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Heading Towards EU

Steps to Be Taken in Municipal Solid Waste Management in Georgia

Nino Antadze

Supervisors: Thomas Lindhqvist,

Naoko Tojo

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———— Internationella miljöinstitutet ————

Published in 2004 by IIIEE, Lund University, P.O. Box 196, S-221 00 LUND, Sweden,
Tel: +46 – 46 222 02 00, Fax: +46 – 46 222 02 10, e-mail: iiiee@iiiee.lu.se.

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Abstract

As the country aiming to join the European Union, Georgia will need to be able to comply with the EU requirements. This applies to the waste management sector as well. The thesis focuses on the situation with the municipal solid waste management in Georgia illustrated with the case of its capital, Tbilisi. The backcasting approach is used to find out the way that will improve the situation in the field and will take Georgia one step closer to the EU. First, the model of the desired future is elaborated. Afterwards the present situation is studied and finally the pathway to connect desired future and current situation is developed. The idea behind the model of the desired future is to minimize incineration, maximize use of waste as the material through recycling and composting and ensure safe disposal. In addition, the model of the desired future should comply with the EU requirements. The main finding of the thesis is that the background for implementing actions directed towards the desired future is already in place. This is reflected in the presence of a large scale after-disposal separation practice, recycling of glass and paper, small scale composting practices. The thesis also explores issues related to the present and upcoming legislation and institutional arrangements related to the municipal solid waste management in Georgia.

Executive Summary

Georgia has become an independent country in the beginning of 1990 and from the Soviet past had shifted its interest towards the West. The country's long term goal became joining the North Atlantic Treaty Organisation (NATO) and the European Union. However, in order to reach this point there is much work to conduct.

Environmental issues in general, and waste management sector in particular, have not been the priority areas for the government neither during the Soviet times, nor after gaining the independence. The result of such ignorance can be clearly seen today, when most of the problems are much harder to solve. Situation with the waste management in the country requires urgent responses from the government as well as from the public.

The thesis aims to show how improvement of the present situation is possible starting with the present resources and competences and, at the same time, how country can go one step closer towards entering the European Union by creating system for Municipal Solid Waste (MSW) that will meet the EU requirements and standards.

This thesis seeks to examine the situation with the municipal solid waste management in the country and picture the possible ways that can lead towards improvements. To do so, the thesis uses a backcasting approach. Backcasting implies first determining the desired future condition and then using it as guidance while making decisions. Thus, the starting point for making decisions which way to take is the future condition and not primarily present trends as in case of forecasting. The advantage of using backcasting approach is the fact that it gives possibility to explore wide range of alternative ways to reach the desired future, not being framed by the present trends.

Model of future established in this thesis views waste as the unity of various materials that can be separated and treated in a way to reduce need for incineration or landfilling. It puts separately Biodegradable Municipal Waste (BMW) to be composted, recyclables to be recycled or/and exported, hazardous waste to be separated from the rest of the waste stream and treated. The remaining waste would go to a sanitary landfill. This model aims to use waste as material as much as possible, employ affordable technologies and protect the environment by reducing waste going to landfills and incineration. In addition, the model is in accordance with the EU waste management hierarchy where disposal of waste is the least priority. Thus, the model gives possibility to protect human health and the environment, use waste as the material and comply with the EU requirements.

The model of a desired future is elaborated based on the EU waste policy and legislation. This is dictated with the desire of Georgia to join the European Union, thus, to comply with its regulations. A study of the present situation in Georgia is conducted through interviews with relevant actors and a review of the Georgian legislation related to waste management. Based on the envisaged desired future and the current situation, the thesis suggest pathway leading towards desired future situation with focus on the capital of the country, Tbilisi.

The present situation related to the management of MSW in Tbilisi indicates the following:

- Most of the actions indicated in the pathways and being part of the desired future model are in place to some extent. Some of them are better developed (e.g. glass and paper recycling) than others (e.g. composting).
- After-disposal separation is happening to a large extent in the waste bins and at the landfills. This is done by the informal private sector represented by the waste pickers.

- The Ministry of the Environment and Natural Resource Protection is not taking an active role in studying present practices and looking for the solutions of problems. It can play more substantial role taking into account its duties, possibilities and competences.
- Situation at legal and illegal landfills is very serious and needs urgent actions to be taken to improve the situation.
- The existing legislation does not cover all the issues related to the waste management, neither does it provide a holistic view of what are the waste management priorities for Georgia. Certain waste types are not regulated by legislation including municipal solid waste. As for the existing legislation, its enforcement is not successful due to the lack of an appropriate system.

Having the idea about the present situation, the pathway leading towards the desired future condition is elaborated. The pathway consists of various actions to be taken in a certain sequence. Some of them should be started right away, while others should be introduced later. Two pathways are presented in this thesis. One focuses on MSW management in Tbilisi, the other scopes only the disposal of waste. The reason of making more detailed pathway for disposal is that the issue of landfilling is urgent to be solved because of the severe problems it creates.

The background for the most actions included in the pathway is more or less present in Georgia. These are in the form of recycling and composting activities as well as after-disposal separation practices for certain types of waste. The challenge would be to use existing competences and resources and create a system that would protection human health and the environment and at the same time meet the EU requirements on waste management.

Table of Contents

List of Figures

List of Tables

1 Introduction

After being part of the Soviet Union for more than 70 years, Georgia has gained independence in 1991. The country started to shift towards market economy and to establish civil society. However, the transition turned out to be very hard, accompanied by difficult social and economic situation, political instability, armed conflicts and civil war, large scale corruption and shadow economy. In November 2003 Georgia witnessed the "Rose Revolution" that resulted in the change of the president and the whole governmental establishment. Leaving behind more than a decade of frustrating transition period, the country started to look at future with hope and self-confidence.

The main priority of the Georgian foreign policy is relationship with the EU that has especially been highlighted after the political changes in November 2003. Membership of the EU and the North Atlantic Treaty Organisation (NATO) has become the major long term priority for Georgia, which would facilitate political stability and economic development in the country. However, till becoming the EU member there is a long and challenging way to go. Almost all the sectors need to be reformed in order to be able to meet EU requirements. In some of the fields various actions have been undertaken, mainly with the financial help of foreign donor organizations.

The waste management sector has not experienced any significant change for the last 10-15 years. The new legislation in relation to some of the waste-related issues has been introduced mainly using the European legislation as a basis. However, the system necessary to implement the laws has not been put in place.

Since Georgia aims to become a member of the European Union, it will have to comply with the EU requirements on waste management not only by harmonizing the legislation, but also practically. In order to do so, different alternatives and solutions should be considered.

1.1 Objective

The objective of this thesis is to identify possible pathways leading towards desired future condition in relation to waste management sector of Georgia. The research questions to be answered are:

1. What is the present situation in Municipal Solid Waste (MSW) Management in Tbilisi?
2. What are possible actions to be undertaken in a short and long run in order to approach desired future condition?
    a. What are the benefits these actions will bring?
    b. What is the degree of acceptability of these actions among decision makers and the public?

1.2 Scope and limitations

The scope of the research is limited to the municipal solid waste. MSW means "waste from households, as well as other waste which, because of its nature or composition, is similar to waste from household" as defined by the European Environmental Agency (EEA, 2004). The study will not explore issues related to industrial, agricultural or hazardous waste not included in the municipal waste stream. Also construction and demolition waste are beyond the scope of the thesis. Thus, waste other than included in the municipal solid waste is not the main focus of the study.

Georgia is chosen as the country to be studied because of the personal interest of the author. Besides, since the author is originated from Georgia, the information is easier to obtain. In addition, most of the relevant materials are either only in Georgian or not available in literature, thus primary data is gathered through interviews. In this regard, knowledge of the language is an important asset.

Having Georgia as the country example and discussing development of waste management sector guided by the EU legislation, points up how different countries could use EU waste legislation and practice in their specific cases. This can give an idea about how different aspects of waste management within the EU can be translated and adopted to other countries outside the EU.

The thesis focuses its attention on the MSW management in the capital, Tbilisi. This is due to the time limitation that did not allow to research situation in other cities. Besides, since Tbilisi is the biggest city of Georgia with the largest concentration of population, main problems related to MSW can be very clearly demonstrated on its example. In case conclusions of this research are applied to other cities, their specific characteristics, competences and resources should be taken into consideration.

1.3 Justification of the research

The research intends to show possible and realistic ways that can be undertaken in order to reach the envisaged future situation. The thesis tries to suggest how present resources can be used in order to improve the situation. This is especially important for decision-makers who barely have the vision of different solutions, especially ones that can be undertaken in a small scale with the limited financial resources. The methodology used is based on the backcasting approach, which makes it possible to find different scenarios in order to reach the future point not being equally influenced by the present trends as it would be in case of forecasting. Besides giving possible pathways to go, the thesis explores present situation in waste management in Georgia, including legislation and practice. This information will also be useful for those conducting further research in the field or taking decisions.

Georgia itself is an interesting case to study with regard to the waste management. With the other former Soviet Union countries it shares main problems existing in the field. It also undergoes the similar transition period from being a Soviet country to becoming an independent state recognising principles of democracy and market economy. In this regard, this study can be interesting to compare with the similar works related to other countries, especially those having the Soviet past.

1.4 Structure of the thesis

After introducing objective and the scope of the research, the thesis introduces the employed research approach and the methodology in chapters 2 and 3. Chapter 2 gives an overview of backcasting approach by giving its main idea, comparison with forecasting and its advantages. This chapter also explains how backcasting idea has been employed in the thesis and what are the overall steps taken during the research. Chapter 3 goes more into details of each methodological step and explains how they have been conducted.

In chapter 4 past and present relations between the EU and Georgia as well as future plans for cooperation are described. The chapter also explains reasons why Georgia wants to become the member of the European Union.

The next section of the thesis can be called the "future" part since it presents a model of desired future and the background used to formulate it. Thus, chapter 5 gives an overview of the EU waste legislation and presents a model for the future. Different elements of the model of the desired future are explained in the second part of the chapter.

The following section of the thesis can be called the "present" part of the thesis. This section includes chapters 6, 7 and 8. Chapter 6 discusses who are the main actors involved in MSW management in Georgia, what are their roles and responsibilities. Chapter 7 provides an overview of the Georgian legislation related to waste management. It also looks at the international treaties ratified or to be ratified by Georgia and draft law on waste management to be discussed and adopted by the Parliament of Georgia in the coming months. Chapter 8 looks more closely at the situation with MSW management in Tbilisi. It touches upon the issues of amount and composition of MSW in the city and its collection and transportation practices. The chapter also looks at how MSW is treated and disposed by giving descriptions of different treatment options and the situation at Tbilisi landfills. Lastly, chapter 7 discusses the costs of MSW management in Tbilisi.

The last part of the thesis is dedicated to the discussion and conclusions. Chapter 10 summarises, discusses and makes conclusions on the present situation with MSW management in Tbilisi. It illustrates the present situation and shows how far it is from the elaborated model of the future. Chapter 10 suggests pathway to reach the envisaged future condition. It presents pathways for MSW management in general and also more detailed one for landfilling. The actions are suggested, justified and put in certain time scale. The very last chapter of the thesis draws together the main conclusions of the research.

Hence, the thesis can be divided into three main sections. The first one describes and justifies model of the desired future. The second section is the description of the existing situation including legislation and on-going practice. The last section aims to link present and future by defining pathway leading towards future destination and to draw conclusions.

2 Backcasting

This chapter introduces the backcasting approach. Namely, it discusses what is the essence of backcasting, how it differs from the forecasting, when backcasting is appropriate to use and what are the steps shaping backcasting as a method. After giving a general overview of backcasting, the chapter describes how the idea of backcasting approach has been used in the thesis. Finally, it presents the overall methodological approach of the thesis and research steps taken.

2.1 Backcasting

> …We have the freedom to invent our own futures. This is an even more creative activity than choosing among alternatives, because it acknowledges that we can tread paths that have not been prepared for us.
> John Peet

2.1.1 Idea of backcasting

Backcasting approach implies to define desired future destination and see how it can be reached. The idea is to work backwards, from the future point to present and explore what measures should be undertaken to attain the desired future position (Dreborg, 1996). Thus, the conditions of future serve as a guide for planning and decision-making compared to forecasting where the starting points are present trends (Holmberg, 1998).

The idea of using backcasting as the planning technique first appeared in the writings of Amory Lovins in 1970s and was addressed to energy policy. This was the period of energy crisis in the world and Lovins presented a future energy situation where efficient use of energy and use of renewable energy technologies were predominant. The shaping of backcasting into the formal method for energy policy analysis was conducted by J.B Robinson in 1982. According to this method present actions related to energy sector are directed towards reaching long-term goal, a created preferable future. Since then the approach of backcasting has been used in different areas such as sustainable transport, recycling and waste management. In addition, backcasting has been used in competitive analysis in business in order to comprehend strategic directions of the firms being either competitors or collaborators (Mac Farlane, 2001, Dreborg, 1996, Wang and Guild, 1995).

When using backcasting approach the focus is not on predicting what future will be like, but rather creating desirable future and focusing how it can be reached. The present is looked from the perspective of the desired future condition and steps needed to reach this condition are determined (Robinson, 1990).

2.1.2 Forecasting and backcasting

When employing forecasting approach we define what are current trends and situation and develop strategy from this point forward. In the case of backcasting we define what the future end-point is and develop strategy from this destination backwards to the present situation. Thus, the future in the case of forecasting is the *effect* of present actions, while for backcasting approach future is the *cause* of present planning and actions (Kuisma, 2000, Wang and Guild, 1995).

A good illustration of the difference between forecasting and backcasting is given by Kuisma (2000) employing example from the real life. Two university students are to finalise their studies soon and decide what to do afterwards. The first one is determined to become a professor in 30 years. Keeping in mind his goal he starts to find out what he needs to do in order to attain this position, what skills he needs to acquire. Thus, he plans his future actions. This is the example of backcasting, when the future destination is the leading factor in directing present actions and decisions.

The other student is eager to start working and apply his knowledge in practice. For this, he thoroughly analyses what are his competences, abilities and knowledge. He thinks about how these skills and knowledge can be employed in a best way to get a job which is interesting and promises good salary and a pleasant working environment. This is the forecasting method of planning short-term future by analysing present competences that can be utilised in a desirable way.

Wang and Guild (1995) named backcasting being a goal-oriented (normative) approach, while forecasting is an opportunity-oriented (exploratory) one. As already explained above, the exploratory one takes the starting point for planning present knowledge and competences and asks question, what the future will be like? The normative approach first analysis its goal and looks back towards present. The question in this case is how the desired future can be reached.

In the case of backcasting the present trends are not determining the future, they just influence the pace and the initial scale of the changes to occur. The direction of this changes are not influenced by the present trends, rather they are determined by the envisaged future destination (Robert et al. 2002).

2.1.3 When to use backcasting

When analysing complex, long-term problems it is very hard to make accurate predictions. By focusing the analysis on the present trends it may be hard to foresee whether they will change and how they will change, because in complex and long-term forecasting many different variables influence future developments. Any of such forecasting efforts are accompanied by uncertainty. Here option of using backcasting becomes interesting (Wang and Guild, 1995, Dreborg, 1996).

The other reason why some give priority to backcasting rather than forecasting approach is a so-called conserving effect of backcasting. This implies that when debating certain issue, forecasting can be captured as truth, thus strengthening particular trend and not leaving space for the development of other alternatives (Höjer and Mattsson, 2000).

By imagining future backcasting approach helps to widen perspective of various actors involved and picture different alternatives. Usually backcasting is appropriate to use when the problem is complex and requires long-term solutions, when the present trends are the part of the problem and a major change is needed to appear, when the issue addressed involves various sectors of the society (Dreborg, 1996).

Backcasting approach can be employed by a range of actors such as authorities, municipalities, private sector, political parties as well as general public. Backcasting is especially useful to use for decision-makers planning long-term actions and involving many parties. This approach is also widely used by business sector (Dreborg, 1996).

In literature there is proposed combined use of forecasting and backcasting approaches, since they complement and inform each other. In this case forecasting provides information on measures that can give results in a short-term period. Forecasting also can help to see when the ongoing measures are ineffective and not desirable (Mitchell and White 2003, Höjer and Mattsson, 2000).

2.1.4 Steps of backcasting

Holmberg (1998) presents backcasting being the research method for sustainability that consists of the systematic step-by-step approach. He discusses backcasting in relation to the sustainable situation as the end point. Hence, the steps building up backcasting as the research method for sustainability are as following:

1. Defining criteria for sustainability

The first step implies defining the criteria for forming desired sustainable future. If the criteria for envisaging the future rest on the present trends only, the image of future may not correspond to the idea of sustainability. This step also points out that it is not essential to picture the future situation in details. Most important is to define the guiding principles that will create the framework for the future (Holmberg and Robert, 2000).

2. Describing the current situation in relation to the criteria for sustainability

The second step is focused on researching present, current trends and existing competences. This gives possibility further on to build up scenarios that are realistic and possible to implement.

3. Envisaging and discussing the future

The third option gives possibility to picture future options that meet the criteria set in the first step, while keeping in mind the current situation.

4. Finding strategies for sustainability

The fourth step connects future destination with the present by forming scenarios to reach the future condition. Planned actions should move us towards sustainable future closer and closer and should be the base for the next step on the way. The other question to ask is whether measure to undertake is a low hanging fruit, meaning that it can pay off soon, will save money and resources, will employ already existing structures (infrastructure, technologies, etc.) (Holmberg and Robert, 2000).

Hence, backcasting approach is translated into systematic step-by-step approach. The methods implied within each step are not prescribed, rather they are dependent on the individual case (Dreborg, 1996).

While creating the model of future various desirable future scenarios can be explored and the best out of them should be chosen. According to Robinson (2003) being the best model of future is not dependent upon cost implications, rather it focuses on the user choices reflected in the future model. Thus, the model illustrates what will be the consequences of the behavioural choices of stakeholders. The model should be able to integrate interests and preferences of different stakeholders, as the problems addressed by backcasting analysis are usually of a social character involving various actors (Robinson 2003).

2.1.5 Using backcasting in the thesis

The use of backcasting approach in this thesis is justified by a few reasons. First, the issue researched is one that the backcasting is quite appropriate to use for. Waste management is a social as well as political issue cross-cutting various sectors and involving different actors. The other reason is that the time horizon presented in the thesis is 30 years, which requires long-term vision and planning. Using backcasting and keeping long-term horizon gives possibility to picture long-term scenarios where major changes will occur. The need for such changes is grounded on the fact that the present trends are the part of the problem.

Most importantly, backcasting gives possibility to free imagination from the present trends and look for the other alternative solutions. It also gives possibility to choose the future that is most desirable and look for the ways to reach it. This is especially important in case of Georgia, since the common vision of the point to reach in future is lacking as well as the horizon of possible alternative solutions is restricted only to the present trends.

Using backcasting approach in this thesis gives possibility not only to define main principles for desired future destination and based on them create a model of future, but also to study present situation, competences and trends. This knowledge coupled with the proposed scenario linking present and future, presents useful information for those interested in the issue.

2.2 Structure of the research

The thesis followed the systematic step-by-step approach of backcasting methodology. First the model of desired future was worked out based on the main principles and on the EU legislation. This phase unified the first and the third steps of backcasting method being defining the criteria and envisaging the future. The next step was to research the present by exploring current practices and trends. The last step was to link present and future by defining pathways leading towards the future destination.

