervision Service

In August 2005 the Tbilisi City Hall Supervision Service assumed the functions of the former sanitary supervision service, the city environmental protection service and the administrative inspection. The City Hall Supervision Service is responsible for studying sanitary conditions within the city. It also monitors sanitary conditions of landfills, and informs local administrative bodies as to sanitation processes (collection and transportation of waste), landfills operations, etc.

The City Hall Cleaning Service and the Supervision Service are both control agencies; however, their functions are clearly defined and do not overlap. The Cleaning Service is mainly concerned with financial and legal issues, while the Supervision Service is mainly concerned with controlling sanitary norms. For example, the Cleaning Service plans to work out the fines system and its implementation,

while the Supervision Service defines the norms that dumpsters, vehicles etc. must comply with. The City Cleaning Service manages the city's landfills, while the Supervision Service ensures that these landfills are operated properly, so as not to threaten public health.

It should be noted that the research coincided with important changes made to Tbilisi's municipal waste management system, for which reason respondents in various agencies chiefly expressed their presumptions as to what their future functions would be. According to them, the system changes had been implemented, and therefore many things could change in the future.

Limited Liability Companies

Eight LLCs currently serve various districts in Tbilisi:

- Nadzaladevi district is served by Nadzaladevi LLC;
- Mtatsminda district is served by Tbilisvisi (a joint enterprise of Tbilisi and Saarbrücken, Germany);
- Saburtalo district is served by Saburatlo District's Sanitary Cleaning Special Auto Fleet LLC;
- Gldani district is served by Sanitari Gldani LLC;
- Krtsanisi district is served by Special Auto Fleet Krtsanisi LLC;
- Vake district is served by Vake LLC;
- Isani-Samgori district is served by Isani-Samgori Sanitary Cleaning Special Auto Fleet;
- Didube-Chughureti district is served by Didube-Chughureti Sanitary Cleaning Special Auto Fleet LLC.

These LLCs were formed on the basis of the district administration services that formerly cleaned the city. Therefore, most managers of these LLCs have experience of working in the municipality or in sanitation services. The LLCs are comprised of administrative personnel, workmen, drivers, yard keepers/cleaners, distributors and vehicle maintenance personnel. The number of personnel in each LLC varies from 200 to 400.

The main obligations of those LLCs are:

- Collection and removal of domestic waste;
- Sweeping, cleaning, sprinkling and washing of streets;
- Maintenance of garbage cans;
- Cleaning gullies;
- Catching and exterminating stray dogs.

The LLCs transport accumulated waste to the Gldani and Iaghluja landfills. The Iaghluja landfill is used by the LLCs that serve the Mtatsminda, Krtsanisi and Isani-Samgori districts. The LLCs working in other districts of Tbilisi use the Gldani landfill. Currently, one loading station is still functioning, but will be closed down soon. The LLCs that clean Vake and Saburtalo districts have their own loading stations. Initially, they transport waste to these loading stations where it is loaded onto bigger trucks, reducing the cost of transporting waste to the landfill.

Representatives of the LLCs supplied different information as to their functions as concerns stray dogs. Some respondents said that they were no longer obliged to catch dogs because animal rights organizations had protested against it. However, there are still districts in Tbilisi such as Didube-Chughureti, where LLCs still catch and exterminate stray dogs. This district has a serious problem with stray dogs, because there many markets there. Every day the LLC working in this district catches and exterminates 20-25 stray dogs, then disposing of the bodies. Local residents often call the LLC to report stray dogs in the street, but then they protest their extermination. LLC Vake also exterminates stray dogs and transports them to the Gldani landfill. According to one LLC representative, as of January 2007 the LLCs will have to catch the dogs and take them to dog pounds. These dogs may be

vaccinated and used for laboratory tests. The LLC representatives that we interviewed welcome this decision.

Two private companies currently store and neutralize waste in Tbilisi's two landfills. The administrations of both landfills have also contracted private companies to disinfect the landfills. Far fewer people currently work on the landfill than the number of people who collect and remove waste from Tbilisi: 11 people are employed by the LLC that operates the Gldani landfill and 16 people are employed by the LLC that operates the Iaghluja landfill. This included managers, dispatchers, machine operators, tractor drivers, workmen and security staff.

Relations between City Services and Limited Liability Companies

If LLCs working in various districts of Tbilisi systematically violate their obligations, the City Cleaning Service can apply certain sanctions against the offending organizations. The City Cleaning Service has technical supervisors for each Tbilisi district who go to various neighborhoods and register all the possible delays in the work of the LLCs. Based on the information they submit, the Cleaning Service can enforce certain punitive measures against the offending LLC, such as withholding payment (for example, when a street is not swept on time or the garbage has not been removed in time).

According to the City Supervision Service, if sanitary norms are neglected, several articles of administrative code (concerning sanitation) can be used against the LLCs, including fines for LLCs that fail to meet their obligations in accordance with the above-mentioned norms. The most extreme measure that can be applied against an LLC is termination of contract. However, this has not been employed thus far. LLCs are often cut funds in reimbursement for various violations, however as LLC representatives note, the City Services are usually indulgent to them as they take into account LLCs' limited capabilities.

Landfill activity is also controlled and monitored by the City Cleaning Service. In particular, the Cleaning Service ensures that dispatchers working in each landfill correctly register the number of trucks that arrive at the landfill. However, according to the Service, monitoring of sanitary practice at the landfills is very difficult. If norms and conditions are violated the City Cleaning Service can terminate contracts with the landfill administration; however, so far there have been no punitive actions or fines given to the landfill administrations.

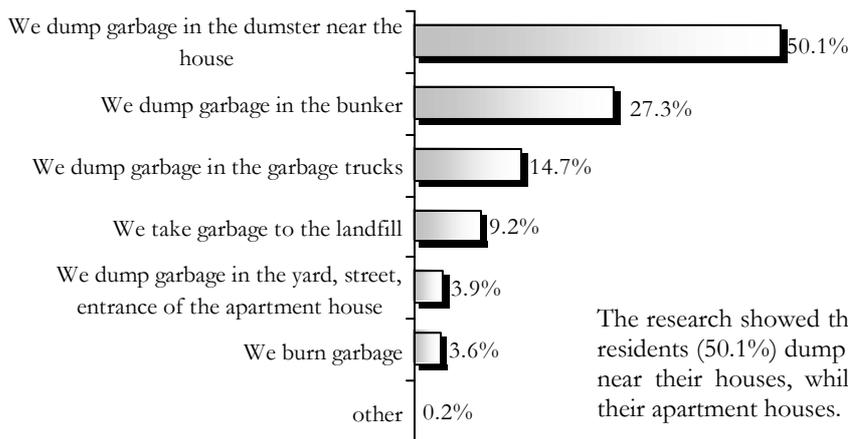
2.2 Municipal Waste Management Pattern – General Picture

Cleaning system

Tbilisi currently employs dumpster, bunker and “ring” garbage collection systems (when the garbage collector rings a special bell so that the residents come outside and dump the garbage in the garbage trucks). The dumpster type is the most widespread. The bunker system is mainly used in multi-storied apartment houses, and the “ring” system is used in old parts of Tbilisi which are difficult for the heavy garbage trucks to access.

There is no strictly-defined schedule for waste removal from apartment house bunkers; the interval may vary from 5 to 10 days. Garbage dumpsters must be emptied daily (on central streets it must be done two or three times a day). As for street cleaning, first category streets (central streets) are swept two or three times a day, second category streets are swept once a day, and streets that have no asphalt are not swept at all.

Where do you and your family members dump your garbage?



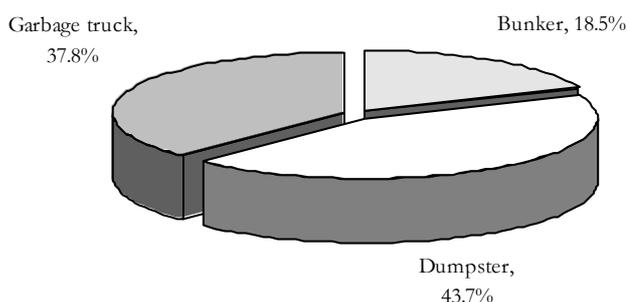
The research showed that half of the interviewed residents (50.1%) dump garbage in the dumpsters near their houses, while 27.3% use bunkers in their apartment houses.

According to research, the most effective system of garbage collection is the dumpster system and the most ineffective is the bunker system. Extracting garbage from apartment bunkers is more difficult than emptying dumpsters. Additionally, disinfection of bunkers is impossible, as the bunkers are a permanent source of filth that facilitates propagation of rodents and insects. The bunker system has been completely abolished in Tbilisi's Gldani district. One representative of Sanitari Gldani LLC says that this was a good decision, as the number of rodents in the apartment houses has now decreased.

The only positive feature of the bunker system is thought to be the fact that residents of many-storied apartment houses do not have to go down to the street to dispose of their garbage. However, respondents said that the foul odor and filth of the bunker outweighed this benefit. To make matters worse, sometimes garbage collectors cannot even physically approach the bunkers to collect waste, as residents often block access by parking their cars in the access path.

The advantage of the dumpster is the fact that it can be easily cleaned and disinfected. If the dumpster's lid is closed, the garbage remains inside and cannot be scattered.

What kind of garbage collection system do you prefer?



As the research shows, polled residents also prefer dumpsters, but LLC representatives state that nobody wants dumpsters in front of their houses. This problem will not be solved until the people stop dumping garbage outside the container rather than inside it. Also, construction waste is constantly dumped near the dumpsters. Many respondents also liked the "ring" system of garbage collection, as well (37.8%).