Thus, the research was carried out according to the following methodological steps (See Figure 2-1):

- **Step 1.** Creation of the future model – literature review
- **Step 2.** Study of the present situation – study of the relevant legislation of Georgia and collection of primary data through interviews
- **Step 3.** Conducting backcasting analysis based on the previous two steps.

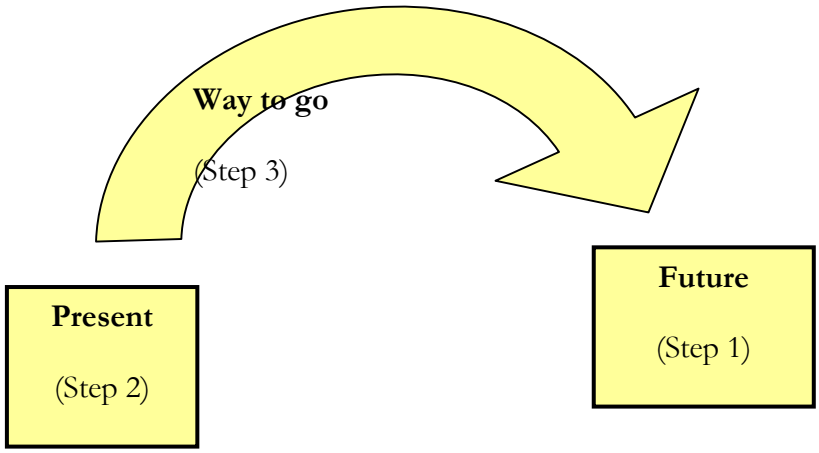

Figure 2-1 Structure of the research

Throughout the research attitudes of different actors and of the society in general have been explained. This gave possibility to understand what degree of acceptability and desirability from stakeholders the model of future or its certain elements would acquire.

Similar structure of the research and approach of backcasting has been used by the author during the module of Strategic Environmental Development during IIIEE MSc programme (namely, in April-May 2004). The topic of the module was Waste Management in the European Perspective and studied situation in Romania. This experience was of much help during conducting this research.

3 Methodology

This chapter explains the methodology used during each step of the research (presented in Chapter 2). Namely, it describes and justifies use of literature review, interviewing and observation. The main idea of using various methodologies is to get the full picture of the present situation, grasp various viewpoints and attitudes of actors. Further down, the chapter explains how the data was analysed and what the limitations are of the methodology employed.

3.1 Literature review

Initially, the future model was created (Figure 3-2) based on the principles of the sustainable waste management and using EU waste policy and practices as a basis. The main idea of the desired future model was to create a system which would minimise the negative impact on the environment and human health. In addition, the system would be able to utilise waste as a material to its maximum extent, minimise incineration and ensure safe disposal of waste. The idea of minimising incineration and focusing on recycling and composting is reflected in one of the scenarios for meeting the requirements of the Landfill Directive (details see in Chapter 5). The relevance of the Landfill Directive to the Georgian case is due to the fact that the only current waste management option in the country is landfilling and the incinerating option is too expensive to afford for at least the next few years. The model of desired future would be in accordance with the EU requirement on waste, since Georgia will have to meet them as the country aiming to join the EU (for details see Chapter 4).

At the same time, while creating the envisaged future, existing competences and possibilities were kept in mind. This would help to make connections between the future and the present and envisage realistic and implementable pathways. The creation of the model was based mainly on the relevant literature and the Internet sources.

The review of waste related legislation of Georgia was done in order to understand the existing legislative base for waste management. Namely, laws, sub-legal acts, the draft law on waste management as well as the relevant international treaties have been reviewed. These legal acts were found in Internet or were provided by environmental NGOs and the Ministry of Environment and Natural Resources Protection of Georgia.

3.2 Interviewing

In order to understand what needs to be done to reach the desired future condition, it is necessary to find out what is in place. That is why the study of the present waste management policy and practices was undertaken. In order to get all the necessary information, interviews were conducted, since the relevant written information mostly is not available.

Interviews aimed not only to gain information needed for the research, but also to get a feeling of what are the attitudes of different interviewees towards the issue, how they present the problem, what interpretations they make and how they see the solutions. Thus, the interviewing did not aim to create "mirror reflection"[1] of the existing reality. Each interviewee gave his/her version of the reality that fitted in a certain context and was backed up with certain experience and knowledge.

[1] The positivists aim to conduct so-called "pure" interviews thus making it possible to approach the description of the "mirror reflection" of the reality as much as it is possible (Miller and Glassner, 1997:99)

Interviewees were chosen according to their relation to the issues touched by the thesis. They represented state ministries, departments and institutions having connection with the MSW management, also environmental non-governmental organisations and international organisations. In addition, representatives of informal sector such as waste pickers were interviewed. The criteria for choosing interviewees were their professional competence, experience and knowledge of the issue. Often initial respondents would suggest the person to interview next about the certain issue. Thus, initial respondents would help to identify the possible interviewee. Interviews were planned in order to grasp alternative viewpoints, describe different realities, reflect diverse experiences and also see various perspectives and attitudes of interviewees.

Interviews were mainly of a semi-formal or informal nature and usually lasted about an hour each. Questions varied for different interviewees, however every interview was designed in a way to help in testing different pathways and actions that would lead towards desired future condition (elaborated by the author and presented to the interviewees), their acceptability from decision-makers and other actors. Besides, interviews helped to picture the assumptions related to the created model of the future, its evaluation by different actors.

Most of the interviews were personal ones. Few interviews were conducted over the telephone. Sometimes group interviews took place, when a few people worked together (for example, waste pickers or waste workers at the landfills). In total 19 interviews have been conducted that covered majority of important stakeholders, however, few planned interviews were not conducted due to the unavailability of interviewees.

One interview was conducted in a format of a roundtable although it included only a few participants. There were involved the head of the Tbilisi Municipal Service of Modern Amenities, Mr. Shalva Beboshvili; a representative of the Department of Land Resources, Chemicals and Wastes of the Ministry of Environment and Natural Resources Protection of Georgia, Mr. Givi Kalandadze and the author. The discussion concerned the feasibility of reaching MSW management as given in the model of future, the ways to be undertaken to reach such conditions, main problems and difficulties that could occur and how they could be overcome.

3.3 Observations

Along with the interviews, visits to different facilities were carried out in order to observe how MSW is managed in Tbilisi. Observations were made at all the legal landfills of Tbilisi, also at some of the illegal ones, at the loading stations and at the metal collection points. Non-participant observations were used to see how waste is collected and transported, what is the behaviour of waste pickers. Observations helped to see how the different processes are carried out in reality, what are the interactions between participants and then compare these pictures with the descriptions given by interviewees.

3.4 Analysing data

The backcasting approach was used to analyse data. Looking from the perspective of the desired future condition and placing a horizon of a 30 year period to reach it, the pathway to undertake was elaborated. While doing so, the present situation was kept in mind in order to come up with the realistic and affordable solutions. The elaborated pathway consists of different steps to be taken simultaneously or consecutively. Actions possible to start now and those to be introduced later are suggested.

3.5 Limitations

One of the limitations was information credibility, especially concerning quantitative data on the amount and the composition of generated waste. Also, some other quantitative data concerning landfills were not reliable.

While using backcasting approach, it is very useful to carry out workshops with the involvement of various actors. This makes it possible to discuss the issue, come up with various standpoints, argue and make conclusions. Besides, while conducting the workshop it would be useful to explain the whole idea of the research and of the model of the desired future. Giving this information would facilitate interesting and various viewpoints. However, in this research such a workshop was impossible to conduct due to the unavailability of the participants. However, the small roundtable described above was held at the Tbilisi Municipal Service of Modern Amenities.

English translations of legal documentation used in the research are done by the author, since the official translations were not available.

4 EU and Georgia

This chapter gives background information about the EU-Georgia relations. It explains why Georgia wants to become the member of the European Union and what benefits could this bring for the country. Further the chapter talks about past cooperation represented mainly by humanitarian aid and technical support from the EU and describes the Partnership and Cooperation Agreement which serves as the framework for the political and economic relations as well as cooperation in different areas between EU and Georgia. The chapter also looks at the future directions of the EU-Georgia relations, namely, at the European Neighbourhood Policy and its relation with Georgia.

4.1 Why to join EU

After being the part of the Soviet Union for more than 70 years, and gaining independence little more than a decade ago, Georgia strives to place itself as an independent state in the world. In this respect, membership of the European Union is seen as the possibility to become a plenipotentiary member of the international community. This is especially important for Georgia, being the country with small territory and population and with its geopolitical location. Even though Georgia is placed in the intersection of Europe and Asia, country considers itself as an European nation historically, by being part of the western Christian civilization and by sharing the same main values culturally.

Georgia sets the long-term priority goal to join NATO and the European Union. This is connected with the security issues including military as well as economic, social and environmental security. The issue of territorial integrity in this context is especially important for Georgia. In addition, the access to the single European market will be a good facilitator for the economic development of the country.

Overall, the direction towards the EU is the political issue determined at the very top of the political arena. This direction has been set in the beginning of the 1990s when Georgia became an independent country. However, after the "Rose revolution" in November 2003 these priorities of the foreign policy have become even more emphasized.

4.2 EU-Georgia relations

4.2.1 Financial Assistance

Georgia-EU relations started soon after Georgia gained independence in the beginning of the 1990s. Initially, these connections were represented by the humanitarian aid provided by the EU in a form of Food Aid Programme in 1991. This was determined by the hard social and economic situation in the country that was the result of the quick collapse of the Soviet economic system. Gradually this programme has transformed into the Food Security Programme. In addition, other instruments were employed to assist Georgia. Namely, between 1992 and 2002 the humanitarian assistance programme by the European Commission's Humanitarian Aid Office (ECHO) provided € 92 million, the Food Security Programme, € 59 million and the Tacis[2] National Programme, € 84 million respectively. Thus, during its initial years of independence Georgia received mainly humanitarian aid from the EU focused to support population suffering from political instability and internal conflicts.

[2] Tacis programme has been initiated by EC in 1991 and is focused on 12 countries of Eastern Europe and Central Asia. It provides technical assistance to these countries with the aim to help them during the transition process (Europe, 2004b).

Starting from 1996 technical assistance provided through Tacis has increased compared to the humanitarian aid (Gogolashvili, 2004, EC 2004d).

The Tacis office was opened in Tbilisi in 1992 and started to provide technical assistance to the country and initiate various programmes and projects. In general, Tacis has country projects and multi-country (regional) projects. In Georgia, although both types of projects are carried out, they are mainly country projects. For country project an indicative programme for 4 year period is worked out pointing out the priority areas to work upon. According to this indicative programme national action programmes are developed for each 2 years and the budget is allocated. In average, budget for a 2 year action programme is 30 million Euros. Nowadays the main priority areas for the EU in Georgia are social consequences of transition, institutional building, support in legal and administrative reforms, infrastructure development, assistance for private sector and the economic development, promotion of environmental protection and management of natural resources and development of the rural economy (Gogolashvili, 2004, EC, 2004d, GEPLAC, 2004).

Georgia also participates in the regional, inter-state technical assistance programmes by Tacis such as TRACECA[3] (focus on transport sector, namely building ferry terminal and also bridge between Georgia and Azerbaijan), INOGATE[4] (focus on transcaspian oil and gas pipelines) and Regional Environmental Centre (REC) for Southern Caucasus with the headquarters in Tbilisi. Also within the inter-state technical assistance programme EU supported the Regional Agriculture Reform Project (focus on food production, processing and distribution) and the Black Sea Environmental Programme (Gogolashvili, 2004, EC, 2004d, GEPLAC, 2004).

In 1993 Georgia received a credit of 70 million ECUs[5] from the EU which has been restructured in 1997 and was given a status of "exceptional financial assistance". The following assistance package provided by the EU amounted to € 110 million loan and € 65 million grant to be distributed in 1998-2004 (Gogolashvili, 2004). The final and the largest financial assistance to Georgia was provided this year (June 16, 2004) by international donors and amounted to 1 billion USD. International donors represented 31 countries and 12 international organisations. Such significant decision related to Georgia was, to a large extent, determined with the support of the European Commission, which together with the World Bank organised a conference for international donors with the aim to discuss future donor coordination and financial support to Georgia. They decided that the priority areas to be financed would be energy and governance sectors and poverty reduction (EC and WB, 2004).

In 1997 the EU started a project "Rehabilitation of territories affected by internal conflicts". This project targeted areas of Tskhinvali Region (South Osetia) and Abkhazia. In Osetia rehabilitation of infrastructure, railway and energy supply were included in the project. It was more difficult to carry out activities in Abkhazia and the project covered only the rehabilitation of Enguri Electric Station (Gogolashvili, 2004).

[3] Transport Corridor Europe-Caucasus-Asia

[4] Interstate Gas and Oil Transport to Europe

[5] European Currency Unit. Existed before the introduction of Euro in Europe, was exchangeable with Euro on one-for-one basis.

4.2.2 Partnership and Cooperation Agreement (PCA)

The main institutional base for the EU-Georgia relations is the Partnership and Cooperation Agreement (PCA) between Georgia, the EC and its fifteen Member States signed in 1996 and enforced in 1999. Three year period from signing to entry into force was needed since all fifteen Member States had to ratify the Agreement. This is due to the fact that some of the issues touched by the PCA are exclusively competence of the European Community (such as trade), while others can be shared by the European Community and its Member States and some issues are within the competence of Member States only. The PCA will be in force for ten years. Afterwards, according to Article 97, it will be automatically renewed if not denounced (Gogolashvili, 2004, GEPLAC, 2004).

This agreement regulates political relations, trade and business arrangements and collaboration in different fields between Georgia and the EU. Hence, this is an agreement covering most of the areas of cooperation except defence. In terms of political relations, the treaty calls for the convergence of positions between the EU and Georgia. This is different definition of relations compared to the statement given in the European Agreements, where important provision is the common position over political issues and not convergence of positions only. Essential elements of the PCA are principles of democracy, human rights and international law as well as principles of market economy. According to Article 2 parties shall respect the abovementioned principles (GEPLAC, 2004).

Trade and business arrangements are presented by trade principles given in the PCA which are similar to those presented in the General Agreement on Tariffs and Trade (GATT). Such arrangements, for example, include rules of starting up business in Georgia for an EU citizen (Gogolashvili, 2004).

The third field presented in the PCA is collaboration in different fields where the main implementation instrument is Tacis along with TRACECA and INOGATE (Gogolashvili, 2004).

Article 57 of the Agreement touches environmental issues. Namely, it calls parties for developing stronger cooperation on the field of environmental protection. Among other fields the article points out "waste reduction, recycling and safe disposal, implementation of the Basel Convention" as the subject of closer collaboration.

The Agreement calls for legal approximation in all the fields, but it distinguishes a few of them including one field named as "environmental issues". This covers protection of health and life of humans, animals and plants, the environment, consumer protection. However, in the list of the preferred areas of approximation only plant protection and veterinary measures is mentioned from the abovementioned category. Other preferred areas for legal approximation include transport, banking, the nuclear industry, health, technical regulations and standards. Process of approximation of Georgian legislation towards the EU legislation and standards has started before the PCA entered into force. This is because from the very beginning of building an independent state, Georgia has declared interest in directing its legislation towards the EU standards and practices (GEPLAC, 2004).

4.2.3 European Neighbourhood Policy (ENP)

The new base for relations and closer collaboration with the EU will be European Neighbourhood Policy (ENP) which implies the creation of a new institutional framework (new treaties) and the introduction of new financial instruments. The ENP concept for Georgia should be worked out by 2006. By this time the action plan for Georgia will be

developed. Future developments will be dependent on how the country will fulfil this action plan. Environment is one of the directions in ENP (Gogolashvili, 2004).

4.2.4 Implication of the EU-Georgia relations on waste management sector

Not much collaboration has been present between the EU and Georgia in waste management field before. However, recent developments of the relations between these two parties allow to make some projections. Namely, the inclusion of Georgia in the European Neighbourhood Policy will widen the area of collaboration between the EU and Georgia. Since the environmental field is one of the priority areas of the ENP, the extension of common work on this direction can be expected. The waste-related problems, being also important environmental problems, will also fall within the focus of the extended collaboration. In this regard, it will be very important for Georgia to know what problems, competences and resources exist in the field and what the priority areas are to focus on. This will enable it to direct the assistance provided by the EU (including financial, informative and technical) to the right direction.

As for the approximation of the national legislation to that of the EU, the process has started since Georgia gained its independence. This was due to the new foreign policy directions of Georgia embracing accession to international organisations such as the Council of Europe and the World Trade Organisation (WTO). A number of the European standards have been introduces into the legal system of Georgia. The same line of legal approximation with the EU legislation was stressed by the Resolution of the Georgian Parliament No. 828-IS of September 2, 1997. The resolution states that all the legal acts adopted by the Parliament should be compatible with the norms and rules established by the EU (Kereselidze, 2002). Thus, the legislation adopted so far and concerning waste is usually dictated by the standards and norms of the EU. The draft law on waste management is also much influenced by the European legislation. The same trend is expected to be kept for the upcoming legal initiatives as well.

5 Model of desired future

What does the desired future in relation to waste management imply? In this regard the main principles should be defined. Waste management should be directed towards minimising impact on the environment and human health. One way to achieve this is set in the waste management hierarchy that presents different waste management options ranked according to how preferable they are. The hierarchy will be discussed later on in the chapter. However, the main idea of the desired future model is to minimise waste going to landfills, thus reducing the scale of the least favourable waste management option. The other priority is to minimise incineration and use waste as the material at a highest extent. This idea is more closely discussed later in the chapter in relation to the Landfill Directive. The model of future combines various waste management options thus, setting a system that will protect human health and the environment.

The EU waste legislation is guided with the overall waste management principles and the hierarchy of waste management operations. This chapter looks at the EU waste legislation and creates a model of desired future that reflects the main idea of what is the best waste management system and at the same time falls within the scope of the EU waste legislation since as the country willing to enter the EU, Georgia sooner or later will have to meet EU requirements.

5.1 EU legislation related to waste management

EU waste legislation can be classified into horizontal legislation, legislation concerning waste treatment options and legislation dealing with the specific waste streams. Horizontal legislation sets an overall framework for the waste management and gives definitions and general principles. Since this is quite a general legislation, more detailed legal acts in areas of waste treatment operations and specific waste streams are provided. These directives address problematic waste streams such as batteries and accumulators, packaging, waste oils, PCBs/PCTs, end-of-life vehicles (ELVs) and waste electrical and electronic equipment (WEEE) (EC, 2003c).

5.1.1 Horizontal legislation

Principles of waste management

EU waste management approach is based on a few main principles being (EC, 1999):

- Prevention principle indicating that production of waste should be prevented and avoided if possible.
- Producer responsibility and polluter pays principle imposing on the waste producers to cover full costs for their actions.
- Precautionary principle indicating that potential problems should be anticipated and avoided.
- Proximity principle requiring that waste is to be disposed as closely as possible to where it was produced.

These principles are touched more closely in the EU waste management hierarchy and the EU Directives to be discussed below.

Waste Framework Directive and hierarchy of waste management options

Waste Framework Directive (Council Directive 75/442/EEC) from July 15, 1975 has been revised twice in 1991 and in 1996. Directive sets uniform definition of certain terms across the EU member states (EC, 2003c). According to Waste Framework Directive:

> "Waste" shall mean any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard (Council Directive 75/442/EEC, Article 1[a]).