In parts of almost every district in Tbilisi the "ring" system of garbage collection is still used. According to the respondents, the "ring" system is more or less justified in the parts of town where the streets are narrow; however, that system also has problems, which are most evident in the outskirts of the city, where there are mainly one-storey private houses and local residents often keep domestic animals. A respondent from an LLC serving the Isani-Samgori district describes the deficiencies of the "ring" system: people often keep poultry and domestic animals in their houses, and they have a larger and more "specific" volume of waste (hay, dung, etc.), and as a result the waste of 3-4 families can often fill an entire garbage truck. Residents demand that the LLC remove this waste together with their domestic garbage, so trucks loaded with waste have to come back to the same street several times a day. As it is

impossible for them to visit every street during the daytime, both the public and the LLC employees are unhappy.

One representative of the City Cleaning Service has a different opinion on the issue: he believes that each of the above-mentioned systems must be used due to various objective circumstances. For example, the “ring” system is justified in those districts of Tbilisi where there are no apartment houses, so in some districts the Cleaning Service plans to place large dumpsters and negotiate with local residents as to how often they will be emptied.

A respondent from Special Auto Fleet LLC, which serves Tbilisi’s Saburtalo district, noted that problems with garbage collection should be expected in newly-built apartment houses, as well. For example, he cited the newly-built apartment houses near the Sports Palace, which have neither bunkers nor designated dumpster locations. The agency that approves construction for such housing has completely failed to consider the garbage collection issue.

There are still problems with cleaning the city. The LLCs admit this, citing outdated equipment and lack of personnel as the main obstacle. Both Tbilisi residents and those agencies controlling LLC activities often express dissatisfaction with the way the garbage is collected and removed.

During the final stages of the research the various LLCs started to use new equipment imported by the City Municipality. According to respondents, this has already yielded some positive results that can be noticed especially during the evening hours (for example, clean streets, pleasant odors, etc.), however, the experience with the new equipment is very brief thus far, and LLC representatives cannot fully evaluate their usefulness yet. At the same time, some respondents noted that the trucks bought by the City Municipality are quite old and could break down soon.

Landfills

Tbilisi currently has two active landfills: Gldani and Iaghluja.

The Gldani landfill has great capacity. It has been in use for the past 10 years and only 1,000 square meters has been utilized. Its lifespan is not defined; this depends on how quickly it is filled with waste.

About 250 trucks go to the landfill daily, delivering around 2,400 cubic meters of municipal waste. The volume of garbage is registered daily, since the budgets for the garbage collecting and landfill operating LLCs are calculated based on these figures.

Waste brought to the landfill is compacted and transported to gullies on tractors. Then various substances are scattered over the garbage to prevent burning, and the garbage is also watered. A tractor pushes the waste into the landfill. The landfill is divided into two parts: when one part is being used the other is being disinfected, and vice versa.

The most serious problem at the Gldani landfill is the fact that it lacks water supply. Water is necessary to minimize the smoke caused by burning garbage. Currently, the smoke cannot be completely stopped there, as garbage has been stored there improperly for years.

The Iaghluja landfill has been used for the past 12 years. Its expected lifespan is 30-40 years. The landfill covers 3 hectares of land. About 1,300-1,600 cubic meters of waste are brought to the site each day. Waste volume has increased during the past two months: whereas previously about 1,200 cubic meters of garbage was brought to the landfill, now the average exceeds 1,700 cubic meters.

The landfill is organized in a very basic way: the drainage system functions, but it is too old and its quality is doubtful. There is no conservation, insulation, or covering of garbage with soil. Waste

products are dumped in the gully and watered. However, due to the large territory, the Iaghluja landfill is not fully watered, so garbage burns here, too.

Respondents note that neither landfill operates according to established standards: they are not fenced, they are not periodically covered with soil, etc. therefore garbage often self-ignites, which is harmful for human health, especially as there is polyethylene and medical waste in the landfill. Control of sanitary conditions at both landfills remains a problem. The composition of waste brought to the landfill is not registered. One landfill employee noted that the site was not fully disinfected due to insufficient funding.

Due to these problems, garbage is not stored/neutralized properly at these landfills, which represents a real danger for public health. A City Supervision Service representative thinks the garbage should be either burned in special factories (with or without recovery of energy) or recycled. He believes that if this could be realized, waste volume would decrease significantly .

2.3 Financial Aspects of Municipal Waste Management

Based on a decision of the Tbilisi Sakrebulo (elected municipal council) on June 20, 2001, the maximum tariff for the removal of 1 cubic meter of waste is defined based on the average distance traveled by garbage trucks in each district of Tbilisi. With this decree, the Tbilisi Sakrebulo decided that the monthly cost for public collection/removal of garbage (when average distance covered by the trucks is 50 kilometers) amounts to 67.2 tetri. The Sakrebulo did not change the monthly residential tariff (40 tetri per individual) but instead decided that the difference between the actual cost of garbage collection/removal and the actual tariff for the population, as well as the costs for covering more than 50 kilometer distances by trucks, should be paid for through subsidies allocated from Tbilisi's district budgets.

The per capita cost varies for LLCs working in various Tbilisi districts. Therefore, subsidies allocated to cover the differences between the real costs of garbage collection/removal and the tariffs paid by the population vary. For example, in the Isani-Samgori district, it costs 57 tetri per person. In this case the state contributes 17 tetri for each individual. In the Saburtalo district, the cost is 70 tetri per person, so the state allocates 30 tetri. The streets are swept through state subsidies, as well.

Reimbursement of various LLCs working in different districts of Tbilisi is done through taxes collected from the public and from business companies, and through state subsidies. Currently, due to the fact that residents and business companies do not pay taxes in full, and as the tax tariff itself is quite low, the most stable source of funding is subsidies.

Currently, LLC representatives note the following problem in their relations with the state: The LLCs pay VAT, which is calculated based on the sum that the LLCs should theoretically receive if the population and business companies pay taxes in full. The problem is that the actual revenue collected is much less, but the LLC must still pay the full VAT, and so, therefore all the LLCs actually have tax arrears:

“For example, I should be collecting 113,000 GEL monthly from the public, but in fact, if I collect 35,000-40,000 GEL that is already something. I pay the government the VAT, which amounts to 18% of that 113,000. That is the way it is written in the agreement, and regardless of whether I receive the sum in full, I still have to pay that fixed sum plus profit tax and whatever I collect from the public I use to pay to the budget to cover my debts”. - Special Auto Fleet LLC, Isani-Samgori district

The amount of funds allocated by the state for landfills are also dependant to the volume of waste. The government allocates 36 tetri per cubic meter of garbage sent to the Gldani landfill, and 47.5 tetri for

garbage sent to Iaghluja. This means that all activities at the landfills are subsidized. The funds are mainly allocated for disinfecting substances, equipment repairs, fuel, water supply, etc.

Businesses also pay certain fees for disposal of waste at the landfills. Sometimes local residents also dispose of construction waste (usually waste after house renovations); however, according to one employee from the Iaghluja landfill, this is rare, and thus the landfill demands no payment from the residents for this service.

Because state subsidies both for garbage collection/removal and disposal at landfills are defined by overall volume of waste, the amount of waste brought into each landfill must be registered. Documents indicating the volume of waste brought to the landfill are checked by representatives of the LLC that hauls the waste and by the LLC operating the landfill. The document is then signed by both parties and sealed, and sent to City Hall's City Service (for example, a respondent from the LLC serving the Nadzaladevi district presented an expenditure paper with monthly data detailing how much waste had been brought to each landfill). In all LLCs covered by our research the salaries of laborers and drivers are determined by the volume of garbage they collect and remove from the city. The salary of a yard keeper/cleaner is based on the size and category of the territory (streets) he or she cleans.

Therefore, both the LLCs collecting/removing waste and the organizations running the landfills are interested in increasing waste volume; however, as one LLC representative noted, LLCs should be stimulated by increasing fines for dumping the waste in illegal landfills rather than by tying the reimbursement to waste volume. The current system directly encourages artificial increasing of waste volume brought to landfills, as it is profitable for both parties (waste collecting/removing LLC and the LLC running the landfill). The volume of garbage in each truck (whether the truck is full or not) is also subject to exaggeration. As respondents noted, the landfills will be equipped with special scales in order to eradicate this problem.

3. Problems in Municipal Waste Management System

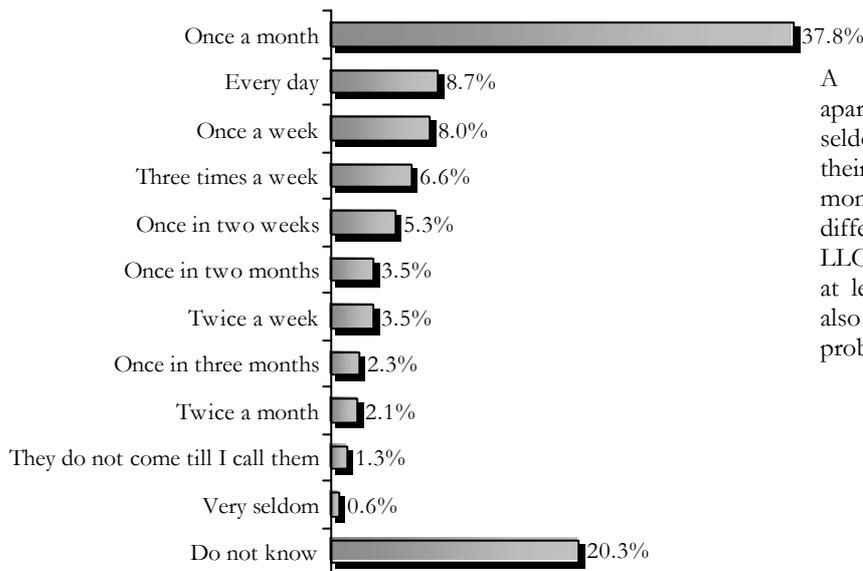
Representatives of City Services, LLCs and the public note problems in the waste management system. The main problem in the municipal waste management system is the lack of financial resources. As a result, the equipment used by LLCs is old and the number of personnel is insufficient. The system suffers additional problems as many residents and businesses do not pay the garbage fees, instead simply dumping their waste right in the streets. Also, due to the outdated equipment, domestic waste and dust are not removed from the streets on time. Trucks often break down, and sometimes several trucks are needed for a single neighborhood. Work starts at 6 a.m., but due to technical problems it is not completed by 8 a.m. (as schedule dictates). Some garbage also flies out of the old trucks before reaching the landfills.