Under this directive there are set priorities for waste management options (See Figure 5-1). The most desirable solution for waste management is its prevention at source, followed by reuse and recovery of waste. Least desirable is waste disposal, which if occurs should be controlled. Besides, both recovery and disposal should be carried out in a manner ensuring that the human health and the environment are not harmed. Disposal costs should be borne by the waste holder, thus being in accordance with the polluter pays principle (EC, 2003c).

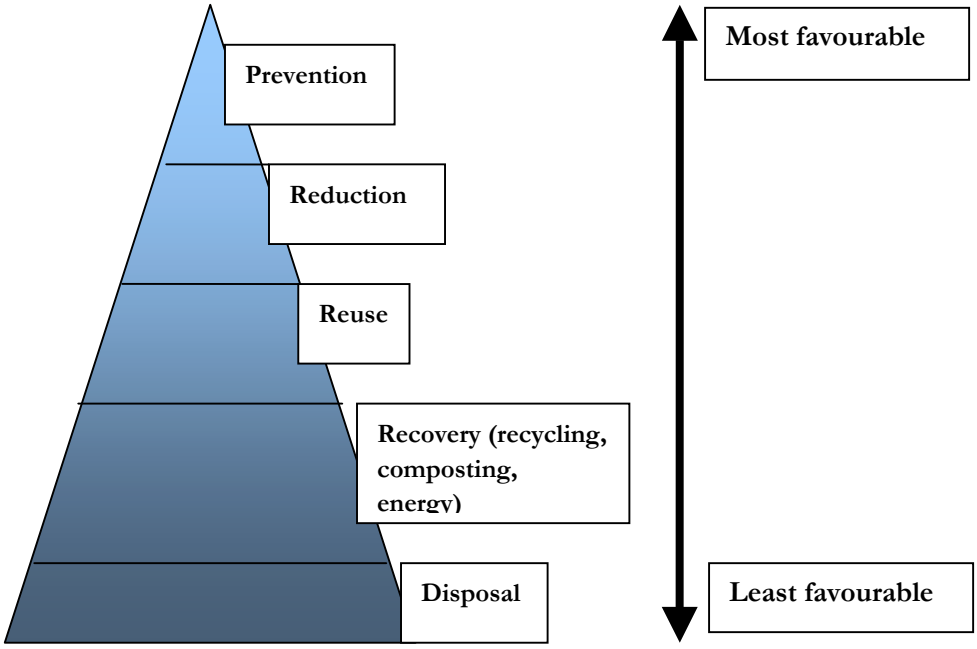

Figure 5-1 Waste management hierarchy

As shown in Figure 5-1 the highest option in the waste hierarchy is prevention. Waste prevention occurs at source through technological development, new product designs and enhancement of more sustainable production and consumption patterns. Waste prevention implies both quantitative and qualitative prevention. Quantitative prevention addresses reduction of the amount of generated waste, while qualitative prevention is about the reduction of the hazardousness of the generated waste. In fact, qualitative prevention can be considered as a case of quantitative prevention, since it addresses reduction of the hazardous

waste generated. Among the directives addressing specific waste streams, qualitative prevention is addressed in the End-of-Life Vehicles Directive, in Directive on the Restriction of Certain Hazardous Substances in electrical and electronic equipment and in Directive on Batteries and Accumulators. Quantitative prevention is addressed in the Directive on Packaging and Packaging Waste (EC, 2003c).

The second option is waste reduction that also implies technological developments, usage of materials in more efficient way and also introduction of more durable and reusable products instead of disposable ones.

The third in the hierarchy stands reuse that means to use items again for its original or other purpose. Next option is recovery being that the value should be recovered through recycling, composting or incineration. The recycling option means that the material value is recovered through different technologies, the material can be recycled into similar products or serve as raw materials for production of other products. The principle of Extended Producer Responsibility (EPR) is used in both Community and national legislation to decrease total environmental impact of the product, promote recycling and facilitate cleaner production practices. The principle of EPR implies that the responsibility of a product manufacturer is extended through the entire life cycle of the product, especially to the end-of-life phase. Thus, producers bear economic, financial and/or informative responsibility[6] for their products. This should provide them with the economic incentives to improve design of their products thus facilitating their reuse and recycling (EC, 2003c, Lindhqvist, 2000).

Composting applies to biodegradable waste. Energy recovery is to be carried out through incineration. The least favourable option is waste disposal that is to be held if no other option can be employed. Waste disposal shall be carried out in a safe way not causing harm to human health and the environment (Kim, 2002).

Moving up on the waste management hierarchy will result in more sustainable waste management practices.

In Georgian reality, those working with the waste issues in general are not well acquainted with the waste management hierarchy. Although they rank waste management options in a similar way as are presented in the hierarchy, they do not acknowledge that well defined and systematised ranking of the more and less favoured options of waste management are the guidelines for the EU waste legislation. In many cases, in Georgia, within the waste management options much less alternatives are considered. Namely, the main focus is on landfilling, incineration and recycling.

5.1.2 Legislation on waste treatment operations

Landfill Directive

In EU, the disposal of waste is regulated through Landfill and Incineration Directives. The Landfill Directive 1999/31/EC aims to prevent and reduce the negative impact on the environment and human health generated from landfilling the waste. For this reason it introduces administrative requirements concerning permitting conditions, technical

[6] Economic responsibility obligates producer to bear expenses fully or to some extent for collection, recycling and disposal of his products. Physical responsibility implies that producer is responsible for physical management of products. Informative responsibility requires producer to provide information regarding environmental properties of the products (Lindhqvist, 2000).

requirements and environmental standards to be applied to landfills. The Directive also separates and defines municipal waste, hazardous, non-hazardous and inert waste. Consequently, it divides landfills into three categories being landfills for hazardous waste, landfills for non-hazardous waste and landfills for inert waste. Following these definitions, the Directive puts standards on landfilling by assigning hazardous waste to be landfilled only on the hazardous waste landfill, landfills for non-hazardous waste to be used only for municipal and non-hazardous waste and inert landfill sites to be used for inert waste only. Besides, in order to avoid any risk associated with the human health or environment, waste is to be treated before being landfilled (EC, 2003c, EC, 2004c).

Moreover, Landfill Directive sets targets for the reduction of the disposal of biodegradable waste into the landfills and bans certain types of waste such as liquid waste, flammable waste, explosive or oxidising waste, hospital and other clinical waste which is infectious and used tyres (EC, 2003c, EC, 2004c).

Under the Landfill Directive all the costs concerning establishment, operation and closure of the landfill should be reflected in the price set by the operator (EC, 2003c).

The Landfill Directive promotes waste to be diverted from landfilling by establishing targets on biodegradable waste to be landfilled and certain waste streams to be banned. Each member state is free to choose strategy in order to achieve these targets. Two extreme scenarios can be discussed while speaking about the requirements of Landfill Directive. The first is shifting waste towards incineration and the second adopting intensive strategy to promote material recycling and composting. Thus, two main scenarios are (EC, 2004a):

- Maximum recycling/composting scenario
- Maximum incineration scenario

The first one implies thorough source separation programmes for dry recyclable materials and compostable waste. In order to pursue this option a country has to adopt large-scale separation programmes and create market for recyclables. Among other things, this requires the change of attitudes and behaviour of citizens in order to have a successful source separation system. This will necessitate long-term information campaigns as well as the creation of convenient separation systems and the provision of population with incentives to separate waste at source. The separation of waste could be also done through Material Recovery Facilities (MRF) being plants that separate recyclables manually or through machinery. However, a number of drawbacks can be identified for MRF compared to the source separation option. Firstly, MRF require high investments costs and once not properly managed can cause injuries to workers. They need high input of waste flow, thus not promoting waste reduction. In addition, the fraction of separated waste are more pure, less contaminated and thus, of higher quality in case of source separation (EC, 2004a, Fenech, 2002).

The idea of the first scenario is exercised in the model of future presented in the thesis. According to the first scenario the waste is separated into few main fractions. Some part of it such as recyclables and compostables are utilised as material and the rest is disposed in a safe way. Thus, the need for using incineration is minimised as well as the waste ending up in the landfill is significantly reduced.

The second scenario focuses on meeting the Landfill Directive targets through diverting waste from landfills to the incineration. This option does not require intensive separation of waste, thus minimizing public participation in waste management system. However, it is important

to note that usually there is a high opposition towards constructing new incinerators from the local population. Hence, this option becomes more and more difficult to implement once environmental consciousness of the public increases. Besides, incineration does not give incentives for waste reduction as it needs high flow of waste to operate effectively. Having incineration in place does not give motivation to carry out recycling activities either. This could effect the fulfilment of material recovery targets set in Packaging and Packaging Waste Directive, Waste from Electrical and Electronic Equipment (WEEE) Directive and EU End-of-Live Vehicles (ELVs) Directive(EC, 2004a).

Taking into account stringent requirements put forward by the Landfill Directive, the landfilling of waste will become much more expensive thus, making other waste management options more interesting (EC, 2003c). The diversion of the waste from landfills to the incinerators will not be less expensive if all the required standards are met for incineration facilities. Thus, saving disposal costs would be an important incentive for promoting first scenario. However, in Georgia, the idea of having incineration as the major waste management option is becoming predominant. Even though the requirements set by the Landfill Directive and consequently, possibility of having two different scenarios for reaching them are not well known among Georgian decision-makers, still to build up an incinerator is considered to be the only possible way of improving the situation. Even when the first scenario is presented as an option, it is mainly ignored from the beginning. The arguments are mainly similar being that separate collection is impossible to do, financial resources do not allow carrying out such changes and incineration is less complicated and more effective way.

These two scenarios are of an extreme nature and exclude overlapping. However, a mixed strategy unifying elements from both options can be adopted (EC, 2004a).

Incineration Directive

The Incineration Directive (2000/76/EC) unifies three previous Directives[7] and sets the consolidated requirements related to incineration and co-incineration of hazardous and non-hazardous waste. The aim of the Directive is to prevent and reduce negative impacts on the environment and human health caused by incineration and co-incineration of waste. Following this aim, the Directive sets stringent operational conditions, technical requirements and emission limit values for incineration and co-incineration facilities within the EU (EC, 2003c, EC, 2004c).

The Incineration Directive distinguishes incineration and co-incineration plants. Incineration plants imply those incineration facilities that may or may not recover heat from combustion of waste and their main purpose is thermal treatment of waste. The main aim of co-incineration plants is energy recovery or production of material products. The latest refers for example, to cement kilts and steel plants (EC, 2003b).

The Directive also addresses issues of delivery and reception of waste and management of residues. Residues from the inicineration process should be minimised in amount and also in their harmfullness and where possible recycled. Otherwise, they should be disposed in a safe way. The Directive sets requirements on conrol, monitoring and measurements for incinearation facilities (EC, 2003c, EC, 2004c).

[7] Council Directive 94/67/EC of 16 December 1994 on the incineration of hazardous waste (OJ L 365, 31.12.1994, p.34); Council Directive 89/369/EEC of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants (OJ L 163, 14.6.1989; p. 32);Council Directive 89/429/EEC of 21 June 1989 on the reduction of air pollution from existing municipal waste incineration plants (OJ L 203, 15.7.1989, p. 50).

5.1.3 Legislation on specific waste streams[8]

Packaging and packaging waste

Directive on Packaging and Packaging waste (Council Direcitve 94/62/EC) is one of the most well known piece of legislation addressing specific waste streams. At the same time, there exists much experience of implementing this Directive. The aim of the Packaging Directive is to harmonise the measures related to management of packaging and packaging waste throught the EU member states in order to ensure environemtnal protection and functioning of the internal market. The Directive is applied to all the packeging that is in place in the EU market. It calls for prevention and reuse of packaging through national programmes. Member states would work out the collection system for packaging that will enable them to meet targets set by the Packaging Directive for recovery and recycling for different packaging materials (EC, 2003c, EC, 2003a).

The Packeging Directive has been revised recently, by proposing more ambitious recycling and recovery targets to be reached. In addition, delegations of the Parliament and Council had reached a consensus over the incineration issue in relation to the recovery targets. They agreed that the incineration of the municipal waste can be couted in the recovery targets presented in the Packaging Directive. This decision was welcomed by packaging industry and operators of the incineration facilities, however caused a harsh opposision of environmentalists (EurActiv, 2003).

In Georgia, the link between the packaging issue and waste problem is not seen. The only type of packeging that is more or less acknowledged as a problem to be solved are PET bottles. Neighter decision-makers nor the public consider other types of packaging waste as a problem.

Batteries and accumulators

The Directive 91/157/EC on batteries and accumulators aims to establish controlled disposal system in the EU for spent batteries and accumulators that contain hazardous materials. The Directive prohibits marketing of batteries that contain a certain amount of mercury and requires member states to set up programmes aiming to reduce heavy metal content of the batteries and accumulators. Besides, batteries and accumulators should be marked to indicate the need for their separate collection, recycling requirements and heavy metal content (EC, 2003a).

The new revised version of the Battery Directive has been adopted by the Commission in November, 2003. It implies setting up a national collection system for all the batteries placed on the EU market to be returned free of charge by the consumers. However, the adopted version of the Directive does not ban nickel-cadmium rechargable batteries. The latter decision caused dissatisfation of the European Environmental Bureau saying that nickel-cadmium batteries are possible to ban (meaning that there are available alternatives) and must be done so (EurActiv, 2004).

Going back to Georgia, the issue of batteries and accumulators is noteworthy to touch. Today the market is full of different types of batteries and accumulators imported from different countries. The content of heavy metals and other hazardous materials in these batteries is not

[8] WEEE Directive, ELVs Directive, also Directive on Disposal of Waste Oils and Directive on Disposal of PCBs and PCTs are not discussed, since in this reserach these waste streams are not considered as Municipal Solid Waste.

studied. The batteries are used to a large extent as well, however they still comprise a very small part of the MSW. That is why they are not regarded as a problem and consequently, no attantion is diverted towards initiating any action for taking out batteries from the waste stream. However, once explained the essence of the problem and the necessity of treating batteries separately, population could paricipate in disposin batteries separately. As for the small butten cell batteries, their separate collection would be easier since they are all generated mainly in the watch reparing shops. The experience of other countries could be used to set up separate collection system for spend batteries and adapt it to the Georgian reality.

5.2 Model of the desired future

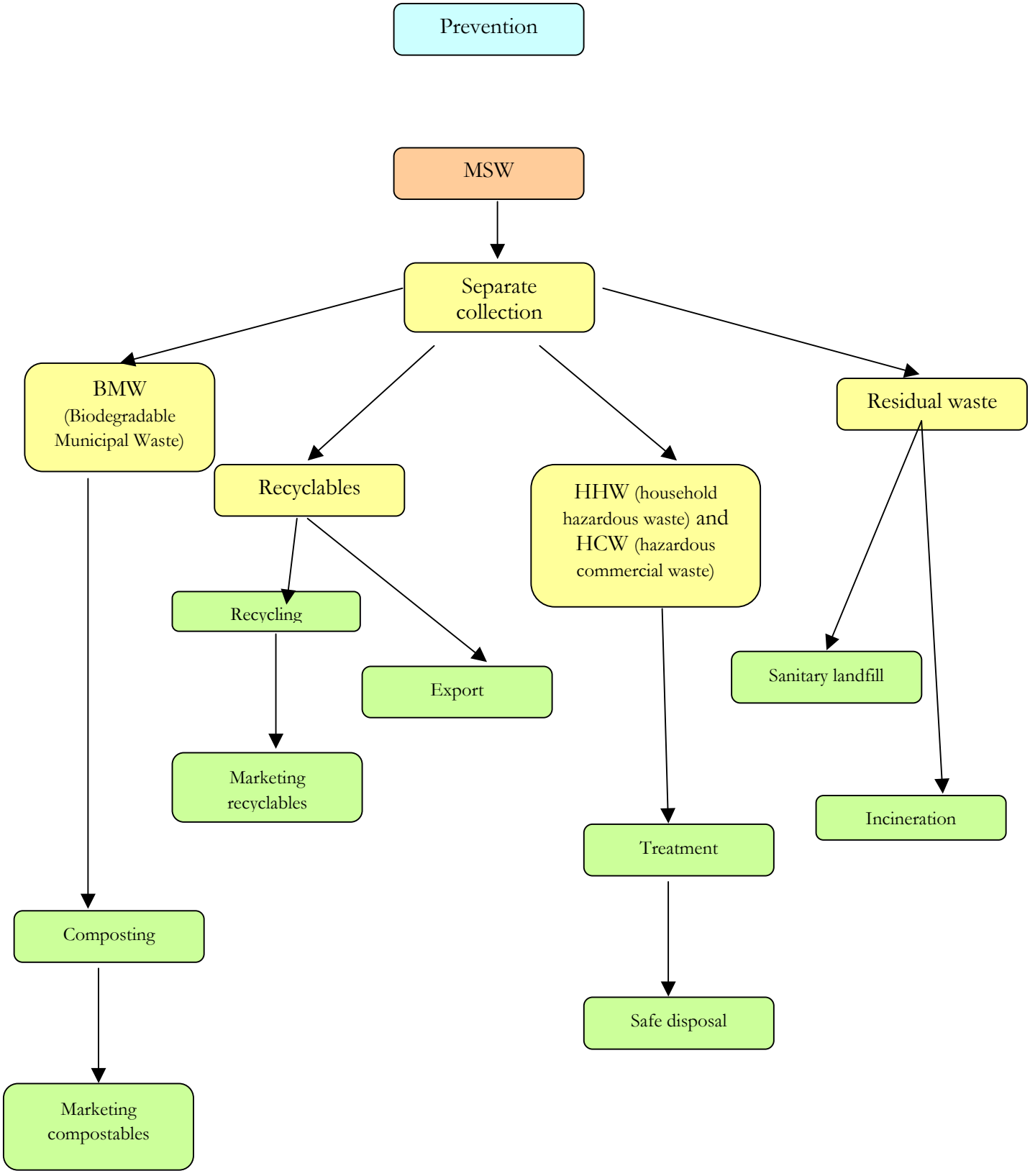

Figure 5-2. Model of the desired future

5.2.1 Explaining the model

This section explains the model of desired future for municipal solid waste management in Tbilisi presented in Figure 5-2. Each of the sections presented below corresponds to the issues addressed in the yellow boxes (BMW, recyclables, HHW/HCW, residual waste, separate collection) in Figure 5-2.

Separate collection of MSW

Separate collection of MSW is a key for the further activities presented in the model of desired future (See Figure 5-2). That is why it is one of the most important points to be discussed and thought through. Separate collection of waste can be facilitated with the combination of various actions such as economic incentives, information campaigns, setting up convenient collection systems and the like. The details of how each of these options could be implemented depend on the local characteristics and current situation in the country.

BMW

Once collected separately with the sufficient purity, BMW can be composted either through home composting or in the centralized composting plant.

Home composting is a cheap and easy way of treating BMW. It could be undertaken in the parts of the city where private houses with gardens are present or in the suburbs of the city. Home composting can be interesting for residents of villages who can use compostables in their gardens or vineyards (Abo Sena, Cristofaro, Hicks & Antadze, 2004).

Other more expensive options of treating BMW are *the centralized composting* and *anaerobic digestion.* The first one could be suitable for a densely populated area, for example a big city. Anaerobic digestion method is mainly used to treat animal waste and to produce methane gas (Abo Sena, et al., 2004).

Recyclables

The options for recyclables can fall into recycling and exporting. The recyclables such as paper, glass, plastic and metal can be recycled and used as the raw material to produce different products.

The other option is to export separately collected recyclables abroad. This option can be used for those recyclables not possible to be recycled in the country.

Having well-functioning market for recyclables is one of the important elements for successful recycling activities. This means that the focus should not only be on the supply part such as collection system, but also on the demand side represented by competitive market for recyclables. One way to do so is to find out new alternative uses of recyclables based on their properties and thus create a diverse marketplace for them. This is one way to avoid a situation when market is represented by many suppliers and few buyers who control the demand side and thus, prices for the recyclables (such a situation is called monopsony). The market for recyclables should be not only diverse but also well organized, thus reducing transaction costs for buyers and sellers (Storer and Davies, 2002).

At the same time, it should be kept in mind that recycling operations should go in accordance with all the relevant standards and requirements.

HHW (Household Hazardous Waste) and HCW[9] (Hazardous Commercial Waste)

Taking care of hazardous waste fraction in the MSW should be started with its separate collection. This can be done through the various ways already described above. Once separately collected, hazardous waste should be treated in order to reduce its potential harm to human health and the environment and be safely disposed.

Residual Waste

Even if the separate collection system works very effectively, there is always mixed, residual waste that needs to be taken care of. Such waste can be either landfilled or incinerated.

Waste prevention

All the pathways described above related to the options dealing with the waste once it is generated. Waste prevention implies that waste is avoided at source as much as possible. This is also the highest priority for the EU waste policy. Even though prevention strategy could be difficult to pursue now in Georgia, this option should be kept in mind.

[9] It is assumed that commercial waste is included in the MSW.

6 Actors involved in MSW management

This chapter introduces the actors who are involved in the management of MSW management in Georgia starting with the law makers and ending with citizens. Their duties and responsibilities are described and links are drawn among them.

6.1 Central Authorities

6.1.1 Legislative Power

The Parliament

According to the Constitution of Georgia, the Parliament is the supreme representative body with the legislative power that determines the directions of domestic and foreign policy and supervises activities of the government (Constitution of Georgia, Article 48). The Parliament adopts different laws and also ratifies international treaties (Constitution of Georgia, Article 65-66).

In order to prepare different legislative initiatives in advance and facilitate decision making process, there are established Parliament Committees (Constitution of Georgia, Article 57). Today there exist 13 committees working on various issues (Parliament of Georgia, 2004).

The Environmental Protection and Natural Resources Committee is most closely related to waste management issues. It prepares and presents relevant draft laws to the Parliament hearings. Other committees can be also involved in this process in case the relevant issues are touched. Committees also having connections with waste management issues are Agrarian Issues Committee, Healthcare and Social Issues Committee and Sector Economy and Economic Policy Committee (Gujaraidze, 2004).

A new committee has been formed this year in the Parliament that will exclusively focus on the issues related to the integration of Georgia into the European Union.

6.1.2 Executive Power

The system of the bodies of executive power, rules of their formation and legislative basis of their activities are determined by the Law of Georgia on the Structure of the Executive Power and Regulation of its Activities of 1997. According to this Law the head of the executive power is the President of Georgia (Article 2). Governmental institutions that are financed from the state budget and exercise the executive power include ministries, State Chancellery, state departments and state inspections (Article 4).

President

President is the head of the State that ensures unity of the state and activities of the state bodies according to the Constitution. The President leads country's domestic and foreign policy (Constitution of Georgia, Article 69). Presently, the President is leading actively the policy oriented towards the integration into the European Union.

Government

Government is an executive body that implements domestic and foreign policy of the country. It is accountable to the Parliament and the President of Georgia. The government consists of

the Prime-Minister and the Ministers (Constitution of Georgia, Article 78). The Prime-Minister determines the directions of the governmental activities, organises, coordinates and controls them. He/she is responsible for the work of the government to the President and the Parliament of Georgia (Constitution of Georgia, Article 79). Among the other duties the government is responsible for exercising unified state policy in the field of the protection of environment and natural resources (Law of Georgia about the Structure of the Government of Georgia, its Rights and Regulation of its Activities, Article 5)

The Ministries are established covering certain sectors of the state and social life in order to carry out governmental policy. The head of the Ministry is the Minister that makes decisions within his/her competence (Constitution of Georgia, Article 81[2]).

Ministries and Departments

The Ministry of the Protection of Environment and Natural Resources sets and implements the state policy for waste management in the country. It prepares legal documentation and controls and monitors existing norms and standards of waste management. Ministry of the Environment and Natural Resources Protection is responsible for implementing international treaties and incorporating their provisions into the national legislation. Ministry should also coordinate work of different state institutions in order to carry out state policy and implement international obligations (Chkhartishvili, 2004). Thus, the Ministry has the aforementioned functions in waste management sector. However, a representative of the Department of the Land Resources, Chemicals and Wastes about the role of the Ministry in municipal solid waste Management, referred to the absence of the relevant legislative base. According to him, this is the main reason why the Ministry is quite passive in taking part in MSW management system in the country (Kalandadze, 2004).

The Department of Land Resources, Chemicals and Wastes includes three main sections: protection of land resources, control on wastes and on hazardous chemicals. The department gathers information about the environmental pollution by the municipal and industrial wastes. This information comes from local authorities, industries and laboratories. *State Department of Hydrology* is responsible for the control of soil pollution, however because of the lack of financing such activities are not undertaken (Chakhrtishvili, 2004).

The Ministry of Labour, Health Care and Social Protection is responsible for setting and regulating standards of sanitary hygiene and preparing relevant legal documentation (Ckhartishvili, 2004).

The Ministry of Agriculture and Food is responsible for managing agrochemicals and pesticides. It should develop an inventory of these chemicals and create catalogue of permitted agrochemicals (Chkhartishvili, 2004).

The State Department of Statistic of Georgia is responsible for setting a national system of waste classification.

6.2 Local Authorities

The Constitution of Georgia (Article 2) states that the territorial arrangement of the country is based on the principle of decentralisation and will be determined after the restoration of the territorial integrity of Georgia. Until then the legal base of the establishment and functioning

of the bodies of local self-government and government is presented by the Organic[10] Law of Georgia on Local Self-government and Government of 1997.

Self-government is declared to be the right, ability and responsibility of the citizens of Georgia and enables them to make decisions independently on the issues of the local importance. The representative body of the self-government unit is Sakrebulo and its executive body is Gamgeoba (government) (Organic Law of Georgia on Local Self-government and Government, Article 1).

Self-government bodies are free to make decisions and carry out actions within the competence given to them by the Constitution (Organic Law of Georgia on Local Self-government and Government, Article 6[1]). However, the central government still controls the regional units by appointing Mayors and governors as well as their deputies (Gujaraidze, 2001).

Article 7 lists the areas that fall under the responsibility of the self-government units. This includes approval, implementation and control of the local budgets, introduction or cancellation of local taxes, operation of the communal services (which include waste management), and implementation of activities related to environmental, sanitary-epidemiological or veterinary issues.

In order to carry out social services, self-government body has the right to create appropriate units, make contracts with physical and legal entities or with other self-government bodies to carry out social services together (Organic Law of Georgia on Local Self-government and Government, Article 32[1]).

6.2.1 Tbilisi Municipality

Self-government, government arrangements and their responsibilities in Tbilisi are determined by the Law of Georgia about its capital - Tbilisi (Organic Law of Georgia on Local Self-government and Government, Article 3).

Self-government in Tbilisi is carried out through its representative body - Tbilisi Sakrebulo. Tbilisi Mayor's Office has double function. It serves as a local government body and also carries out executive functions of the Sakrebulo. The Mayor's office unifies Tbilisi Government, Gamgeobas (executive body) of its districts and Tskneti village, also bodies of administrative units under the city districts (Law of Georgia about its capital – Tbilisi, Article 4). The government of Tbilisi includes the Premier, deputy Premiers, the head of city services, heads of the Gamgeobas of Tbilisi districts and village Tskneti (Article 23). Among other functions, self-government and government bodies of Tbilisi are responsible for the rehabilitation and development of the communal system of the city (Article 6). Setting up strategic plans in the field of urban studies, construction and communal services is the common responsibility of the state and the capital (Article 9).

6.3 Roles of the authorities in waste management sector

The authorities described above have roles to play in the waste management sector of Georgia. Parliament as the law-making body is responsible for adopting the law on waste

10. Organic law concerns fundamental political principles stated in the Constitution. The Constitution itself indicates the issues that should be governed by the organic law (Gujaraidze, 2004).

management. It will also adopt other legal acts directly or indirectly related to the waste management. Central authorities set the policy direction for the waste management sector.´ The Ministry of the Environment and Natural Resource Protection is especially important institution in this context. The Ministry works out and further implements the state policy in the field. It defines the priorities and the directions to take. Upon these guidelines act the local authorities, who are free to choose how to implement the state policy. Waste management is their responsibility at the local scale, however their guiding principles are determined at the governmental level.

6.4 Non-governmental organisations, international organisations and mass media

Non-governmental sector is not much involved in the issues of MSW management. Neither international organisations are carrying out projects in MSW management. However, one significant project implemented by the World Bank Agency for the Development of Municipal Services was performed back in 1997. The project was carried out by the Dutch consultancy firm "Heidemij advise". The main goals of the project were to assess present situation of MSW management in Tbilisi and come up with the long term strategy and master plan. In addition, support for the participation and development of the private sector was stressed within the goals of the project. The overall conclusion of the report was that the situation with MSW management in Tbilisi is disastrous and needs significant improvements and investments. The project proposed 12 major activities to be performed and scheduled them in time since all of them could not have been performed simultaneously (Heidemij advise, 1997).

The aforementioned project was presented to the representatives of the relevant organisations in 1997, however, almost nothing has been implemented from the recommendations of the report. Moreover, some of the officials did not welcome such initiatives (Vardosanidze, 2004).

The other interesting initiative that could be mentioned was a project by "Green Movement" party with the support from Embassy of Germany in Georgia in 2002. The project aimed to collect waste paper from households and different organisations, press and compact it and deliver to the paper plant for recycling. The collection points were opened in Tbilisi with the payment of 4 Tetri (2 US cents) per kg of delivered waste paper. The amount received per day was about 700-800 kg. The major part of received waste paper was old books from households, while little less was office paper from different organisations. Since the main collection office was located near the biggest marketplace in the city, a large number of cardboard boxes was brought from the market. The system worked for one year and has experienced quite an active participation of citizens. Afterwards, the pressing equipment for the paper was stolen from the collection point and the system ceased to operate. However, it restarted working this year (Guledani, 2004).

The interest of mass media in waste management issues is quite superficial. For instance, a couple of articles were published in the last half a year mainly concerning problem of radioactive waste. Problems of MSW have not been highlighted or stressed. Some more interest of media rose during mid-June, 2004 when one of the landfills of Tbilisi (Lilo landfill) closed and a new one opened instead in Iagluja. High officials of Tbilisi Municipality led by the Mayor visited newly opened landfill and this attracted the attention of journalists. After this a few articles have been published regarding problems of landfilling and also medical waste, however this was just a temporary attention towards this issue which faded soon after this event. Media is quite attentive towards the actions initiated by various groups, for example street actions protesting certain decision or trying to drive public attention to a

certain problem. This attention of the media towards organised action of different interest groups can be used to inform the public about waste issues. Thus, not only participants and witnesses of such actions will get more familiar with the problem, but also those watching TV or reading newspaper in different parts of the city.

6.5 Private Sector

The involvement of private sector in Georgia is seen at a few different phases of MSW management process. Firstly, as mentioned above, local self-government and government bodies are responsible for collection, transportation and treatment of MSW within their district. They are free to do this themselves or through private operators. Consequently, based on the Tbilisi example, we can say that most of the work is done by private companies with the legal status of limited company.

Recycling of glass, paper and plastic is also done through private companies in Georgia. Paper is mainly recycled by one big company, stock company "Tbilisi Paper Factory". The factory is located within the city. It does not collect paper itself, but has contracts with different organisations that collect, press and deliver waste paper to the factory. Providers of waste paper include "Green Movement" party mentioned above, Baku-Ceyhan Pipeline Project, etc. The price for delivered waste paper varies according to its quality. For example, the price for a ton of cardboard boxes is around 60 Lari (30 USD) and for a ton of office paper around 80 Lari (40 USD). The factory produces cardboard boxes that are all bought within Georgia, mainly by food producers. Interestingly, production capacity of the factory is more than is currently utilised, thus, more paper can be recycled. However, since there is not enough waste paper delivered as a raw material for the production the factory does not operate with its maximum capacity. The demand for cardboard paper for boxes in Georgia is much more than the current production of the company. In average the company produces 150 ton of cardboard paper per month, which represents only 15% of the market demand. The maximum capacity to be achieved by the company is 400 tons per month. The company tried to import waste paper from neighbouring countries, however it appeared to be not profitable (Mujiri, 2004).

The glass is mainly recycled in "Ksani Glass Company" that produces all types of glass bottles from green glass. The company receives only bottles made of green glass, produces cullet and uses it for the production together with the raw material. The ratio of virgin material and cullet for the production of new bottles is 70% to 30%. The technology gives possibility to increase share of cullet and thus recycle more, however the amount of glass delivered is not enough to do so (Kavjaradze, 2004).

Plastic recycling is done in small scale factories within Tbilisi and also in other cities. These factories mainly recycle packaging made of polyethylene (cellophane packaging). The products of such factories are similar but lower quality packaging compare to packaging that has been recycled. They also produce different small household items such as disposable cutlery. Polyethylene packaging is delivered usually by private persons that collect such material. The price for a kg of delivered material is around 20-40 Tetri (10-20 USD cents). Factories usually do not meet environmental standards and norms (Guledani, 2004, Tetvadze, 2004).

Metal is not recycled in Georgia. Almost all the collected metal is exported abroad, mostly to Turkey by private firms. The collection points for metal are located almost in all the cities of Georgia and also on the main highways (See Figure 6-1). For some people metal collection and its delivery to such collection points became the main occupation and the only way to

earn money. The price per ton of metal varies. In July 2004 it was around 110 Lari (55 USD). Most of the waste pickers look for metal pieces in waste bins or at landfills. Metal is picked up not only from waste but also stolen from different factories, equipment, and the like. After the collapse of the Soviet Union in the beginning of the 1990s, most of the factories ceased their operations due to the lack of raw material that was before delivered from Russia or other parts of the Soviet Union. During the 1990s almost all the factories were taken apart and all the metal was exported. Even now it is striking to see that lids of pits for the communal connections at the streets are taken away to be sold. This is very dangerous, especially during the night time, because the height of the pit under the lid is more than 2 meters and it is quite easy to fall down. Since the factories are already all taken apart, metal is looked for whenever it could have been buried or disposed. The amount of delivered metal has decreased over the last couple of years. According to one of the collection companies, although they could gather about 500 tons of metal per month last year, this year this amount decreased 10 times (Ckhartishvili, 2004, Jigauri, 2004, Ositashvili, 2004).

Figure 6-1. End-of-Life Vehicles at metal collection point in Tbilisi

Different private operators hired by Gamgeobas, recycling factories and collection points are representatives of formal private sector involved in MSW management. However, this is not all we can say about private sector. Most of the separation and collection of various recyclables is done by informal private sector, a big number of waste pickers and collectors of recyclables from households (See Figure 6-2). It is common to see a person digging up waste bins at the street looking for old items, recyclables and sometimes even food leftovers. It is also everyday case to hear somebody at the street offering collection of used glass bottles. This informal private sector is absolutely ignored by decision-makers involved in this field.

Figure 6-2. Separately collected metal at Iagluja landfill

Meanwhile, informal private sector has established some type of a system, where different parts of the town are allocated to the waste pickers. For example, one or two waste pickers are assigned to certain bins and have certain times of checking them out. The same systematised approach is formed for waste pickers working in landfills. In order to get into the landfill they have to pay to people in charge of landfill according to what they find by the end of the day. If the collected material is metal and has higher value, the payment for that day will be higher too. Even waste workers who collect waste from households are also interested in collecting material they can sell afterwards. Thus, to some extent they are also involved in the informal collection system (Chkhartishvili, 2004).

6.6 The public

The public are not involved in decisions taken around the issues of waste management. Generally, they are not asked their opinion, neither do they initiate any activity to get involved more into the waste management process. However, there has been an interesting case when the public became one of the major player in waste management process, namely, related to Lilo landfill in Tbilisi.

As Lilo landfill will be discussed in details in the next chapter, here the role of the public in the cancellation of this landfill will be pointed out. Lilo landfill was established in 1989 in Samgori district of Tbilisi. Initially, it was said to be a temporary landfill, however it functioned until mid-June of this year. During this period waste from Isani-Samgori and Krtsanisi-Chugureti[11] districts were delivered to Lilo landfill. The landfill was located only 800 meters away from residential houses. Inhabitants became preoccupied because of the closeness of the landfill to their residence and problems of smoke and litter. The problem became not only about the landfill itself, but the whole surrounding territory. Cars loaded with waste (usually with construction waste) sometimes would not be allowed to dispose their waste on the landfill (reasons could be different, but mainly it was reluctance to pay for disposing waste on the landfill). In this case, waste would be disposed just outside the landfill even closer to the residential buildings. The landfill was not fenced and remained open for children and cattle to walk freely on the waste (Chrikishvili, 2004).

Organised action of the residents of nearby district for the closure of Lilo landfill started in 1998. Their effort was supported by the Centre for Strategic Research and Development of

[11] Districts located in the South part of Tbilisi.

Georgia. The project was developed and consequently financed by the World Bank and Novib foundation. Lawsuits followed and on February 21, 2002 the court came up with the decision that the capacity of Lilo landfill has been fulfilled in 1998 and it shall be closed. According to the decision, for this reason, expenditure for the closure of the landfill should have been included in Tbilisi budget of 2002. Also the commission including representatives of Tbilisi Municipality and interested non-governmental organisations should have been formed to control the process of the landfill closure (Chrikishvili, 2004).

Although the decision was issued by the court, actions were not followed by the Tbilisi Municipality. The closure process delayed and it only happened on June 16, 2004, after more than two years (Chrikishvili, 2004). This case is an example showing the sharp negative reaction of population towards landfills. This is also the first case in Georgia organised by the community and directed towards an environmental issue. It is noteworthy that this case arose attention of decision-makers as well as the environmental NGOs. They acknowledge this precedent as an important attempt of influencing decisions in the environmental field by organised public efforts. Similar cases have been quite often directed toward other issues, for example, protection of human rights, issues of fair elections or illegal constructions. However, environmental issues have never enjoyed such an active participation of the public.

The attitude of the public towards problems related to MSW in Tbilisi is well shown in two surveys. One is conducted by the Chair of Urbanistics at the Institute of Urbanistics within the student project regarding reconstruction of historical district in Tbilisi – Avlabari. The survey was carried out for a few years starting from 1997 and continued until 2001. Two questions were especially interesting for this research. The first one asked the respondents which problem was most embarrassing for them and listed a number of issues. Waste problem ranked the third in the results of the survey following the problem of old, ruining houses and lack of living area (small apartments).