All LLCs note that the public often complains about the service. Residents' complaints are mainly as follows:

- Bunkers in apartment houses are not emptied on time;
- Construction waste accumulates on the streets;
- Stray dogs wander the streets;
- There are many homeless people, whom most Tbilisi residents associate with pollution.

How often is the bunker emptied in your apartment house?

Respondents whose family members generally dump garbage in their apartment bunkers



A survey of residents shows that apartment bunkers are emptied quite seldom. 37.8% of respondents say that their bunkers are emptied only once a month. This information radically differs from the data provided by the LLCs, who say that bunkers are emptied at least once in 10 days. Though they also note that emptying bunkers is problematic to them.

Respondents say that they complain to the City Cleaning Service via the telephone hotline, and sometimes directly to the LLCs, as well. The complaints are “seasonal” – their number sharply increasing in summer.

All the LLCs spoke of receiving public claims, with the exception of one LLC working in the Krtsanisi district. A representative of that company believes that the lack of complaints is due to the fact that the district has no apartment houses and uses the dumpster system. The dumpsters are always emptied on time, all bunkers have been retired there, and in some parts of that district the “ring” system is still used.

According to representatives of the City Cleaning Service and the LLCs, since City Hall gave the LLCs new garbage trucks the situation has improved. However, at the time of research the LLCs had no longstanding experience using those new trucks.

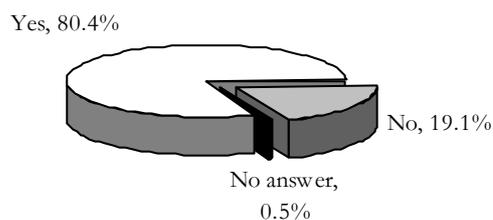
Lack of funding creates problems for landfills, as well. They are poorly organized and need corresponding equipment and personnel so as not to threaten the environment or human health. The drainage system is old and it cannot function properly, and the landfills do not meet modern standards.

3.1 Collection of Fees from the Public

The rate of fee collection varies from district to district; but never exceeds 65 %. The highest rates of collection are in the Vake district (60%) and in Saburatsulo (about 65%), whereas the lowest collection rates are in the Nadzaladevi and Krtsanisi districts (about 25%). Collection rates have increased in all districts since the LLCs established contracts with Telasi, Tbilisi’s electricity distribution company, according to which the two companies collect fees jointly. Nonetheless, fee collection remains a serious problem.

The average rate of fee collection in Tbilisi is about 50%, although a survey of Tbilisi residents shows absolutely different results.

Do you pay your garbage collection fee regularly?



Respondents polled in Tbilisi provided different data concerning the above-mentioned issue. The absolute majority (80.4%) said that they paid the fee for garbage collection/removal regularly.

The problem is that there is no mechanism that allows LLCs to make residents pay for the service. The reason is simple: if an LLC decides to not serve an individual family in any given apartment, then it must stop serving that individual's neighbors, as well, who may be paying the fee regularly.

All respondents agree collecting fees jointly with Telasi has been a wise step. The LLCs pay Telasi a certain interest from the fees collected from the population, but respondents say the increased collection of the fees is really worth it. Telasi sends the bills to absolutely all the households that have Telasi electric meters installed, and the bill includes the garbage fee as well. This reminds people that they must also pay for water and garbage services. In this way, the public is gradually getting used to the notion that they have to pay for garbage services, too. Telasi prints and distributes these bills. Fees collected for garbage service are first transferred to Telasi's account, and then forwarded to an LLC's account, minus the sum that the LLC pays to Telasi for this service.

Previously, garbage collection/removal fees were collected by distributors of service centers (the "Household Management Offices"). The amounts collected by them were not substantial, but they could implement punitive measures for non-payment, such as denial of documents needed from the service center. After the service centers were abolished, the LLCs started thinking about finding distributors and settling other organizational issues. In the end, working with Telasi turned out to be less expensive than hiring distribution companies.

There is only one problem connected with the collection of garbage service fees from the public with Telasi: the garbage service fee is calculated based on the number of people in a certain family, whereas the number of family members on the Telasi bills is often incorrect. Telasi used information on the number of family members in each household from data that comes from Tbiltskalkanali (Tbilisi's water supply company). However, Tbiltskalkanali had no information on the number of family members in some households, so Telasi decided to indicate four members for bills sent to those households. Because of this, families with fewer members then had to apply to the City Cleaning Service and ask them to change the data in the bills. For this reason, some individuals have refused to pay garbage collection/removal fees.

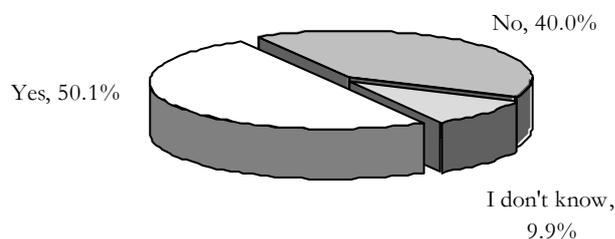
Respondents representing the LLCs state that the fee tariff itself was quite low, and reflected actual fuel costs, but since the tariff was approved the cost of fuel has increased significantly. Also, the new vehicles received from the City Municipality require additional servicing, which means additional cost. Therefore, they believe the tariff must be changed and made more realistic.

In the initial stages of research, respondents spoke more of increasing tariffs; but by the end of our research they had more information on expected changes in the financing of that sphere and the control of financial resources, so it became less of an issue.

At the same time, while most LLC respondents said that tariffs were too low, they said that the most effective way to increase LLC incomes was not by tariff increase, but by better fee collection.

“A tariff hike could even decrease our income, as honest payers would naturally protest: ‘I am paying the tariff and you are increasing this tariff at my expense? You want to collect half the city’s tariffs from me?’” (Special Auto Fleet LLC, Krtsanisi).

Would you pay more in order to make the city cleaner?



Public opinion on a probable tariff hike is split; however, almost half of all respondents would pay more if it would solve the garbage collection/removal problem in the city.

3.2 Relations with Business Companies

Apart from its problems with the public, the LLCs serving the various districts of Tbilisi have problems collecting garbage service fees from businesses, as well. Businesses are obliged to sign contracts with the corresponding LLCs and pay different fees for the service. There are problems in the formalization of contracts and in the collection of the fees.

There is no fixed sum for business companies. Respondents from LLCs say that the tariff is by mutual agreement: the parties calculate the volume of waste and the cost of its removal.

The tariff for businesses must take into account the distances covered by garbage trucks, the volume of waste, and the type of business. The City Cleaning Service believes that calculation of tariffs for businesses is one of its biggest problems. This is for several reasons:

- Various companies accumulate various kinds of waste;
- Criteria must be clear for what each business should pay for waste removal (for example, what criteria should a hotel use for waste calculation: property area or number of beds?).

The only respondent who could provide us with a clear tariff calculation scheme for businesses was a representative of Vake LLC (the arrangement is not used in other districts of Tbilisi): The distance between the Vake district and the landfill is 78 kilometers, so each business must pay 11.97 GEL per cubic meter of waste. This sum covers fuel, salary, vehicle wear-and-tear, and budget costs. In order to determine waste volume, trade centers and enterprises must make a contract with the LLC, after which a dumpster is installed on the premises. The dumpster makes it much easier to determine waste volume.

Most businesses do not pay garbage service fees – instead, they use dumpsters intended for residential customers. Some of these companies refuse to pay the designated sum for garbage removal, and pay only 3-5 GEL. This is a very small sum, as the respondents say even a medium-sized shop can accumulate 1 cubic meter of waste in 2-3 days, for which it should pay at least 10 GEL.

Problems with businesses are less evident in those districts of Tbilisi where there are fewer enterprises or shops and their shares in the total incomes of the LLCs are insignificant (for example, Nadzaladevi and Isani-Samgori districts). The LLCs have much bigger problems in the center of the city, where most of businesses are situated, as these companies refuse to pay the garbage fees and the LLCs suffer significant loss. For example, a respondent from an LLC serving the Saburtalo district noted that 70% of the businesses operating in the district did not pay for garbage service at all.

Some state agencies are also reluctant to pay the tariff. The debts of some of these agencies amounts to several thousand GEL. According to respondents, some of these agencies just do not want to pay,

despite the fact that they could, whereas some, such as kindergartens and schools, simply have insufficient funds.

The main problem in relations with businesses is that there are no mechanisms to make the business organization formalize its agreement with the LLC. The state does not subsidize the LLCs for serving businesses. If businesses do not pay the fees, the LLCs could stop serving them, but even in this case, businesses would still dump their garbage in the districts that the LLCs served (maybe even right in the streets) and eventually the LLC would still have to serve them. The only way to influence businesses is to delay garbage removal temporarily, which would be an inconvenience.

The administration of landfills also makes contracts with businesses. For example, the Gldani landfill has a contract with the Eniseli Company, and the tariff is defined by mutual agreement.

One respondent recommended it would be better if they could receive information on each business from the tax inspection service, and then each would have to be forced to pay fees using different mechanisms (such as property area, etc.). A special body that could work on fee collection and fines for businesses could also be formed.

3.3 Personnel

Due to low income, LLCs serving various districts of Tbilisi have trouble hiring sufficient number of personnel. For this reason, even when an employee's work is unsatisfactory, the employer is reluctant to fire him, as there is no guarantee that a replacement could be found.

The salaries of workers who load garbage trucks and for truck drivers are very low: only 65-70 GEL per month for the worker and 120-160 GEL for the driver. If a street sweeper sweeps 2,500 square meters of first category streets, his or her salary is around 60 GEL per month. A sweeper of second category streets receives the same salary for sweeping 3,000 square meter area. Each sweeper is supposed to clean at least 2,000 square meters.