The other survey was done by the Caucasus Environmental NGO Network (CENN) this year and targeted residents of apartment houses in the new districts of the city, Varketili and Nutsubidze Plateau. The survey was conducted within the project "Development of local capacities and public awareness for better energy governance". The respondents were asked to list their main communal problems. The results showed that waste problem ranked the forth following the problems of bad condition of roofs, outer illumination and elevators.

Thus, the community attitude toward existing waste management system in Tbilisi is quite negative. Still, they have undertaken no action to participate more actively into decision-making in this field or divert attention of officials and media towards waste issues. However, it can be quite possible that once waste problems become more severe, people will get more active and concerned. Still, it is better to involve them now, thus making the public participation as one of the keystones of decision making in waste management sector.

7 Georgian legislation related to waste management

This chapter gives an overview of the existing Georgian legislation related to waste management, and also discusses relevant sub-legal acts and international treaties. Thus, it presents the legislative base for the waste management in the country. The chapter discusses the main drawbacks of the existing legislation. The chapter also speaks of a draft law on waste management to be adopted by the Parliament and is now subject of discussion.

7.1 Existing laws

The Law of Georgia on Environmental Protection of 1996 is the main legal document of the Georgian environmental legislation. This law regulates legal relations between the state institutions, between physical and legal entities and delegates responsibility between different administrative bodies in relation to environmental and natural resource protection. A number of principles and notions are declared in the law including "sustainable development", "integrated pollution prevention and control", "best available technology", "cleaner production", "polluter pays principle", and the like (Chkhartishvili, 2004).

Article 34 of the Law is regulating ecological requirement of waste management in the country. According to this article industrial, municipal and other types of waste shall be minimized, treated, utilised and disposed of in accordance with the environmental and sanitary norms and rules. This should be done by the physical or legal entities carrying out certain activities[12]. The disposal of industrial and municipal waste is allowed only in a certain territories and the same rule goes for the toxic, radioactive and other hazardous waste.

The Law of Georgian on the Environmental Permitting of 1997 sets the legal base for the permitting rules and procedures, carrying out environmental expertise and Environmental Impact Assessment (EIA) for different activities and ensures public participation in these procedures. The law defines three categories of activities according to their potential hazard to the environment and human health while activities falling within the first category being the most dangerous ones. Procedures of issuing environmental permits vary according to activities of different categories. Waste management is included in the first category of activities indicating the recognition of its very serious and even irreversible consequences on the environment and human health with its scale, location and magnitude (Ckhartishvili, 2004).

Permitting procedure for the activities of the first category including waste management comprises of a few elements such as EIA, state ecological expertise and public participation in decision-making process. The expenses for conducting EIA should be covered by the applicant as the part of the fee for issuing an environmental permit. Permits for the activities of the first category are issued exclusively by the Ministry of Environmental and Natural Resources Protection of Georgia (Chkhartishvili, 2004).

The Law of Georgia on State Ecological Expertise of 1997 defines the meaning of state ecological expertise, its aims, principles and its procedure. State ecological expertise is carried out by the Ministry of Environment and Natural Resources Protection of Georgia and the

[12] "Activity" is defined in Article 4 [g] as any entrepreneurial, agricultural or other types of activities, implementation of development plans and projects, infrastructural projects, projects on sectoral development, projects on the protection and use of water, forest, land and mineral resources within the territory of Georgia and technical and technological renovation of existing factories that can have impact on the environment.

costs are covered by the legal or physical entity carrying out certain activities. This regulation is the same as for EIA by considering costs as the part of the expenses included in the process of permitting.

The Law of Georgia about Hazardous Chemical Substances of 1998 regulates legal relations between state institutions and between legal and physical persons regarding the following issues related to hazardous chemical substances: their creation, examination and state expertise; standardisation, accounting and registration; production, packaging and labelling; transportation, consumption, export and import; recycling, treatment and disposal and their prohibition or reduction in use (Article 1).

The law gives definition for a few important terms including chemical substances, prior informed content and activities related to hazardous chemical substances (Article 2). Article 6 lists the principles for the safe use of hazardous chemical substances. These principles include optimisation of the state governance in this field, introduction of the best technologies, normalisation and classification of hazardous chemical substances and their products, their substitution with less hazardous materials and products, and the like.

Main actors in regulating hazardous chemical substances are the Ministry of Labour, Health Care and Social Protection in the field of protection of human health from hazardous chemical substances; the Ministry of Environment and Natural Resource Protection in the field of environmental protection from the negative impact of hazardous chemical substances and the Ministry of Infrastructure[13] in the field of use of hazardous chemical substances (Article 8). In addition, control over labelling of hazardous chemical substances is the responsibility of the State Department of Standardisation, Meteorology and Certification (Article 25).

It should be also mentioned that according to Article 24 reuse of the packaging of hazardous chemical substances is prohibited in Georgia.

The Laws of Georgia about Pesticides and Agrochemicals of 1998 regulate permitting issues for the production and trade, as well as import and export of pesticides and agrochemicals, their transportation, storage and use. The law requires testing on pesticides and agrochemicals, creation of the state catalogue for them and their registration. State governance of this field is the responsibility of the Ministry of Agriculture and Food, however process of safe use is regulated by the Ministry of Labour, Health Care and Social Protection together with the Ministry of Environment and Natural Resources Protection. Prohibited pesticides are the subject of the Law of Georgian on Hazardous Chemical Substances (Chkhartishivili, 2004).

The Law of Georgia about Nuclear and Radiation Safety of 1998 sets the legal base for the nuclear and radioactive safety in the country. The law requires creation of the catalogue listing sources of radioactive wastes and their quantitative and qualitative properties. The law also requires development of an inventory of the sources of radioactive wastes and of radioactive wastes themselves. Chapter 7 of the law is dedicated entirely to the issues of radioactive waste, including their transportation, import, export and transit and issues related to the selection of the storage territory and facility for the radioactive waste. According to Article 41, transit, export, re-export or import of any kind of radioactive waste with any kind of reason is prohibited within the territory of Georgia (Chkartishivili, 2004).

[13] Presently Ministry of Infrastructure does not exist as a separate state institution. It has become part of the Ministry of Economics.

The Law of Georgia about transit and import of waste within the territory of Georgia of 1995 regulates issues related to import and movement of all types of waste within the territory of Georgia. According to Article 2, transit and import of industrial, municipal or other type of hazardous and radioactive wastes are prohibited. In addition, transit and export of non-hazardous and non-radioactive waste with the purpose of their treatment and disposal or any other purpose listed in Annex IV, Group A of the Basel Convention, is prohibited as well.

Article 3 of the law regulates those waste allowed to be imported and transited within the territory of Georgia. Such wastes include non-hazardous and non-radioactive wastes imported with the purpose of their recycling, re-export or any other purpose given in Annex IV, Part B of Basel Convention. Such wastes are ferrous and non-ferrous metal scrap, all sorts of waste paper, plastics (only those that are possible to recycle in Georgia), textile waste, waste from timber production and glass waste.

7.2 Sub-legal acts

A few interesting sub-legal acts related to waste management are noteworthy to mention.

The Order of the Minister of Labour, Health Care and Social Protection # 36/N of February 24, 1995 about sanitary rules and norms of arranging and operating municipal solid waste landfills regulates the rules of selecting locations for MSW landfills, their arrangement and operation, conservation, technological control and activities for monitoring health of waste workers. The order sets the amount of toxic industrial waste that is allowed to be placed on these landfills (Article 1). MSW landfill is defined as the special facility aimed to isolate and treat waste and thus ensure protection of the human health and the environment. According to this order, MSW landfill can be established for any size of the populated area, however one centralised landfill is recommended for a few small areas (Article 3).

Article 4 lists waste types that are prohibited to be placed on MSW landfill. Such waste includes hazardous waste, radioactive waste, waste from slaughter houses, medical waste, and the like. Interestingly, the order prohibits selection and collection of secondary materials directly from waste transportation facilities (waste lorries). Selective collection of waste is permitted only while considering sanitary-hygiene norms. Another noteworthy regulation is given in Article 12 that requires alongside territories and roads of the landfills to be checked once every 10 days. In case alongside territory is polluted with the waste, it should be cleaned and clean up taken to the landfill. Also, this article prohibits burning of MSW at the landfills. In case waste starts to burn itself, fire should be ceased.

These last few requirements, mainly prohibition of collecting selected materials from transportation facilities, prohibition of mixing hazardous and medical waste with the rest of the MSW stream going to landfills, ceasing fire at landfills, checking alongside territory of roads are not fulfilled at any of the Tbilisi landfills (see Chapter 8).

The Order of the Minister of Labour, Health Care and Social Protection # 300/N of August 16, 2001 about adopting rules on collection, storage and treatment of the medical waste sets regulations and norms about collection, storage, treatment and disposal of all kinds of waste coming from medical institutions. These rules and norms are worked out not only for medical institutions producing such waste, but also for operators who are responsible for collection and transportation of medical waste and also for the operators of landfills where this waste is disposed. Under the chapter "Classification of medical waste" the document lists the following five categories of medical waste:

- Category A – Non-hazardous waste from medical institutions
- Category B – Hazardous (risky) waste from medical institutions
- Category C – Particularly hazardous waste from medical institutions
- Category D – Waste from medical institutions that according to its content equals to industrial waste
- Category E – Radioactive waste from medical institutions

Further, the Order lists rules and regulations for collection, disinfection, storage, transportation, disposal separately for each category of medical waste.

A few provisions of this Order related to the disposal and treatment of the medical waste are worth to mention. In chapter VIII, under conditions of temporary storage and transportation of waste, it is said that medical waste of Category A can be disposed at MSW landfills (Article 10). For Category B and C the Order requires medical waste to be treated at medical institutions in special incinerators (Article 11). Next article specifies that such treatment can be carried out in a centralised or decentralised way. Further, Article 14 makes confusion by saying that waste from medical institutions shall be treated thermally in centralised way at large incinerators. Thus, it is unclear whether this article means that medical waste should be burnt with the rest of the municipal waste in a large incinerator (that does not exist now in Georgia), or it speaks about creating one centralised incinerator for the medical waste only. In both cases, this Article is not consistent with the Articles 11 and 12, saying that medical waste shall be treated exceptionally in the incinerators of medical institutions in a centralised or decentralised way.

As for export and re-export of ferrous and non-ferrous metal scrap, one law and a few sub-legal acts are related to this issue. *The Law of Georgia of 1998 about regulations on export and re-export of ferrous and non-ferrous metal scrap* sets legislative requirement in this field throughout Georgia. However, prior to this law the issue is touched upon in the *Resolution of the Cabinet of Ministers # 334 of June 7, 1995 about regulations on production, delivery*, *transportation and re-export of ferrous and non-ferrous metal scrap.* According to this document scrap of ferrous and non-ferrous metals are of strategic importance and state control is imposed on them. This legal act also puts all the responsibility on the relevant departments and also on stock company "Sakmeoliti" not to allow illegal export of ferrous and non-ferrous metal scrap. In 2002 President of Georgia issued the Order about extra activities on purchase and transportation of ferrous and non-ferrous metal scrap. The document states that its adoption became necessary because of many serious problems existing in this sector. The Order sets certain tasks for different ministries and gives detailed regulations on the purchase and transportation of ferrous and non-ferrous metal scrap. According to this document who can deliver metal scrap are: citizens having unusable household items made of metal; organisations and institutions that because of their activities have unusable metal equipment and waste; physical or legal entities that due to their activities have gathered unusable metal scrap and equipment (Article 2). Article 3 states that the purchaser of metal scrap shall make sure that if certain articles are delivered, the person delivering it has the property right on them. This refers to electro cables, pipes and other items that could have been stolen. Such cases still take place often creating doubt whether the regulation given in Article 3 works in reality.

Another interesting sub-legal act is the *Common Resolution of Minister of Economics of Georgia and Minister of Environmental and Natural Resources Protection of Georgia # 131-197 of December 19, 1996 about the rules of removing solid and liquid municipal waste.* This document gives rules of how removing service for waste should be conducted, what is the procedure for giving or receiving orders, and the procedure for the service payment. In addition, the resolution states what are rights and obligations of the costumer and duties and responsibilities of the service provider. Article 4.4 of chapter IV is noteworthy to mention. According to it, a service provider is responsible to provide special containers (bins) to the costumers for waste separation. Throughout this research it was impossible to find even one case meeting this requirement of the abovementioned resolution.

7.3 International treaties

In May 1999 Georgia has ratified the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention). However, it has not ratified the Ban Amendment of 1995 and Protocol of 1999 on Liability and Compensation for Damage resulting from Transboundary Movements of Hazardous Wastes and their Disposal. Georgia, as a convention party, is reporting annually to the Basel Convention Secretariat the required information. Namely, it sends data about import, transit and export of wastes controlled by the Basel Convention. Although Georgia is gradually introducing provisions of the Basel Convention into its national legislation (for example Law of Georgia on Transit and Import of Hazardous Chemical Substances), its enforcement and implementation still needs to be improved much (UNECE, 2002, Kalandadze, 2004).

Georgia has signed the Stockholm Convention on Persistent Organic Pollutants, but has not ratified it yet. As a signatory country, Georgia now works on formulating national implementation plan to manage persistent organic pollutants. The programme, Development of the National Action Plan for the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs), has been developed together with UNDP with the financial support from GEF. At this stage, the inventory process is going on throughout the country (Nadirade, 2004, UNECE, 2002, Kalandadze, 2004).

Georgia plans to join the Convention on the Prior Informed Content Procedure for certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention). It should be mentioned that Georgia is the participant of the Prior Informed Consent (PIC) procedure under the London Guidelines for the Exchange of Information on Chemicals in International Trade (UNECE, 2002).

7.4 Discussing existing legislation

The existing legislation on waste management in Georgia, covers only certain aspects of the issue. Namely, it almost fully covers the licensing, permitting and testing procedures, however the activities following this phase are not under the legal regulations. In addition, existing legislation only concerns certain types of wastes, mainly focusing on hazardous waste. Municipal solid waste management is not regulated by any legal act, neither the definition of it is present in the legislation. Only landfilling is regulated by the relevant sub-legal act, however it is not fulfilled due to the absence of the appropriate institutional base. The same drawback of not successful implementation is characteristic to the majority of the legal acts discussed above. The draft law on waste management has been developed in order to fill the legislation vacuum existing in the waste management sector of Georgia.

7.5 Draft law on waste management in Georgia

A Draft law on waste management and related legal acts to be adopted have been submitted to the Parliament in 2003. However, the discussion of this draft law in the Parliament has not started yet. This is the first law that exclusively deals with the wastes and covers almost all the issues related to this field. For the purpose of this research, the law is especially interesting since this is the first law that will regulate management of MSW in Georgia.

The law gives definitions of terms related to waste management. This is important since a few important terms (for example, definition of different types of waste) have not been present in Georgian legislation before. Also, in Articles 12-17 the law categorises and defines different types of wastes. The categories are set according to the origin of waste and include:

- Household waste;
- industrial waste;
- medical waste;
- agrochemical waste;
- biological waste.

In the same article it is indicated that each of these categories distinguishes subcategory of hazardous waste.

Among the purposes and tasks of the draft law, it is interesting to distinguish one point related to the EU waste legislation. In Article 4, clause 2(f) it says that the law aims to facilitate gradual enforcement of the EU standards and norms related to waste management in the territory of Georgia. The law also sets up the criteria according to which the responsibilities are delegated among the governmental structures. It sets the duties and responsibilities for the highest governmental institutions.

The law aims to create unified state system for waste management in the country. This issue is extremely important since today the system is disorganised and not well coordinated (See Box 7-1). The system unifies registration, planning, regulation and economic and legal mechanisms. Besides it will cover issues related to marine pollution with waste and its transboundary movement. The law also speaks about the creation of Coordination Commission of the unified state system of waste management.

It is obvious that the draft law is quite ambitious and if all its provisions are fulfilled, waste management system in Georgia will be improved much. However, being ambitious does not mean that the draft law is realistic to enforce. If it is adopted now, it will be impossible to follow its requirement due to the absence of the proper system. Hence, two options can be discussed. First, that the system should be created in the first place at least to the some extent in order to make sure that law is enforced. However, this process may delay adoption of the legal framework for waste management in the country. The other way is to simplify the law and afterward make its regulations and standards stricter as the enforcement system develops.

The adoption of the law on waste management issues is welcomed by decision-makers dealing with waste problems almost at all the levels of government. However, the viewpoint of the Parliament is yet unknown and even though the law is planned to be adopted shortly, it is hard to say when this will happen. This is due to the usual long and complicated procedure for the approval of laws and also because of the a few serious political problems presently existing in the country (namely, issues of territorial integrity and relations with Russia).

Representatives of the non-governmental sector also admit the law regulating waste management is necessary. However, they consider that before submitting the law to the

Parliament hearing it should be presented at the public hearing more extensively so that all the interested parties could participate. The idea behind this is that members of the parliament are not well acquainted with the waste related problems and may not notice certain shortcomings of the law.

Box 7-0. Case of NGO "Green Alternative" – an illustrative case of bad coordination among governmental institutions

On July 2, 2003 NGO "Green Alternative" has send a letter to the Minister of Environment and Natural Resource Protection, Nino Chkhobadze, asking information about the incinerator for Baku-Subsa pipeline project by British Petroleum. Namely, "Green Alternative" asked about how many incinerators had been built, their locations, whether the operator of the incinerator was reporting to the Ministry of Environment and Natural Resource Protection and whether the Ministry was conducting monitoring over the operation of the incinerators.

The letter was directed to the Department of Environmental Licensing and State Ecological Expertise. The head of the Department, G. Jorjoliani, reported on July 3, 2003 that building incinerator for non-hazardous waste is included in the master plan of the Baku-Supsa pipeline project. According to this letter, such incinerator is located at the territory of Supsa (Guria Region) terminal and its monitoring and issues related to the operator's reporting over the operation of the incinerator are under the competence of the regional bodies of the Ministry of the Environment and Natural Resource Protection.

Further, on July 18, 2003 the head of the Regional Department of Environmental and Natural Resource Protection of Guria Region, T.Sajaia, reported that the incinerator of Baku-Supsa pipeline project is not built and consequently, is not operating in Guria Region.

The next letter from T. Sajaia of July 30, 2003 makes the issue even more complicated. He states that he has contacted the administration of Baku-Supsa pipeline project that has informed him that the incinerator for this project is built in the city of Rustavi.

Because of receiving contradicting information from the Regional Department of Environmental and Natural Resource Protection of Guria Region and the Department of Environmental Licensing and State Ecological Expertise, the question has been directed to the representation of British Petroleum in Georgia. In his letter of September 15, 2003, a field environmental officer of BP Georgia, M. Gurgenidze, reports that Baku-Supsa pipeline project considered construction of the incinerator. Thus, in 1999 in Rustavi an incinerator has been built for petrol and petrol containing products by a Limited company "Sarini". The capacity of the incinerator is 15m^3 per day. According to Gurgenidze, BP annually reports about operation of the incinerator to Georgian International Oil Company (GIOC). For further inquires Gurgenidze asks to refer to the Limited company "Sarini".

The case shows that the Ministry of Environment and Natural Resource Protection and its departments could not provide reliable information not only about location of incinerators, but also about their types. The incinerator was not located at Supsa terminal, as was reported by the department, but in Rustavi. Moreover, this incinerator was not for household waste but for hazardous waste, namely for petrol and petrol containing products.