Also, most of these workers are non-Georgians, and come from districts adjacent to Tbilisi, so they have to rent apartments in town and somehow survive on their small salaries. Because of this, the LLCs' requirements of them are minimal. In order to ensure that employee salaries are not too low, the LLCs try to give them many tasks. For example, each street sweeper is allowed to sweep 3,000 square meter area. The street sweepers are supposed to finish their work by 8 a.m., but quite often they are unable to finish on time; therefore, they do everything quickly and not very thoroughly. Respondents believe that this problem could be solved if the salaries were increased.

Sometimes many workers come from a single village, and when something important happens in that village or district (religious event, funeral, etc.) all these workers go home together. This creates additional problems.

During the final stages of our research, representatives of some LLCs noted that the salaries of their employees had already been increased.

3.4 Lack of Competition in the Waste Management System

The development of a waste management system is hampered by the fact that there is no competition in the field. Periodically, both Georgian and foreign companies express interest in investing in this sphere, but then refuse to get involved because:

- Tbilisi has a difficult schematic. The town is built on the Mtkvari River Valley and its length is 45 kilometers, so the territory is hard to manage.

- There are various types of neighborhoods. The bunkers in multi-storey apartment houses are hard to look after.
- The fee collection rate is very poor, so the business is not profitable.

Furthermore, foreign companies require higher tariffs for their services, which Tbilisi Municipality cannot afford.

All respondents agree that, generally speaking, the waste management business is profitable all over the world, but without adequate funding the business will never be profitable in Georgia. All LLCs that clean the various districts of Tbilisi have standing debt to the state, as fees from the public and from businesses are not fully collected. For example, representatives of Special Auto Fleet LLC (Krtsanisi) noted that the organization had to take out two bank loans in order to pay the VAT to the state and continue working.

The way bidding is carried out in the waste management field also indicates the lack of competition. According to LLC representatives, the most recent tender was conducted in the spring of 2006. These respondents did not know anything about the concrete conditions of the tender; they simply said they submitted required documents without reading the conditions thoroughly. The general conditions were that LLCs were supposed to sweep and sprinkle the streets, garbage was to be removed on time, and new equipment was to serve the city. Respondents often noted that bidding was just a formality, and that it was actually impossible for them to meet all the requirements as detailed in the tender.

Currently these LLCs have short-term agreements with the City Cleaning Services. Respondents expected the announcement of a new tender in the autumn, based on which, selected companies would be awarded 5-year contracts. They also commented that if the City Cleaning Service signed long-term contracts with them they would be able to renew their fleets, which was impossible under the short-term contracts.

There is little competition in the landfill management sphere, as well. Representatives of Dzala, LLC, which won the bid for the Gldani landfill operation, noted that there were few contenders in the bid, as the business is not very profitable. Respondents hope that after the expiration of the one-year contract they will win the tender again and continue operating the landfill.

Respondents credit the absence of competition in waste management system to the fact that “working in waste management system is not pleasant; nobody wants to work here.” They said that foreign investors would be interested in the landfill if a recovery of energy, fertilizers, etc were possible. Some respondents said that the introduction of new vehicles would change bidding conditions and control from the supervisory organizations would increase.

Some time ago, Japanese investors expressed interest in cooperating with the Iagbluja landfill. Their goal is to utilize waste to recover energy. Negotiations between the parties are now at the initial stage.

3.5 Level of Public Awareness

Representatives of agencies involved in the waste management system cite low public awareness as an insurmountable problem. According to respondents, despite the fact that in some districts the City Municipality has placed a limited number of containers with lids, people are still throwing garbage outside the containers: some people are loath to open the lid, while others send children to dump garbage, and small children cannot reach the container lids, etc.

One of the most problematic issues for LLCs is the removal of construction waste and garbage accumulated as a result of remodeling and renovation. Although LLCs serving the Tbilisi districts are obliged to collect and remove only domestic waste, residents often dump construction waste, tree

branches and building materials in dumpsters. Some residents of multi-storey apartment houses dump such waste straight down the apartment bunkers. Collection and loading of construction waste from these bunkers is quite difficult. Some residents dump various waste from their cars, and even out the windows of their apartments. Mixing domestic and construction waste creates problems for the newly imported trucks. These vehicles compact the garbage, and if there is construction waste in the mass it could damage the vehicle. The vehicles lift and dump the dumpsters automatically. The garbage is then crushed and compacted inside the vehicles. The trucks have several kinds of failsafe devices; for example, they do not lift any dumpster that is over 500 kilograms. If a dumpster contains too much iron or glass, the truck's alarm goes off to signify that the mass is too dense to process. However, even with such failsafe devices, other non-domestic waste could still damage the new trucks.

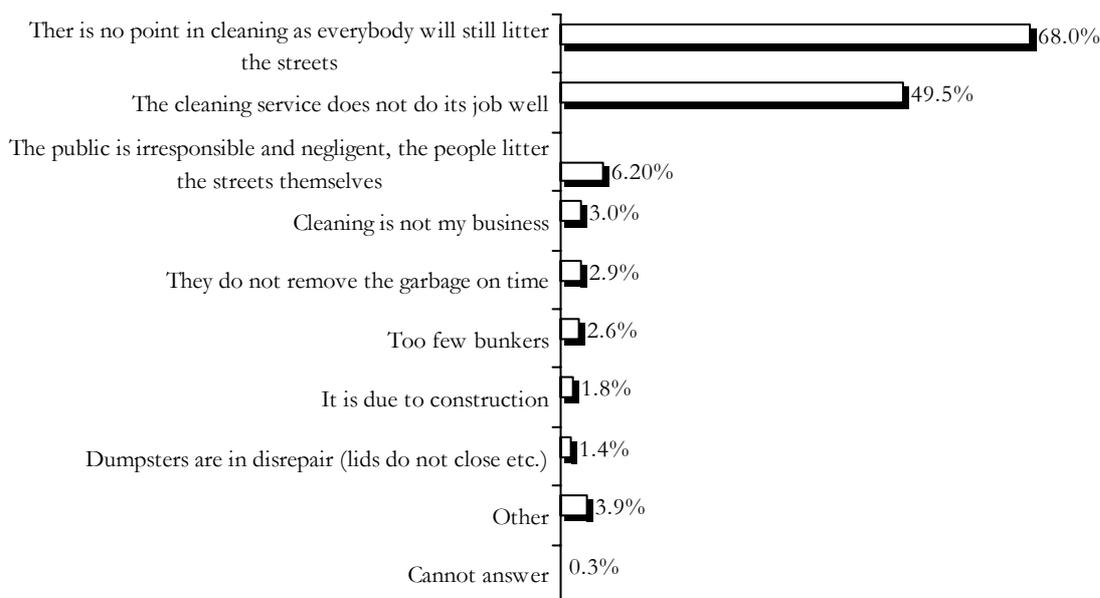
According to respondents, as of January 2007, a PSA will be aired on TV to inform citizens as to what kind of waste should and should not be put in dumpsters.

LLC representatives say that there is no clear regulation concerning how non-domestic waste should be disposed of. Respondents believe that anyone with such waste should simply contact the corresponding LLC that serves the neighborhood and negotiate a price for removal. However, many residents prefer simply to dump such waste on the street at night. If others add to this pile, it leads to large masses of waste in the central streets.

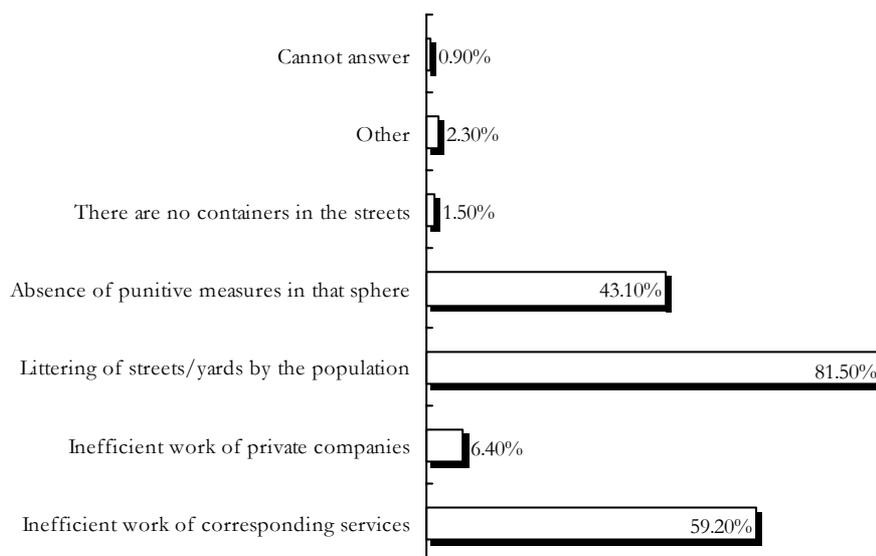
Some residents hire trucks to haul off construction waste, but these trucks simply take the garbage to the nearest dumpster, so it really makes no difference whether a private truck is hired or the LLC. Either way, the LLCs often have to send several vehicles to collect and remove all the garbage at their own expense.

Tbilisi residents also cite the fact that the public litters the streets. 59% of respondents say that garbage is dumped near the entrances of their apartment houses/yards, citing as an explanation: "There is no point in cleaning as everybody will still litter the streets" (68%).

Why do you think things are in such a bad state?



Please name the main causes of street pollution in the town



For most polled residents of Tbilisi, sanitary conditions near their homes are critical; the average points given by residents is 4.1 points out of 11 maximum points (see the graphic). According to 81.5% of those polled, the public is chiefly responsible for street pollution. A smaller number of respondents blame the corresponding services, as well. Respondents cite the absence of punitive measures in the sphere as a contributing factor.

Note: respondents were allowed to submit multiple answers. Thus, the sum of the answers exceeds 100%. "Other" includes answers do not exceeding 1%.

It is to be noted that the most effective way to improve the current situation is thought to be the introduction of punitive measures.