Source of the information: Gujaraidze, 2004

8 Municipal Solid Waste Management in Tbilisi

This chapter describes the present situation with the generation, collection, transportation and disposal of MSW in Tbilisi. It also looks at the composting practices and costs of MSW management in the city.

8.1 Waste amount and composition

The amount of waste generated in Tbilisi is given in m^3 and it is only possible to calculate it by adding up data on waste coming to landfills. However, the official sources point out that only 60% of MSW goes to legal landfills (where they are registered and serve as source of data), the rest is disposed illegally (Beboshvili, 2004). Thus, it is hard to get reliable data on the amount of waste generated in Tbilisi.

The data given by Tbilisi Municipal Service of Modern Amenities about the waste composition in Tbilisi in 1995 looks as following:

Table 8-1. Composition of MSW stream in Tbilisi in 1995

Material	Share in MSW stream
Paper, polyethylene	33.3%
Plastic	2.1%
Wood	2.8%
Leather, rubber	0.8%
Glass, Ceramics	2.7%
Metals	2.1%
Stone, ash (dust)	0.7%
Food waste	39.4%
Textile	4.8%
Bones	2.3%

Source: Municipal Service of Modern Amenities, 2004

A few points in this statistics are to be stressed. Firstly, it is interesting why paper and polyethylene are put in the same category since polyethylene is usually included in the category of plastics. Even if those two materials are unified, the amount is rather large. On the other hand, plastic represents only 2.1% of waste generated. Plastic share is believed to be much more. It is enough to have a look at Tbilisi landfills. As for food waste, it could be possible that its share is more than 40% as given by the Municipality. It should be taken into account that the population mainly cooks at home, buys unpeeled and uncleaned vegetables (for the

most part, packaged food is bought not at supermarkets, but at open market places), can vegetables for winter, make jams and consequently generated large amount of food waste. In addition, it is not indicated whether the percentage of composition is according to weight or volume that makes this data even more confusing. Lastly, the document says that toxic waste is not present in the MSW stream. This arises doubts since all municipal solid waste is disposed of without sorting hazardous waste stream. Moreover, the major part of medical waste is mixed with the rest of the municipal waste (Kuzanova, 2004). Thus, the information about the amount of the waste generated and about its composition needs to be refined in order to have accurate data for decision-making.

8.2 Collection and transportation

Collection and transportation of waste is the responsibly of Tbilisi Gamgeobas. As mentioned in the previous chapter they are free to carry out these activities themselves or hire private companies. Thus, according to the Municipal Service of Modern Amenities of Tbilisi, there are 8 organisations working on collection and transportation of waste. Three out of eight are owned by the municipality (serving districts of Didube-Chugureti, Gldani and Nadzaladevi), while the rest are privately owned companies (serving districts of Vake, Mtatsminda, Saburtalo, Krtsanisi and Isan-Samgori).

There are three types of waste collection systems in Tbilisi: bell system, waste bins located at the streets and bunkers in apartment buildings. The first system implies that waste car is coming every morning at certain streets and rings a bell. Residents take out their waste and dispose it into the waste lorries. Such system is mainly used in the old parts of Tbilisi, where settlements are very compact and streets are narrow. It is hard to place waste bins at the streets, since it creates odour problems for those living nearby. The second system of locating waste bins at the streets is present for the major part of the city. Bins are located about after every 100 meters and are emptied daily. The third system of waste bunkers is present in apartment houses in the new districts of Tbilisi. All the waste from each floor of an apartment building goes down through the tube to the bunker located at the basement of the building. Approximately 60% of Tbilisi population is served by bell and bin system and 40% by bunker system.

Each of this system is associated with different problems. In the districts served by bell the system waste cars usually come early in the morning. If citizen does not get up and throws waste at this hour, s/he usually takes out waste later and puts it on the street. That is why it is quite common to see waste put at the trees or on the pavements. The other common scene in the city is overfilled waste bins (see Figure 8-1). Waste is not fitting into the filled bin and is spread around it. The reason of such situations can be that waste bins are too small for the generated waste and the bins are not emptied as often as they should be emptied. As for waste bunkers, sometimes they are not emptied for a quite a long while and create a number of hygiene and health related problems (for example, presence of rodents). The complaints addressing this issue are quite often heard from the citizens.

Figure 8-1. Overfilled waste bin

MSW is collected and transported by the waste lorries. Most of them are old lorries with an open truck. Waste is piled up on the truck and covered with cloth not to let litter fly around. There are few more modern compacting vehicles. Since such cars can compact the waste, they can take away more than other trucks and thus, are more efficient. However, such trucks are limited in Tbilisi. The capacity of old not-compacting lorry is 12 m^3, while compacting vehicles are able to handle up to 30 m^3 waste (Jigauri, 2004).

This June Tbilisi Municipality initiated the establishment of so-called loading stations. These are transfer points where cars loaded with waste come from certain districts and reload their waste to a big container that takes it to the landfill. The reasoning behind this innovation is that both of acting landfills today are quite far from the city and it costs much money to transport waste to that distance (Abuladze, 2004). That is why one big truck that can transport waste carried by 10-12 cars delivers waste to its final destination. 7 such large lorries with the volume of 80 m^3 are operating today (Topuria, 2004). The loading stations are also operated by limited company, similar to landfills. Even if the transportation of waste is conducted from one car directly to the other (as shown in Figure 8-2) the litter is still spreading around the place.

Figure 8-2. Loading station at Ponichala, Tbilisi

Note: Waste lorries empty their trucks on the upper floor and waste comes down the tubes ending up in the truck of the bigger lorry. The big lorry delivers waste to the landfills.

8.3 Treatment and Disposal

The only treatment of MSW in Tbilisi is compacting and pressing. This is done to a small extent by compacting vehicles. Otherwise, once delivered to the landfills after a certain while waste is pressed down. No other treatment is practiced. Thus, just the volume of waste is decreased while its chemical properties are not changed at all.

Almost all of the waste generated in Tbilisi is landfilled. The same goes for the whole country. The exceptions are few small scale incinerators that mainly work for private companies (See Box 8-2). Three legal landfills operated in Tbilisi until June, 2004 when one of them, Lilo landfill, was closed. However, all three landfills will be described and discussed in this chapter.

8.3.1 Gldani Landfill

Gldani landfill is located at the north of Tbilisi in Gldani district. There have been two separated landfills in this area, Gldani 1 (opened in 1968) and Gldani 2 (opened in 1972) landfills. However, Gldani 1 landfill has been closed and now only Gldani 2 landfill is in operation. Thus, only operating Gldani 2 landfill will be discussed below.

The area of Gldani landfill is 8 hectares and the minimal and maximal depth of waste at the landfill is 3 m and 30 m respectively. According to the statistics of Municipal Service of Modern Amenities of Tbilisi, Gldani landfill received around 750 000 m^3 waste. However, the chief official of Gldani landfill gives data on waste coming daily to Gldani landfill (see Table 3-2). Consequently, data received for the annual delivery of waste to the landfill from this statistics is different than the official data.

Table 8-2. Amount of waste delivered daily to Gldani landfill

Name of the district	**Amount (m^3)**
Vake	350
Gldani	430
Didube	151
Nadzaladevi	430
Chugureti	180
Saburtalo	314
Total	**1855**

Source: Jorbenadze, 2004

According to data presented in Table 3-2 annual amount delivered to Gldani landfill equals to 677 075 m3,[14] while the official data from the Municipal Service of Modern Amenities says

[14] Calculation conducted with the assumption that landfill receives waste 365 days a year.

750 000 m3. According to the Tbilisi Committee on Environmental and Natural Resources Protection Gldani landfill annually receives 6 000 000 m3 of waste. Since this number is very large, we should assume that the mistake is made and one zero is extra. Even in this case we will receive different data equal to 600 000 m3. Thus, the data received is different, however all the institutions are interconnected with each other. Landfills, including Gldani landfill, are operated under Municipal Service of Modern Amenities and its operation is controlled by the Tbilisi Committee on Environmental and Natural Resource Protection. These connections in institutional arrangement imply that there should be good collaboration and exchange of information. However, if we look at varying data coming from these institutions, collaboration between them does not seem to be very effective, at least in terms of information exchange.

Gldani landfill has a big entrance gate with the security, however it is not fenced around. Trucks coming to landfills are not weighed, although landfill has weighing equipment. According to landfill director Givi Jorbenadze (2004), they know how much waste (in m^3) is in the truck once it is full. If they see that truck is not full, only in this case they weigh it. Here is hard to follow the logic. If some trucks are weighed and some are not, this means that amount of waste coming to landfill is measured in two different parameters (kg and m^3). If the weighing mechanism is in place why not all cars are weighed to receive more exact data instead of relying on guessing?

Gldani landfill is burning and litter is spread around the area. Waste pickers are present at the landfill, selecting plastic, metal and other materials. Dogs are also walking on the landfill.

8.3.2 Lilo Landfill

Lilo Landfill is located at the South-East part of Tbilisi in Samgori district. It was opened in 1989 and served Isani-Samgori and Krtsanisi-Chugureti districts. According to the Municipal Service of Modern Amenities of Tbilisi, the area of Lilo landfill was 10 hectares and the minimal and maximal depth was 1 m and 9 m respectively. However, Bichiko Jigauri, the former director of Lilo landfill, mentioned that the depth of waste at Lilo landfill would be up to 40 m high. This could be quite possible since this landfill as well as the other ones are not located at flat surface. They are all located in valleys and serve to fill up the place. When Lilo landfill was supposed to be opened, the groundwater collector pipe was put in the valley to prevent it from being polluted by the waste. This collector is located at the very bottom of the valley and is covered with the waste pile of a few meters in height (Jigauri, 2004). The present condition of the collector and consequently the quality of the groundwater at this location is unknown since no analysis of groundwater or soil quality has been made for more than 10 years.

According to the Municipal Service of Modern Amenities of Tbilisi the waste received by Lilo landfill equalled 450 000 m^3. According to Bichiko Jigauri, the former director of Lilo landfill, landfill was getting not only MSW and construction waste coming from the city, but also waste delivered from Vasiani military base. Thus, it could be quite possible that radioactive waste is also present to a small extent at the landfill. However, this is only an assumption not based on the documented facts, since no testing (water or soil analysis) has been done so far.

It is interesting to point out the inconsistency of data received from different state institutions. Official information sheet from Municipal Service of Modern Amenities of Tbilisi says that the area of landfill is 10 hectares while the official letter of the former head of this service G. Rukhadze to the head of the "Green Movement" Party G. Gachechiladze (dated September 25, 2001) states that landfill area is 6 hectares. The information sheet from Tbilisi Committee

of Environmental and Natural Resources Protection on the closure process of Lilo landfill says that 80% of the landfill is already covered with soil of 1.5 m height and the rest of the landfill will be covered with soil in no time. Officially, Lilo landfill closed on June 16, 2004 and the above mentioned information was given to the author on June 15, 2004. Soon after this statement, on June 25, 2004 the meeting was held at the Ministry of Environment and Natural Resources Protection, discussing the closure of Lilo landfill. The participants included representatives of environmental NGOs interested in the issue, the Ministry of Environment and Natural Resources Protection, Tbilisi Municipality and community organisation "Lilo". The discussion mainly concerned operations at Lilo landfill after closure. Namely, it was stressed that covering waste with land had been going very slowly and was not well organised (there is no project of closure). Even for visitors of Lilo landfill it is obvious that closure operation is going extremely slowly and the waste is left unfenced and unprotected. Thus, even though Lilo landfill is officially closed and waste is no more delivered there, what is left needs more attention and control.

8.3.3 Iagluja Landfill

Iagluja landfill is located in Gardabani Region, 22 km away from Tbilisi. It has been opened since 1985, however has not been actively exploited. Only waste from Mtatsminda district partially was delivered to Iagluja landfill. This landfill has been put into an intensive operation since Lilo landfill was closed on June 16, 2004.

The area of Iagluja landfill is 5 hectares and minimum and maximal depth of waste is 3 m and 10 m respectively. Annual delivery of waste equals 400 000 m^3. However, it is said that after the closure of Lilo landfill the waste coming into Iagluja landfill will amount 750 000 m^3 annually.

Nowadays Iagluja landfill receives waste from Isani-Samgori, Mtatsmnda-Krtsanisi districts of Tbilili. Soon will join Chugureti district as well (Jigauri, 2004). Since Iagluja district is quite close to the city of Rustavi, MSW from this city is also coming to this landfill. However, according to Jigauri, former director of Lilo landfill and present director of Iagluja landfill, this issue will be revised and possibly the city of Rustavi will have to pay for the delivery of its waste to Iagluja landfill.

8.3.4 Reflections after visiting Tbilisi landfills

Although landfills in Tbilisi are located quite far from each other, have different area and are of different age, they all have similar characteristics that are important to mention.

All three landfills, including two acting ones (Gldani and Iagluja) and one recently closed (Lilo), are constantly burning. The smoke is so intense that it is possible to see it from quite far away. None of these landfills is fenced around which makes it easy for cattle to come and feed on waste piles. Dogs are also present at landfills. No isolating layer is underneath the landfills. Collectors for ground water are present, however they are already old and their condition is unknown. It is quite possible that they are already leaking since small ponds of water can be noticed at landfills.

Waste pickers are sorting waste at the landfills. They work during the whole day and select plastic, metal and some old household articles (see Figure 8-3 and Appendix 1). Still, their main target is metal. During an interview at Iagluja landfill one waste picker said that landfill administration offers him to start working as a waste worker. However, he refuses since the

salary of a waste worker (around 50 USD) is less than what they can earn by digging into the waste and then selling selected material.

Figure 8-3. A waste picker at the burning Iagluja landfill

Both people living in the areas surrounding landfills and waste workers and waste pickers are in danger of having serious deceases from smoke of burning landfill. However, neither the Ministry of Labour, Health Care and Social Protection, nor the Tbilisi Municipality initiated medical examination for them. According to Chrikishvili, Onkological hospital of Tbilisi has data that a large portion of patients with cancer are living nearby Lilo landfill.

The scene of the surrounding territory of landfills is notable as well. Light fractions of waste, such as pieces of paper, plastic bags are spread around the area by the wind. Nearby trees and fences are all "decorated" with colourful litter. This territory is not useful for agricultural activities, nor can it be used as grassland for cattle until it is cleaned up.

8.3.5 Incineration

Presently all the MSW is going to landfills. No incinerator is serving the city. There has been an incinerator in Tbilisi, however nowadays it is shut down. The incinerator was located at Ponichala area of Tbilisi (where loading station is established now) and worked in 1978-94. The capacity of the incinerator was 8 tons of waste per hour, but it worked with the capacity of about 6 tons per hour. The temperature at furnace was up to 1000^{o}C. The incinerator used to burn the waste coming from only one district of Tbilisi. The temperature of the incinerator seems to be too high for the MSW. Such temperature is present usually in the incinerators for hazardous waste. Thus, if the given data is accurate, the incinerator was serving only a small part of the city population and at the same time was burning waste with higher temperature than necessary.

Metals were taken out of slag after the waste was burnt. Afterwards, the slag was buried in the nearby territory into the pits (Berianidze, 2004). Nowadays, the incinerator is in a ruined condition and it will be impossible to restore it and put back into the operation.

Thus, there is no incinerator today working in Tbilisi or in any other city of Georgia except those owned by private companies. One of them is owned by British Petroleum and is located in Gardabani region (See Box 8-1). The incinerator is of a small scale with the capacity of 100 kg per hour. Incinerator is for non-hazardous domestic waste generated exclusively by

the activities of constructing Baku-Ceyhan pipeline in the territory of Georgia (Tetvadze, 2004).

The other incinerator is located in the city of Rustavi and is operated by a stock company "Sarini". The incinerator was build within Baku-Supsa Pipeline project by British Petroleum. The capacity of the incinerator is 15 m^3 per day and is burning hazardous waste coming from the operation of Baku-Suspa pipeline project (Gurgenidze, 2003).

The idea of having a new incinerator for MSW in Tbilisi has been brought forward by the Mayor of the city as well as other officials working with waste management issues. Their argument is the difficult situation at the landfills and the need to find other solutions. At the same time, they acknowledge that incinerator is an expensive option and the city will not be able to afford it in the nearest future. NGOs are mostly opposing idea of introducing large scale incineration practices. They fear that this will facilitate import of waste, especially hazardous waste, to be burnt or buried in Georgia. Still, the discussion around incineration has not been actively undertaken neither at the governmental not at the non-governmental levels. However, it can be expected that once the issue is on the agenda, quite an intensive discussion will follow up.

Box 8-0. Managing waste in multinational company operating in Georgia – Case of Baku-Ceyhan-Pipeline project by British Petroleum

Before starting construction of the Baku-Tbilisi-Ceyhan (BTC) pipeline British Petroleum (BP) has made an Environmental Impact Assessment of the project and also developed waste management plan that would cover all the waste produced through the activities of the project. According to this plan there are three main activities for waste management being recycling possibility, incineration and landfilling. The waste management plan covered all kinds of waste generated by the project activities including hazardous, non-hazardous and inert waste.

Waste separation had been started from the very beginning of the project. The waste is generated on the following sites:

1. Construction site
2. Offices
3. Camps
4. Guesthouses
5. Kitchen
6. Clinics (medical waste)

Each site has a waste area with different containers. It was necessary to establish, a special place for hazardous waste on the site which is isolated from the rest of the waste and is locked. Hazardous waste generated is mainly used oils and medical waste.

As for the recyclables the following fractions are separated:

1. Paper
2. Glass
3. Plastics
4. Metal

Paper goes to a stock company "Tbilisi paper factory" which recycles paper and produces cardboard boxes. Glass is delivered to Ksani Glass Company. Plastic is pressed and stored so far. In Georgia there are a few plastic recycling companies (recycling polyethylene packaging, cellophane packaging), however they do not meet environmental standards and requirements. That is why the BTC project does not collaborate with them. The solution for PET bottles seems to be compacting and afterwards landfilling in a sanitary landfill. Metal is sold to a private company that exports it abroad.

On one of the sites, all the waste is brought together from all the sites and afterwards re-sorted again to make sure that all the fractions are separated. Separation is done manually.

BTC project operates one incinerator for non-hazardous domestic waste that is situated in Gardabani. The capacity of the incinerator is 100 kg of waste per hour.

BP plans to build sanitary landfill. It is thought to use this landfill for the waste coming from all the three big projects run by BP which are Baku-Tbilisi-Ceyhan and Baku-Subsa oil pipeline projects and Shah Deniz South Caucasus gas pipeline project. The landfill will be mainly used for hazardous waste and for plastics that will not be possible to recycle in Georgia. The other option is to install a small scale incinerator for hazardous waste. However, decision on this issue is not made yet.

This case of waste management corresponds to the idea of the desired future model presented in the thesis where waste is separated into various fractions some of which are recycled and some disposed in a safe way. The other point is to consider possibility of using waste management facilities operated by BP for treating municipal waste, especially for hazardous waste (for example, using incinerator for hazardous waste).