4. Changes in the Municipal Waste Management System

All respondents working in the municipal waste management system noted that significant positive changes had been carried out in the sphere recently. City Hall is very interested in improving the municipal waste management system. This interest is reflected in actual assistance given to various services involved in the field, in particular:

- A specialized structure, the City Cleaning Service, has been formed, to strengthen control of the sphere and improve coordination among the various services. This newly formed service directly manages the city cleaning activities and has no other function, allowing it to concentrate on the task at hand - municipal sanitation.
- The municipality imported new dumpsters with lids, foreign-made garbage trucks, and "sweeper vehicles" for washing the streets. Salary increases are also planned for sanitation employees.

Respondents believe that at the moment the municipality actually is doing the job that LLCs are supposed to do, and that the activities carried out over the past several months are "more than has been done during the last 10 years".

During the research, LLCs involved in cleaning various districts of Tbilisi received new equipment from the City Hall's Public Works Service; this includes vehicles for transporting waste, which have been leased to the LLCs. According to one respondent, these vehicles can transport, compact and process waste. Respondents said they expected more equipment by August 25.

Respondents felt that the activities carried out by the City Municipality raised the field's prestige and helped motivate the public to cooperate with the corresponding organizations. One respondent comments:

"New equipment, dumpsters and personnel wearing the same uniforms would be a kind of stimulus. People constantly complain about the quality of the cleaning services' work. Now with dumpsters at almost every corner, asphalt washed with soap rinse, new waste collection trucks, and streets cleaned during the night, [the public] will be grateful and will start helping us in cleaning activities."

In addition to these recent new changes, respondents report that the following changes are planned in the municipal waste management system:

- City Hall will assume the responsibility for collecting garbage service fees and LLCs will be reimbursed according to the volume of waste they transport to landfills. In other words, LLCs will no longer have to deal with the public; they will be paid for services rendered. According to a City Cleaning Service representative, once these changes are made, the City Cleaning Service will demand much more from LLCs. All respondents welcome this change, saying that it will make their work profitable.
- The state will allocate garbage collection/removal funds according to waste volume. Important parameters will be the number of cubic meters per metric ton of waste, number of bunkers and dumpsters served by the LLC, etc. To prevent LLCs from bringing half-empty trucks or dumpsters to landfills, special scales will be installed at the entrance of the landfills to weigh all incoming trucks.
- The City Cleaning Service will collect fees from businesses as well, as LLCs cannot do this on their own.
- The salaries of LLC employees are gradually being increased. In the future, awards will be given to the most active workers (with bonuses, for example). LLC representatives say that as of August 1, 2007, the average salary of sweepers will be 200 GEL per month, waste collectors will receive 350 GEL per month, and driver will have 500 GEL per month.
- If construction waste accumulates somewhere the public will be able to use LLC hotlines to arrange removal for a fee. After paying this fee, the individual will receive a receipt. This will be an additional source of income for both LLCs and for the state budget. According to one LLC representative, as of January 2007, TV commercials informing the public of this opportunity will be aired.
- The City Cleaning Service plans to impose fines on the public and on businesses that litter the city. An additional division is to be formed whose employees will have the right to draft corresponding protocols and fine the public and businesses for violation of sanitary norms. The City Cleaning Service believes that the main source of income of that division will be fines paid by individuals and business companies. The service will have 40 technical supervisors.

According to one City Cleaning Service representative, the above-mentioned changes will be carried out as of September 1, 2007. The form of the aforementioned protocol will soon be prepared. Yellow Opel cars are already visible in Tbilisi's streets, manned by City technical supervisors in orange uniforms; their goal is to check the level of cleanness in various parts of the city as a kind of sanitation patrol.

The Ministry of Environment Protection and Natural Resources is also working in several different directions:

- Elaboration of a general strategy and concept for waste management (due by the end of 2006 or early 2007);
- The National Plan on Persistent Organic Pollutants is almost ready. Also, financed by the Dutch government, a Dutch NGO will thoroughly cleanse the Kakheti province of organic pollutants;
- Together with the UN Development Program, an inventory of waste throughout Georgia is planned. This implies inventory of waste composition and location, and creation of a database.
- A waste management draft law has been prepared defining the rights and obligations of various stakeholders involved in the sphere (the draft is now being coordinated with various agencies).

The main problem that the Ministry of Environmental Protection and Natural Resources faces is the lack of qualified staff. However, one Ministry representative believes that this problem can be solved;

for example, the Ministry worked out its waste inventory methodology together with Czech colleagues. The Ministry now plans to hire experts to train local staff.

5. Prospects for Waste Separation

5.1 Organizations Involved in the Waste Management System on the Prospects of Processing Separated Waste

Representatives of all polled LLCs agree that important resources accumulate in waste: glass bottles, plastic items, cardboard boxes, etc. They believe that with appropriate equipment and funding it could be profitable to recycle these materials. However, respondents believe that it is still a risky business and that the state should play the main role in its development. They also believe that the government should provide incentives for private companies to recycle.

According to a City Cleaning Service representative, it is preferable for LLCs to organize sorting of waste, as they already have certain infrastructure, and other organizations have no experience in this field.

LLC representatives think that it would be profitable for them to remove sorted waste if they could sell secondary raw materials to generate additional income. The state would also profit, as the LLCs would pay VAT on sales. According to one respondent, selling secondary raw materials would be profitable if the state will not have its share in the business *“I will pay the government VAT for selling the secondary materials, it is a profit for the state too. I must be interested in collecting the secondary raw materials. It is this way in Europe: whoever collects the waste he/she owns it (‘Tbilservisi LLC’)*.

Currently, only two LLCs have experience in sorting and selling secondary raw materials: Tbilservisi LLC and Vake LLC. Both companies collect and compact paper for resale. Their client is the Tbilisi Paper Factory.

Recently, Vake LLC bought plastic compacting equipment. Thus far they have no steady customers, but they believe they will be able to find clients, as they believe that waste containers could be made from recycled plastic.

LLC representatives believe that collection of sorted waste would increase the overall expense of garbage removal, as it would require additional containers. However, they note the possible benefits, as well: waste volume would decrease; landfill use would be more efficient; the lifespan of landfills would increase; environmental damage would decrease.

5.2 The Role of the Public in Waste Separation

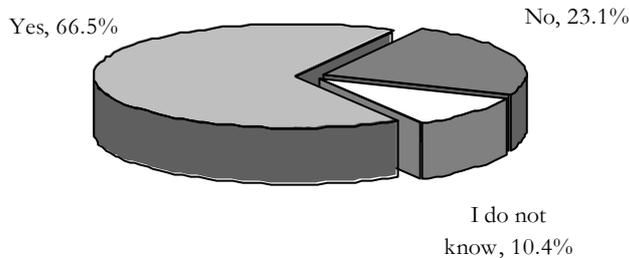
In order to ensure that waste is effectively and easily reused, waste must be sorted at source or at special stations rather than at the landfills. This will minimize their contamination and increase the volume of recyclable waste stream.

It must be specially noted that all LLC respondents state that it is too early to ask people to sort their garbage. They think the most important thing at the moment is to “teach people” to put waste in the bunkers or dumpsters. Once this goal is achieved then the public awareness must be raised and public must be convinced that their garbage should be sorted. Respondents think that the most effective way to do this is to create recycling enterprises and stations that accept recyclable items.

“Individuals should have incentive to sort their garbage: they should be doing it either because it is good for the public or because it is financially profitable. There is no incentive today for them to do so”.

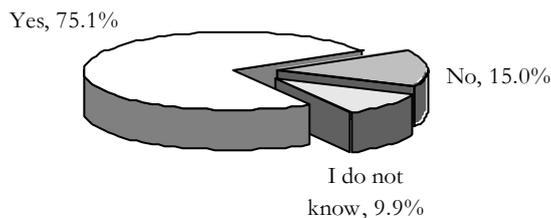
Most Tbilisi residents interviewed showed some readiness to participate in waste separation schemes:

Would you be willing to participate in waste separation scheme?



Respondents representing LLCs believe that the overall low level of public waste collection culture is the main problem: *“we need a century to learn to sort waste.”* Despite this, 66.5% of Tbilisi residents surveyed agreed to sort waste. Those who refuse say they do not know what they will really do, mainly due to lack of time (17.1%).

Would you be willing to take sorted waste to special stations if you were paid for it?



75.1% of respondents say they are ready to take sorted waste to special stations if they are paid. Respondents who refuse are actually unsure of what they'll finally decide or cite lack of time as the main problem (26.3%).

Only one polled LLC, Special Auto Fleet LLC, (Didube-Chugbureti district) reported that in January 2007 several different containers may be placed in various parts of Tbilisi and that the public may be asked to put different types of waste in different containers.

LLC representatives believe that the specific features of Tbilisi's various districts must be taken into account. For example, districts where there are mainly private single or two-storey houses (such as Nadzaladevi) accumulate waste not commonly found in central parts of the town – waste from maintaining private courtyards. For this reason, the volume of potentially recyclable waste is relatively smaller there. The situation in the central districts is different, as many state and private structures are located there. Here paper waste, for example, accumulates in large volumes.

5.3 Private Companies on Waste Separation

Representatives of both the City Cleaning Service and private companies involved in this field or that export waste noted the variety and great potential of waste dumped in landfills: plastic, scrap metal, leather, ferrous metals (copper and gold, which are found in various electronic parts, etc.), cardboard, etc. – all of them have potential users.

Homeless people collect different materials at the landfills at the request of various organizations, but it is not done in an organized way and is only small-scale. The following factors hinder the utilization of resources dumped in landfills:

- The risk of investing in the sphere, as no company has done anything like this in Georgia yet;
- The lack of corresponding legislation – waste recycling and reuse is practically unregulated;

- Lack of trust in potential collectors at landfills (homeless people, beggars, etc.) and their low level of motivation;
- Filth of items collected at the landfills, which often renders them useless.