Source of information: Tetvadze, 2004

8.3.6 Composting

Nearby Gldani landfill there was located compost plant of Gldani that used to produce 38 000 tons of compost annually. However, only 1000 tons were sold due to its low quality. Organic waste used to produce the compost was not sufficiently separated from the other waste fractions. Even if glass, metal and bigger parts were removed, hazardous waste and plastics still remained. This made compost to be of low quality and not marketable (Heidemje advise, 1997). Presently, this plant is shut down.

Composting is carried out by farmers in different regions of Georgia. These farmers are the members of Biological Farming Association "Elkana". Farmers compost biodegradable waste from their farms and households and use it afterwards as fertilisers. Some of the farmers have also a small-scale production of methane through anaerobic digestion of animal waste. Thus, the composting activity carried out by the farmers does not go beyond their farms. In case compost material of high quality can be produced and the market for it is be in place, farmers most probably will be interested in participating and extending their present composting activities (Akhvlediani, 2004).

8.4 Costs of MSW management

The payment for MSW by the households is fixed and equals 0.4 Lari (0.2 USD) per month per person. This is the same amount for the whole city, however, expenses for waste management are different in different districts. This is due to a few factors including difference in the amount of waste generated in different districts of the city, difference in the amount of needed fuel for waste transportation and different number of waste workers. In addition, the payment is paid only by 40-50% of the population. The payment is gathered by Gamgeoba and is transferred to the regional budgets. Thus, waste payment system is not able to cover the costs for waste management in the city. In order to cover these expenses waste management is subsidised by the state (Abuladze, 2004, Beboshvili, 2004). According to the Resolution # 7-3 of Tbilisi Sakrebulo of June 20, 2001 about the waste payment, in average the cost for waste management in Tbilisi is 67.2 Tetri (about 0.30 USD) per person per month. However, the resolution states that in spite of this indicator, existing payment of 40 Tetri (0.20 USD) remains as it is and the difference between payment and the cost is to be covered by state subsidy.

According to the Resolution # 8-8 of Tbilisi Sakrebulo of July 30, 2001 about the categories of citizens with the reduced payment for communal services (water, gas, waste) with the support of Tbilisi budget and Amendment of this document of February 13, 2002, the payment for communal services is differentiated. There are categories of citizens who have 50% or 100% reduction for the payment. Examples of the categories include participants of the Second World War and other military conflicts at the territory of Georgia, persons recognised as the victims of political repressions, first category handicaps, orphans, and the like.

Nowadays, financing of waste management in the city happens with the share of 50/50 by the state subsidy and payment by the citizens. However, according to the Order #531 of the President of Georgia, this sector should be financed totally by the gathered payments. The plan is to reach this point gradually by increasing the share of payment in the financing and consequently decreasing the amount of subsidies. However, it should be kept in mind that ability of population to pay the given amount is largely dependent on their economic condition (income and employment) (Abuladze, 2004, Beboshvili, 2004).

The cost for waste treatment at the landfill paid from the budget is 0.7 Lari (0.35 USD) per m^3. Treatment in this context means pressing waste once on the landfill and covering it with earth when the new layer of pressed waste reaches 1 or 1.5 meters (Topuria, 2004).

9 Discussion

The aim of this chapter is twofold. It attempts to sum up the main points from the previous chapters and draw the conclusions about the present situation with MSW management in Tbilisi. The first half of the chapter discusses the current situation with the various waste management options, while the second part of the chapter talks about the existing and upcoming legislation.

9.1 Analysing the present

The discussion in this section will concern the present situation of MSW management in Tbilisi. While analysing present, the future model is kept in mind in order to see how far present situation is from the desired future outcome.

From one sight it can be said that the situation of MSW management is very bad. However, looking into the details of the existing system it is possible to see elements of the future model (see Figure 5-2) present to some extent.

9.1.1 Separation

Waste separation is not practiced in an organised way at source nor at disposal sites. This means that separation is not organised by any of the state institutions and is not clearly regulated by the legislation.[15] Only separation of certain waste streams such as medical waste is required by law. However, separation of waste into different waste fractions is not entailed in the law.

Unofficial separation is carried out. This activity is not dictated by any official requirements, but is the cause of hard economic situation. People employ themselves as waste pickers who separate waste and sell collected metals, plastic and glass bottles, some used household items (See Appendix 1). Hence, there exists quite a large scale activity of waste separation all over the country. Although these people work and separate waste, they are not recognised by any state institution. Instead of considering their possible involvement in waste management, they are totally ignored both by officials and also by ordinary citizens.

9.1.2 Composting

Elements of composting are present in Georgia, however it is not connected with the management of MSW. Composting is a very small scale, private activity carried out by some farmers to utilise their biodegradable waste. However, this is a precedent when considering the possibility of introducing composting as the treatment option for BMW in future. Market for compostables does not exist. Compost produced by the farmers is used by themselves as fertilisers. This compost is not sold, although, potential market for organic fertiliser can be quite good in Georgia. This is due to a few factors. Firstly, Georgia is a country dominated by agricultural activity. Secondly, different parts of the country have different structure and quality of soil. If in Eastern Georgia (e.g. Kakheti region) soil is of a very good quality, in higher regions of Western Georgia (e.g Upper Imereti region) soil quality is very poor. Thus, farmers in such regions could be interested in purchasing compost for enriching soil.

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[15] Only one sub-legal act (*Common Resolution of Minister of Economics of Georgia and Minister of Environmental and Natural Resources Protection of Georgia # 131-197 of December 19, 1996 about the rules of removing solid and liquid municipal waste)* refers to the need of separation by requiring service providers to provide containers in households for waste separation.

9.1.3 Recycling

Recycling of glass and paper is present, which gives possibility to utilise these waste fractions as secondary material within the country. Plastic recycling is present also to some extent. However, this area of activity needs more control and stricter regulation from the government. The issue of plastic bottles is left without any solution. These bottles are not recycled, but mostly reused. This creates a number of hygiene and health problems because PET bottles are not designed for reuse and moreover, they are picked up from waste files and then refilled (See Appendix 1). Even if such collected bottles are washed, it is still highly questionable whether it is suitable to reuse them or not. As for metals, there exists quite a well-organised system of collection and export. It can be said that hardly any piece of metal is ending up in the landfill. Even if it happens to be disposed, it is picked up by waste pickers and sold to metal collection points.

9.1.4 Incinerating

Incineration is just present to a very small extent. It is mainly related to the incineration of hazardous materials such as oil and oil containing products. Incineration of municipal waste is not practiced, however possibility of introducing this option is discussed among officials. This discussion is at the very preliminary stage and implementation of this idea is delayed because of lack of financing. Speaking of incineration, it is noteworthy that spontaneous, small-scale open burning of waste is quite frequent. Such practice is especially often nearby market places, mainly in winter. Mostly cardboard boxes and other residual waste from market are burnt. Tyres are also quite often put in fire.

9.1.5 Landfilling

Landfilling is the main way of dealing with MSW in Georgia. Almost all the MSW is taken to landfills and dumped. Not all the waste is landfilled legally, quite a large part of it is disposed in the illegal dumpsites. Landfilling is not meeting international standards.

9.2 Analysing legislation

Existing legislation related to waste does not cover MSW. It mainly concerns hazardous waste. A few sub legal acts are touching MSW partially, namely issues of medical waste and landfilling. Responsibility for waste management is mostly divided among few ministries. They are usually the Ministry of Environment and Natural Resource Protection, the Ministry of Food and Agriculture and the Ministry of Labour, Health Care and Social Protection. The coordination between ministries needs to be improved and closer collaboration should take place.

According to the Organic Law of Georgia about Government and Self-government, waste management is the issue of local importance thus falling into the competence of local authorities. The draft law on waste management that is to be discussed by the Parliament is also assigning responsibility for waste management to the local authorities. This law will be the first legal act covering MSW. However, even if this law will be adopted the state strategy on waste management is still obscure. There is no document stating state priorities and plans in waste management. The draft law itself is quite ambitious in its regulations. Some of the requirements will not be possible to be implemented in the nearest future even if the law is enforced.

Thus, Georgia has a legal base for waste management which is quite scarce and scattered. It does not give one picture of what is the direction country aims to go. Quite often legislation

covers issues of licensing and permitting (as in case of importing or exporting metal scrap and other waste fractions). What happens afterwards is not regulated by law. This vacuum in legislation is a significant obstacle towards improving existing situation. However, it should be kept in mind that legislation should be possible to realise in life and it should not be standing far away from what is happening in reality. Unfortunately, now such situation is present not only in waste management field but also in many other sectors.

10 Way to undertake

This chapter presents the pathway to take in order to reach desired future condition regarding waste management in Georgia. The pathway is presented in a form of steps to be taken over the next 30 years. Some of them can be started immediately, some can be initiated later. The timing of actions is decided upon the magnitude of the problem they serve to solve and the possibility to implement them. For example, if the certain element of the model is already in place, its development would be able to start sooner (e.g. recycling) compare to the element that should be introduced on the spare ground (e.g. PAYT and EPR systems). However, the timing of the actions can be different in reality due to various reasons as well as the time period needed to reach the desired future. The aim of putting actions into the time scale is to give an idea how different actions can be put in combination, one after another, in order to create the desired system.

The chapter gives an idea about the possible level of acceptability of certain measures. The pathway is presented for the entire MSW management and for the landfilling separately (sees Figures 10-1 and 10-2). This is because landfilling is the predominant option for waste disposal now in Georgia and will probably remain as such for the coming few years. Besides, the situation with landfilling in Tbilisi requires immediate actions to be taken to improve the situation. Thus, taking into account the magnitude of problem with landfilling, the separate, more detailed pathway has been elaborated for it. The last part of this chapter talks about the general problems related to MSW management in Georgia and concerns legislation, and institutional arrangements in the sector.

10.1 Pathway for MSW management in Tbilisi

10.1.1 Separate collection

Information and education campaigns

Information and education campaigns are necessary in order to ensure that public is participating in the separate collection. Information campaigns can be started immediately. They could be initiated by municipalities and also by NGOs. Schoolchildren and students can be also involved in different public actions, such as picking up litter, and the like. Such activities have been practiced during Soviet times. Similar activities have been initiated by Tbilisi Mayor's Office a few times recently. Hence, it should be possible to carry out such actions systematically, thus raising the awareness of schoolchildren and students. Social advertisements can be launched on TV and radios with the participation of popular representatives of show-business in Georgia (such attempt has already been made a year ago). Since waste fee is collected door to door in cash, talking with people and explaining them why their participation is important would be an effective tool to convince them to separate waste. Information campaigns can be undertaken already now, but should not be ceased or stopped, since the attention of the public can be very easily shifted away until separation becomes an everyday practice.

Convenient collection system

Convenient system for collection of recyclables is extremely important in order to ensure public participation. Nowadays, waste is collected using kerbside collection system or through waste lorries. The same systems can be kept with the difference that kerbside bins have different compartments for different waste fraction and the same principle goes for lorries.

This could require capital costs (to introduce new types of lorries and set up new waste bins). However, in the beginning kerbside bin can be complemented with a few other bins for different fractions of waste. The main challenge here will be to convince people dispose waste separately and not mix it all in one bin. The other issue is to make municipality interested in introducing such system, at least starting up pilot projects. The main argument for delaying such initiatives will probably be the lack of financial resources and the unwillingness of population to participate in separate collection. However, if the information campaign is well organised and existing recourses are employed more effectively, the outcome could be quite successful.

In case of apartment buildings one basement room could be dedicated for separate disposal of waste in different bins. This would ease the problem that currently exists in such apartment houses, since all the waste from the building goes in the basement bunker through the waste tube installed in the building (from their floors through tube system the residents throw waste, that crushes down into the waste bunker). When the bunker is not emptied for a quite a long time, a number of hygiene and health related problems rise. Such initiatives will be welcomed by the population who suffer much from the odour and unsanitary environment created by the overfilled bunkers.

In old districts of the city, where there are predominantly so-called Italian style courts (usually, two- or three-stored houses with an inner court), the same kerbside collection system can be used. The other idea is to distribute free of charge bins for separate collection of waste for households (in case relevant financial resources are available). This will increase the motivation of the public to participate and make the separation procedure more convenient for them. The same efforts should be made targeting not only households but also different institutions, educational organizations (universities, schools, etc), hospitals, and the like, thus, making waste separation an issue not only in the households but everywhere else. Designing and planning how a convenient system will work can be started now. Its introduction could be question of one or two years.

Deposit refund system

A deposit refund system is one way of making people participate in separation of recyclables, especially for glass bottles. This system existed during the Soviet times and is still in place to a certain extent. However, the system can be extended to more types of glass containers than exists now. Currently, it is covering only bottles with Coca-Cola drink and half a litre jars for yogurt (matsoni). Since the deposit refund system is already in place, future work should be carried out in order to extend it and make it better organised and more convenient.

Pay-As-You-Throw (PAYT) system

Economic incentives are the market-based instruments aiming to influence consumer behaviour (Thogersen, 1994). Economic incentives could be given to population through Pay-As-You-Throw (PAYT) system. This system will make it more attractive for MSW generators to separate certain waste streams and dispose them separately, thus avoiding costs for residual waste. However, it is quite probable that this scheme will cause much opposition from the population due to the hard economic situation and high unemployment in the country. Consequently, other measures such as educational and information campaigns should be launched in advance in order to prepare a background for introducing PAYT schemes in future with an approximate time horizon of 7-8 years.

EPR systems

Setting up EPR systems could facilitate separate collection of certain waste streams. In addition, EPR system can cause shift towards more environmentally sound design of products. Once producers are responsible for collection of their products after they are discarded, they will try to make collection system convenient for the public. This will make it possible to collect separately not only small-size recyclable fractions of waste, but also large scale bulky waste, such as WEEE. Introduction of an EPR system should happen later on, since in the present economic situation in the country it would not work. Producers and importers as well should be informed in advance about the introduction of such system. In case the previous steps are undertaken as planned, EPR system could be introduced approximately in 12-14 years. However, before then work on this direction should be started in order to come up with an effective system.

10.1.2 BMW

Home composting

As described in the model of future, home composting is the cheapest way to treat BMW and produce organic fertilisers. Home composting already exists in the country in a small scale that could be further developed by involving more participants. This process could be started now. Working with farmers and providing information on composting is done by Biological Farming Association "Elkana" that promotes organic agriculture in Georgia. In collaboration with them and other interested organisations, different projects could be carried out in the direction of developing and widening home composting practices.

Centralised composting and anaerobic digestion

Centralised composting could be a good solution for big cities, however high expenses of such option makes it impossible to implement it now. However, after a certain period it could be possible to discuss this option too. Anaerobic digestion as well is an expensive way to treat BMW, namely animal waste. However, some small scale initiatives are present organised by farmers. Gradually, anaerobic digestion could be also introduces in a larger scale involving farmers or other interested parties. Large scale introduction of centralised composting and anaerobic digestion is assumed to be possible after 12-13 years.

Market for compostables

Both home composting and centralised composting will be much easier to develop once the market for compostables is established. This means that product from composting can be sold on the market for a price which is affordable for buyers and acceptable for sellers. Buyers will mostly be farmers willing to enrich their soil with organic fertilisers or citizens supporting their own gardens (mainly city inhabitants). Buying composting can be especially interesting for those who grow flowers for commercial reasons (especially in the villages bordering Tbilisi) and those having vineyards (especially in the regions where the soil is not very good).

10.1.3 HHW and HCW

Treatment

The treatment facilities of hazardous waste can be built after a certain period of time, when it is financially feasible. Such period is assumed to be 7-8 years. Till then, it is essential to ensure that hazardous waste stream is still separated from the rest of the MSW and stored safely.

Incineration option can be employed by building a new incineration for hazardous waste which seems to be quite expensive and not realistic option at least for the nearest future. The other way is to co-incinerate hazardous waste from MSW streams in the hazardous waste incinerator of BP or small scale incinerators for medical waste when they meet all required standards.

Disposal

The other option can be to landfill hazardous waste in a safe way, not mixing it with the rest of the waste. In the beginning, this could be done by zoning landfill into different compartments for different waste streams. Later, separate landfills for hazardous waste could be set up (issue of disposal discussed in details in Chapter 10.2)

10.1.4 Recycling

Recycling

Well-functioning recycling for glass and paper is carried out in Georgia, while quality of plastic recycling is questionable. Recycling facilities for glass and paper can be extensively used for the separately collected recyclables. Moreover, these facilities do not operate with maximum capacity which makes it possible for them to utilize increased amount of generated recyclables. The recycling of plastics needs to be examined more carefully and in case these facilities do not meet relevant standards they should be closed or reconstructed. Recycling of PET bottles is not happening in Georgia. PET bottles are not pressed and compacted or granulated into pellets (this way it is more convenient to transport PET bottles). In case such activity can be carried out, prepared material could be exported for recycling in other countries.

Export

As already discussed one material for potential export can be PET bottles. Metal is already exported to a large extent. Working on exporting PET bottles could be started in the nearest future by collecting separately PET bottles (which is already carried out by informal sector) organising pressing or chopping facilities and looking for buyers abroad. The issue is quite important to be solved in no time, since PET bottles represent a serious problem nowadays. A good system of exporting certain recyclables and developing contacts with foreign partners could be reached in about 5-7 years.

Market for recyclables

Market for certain recyclables, such as glass and paper is already in place. The same can be said for metal scrap. Market is absent for plastics. However, it could be gradually developed by finding interested buyers of collected plastic or setting up small scale and environmentally sound plastic recycling facilities.

Reach recycling targets

Reaching recycling targets which are now set for the EU countries is still a far perspective for Georgia. Not only good waste management system will be necessary to reach recycling targets, but also the certain level of economic activity will need to be present. Today most of the industrial facilities are not working. In case industry is operating, government is ensuring enforcement of laws and monitoring and controlling mechanisms are put in place, recycling targets will be easier to be met. However, in order to do so 15-17 years would be needed.

10.1.5 Public-private partnerships

Public-private partnerships are presented by the collaboration between local authorities and companies providing various services. Mainly they collect, transport and dispose waste. These companies are winners of tenders announced by local authorities, however competition is minimised in such tenders. Private sector is also present on recycling phase. However, they do not have close collaboration with the public sector. They are more closely linked with private organisations and private informal sector providing them with collected recyclables. Thus, existing public-private partnerships need to be examined and improved. This option seems quite possible to carry out since the governmental institutions welcome the increased share of private sector in waste management sector. It is considered as one of the most realistic ways to improve the situation.

There are more possibilities of involving private sector in MSW management. Local authorities should create conditions in order to attract private sector in this field. This would bring new management in the sector and improve the quality of service.