One of the companies which has been washing, cutting and compacting plastic collected at landfills for export to Asia experienced all of the above-mentioned difficulties. The spotty legislation, which neither forbids collection and removal of waste nor regulates the process, has created some major problems for this company. Nobody actually monitors or controls the activities of this company, which had an agreement with the landfill and paid a certain sum. However, the company failed to find a way to force the landfill to stop others from removing resources needed by the company from the landfill.

Relations with homeless people and beggars were also quite difficult. According to one respondent's estimates (a representative of the company), the company could have exported up to 60 metric tons of materials per month. It rented territory and bought equipment. The clients' demands were simple: collected materials should be clean, but none of the homeless people wanted to collect materials, as the company paid them only 150-200 GEL per metric ton, while collection of large volumes of plastic is quite difficult. The homeless people were mainly interested in collecting ferrous metals, which are relatively rare but worth much more than plastic.

In addition, it was also impossible for the company to have legal relations with these people, as most of them had no residences, jobs, IDs, etc. and nobody else agreed to work at the landfills.

Homeless people often collect some type of waste to sell themselves. They collect glass, plastic, scrap metal, ferrous metals (copper etc.), broken stabilizers and electronic items in bunkers and landfills, or collect them from Tbilisi residents. They take these articles to various stations. They get 2-3 GEL for 100 glass bottles, and 7 GEL for one kilogram of scrap metal. Ferrous metals are most valuable, yielding 7-10 GEL per kilogram. Collection of glass bottles is steadier work, as many such bottles can always be found in the garbage. Glass bottles must be washed or stations will not accept them. Scrap metal and ferrous metals are rarely brought to these stations. There are no special requirements for scrap metal and discarded electronic items.

Tao+ LLC cites the necessity of recycling (the company produces disposable cellophane bags that are mainly used for food products). A respondent representing this LLC believes that waste could be collected, processed and exported. This organization has drawn up a plan for a recycling factory. According to the respondent, Dutch investors were interested in this. Various kinds of waste could be collected, washed and processed, and granules could then be sold abroad, as there is a high demand for such products there. The price of granules is much less than that of initial manufacture and market for secondary raw material is broad.

The recycling factory would have to meet international standards, as the Dutch company that is interested in this issue has similar technology in many countries (a similar process is now underway in Ukraine). According to Tao+'s plan, all 49 districts of Georgia would have two stations for receiving secondary raw materials. These stations would then send collected materials to the factory once a month. The respondent felt that this project would not be profitable in Georgia unless the state subsidized the sphere for awhile. He stated that the factory would start profiting in about 5 years, and that this project should be a priority for the government, as it would reduce environmental pollution: *"Without serious government involvement this project cannot be implemented. The Dutch are very interested in building a recycling factory here. They want to be the first, as two recycling factories would not work in the country – there is not enough waste in the country."*

A representative of the Ministry of Environmental Protection and Natural Resources has a different opinion. He says it is impossible for anyone to be interested in financing a waste processing factory, as nobody really knows the volume or types of waste actually accumulated in the country. He believes that

the project could be initiated by private companies that build such factories in developing countries, and that they bring in waste from other countries and process them in these factories when they have no sufficient local resources. This could pose the danger of hazardous materials entering the country.

The Ministry representative believes that discussion of a waste processing factory is logical only after the composition, volume and location of waste accumulated throughout Georgia has been fully documented, after which the concrete directions for the interested parties can be defined.

5.4 Other Prospects for Waste Reduction

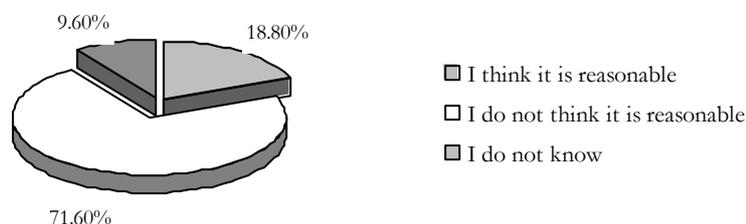
There are various views concerning the methods of waste reduction used in various countries, such as: introduction of certain taxes for disposal of waste in landfills, producer's responsibility, introduction of taxes according to actual weight of waste, etc.

Respondents said that if the tax for disposal of waste in landfills is introduced, then the decreasing of waste will really become an issue. However, LLCs operating the landfills do not like the idea of reducing the volume of waste, as they are interested in receiving as much waste as possible, as their remuneration is based on volume. As for reducing waste by minimizing production of various materials (such as packaging), respondents say it would be acceptable, but premature, because:

- Improving the quality of packaging is costly
- Products that are not packaged properly do not sell well
- Some companies compete with others solely on packaging quality and design.

The public does not like the idea of taxing based on the volume of accumulated waste.

Is it reasonable to introduce taxes based on waste volume?



Resources in landfills can also be used for composting and energy recovery. No company currently composts waste in Georgia. Biological farming association Elkana is the only organization that teaches farmers to composting, but the organization has no experience producing its own composted products. The program implemented by Elkana is called the Agriculture Support Program, and it aims to produce ecologically clean fertilizers from agricultural waste. The main goal of the organization is to get farmers accustomed to composting by offering training courses for them. Five consultants from Elkana periodically visit various villages and teach local residents how organic waste can be composted.

An Elkana representative notes that compost makes very cheap and useful fertilizer, and any agricultural waste can be used as raw material. Sawdust, manure, leaves, ashes, hay, etc. can also be used. Compost materials are of high quality and environmentally sound and therefore yield a good price on the international market. Demand for composting is small in Georgia, as most farmers do not know what compost is. According to the respondent, as farmers do not know how to fertilize soil properly they often have small harvest yields, leading to a distrust in fertilizers. In order to make composting a widespread activity, organic waste must be separated from other waste (for example, Christmas trees are used for this purpose abroad). According to the respondent, fertilizing soil with compost is not

costly in Georgia because it is done manually rather than with special machinery. In order to establish this method, the demand for organic fertilizers need to increase, and this requires systematic contact with and training for farmers.

6. Enterprises Recycling Secondary Raw Materials

Two large enterprises interviewed process secondary raw materials: the Ksani Glass Factory and the Tbilisi Paper Factory. Both use waste collected from residents as well as various business organizations. The Ksani Glass Factory uses crushed glass as raw material. Raw materials are essential for the Paper Factory, because without them the factory would have to stop its activities. Plastic processing company which produces plastic containers was also interviewed.

The Ksani Glass Factory and Tbilisi Paper Factory could process much more raw material than they do now: with sufficient raw material the Glass Factory could recycle about 2-3 times more crushed glass than it uses now, and the Paper Factory could process about 6 times the amount of mackle-paper if it operated to capacity.

6.1 Ksani Glass Factory

The Ksani Glass Factory produces glass containers for soft and alcoholic drinks. Its clients are major soft and alcoholic beverage companies. The Factory uses modern European equipment, because many above-mentioned companies (the factory's clients) export their products and have certain requirements of the Glass Factory. The factory uses both primary raw material (sand) and secondary raw material. Secondary raw materials (glass bottles, crushed glass, etc.) are provided by: various small-scale legal entities; individuals and major companies (Coca-Cola, Kazbegi, Natakhtari).

About ten legal entities cooperate with the Ksani Glass Factory, some of which are more or less stable suppliers. They collect chiefly old, broken glass. The Glass Factory has the following main requirements for its suppliers:

- Broken glass must be relatively clean – volume of dirt, mud and stones must not exceed a certain limit;
- The color of crushed glass must be acceptable.

The Ksani Glass Factory receives both bottles and glass fragments. The factory uses broken glass, so it does not really matter whether a bottle is whole or not. If the glass is broken it is even more profitable for both parties, as vehicles can transport more broken glass than whole bottles, which are bigger and take up more room.

Major companies producing various drinks supply the Glass Factory only with bottles broken during production. Almost all large companies (Coca-Cola, Kazbegi, Natakhtari, etc.) accept returned bottles from the public for reuse. Glass bottles can be used up to 10 times before becoming damaged, deformed or unusable for some other reason. Besides bottle and jar glass, the factory buys window glass as well. The factory also accepts auto glass if it contains no wires.

Glass is collected in restaurants and markets where it is cut. Factory representatives say they probably also get glass collected from landfills. This is no problem for the Factory as long as the glass is washed sufficiently. The factory has its own washing equipment. The glass is then melted at 1,500 degrees Celsius and all the germs or bacteria die during the process.

10-30% of the materials used by the Ksani Glass Factory are secondary raw materials. This figure depends on the concrete period and the color of glass used by the factory. If the Glass Factory is making clear glass, secondary materials are not used much, as it is difficult to find sufficient volume of clear glass to recycle. Green glass is submitted to the Factory in much larger volumes; the problem is that if green and white glass are brought to the Factory unsorted it is very difficult to process, as the chemical composition of these two types of glass is different. They are actually different raw materials. When green glass is produced it is still possible to mix green glass crush with white one, but doing it vice versa is impossible.

The factory uses 3,000-6,000 thousand metric tons of broken glass a year, as well as its own broken materials, which are melted down again and recycled. At the moment, the factory is able to receive and process up to 10,000 metric tons of broken glass per year. If it buys more secondary raw materials the risk is higher – there are different kinds of glass and the probability that unwanted materials could be mixed in is high, so the factory would suffer greater loss.

Using secondary raw materials is not particularly advantageous for the factory, as the cost of sand and crushed glass is approximately the same. Currently, the factory pays 82 GEL per metric ton of crushed glass. This figure was 57 GEL last year, but rising fuel prices have inflated the cost. If crushed glass were cleaner the Factory could spend less money cleaning it, and the management of the enterprise could pay the suppliers 10% more than it does now. Thus, saving on washing could increase the price the Factory pays its suppliers.

If the state allocated subsidies to encourage recycling or if the factory received tax privileges, then the factory would show more interest in secondary raw materials.

6.2 Tbilisi Paper Factory

The Tbilisi Paper Factory produces corrugated paper for boxes. Its direct customers are crimp producers, who then sell the crinkled paper to food producing companies. The factory also manufactures boxes. Its products are sold to ice cream factories, wine factories etc. In winter these boxes are also manufactured for the Tbilaviamsheni factory (aircraft manufacturing plant) for storing heaters. The Tbilisi Paper Factory also produces tar paper and paper bags for cement. The main type of raw material used by the factory is mackle-paper. Without it the factory would have to close down.

Mackle-paper comes chiefly from markets and major companies (Coca-Cola, Nabeghlavi, etc.). The factory is also regularly supplied by the Tbilservisi and Vake LLCs. The factory tried to get mackle-paper from landfills, as well, but it was not profitable, as the mackle-paper was not properly separated from other waste, making the mackle-paper processing difficult. The attempt to reclaim mackle-paper from the public was also unsuccessful as mackle-paper is only worth 10 tetris per kilogram, so Tbilisi residents were reluctant to transport this waste to the factory.

The cost of mackle-paper varies depending on quality, supplying conditions and regularity. One-time purchase of mackle-paper costs more, whereas if the supplier is steady then price breaks are possible. Based on these criteria the price of 1 metric ton of mackle-paper varies from 50 to 100 GEL. However, such discounts are still not enough to get the major businesses interested. Their interest in this case may be simply to dispose of garbage and show some civil responsibility. Sometimes the factory's vehicles collect the mackle-paper from offices itself, but this is not done on a large scale. The main problem is that organizations that use paper in large volumes simply do not know about the existence of the Tbilisi Paper Factory, and the latter has no means of buying airtime for advertisement.

The Tbilisi Paper Factory processes all types of mackle-paper, from which it manufactures various types of products. For example, various types of mackle-paper are used for manufacturing crepe paper

boxes and tar paper. By mixing various types of mackle-paper the quality of the manufactured paper decreases.

The Tbilisi Paper Factory divides mackle-paper into several categories:

- Wrapping boxes from Coca-Cola, Omega LLC, etc. These are high quality boxes;
- Medium quality boxes collected from the markets, which are cleaned and submitted to the factory. Most mackle-paper is this medium quality (mackle-paper collected and pressed by Tbilisvisi LLC also falls under this category);
- Books are considered to be low quality mackle-paper, as the quality of fiber in them is low due to their age. Mackle-paper collected from landfills is also low quality.

The factory accepts both white and brown mackle-paper, which can be torn or wet. However, it must meet the following requirements in order to be processed:

- It must not be mixed with cellophane
- It must not be mixed with foam plastic. The Factory was built in 1935 and still uses the equipment installed at that time, which is incapable of removing foam plastic, which in its turn harms the quality of the final product;
- Mackle-paper must be free of any serious dirt (oil, grease,, etc.)

Boxes manufactured by the factory are used for packaging food products (cakes, waffles, etc.) that touch the box itself; therefore, the quality of the boxes is very important. The factory's clients are major enterprises for whom good reputation and quality of the boxes is very important. All major enterprises have labs for quality control of boxes. The director of the paper factory notes that none of these enterprises has ever found any germs or dangerous substances in boxes manufactured by the factory. *"Therefore, our clients are the best controllers for us. All the sanitary norms are met, because the raw materials are first washed with water and then treated with 100-150 degrees Celsius heat to kill any bacteria."*

Currently, the biggest problem the factory faces is lack of raw materials. Each working day (12 hours) the factory processes paper equivalent to about 4 hectares of forest. The factory processes an average of 2,000 metric tons of mackle-paper per year, whereas it could be processing 12,000. It could process all the mackle-paper it receives annually in just two months. Thus, the factory actually operates at only 15-20% of its capacity; however, the demand for its products is high in Georgia, as well as Armenia and Azerbaijan, as there is no other such factory in the South Caucasus. However, the factory cannot currently satisfy even the Georgian market. The Tbilisi-based enterprises that purchase crepe paper from the Tbilisi Paper Factory sometimes has to buy some of these materials abroad.

Apart from the Tbilisi Paper Factory, there are several small-scale enterprises (manufacturers of paper napkins, toilet paper, etc.), that use only printing press mackle-paper.

6.3 Metalplastic Plastic Processing Factory

The Metalplastic Plastic Processing Factory manufactures plastic containers for various drinks. The share of the secondary raw materials (broken boxes, washtubs, bottles, polyethylene waste, etc.) used in its production is almost 80%. Primary raw materials are low- and high-pressure polyethylene granules. Use of secondary raw materials is quite profitable for this factory, as it sharply decreases manufacturing costs; however, the quality of products manufactured from secondary raw materials is relatively low. Metalplastic's customers are mainly small-scale producers of soft drinks, for whom products manufactured from secondary materials is much more affordable.

Secondary raw materials are supplied mainly by individuals who collect these materials from the streets or landfills. However, a respondent representing the factory said that since the new government came to power collecting secondary raw materials on the landfills has become difficult. The minimum price the factory pays for 1 metric ton of plastic is 500-600 GEL. The organization cannot cooperate with stations accepting this waste because it is unprofitable for these stations to accept plastic items due to their large size and relatively low weight. The stations prefer bottles. Waste is sorted in an unprofessional way – by hand. Afterwards the material is washed, cut and ground into granules. Secondary raw materials are treated with 200-250 degree Celsius heat.

The deficit of secondary raw materials is a problem for Metaloplastic, as well. The organization is capable of processing 700-800 kilograms of raw materials a day, but sometimes fails to process even 1 metric ton of raw materials each month.

6.4 Recommendations of Enterprises Processing Secondary Materials

Recommendations voiced by respondents representing factories that process secondary raw materials are as follows:

- The municipality should organize collection and sale of secondary raw materials to factories
- Corresponding legislation should be drafted and approved;
- Collection of separated waste requires a corresponding informational campaign – distribution of booklets, airing of commercials, etc.
- The government should provide substantial assistance to the processing factories
- Cleaning and re-use of bottles should be prohibited by law. This would be a significant move towards establishing a sorted waste collection system.

Respondents claim that firms that distill various drinks in reused bottles do not wash them according to established norms. *“Instead of sending bottles from landfills or streets straight to enterprises, they should be crushed. Various state agencies should enforce this, because it is a problem for the whole country, not just private businesses. All the bottles should be reprocessed, or else they should be properly washed.”*

Respondents have different views on how the municipality should assist – with hiring premises, purchasing certain types of equipment (such as special urns that automatically press paper), getting loans, or filming commercials and airing them (for example, commercials in which celebrities dispose of their garbage after sorting it), etc. Respondents feel that the prospects of waste processing depends on who manages the sphere. Such activities will most likely involve high costs, and therefore waste recycling may never become profitable. Therefore, they assert, the government should take care of the system.

Private companies do not rule out the possibility of actively participating in this process. For example, the administration of the Tbilisi Paper Factory agrees to distribute cellophane bags to stations where garbage is sorted, because once mackle-paper gets to landfills it is difficult to sort it from other types of waste. Also, respondents believe that establishing a recycling industry would improve the socio-economic and environmental conditions in the country:

- People will get jobs (including those homeless people who are now collecting waste at the landfills anyway);
- The budget will receive additional revenue;
- The city will get rid of garbage;
- The environmental situation will improve.

The director of the Ksani Glass Factory describes the mechanism for collection of sorted glass in Turkey: in a city that has about one million residents there are about 200 special bottle receptacles for green and for white glass. The value of each bottle left by the public goes to charity; these sums are used to help homeless children, invalids and the elderly. Correspondingly, if the Ksani Factory received 10,000 metric tons of crushed glass per year, it could allocate a portion of the income from this glass to people who need this money, such as the homeless people who collect bottles from the landfills.

6.5 Major Soft Drink Companies on Recycling

Coca-Cola, Kazbegi, Nabeghlavi, and Georgian Glass and Mineral Water Company do not produce their own containers for their drinks. Therefore, they almost rule out the possibility of recycling waste generated at their factories.

All of these companies except for Nabeghlavi bottle their products in both glass and plastic containers. Kazbegi also uses aluminum cans. Their main supplier of glass bottles is the Ksani Glass Factory. Nabeghlavi also imports glass bottles from Armenia. The companies purchase special raw materials in the form of capsules for plastic bottles, which are then inflated through pressuring and given bottle form. Kazbegi and Georgian Glass and Mineral Water Company purchase this raw material from the Caucasus Pet Company, which is situated in Rustavi. Coca-Cola and Nabeghlavi import this material from abroad. Kazbegi imports ready-made aluminum cans.

Coca-Cola in Azerbaijan started to produce plastic preforms which inflate into bottle form. In order to introduce this technology in Georgia, the company needs corresponding raw materials, equipment, assembly line, staff, etc., which in itself requires additional investment. A representative of the company says that Coca-Cola has started to work in that direction, and he does not rule out that at some point the Georgian Coca-Cola will also start to produce preforms.

As for reuse of containers, all of the above-mentioned companies accept returned bottles (purchase them from the public) except for Georgian Glass and Mineral Water Company. Neither of the aforementioned companies accepts plastic bottles for reuse. Aluminum cans are not accepted, either. According to a representative of Kazbegi, other companies or individuals would not be interested in collecting aluminum cans because they are very light (10-12 grams) and it is physically difficult to collect enough weight to make it profitable. A respondent from Nabeghlavi notes that there are several stations in town which buy plastic bottles, filling them with falsified drinks; however, there is no effective way to battle this “business.”

Representatives of Kazbegi, Nabeghlavi, and Georgian Glass and Mineral Water Company think that recycling is a different type of business that has nothing to do with their main activities. Also, recycling requires the presence of a special factory with modern equipment and qualified staff. It is profitable for these companies to buy original production, the cost of which is added to the price of the products they produce. Therefore, at this stage, these companies do not plan to start recycling, even with government subsidies or tax exemptions.

A representative from Coca-Cola had a different opinion. He said that if the government took serious interest in this issue, allocated subsidies, reduced taxes, helped companies secure bank loans, etc. then the company would probably form a group to evaluate the financial profitability of the undertaking, study the technical aspects of the process, etc. Based on the findings of this group, Coca-Cola would make its final decision. The respondent believes that the company will really be interested, but then the company’s own standards would have to be taken into account.