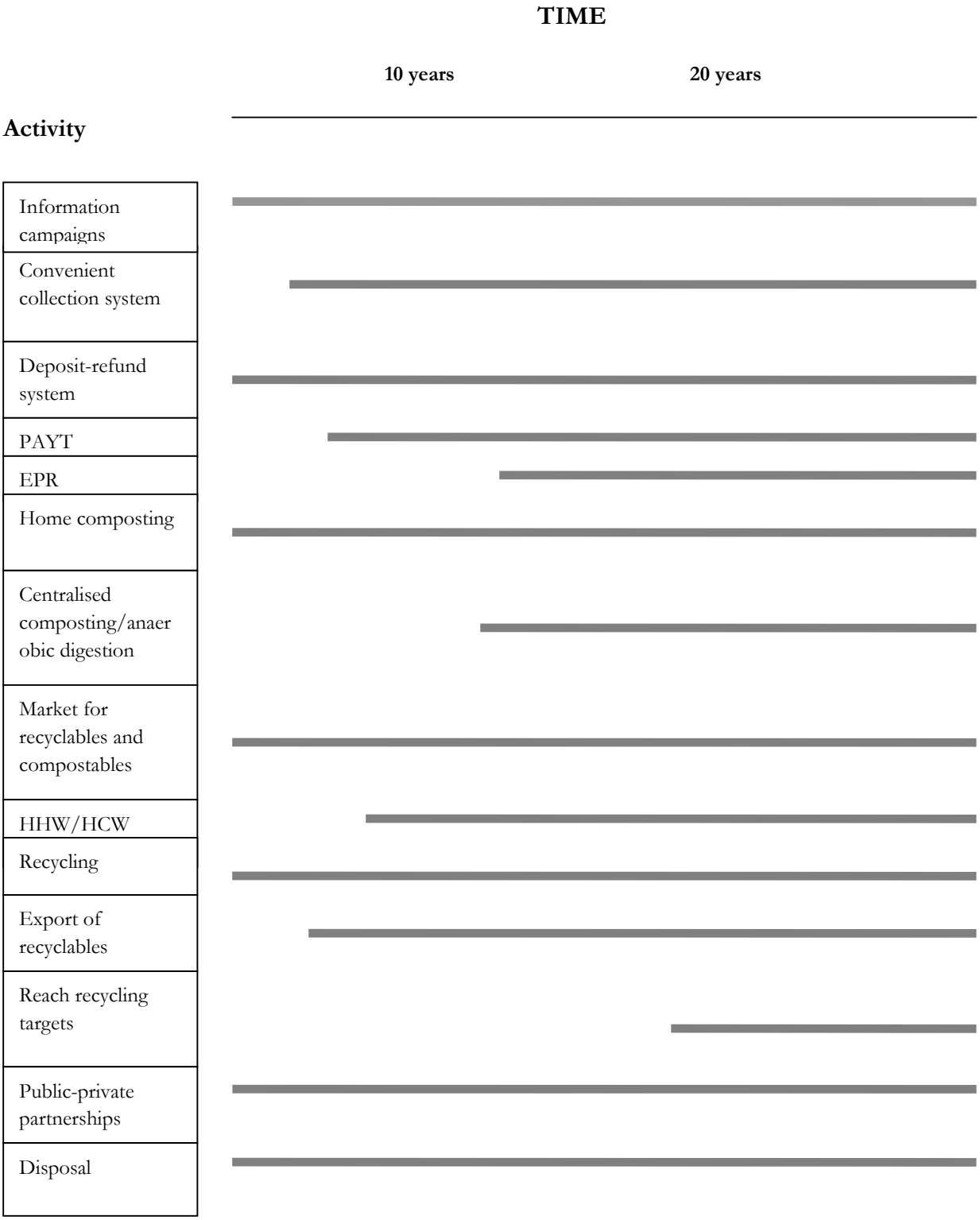

Figure 10-1 Pathway for MSW management in Tbilisi

10.2 Pathway for Landfilling

Isolating operating and closed landfills

Operating as well as closed landfills in Tbilisi are not fenced which creates a number of problems. Firstly, cats and dogs as well as domestic animals (mainly pigs and cows) have access to landfills where they feed on food waste. Second, migration of waste all around the landfill area is happening in a significant scale. Not having any barrier, litter is taken by wind for long distances. Unfenced and uncontrolled landfills are easy to be accessed (especially during nighttimes). This makes it possible for various interested parties to dump their waste without any checking, paying and control. Fencing landfills is an urgent step to take and quite feasible in the present situation. The need of this measure is recognised by the decision-makers, however actions are not followed. Usually, delay of actions is justified by the lack of finances.

Zoning landfills

Zoning landfill implies dividing landfill area into different compartments for different types of waste. This is especially important for hazardous waste and medical waste. Waste coming from medical or other institutions producing hazardous waste is dumped in the MSW landfills of Tbilisi. Many environmental and health problems can be avoided in future by providing separate, isolated space for such waste. The same can be done for construction waste that also quite often ends up either at the illegal dumpsite or at MSW landfills. This activity can be carried out in a short while when the relevant implementation plan and resources are available. The separate landfilling of hazardous and medical waste is welcomed by the institutions working on sanitary issues in the city. They acknowledge that separation of such waste on the disposal site is necessary.

Close old landfills and eliminate dumpsites

Old landfills which have exhausted their capacity should be closed. One of such landfills was already closed this June. After a few years, Gldani landfill will be closed. Meanwhile, discussion and work over constructing new landfills should be started. Illegal dumpsites present a huge problem for environment and human health. They are located in various places within the city and also in its suburbs. Such illegal dumpsites are not controlled, registered or cleaned up. That is why their number is increasing over time. A few ways can be used to prevent creation of new dumpsites. Penalty system for illegal dumping should be strengthened and developed, information campaigns should be extensively undertaken and existing dumpsite should be gradually cleaned up. Working on reducing illegal dumpsites can be started now, while the closure of old legal landfills will be delayed until these existing landfills reach their maximum capacity.

Water control and leachate management

Water control and leachate management of the existing landfills has been carried out very superficially. Namely, collectors for groundwater have been put on the bottom of landfill when they were constructed. No attention has been paid to quality of groundwater or leachate management since then. Thus, the analysis of groundwater should be done urgently to find out how landfills affect its quality and work on the future plans to protect water quality.

Location for new landfills

The previous steps are focused on existing landfills. However, they will need to be closed sooner or later and the construction of new landfills should be started. Firstly, its location should be chosen. This process takes time and discussion will be needed to be held between relevant state institutions, scientists, population, and the like. That is why while making improvements for existing landfills, establishment of new landfills should be kept in mind.

Protection of soil and water and gas control

Once the landfill location is chosen, it should be constructed in a proper way by isolating waste from soil and groundwater. Besides, it should be ensured that gas emissions are well controlled thus avoiding risk of explosion and air pollution. All this requires preliminary work to be done in order to make a project for a new landfill.

Categorise landfills

Important steps to undertake is to categorise landfills according to the waste they receive, namely hazardous and non-hazardous waste and also radioactive waste. Today landfills receive all types of waste. Only radioactive waste is kept separately.

Landfill targets

Meeting landfill targets is still far perspective for Georgia, however if the model discussed in this thesis is implemented, it will be possible. Initially, well functioning system of waste management should be set up in the country thus paving the way for EU requirements, including landfilling targets.

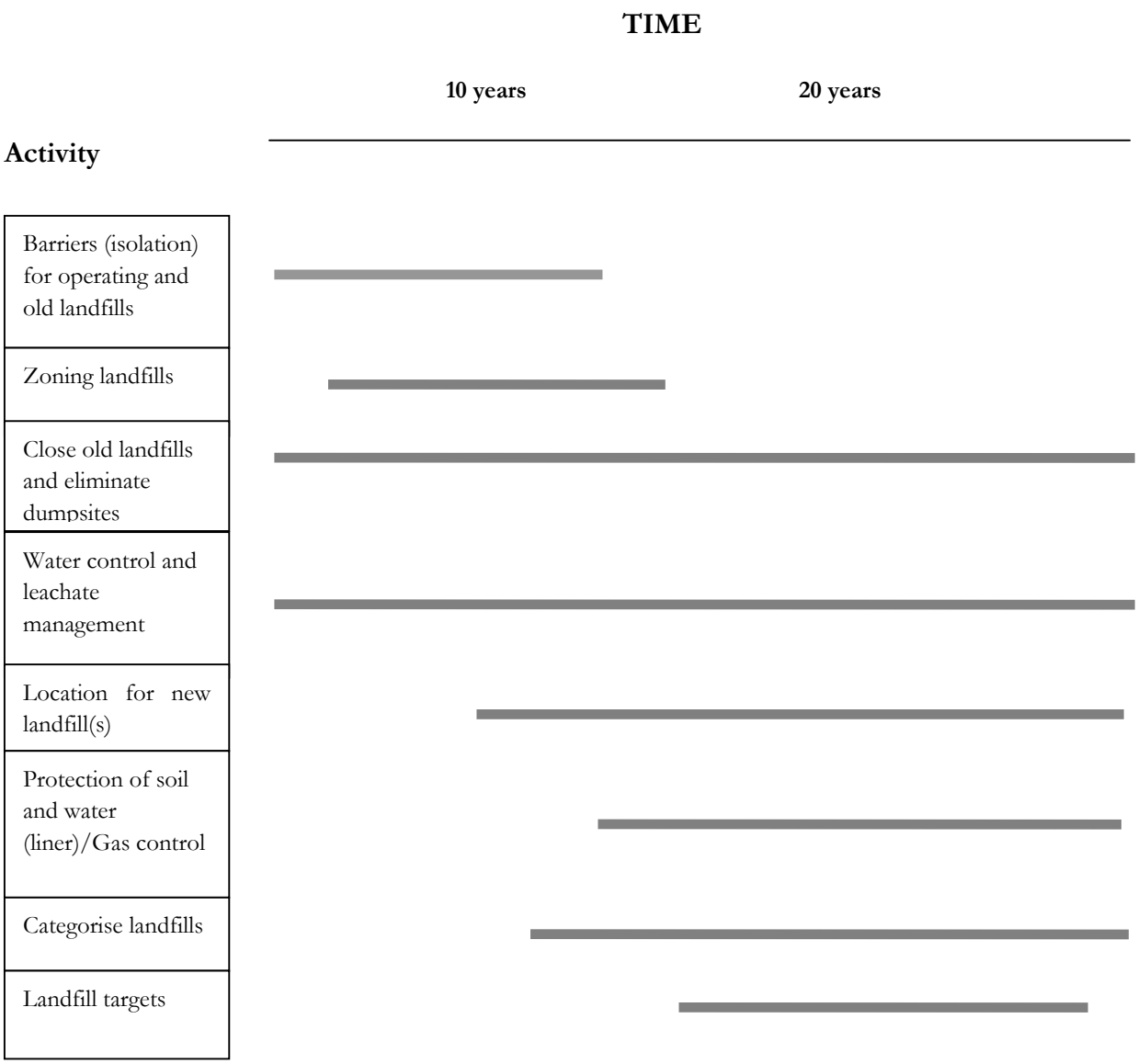

Figure 10-2 Pathway for landfilling in Tbilisi

Waste prevention

Waste prevention option is more applicable to industrial activities than to households. Since industrial waste is not the focus of this thesis, this option is not discussed in details. However, a few points should be made, since prevention is the top priority in the EU waste management hierarchy and one of the elements of the proposed model of future.

From the first sight it could seem that speaking about waste prevention is too early for Georgia. However, after a few years when industrial activities will intensify, it will be necessary to discuss this topic. If some steps are taken now in order to promote waste prevention, results can be more effective. The producers should be informed about the new legislation that will be adopted sooner or later and that will make waste management for them much more expensive. The benefits of pursuing more efficient ways of production and designing more environmentally sound products should be shown clearly. Design of durable, easy-to-dismantle and recyclable products should be their priority from now, even though they are not obliged to do so by the legislation. However, once the legislation comes into the scene, they could be already prepared for it. As for the household, information campaign should be designed in a way to give them picture, why prevention is good for environment and consequently for their heath and well-being. Also, explain that once PAYT system is in place, waste prevention is a way to avoid costs for waste disposal. This can be done by reusing products (which is already largely practiced).

10.3 Areas to be improved

Increase role of the Ministry of Environment and Natural Resource Protection

The main duty of the Ministry of Environment and Natural Resource Protection is to work out and implement state policy. However, such policy does not exist for waste management in Georgia. Once created it would serve as a useful guidance while making decisions and choosing activities. Besides, the Ministry is quite passive in taking part into existing waste management practices. It should get more interested with the present situation and state its position over different issues. Ministry should actively work on disseminating information on various waste management options on the local level of government, also in controlling and cleaning up illegal dumpsites, monitoring and controlling activities of small plastic recycling facilities, collaborating with NGOs with projects related to waste management. These are just a few proposed directions the Ministry can take to activate its role and use its competences. Strong national power over the issue and well-defined policy can facilitate better cooperation between different institutions, it will guide local authorities in implementing their tasks related to waste management.

Creating a legal base

Currently there is no law on MSW management. Only the draft law has been elaborated which is not yet discussed and approved by the Parliament. The law should be put in place as soon as possible, since the existing legal vacuum slows down improvement processes that can be undertaken. At the same time, while discussing new law, the question of its enforcement should be kept in mind. If the law will just stay in paper and it will not be possible to enforce, situation will not change.

Improve data collection system

In order to make effective decisions, it is essential to have correct data about present situation. Such reliable and accurate data is absent today. Different institutions give different data, while in reality the situation is different. The need for accurate data is somewhat not quite clearly indicated, since the decisions are over and over based on old data. When it becomes necessary to have a certain data which is absent, the estimated data is employed. Thus, it is necessary to put down a new database and set up a system that would track present trends and produce accurate data systematically.

10.4 Suggestions on using backcasting in decision-making process

The use of backcasting approach in decision-making can be interesting because of a few reasons. First, it will give possibility to picture various alternative solutions. This can be a significant step forward in decision-making, since in case of Georgia, presently the focus is driven only on the conventional ways of solving problems. Sometimes our perceptions of what is possible and reasonable may serve as the major constraint towards making change. Thus, widening horizon of possible actions will give better foundation for decision making, will free us from undesirable present trends which otherwise can become the part of future and will put good basis for shaping public opinion (Robinson, 2003, Dreborg, 1996).

The other important reason of using backcasting, especially in the case of often controversial social and political problems, is possibility to create a framework for future goal, shared by all the parties. Thus the main principles would be defined upon which all the actors will agree. This is an important challenge especially in the cases when different sectors of society with different interests are involved and finding consensus can be difficult. Finding agreement upon the main guidelines and priorities and thus picturing direction of future actions would ease collaboration between parties (Holmberg and Robert, 2000).

The existence of the shared vision of what the developments in the wastes management sector should be, are largely lacking in Georgia. The priorities of the field are not identified which creates the confusion at the lower levels (including levels of local authorities) which way to undertake. Thus, the problems are not solved with the long-term perspective. Rather they are treated in a way to get quick results which do not last long or even worsen the problem. Thus, employing backcasting could be useful for solving the problem of absence of the overall shared goal.

Backcasting approach can be used in relation to a wide range of different issues by decision-makers. Moreover, the approach to the issue used in the thesis can be adopted, since almost all the sectors require long-term reforms and preferably should be in accordance with relevant EU requirements. The use of backcasting analysis by decision-makers would be easier, since they posses more information then ordinary employee or the person not involved in the system. This knowledge can be employed while defining different pathways towards future end-point. The interplay of the knowledge of present competences and possibilities and the vision of the full horizon of possible alternatives will be of a big importance in the decision-making process.

11 Conclusions

Georgia, one of the post Soviet countries with the legacy of the hardest economic and social problems, has put forward the goal to approach the European Union and become its member. This priority has been especially highlighted after the political changes in November 2003. New President and new government have started to work actively towards deepening ties with the EU. However, before approaching the entrance door of the European Union there is much to be done. Almost all the sectors need to be reformed dramatically.

Waste management sector in general and municipal solid waste management in particular has not experienced any improvement or innovation since the collapse of the Soviet Union. The management practices and attitude towards the problem remain the same. This results in the worsening situation, making problems harder and harder to solve and approaching irreversible environmental consequences. The condition of landfills and illegal dumpsites require urgent improvements. The legislative base is also scattered leaving unregulated a number of important issues.

This thesis has elaborated a model of future for the MSW management. The idea is to use waste as the material as much as possible, thus reducing waste going to landfill and minimizing the need of incineration. The model uses EU waste policy and legislation as the basis. The pathway has been worked out using backcasting approach to create such system.

Pathway has multi-step nature, meaning that some actions can be undertaken right away, while others should be introduced later. In case all the steps are followed and implemented, after a certain period Georgia will have MSW management system that meets EU requirements and protects the environment and human health.

Beside the specific actions included in the pathway, changes cross-cutting the whole waste management sector should be introduced. Firstly, the existing problems with MSW should be stated in a way they are, neither of their aspect should be neglected or forgotten. Also, objective evaluation of what is in place should be carried out. All the competences and possibilities should be recognized. Afterwards the actions leading towards specific results should be planned and implemented. Priorities of waste management sector for Georgia should be stated. These priorities would guide local authorities while decision-making and undertaking certain actions, since MSW management falls under their competence.

The main idea of backcasting has been used in the thesis to form the research structure. The backcasting has been explored as a possible approach to be utilized in the decision-making process. The thesis has concluded that the use of this approach for the complex social problems could be useful as it can open a wide horizon of various alternative solutions. In addition, backcasting approach can help decision-makers in formulating the goals to reach and shaping clearly the situation which is desirable to attain.

The thesis examined the degree of acceptability of the proposed actions from the decision-makers and the public and concluded that the acceptability varies for different actions. The approval of certain ideas from the decision-makers is hard to receive until the whole magnitude of the problem and the importance of solving it is not presented clearly (in this respect argument of the EU is the strongest one). Once the possible ways to reach the desired future are explained and linked with the present competences and resources, the attitude changes and the acceptance level rises. As for the population, certain actions such as recycling or composting will be acceptable once the appropriate conditions are set. At the same time,

innovations such as PAYT system will be harder to introduce in the nearest future. The overall awareness of the population regarding the waste management issues is not high, however the desire to have better service system and willingness to contribute is present.

Overall, what this thesis tries to show falls into the following ideas: The situation with MSW management in Georgia is very hard and needs urgent improvements. Georgia, as the country aiming to join the EU should approach its waste management system to the requirements set by the EU. Almost all the elements of the future model elaborated in this thesis are in place to some extent. This gives possibility to further develop them, fully involve them in the system and add what is missing.

Problems in waste management sector of Georgia are hard, but possible to solve. This is a matter of desire, effort and much work. Improving waste management sector will be one of the steps on the way leading towards the EU.

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Abbreviations

BMW	Biodegradable Municipal Waste
BP	British Petroleum
BTC	Baku-Tbilisi-Ceyhan
CENN	Caucasus Environmental NGO Network
EC	European Commission
EC	European Communities
ECU	European Currency Unit
ELVs	End-of-Life Vehicles
ENP	European Neighbourhood Policy
EU	European Union
GATT	General Agreement on Tariffs and Trade
GEF	Global Environmental Facility
HHW	Household Hazardous Waste
HCM	Hazardous Commercial Waste
INOGATE	Interstate Oil and Gas Transport to Europe
MSW	Municipal Solid Waste
NATO	North Atlantic Treaty Organisation
TRACECA	Transportation Corridor Europe-Caucasus-Asia
PCA	Partnership and Cooperation Agreement
PCBs	Polychlorinated biphenyls
PCTs	Polychlorinated terphenyls
POP	Persistent Organic Pollutant
REC	Regional Environmental Centre
UNDP	United Nations Development Programme
WB	World Bank
WEEE	Waste from Electrical and Electronic Equipment
WTO	World Trade Organisation

Appendix 1

Separately collected tyres at Gldani landfill in Tbilisi

Separately collected PET bottles at Lilo landfill in Tbilisi

Corpse of a dead animal at Lilo landfill in Tbilisi

Fixing old and out-of-dated waste lorries is left for waste workers

Field of plastic packaging nearby Iagluja landfill