Respondents recalled that the introduction of special taxes on production of plastic bottles was quite a prominent topic a few years ago (this method is widely used in various countries as a tool for reducing waste volume). In particular, the introduction of special excise duty was proposed. In this case, various

proposals could be submitted to the companies. For example, the company could simply pay taxes on each produced plastic bottle and the paid amounts would go to the State Recycling Fund. At the same time, instead of paying this tax, the company would have the option to receive used bottles from its customers. In this case the customers would be paid by the State Recycling Fund. Respondents had no definite answers in connection with these options, saying that it required thorough calculation and analysis. A representative from Coca-Cola presumes that the company would rather receive used bottles from customers if it is exempt from any taxes for this. However, a representative of Kazbegi thinks that introducing excise duty on plastic bottles could be more acceptable for the company than accepting used bottles from customers (despite the fact that it would increase the price of the product). Even if customers were paid by the State Recycling Fund, Kazbegi would have to allocate additional human and financial resources to organize the submission of bottles by customers. In the respondent's opinion, the City Municipality could do it in a much more efficient way.

Conclusion

The international community started to implement sustainable methods of waste management in the 1970s. These methods are primarily directed at decreasing waste volume and promoting safe management of waste. Developed countries have gradually replaced the less acceptable methods of waste management (dumping in landfills and incineration) with such methods as recycling, reuse of products and waste prevention. In this respect, Georgia is only in the initial stages of development. As we have already noted, the main problems in the waste management system that hinder the development of the sphere are planning and administrative problems – financial, personnel, enforcement and control issues, etc.; lack of data and research, dismantling of the monitoring system and low public interest in environmental issues also contribute.

The changes that are now being implemented in this field can be considered positive. In particular, a united coordinating agency – the Tbilisi Cleaning Service – has been formed, which has assumed some functions of the Public Works division and City Administration. A singular budget for removing waste will be created, which will solve financial problems and make expenditures more transparent. Fragmentation of the budget and unstable collection of waste service fees have been reflected in the quality of the work carried out by LLCs. These LLCs could always accredit their poor work to lack of finance, which is due to unstable payment. Once the budget is unified the LLCs will be fully reimbursed, which will raise requirements concerning the quality of their work. The existing tariffs will be probably changed as well, as they are based on the Soviet calculation system, which may more or less fit the current needs and financial means, but does not reflect the real state of affairs. The fee collection mechanism has not been worked out yet, but LLCs will not suffer losses from that anymore. Additionally, the government plans to improve the collection of fees from businesses.

City Hall's Supervision Service now unifies the three former city services. That change should also have a positive impact on the city's cleanliness and improve control of landfills. Fines are planned to be imposed for littering the town, which will have to be paid by both residents and businesses. City Hall also provides practical assistance. For example, new equipment has been allocated and new dumpsters placed in various districts of the town, which should have a positive impact on the waste removal process. The increase of salaries for people employed in the waste management system should be noted as well. This should contribute to stability of staff in this sphere. The government plans to work with the public, and public service announcements are planned to be produced.

The most important thing is that a waste management strategy is to be worked out, and waste inventory is planned throughout Georgia as a preliminary step towards working out the waste management strategy. The inventory is very important in itself, because effective waste management is impossible without knowing the volume and composition of waste. The data that has existed up until now is incorrect, and in many cases contradictory.

However, there are still a number of issues that remain to be solved. The city cleaning system is far from being perfect. The existing landfills remain constant sources of pollution, and thus there are no plans for their renovation or for creating any new landfills.

False declaration of actual waste volume is still a problem. Companies removing and placing the waste in the landfills are still interested in increasing the volume of waste (as they are paid according to volume of waste they collect/dump in the landfill), so there is always the danger of false declaration of actual volume. One way to help control this would be to weigh the trucks entering the landfills; however, without making the control mechanisms stricter or rendering the old, corrupt transactions impossible, this could also become a formality.

There is no mechanism to exclude the possibility of such false declaration, nor are there any incentives for waste reduction. For example, taxing the landfill could be part of such a mechanism. In this case,

the manager of the firm that operates the landfill would pay the state a certain tax for each cubic meter of garbage dumped in the landfill, and correspondingly, the LLCs transporting this waste to the landfill would have to pay the landfill operator a certain sum for dumping waste. In this case, financial regulation is based on market relations and the need to falsify waste volume vanishes. LLCs transporting waste to the landfill would be more interested in dumping as little waste as possible, which should encourage recycling. However, the introduction of that mechanism means increased costs, so if we take into consideration the existing financial problems, the aforementioned mechanism is unlikely to be implemented. Furthermore, given the existing administrative problems, with practically no controlling system or punitive mechanisms, this move could increase the volume of waste dumped in illegal landfills. In order to avoid false declaration of waste volume, administrative measures should be stricter and the registration of waste entering the landfill should be closely and constantly monitored.

It seems that thus far the current changes have been directed at improving the cleaning system without fundamentally changing the waste management system. The reason is that waste management is still largely associated only with city cleaning and observation of sanitary-hygienic norms. The ongoing processes at landfills, constant pollution of environment and damage to human health are still of little interest. This poses the danger that the requirements of the city waste management system might be limited to city cleaning and improving its outward appearance. In this respect, the direction of the future state waste management strategy and the general plan of city waste management are important. as they should define the main goals, priorities and actual tasks of waste management. Only after the government defines its vision and plans in this sphere can the elaboration and establishment of various methods and mechanisms of waste management become more realistic.

These issues should always be important for the public so that the aforementioned steps are really taken. It is important to determine whether the waste management sphere will remain a priority, and whether the changes will really be fundamental, or more symbolic, as in the past. The formation of a waste management system is a long-term process and it cannot boil down to only several concrete activities. The reduction of staff drain is also important. Constant personnel changes, especially at managerial levels, have been a serious problem in this sphere over the past several years. Several programs have never been finished because the main coordinators and others responsible have often been transferred to other positions.

As for introducing methods aimed at waste reduction, there are no clearly defined prospects yet. We have already noted that the state waste management strategy has not been elaborated yet. and preliminary works have started only recently. However, despite this fact, we still thought it would be useful to interview stakeholders concerning the possibilities of introducing methods aimed at waste reduction. It should be noted that secondary raw materials such as paper, glass and plastic are in high demand. Quantitative data is included in the research. The existing factories and enterprises that process such products constantly lack raw materials. However, the absolute majority of them note that the state should play the leading role in developing a recycling schemes. Undoubtedly, introduction of alternative methods of waste management would involve increased costs. In particular, collection of secondary raw materials requires additional infrastructure and it would also increase waste removal costs. It is also necessary to work with the public and to have a control system to prevent illegal landfills and littering of streets. In many cases, especially when it is done on a mandatory basis, recycling is not profitable, and operates only through government subsidies. However, in some cases it can be profitable, especially when paired with other mechanisms of waste management. In order to select an optimal waste management package for the city, the actual correlation between supply and demand for recyclables must be thoroughly studied.

As research showed, the majority of the public (60%) is willing to participate in waste separation schemes, which in itself is a positive sign since public support and involvement is essential in the proper functioning of the waste management system. However, the same survey results show that that part of the public remains indifferent to the waste management issue. Most respondents blame the

public for most littering. It is a well known fact that waste management control entails certain difficulties, especially when it concerns the littering of streets and yards, improper disposal of waste in dumpsters, etc. Generally speaking, the level of the Georgian public's awareness in regard to general environmental issues is quite low. This is due to certain socio-economic and political circumstances. Providing the public with information, education (informational campaigns, educational programs), and corresponding practical activities in schools are very important. The low level of public income should be noted too, and should be taken into account when new tariffs are introduced or when new economic mechanisms are established to help discourage littering.

Introduction of the principle of "producer's responsibility" is very important in the waste management system. It may not seem very important today, as the industry is in the initial stages of development, but should there be any expected industrial development the issue will really become very important. Therefore, "producer's responsibility" mechanisms should be considered at this stage to help avoid future difficulties. There is no "producer's responsibility" principle in Georgia today. There have been certain attempts to negotiate with major beverage companies concerning the introduction of taxes on plastic bottles. However, these negotiations have yielded no results and there have been no subsequent attempts. Companies are ready to cooperate with the government if it is profitable for them.

According to a representative from the Ministry of Environmental Protection and Natural Resources, discussion on the necessity of building a waste processing factory before waste inventory has been completed is premature. There are certain problems with such factories all over the world, and this aspect must also be considered. In particular, the construction of processing factories is very costly and in order to keep them profitable much energy and resources are needed, which sometimes makes it necessary to import waste from other countries. In addition to certain environmental problems linked to these factories, they do not really encourage waste reduction; on the contrary, they encourage increased waste and energy consumption and this contradicts sustainable waste management principles. In this case, the role of the public and proper attitudes toward the waste management problem are also out of the question.

To summarize, it is essential to realize that waste management is quite a complex and difficult process. Moving from city cleaning to waste management requires radical changes: development of waste management planning and strategic solutions to the problems caused by waste. The government's role and public support are very important in this process. It is also very important to do as much as possible in the nearest future, while this issue is still a subject of interest. We must ensure that it remains an important one in the future, as well. In this respect, a correct attitude towards the waste management system is very significant. The main breaking point for the international community in the development of the waste management system was the realization of the fact that sustainable waste management meant more than simply reduction of waste volume and the areas used for landfilling; it was also saving primary raw materials – natural resources, reduction of air and water pollution and soil contamination. Therefore, waste management issue covers all three aspects of sustainable development – economic, environmental and social – and a comprehensive attitude is necessary. Given the current sparse financial and administrative resources, the establishment of a well-run waste management system in Georgia will be a long process. However, even under the existing conditions, it should be possible to introduce the principles of sustainable waste management gradually, so that in the future our local conditions can approach those of the developed world.



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