A thesis submitted to the Department of Environmental Sciences and Policy of Central European University in part fulfilment of the Degree of Master of Science

Prospects for the Adoption of an EPR-based policy for the Management of WEEE in Moldova: Opportunities and Barriers

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Author's declaration

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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ABSTRACT OF THESIS submitted by:
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The emerging problem of increasing volumes of waste electric and electronic equipment (WEEE) and the poor practices for their management that are currently in place in Moldova pose serious hazards to the environment and the health of people who collect the metal scrap from it. In Moldova, the government and the society at large has a great opportunity for addressing existing issues in the management of WEEE by adopting a policy based on the Extended Producer Responsibility (EPR) principle. By extending producer's responsibility for the management of the products to their end-of-life stage, application of EPR for the management of WEEE is viewed by many countries around the world as a solution to the WEEE management problem. The opportunities and barriers for adoption of an EPR-based policy for the management of EPR are explored in this thesis. The research is based on the review of literature and interviews with different stakeholders. The results of the research reveal that the commitment of the government to harmonize the national legislation with the EU environmental *acquis*, including the WEEE Directive, is an opportunity for adopting an EPR-based policy for WEEE in Moldova. The prospect for adoption of such a policy might be hindered by institutional capacity constraints and the low priority attached to environment in the national agenda. The study highlights the need for institutional capacity building in order to ensure that the policy transposing the EU Directive on WEEE will be developed and adopted in accordance with the planned approximation plan.

Keywords: Extended Producer Responsibility, EPR-based policy, Moldova, WEEE, EU Directive on WEEE, policy adoption

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List of Abbreviations

ADF	Advance Disposal Fee
ARF	Advance Recycling Fee
EEE	Electric and Electronic Equipment
EPR	Extended Producer Responsibility
EU	European Union
IT	Information Technology
MoE	Ministry of Environment
MSW	Municipal Solid Waste
OECD	Organisation for Economic Co-operation and Development
PAYG	Pay-As-You-Go
WEEE	Waste Electric and Electronic Equipment

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1. Introduction

1.1 Background

Rates of municipal waste generation are increasingly growing worldwide, both in developed countries and developing countries. Factors that influence municipal waste generation are income of the population, consumer behaviour and demographic trends. Among the types of solid waste generated in a typical household is also the electronic waste or waste electrical and electronic equipment (WEEE). This type of waste comprises a wide range of electronic devices which "have reached their end-of-life" (OECD 2001) or "no longer satisfy the current owner for its original purpose" (SINHA 2004).

Due to the increase in the use of electronic devices in recent decades throughout the world, the amounts of such devices that are discarded by their users are also growing. WEEE is being appreciated as one of the fastest growing waste fractions and comprises around 8% of municipal waste (Widmer et al. 2005). Despite the fact that a large proportion of electronic waste is generated in developed countries, in industrializing countries and countries with economies in transition where the consumption rate for electric and electronic equipment (EEE) is rapidly growing it is expected that large quantities of WEEE will become part of the waste stream in the near future (Widmer et al. 2005).

In Republic of Moldova the rate of waste generation follows a similar trend. In Chisinau city alone, the volume of municipal solid waste that is collected and transported from households to the landfill increases by 30 thousand m^3 each year (Serghienco pers. comm.). The increase in waste volumes that is being encountered in the recent decades is considered to be directly

proportionate to the level of national economy growth and improvement in the living conditions of the population (Iftodi and Guvir 2008).

The exact amount of WEEE that is generated every year in Moldova is rather difficult to estimate and predict since there are no statistical surveys for the EEE imported and sold and comprehensive studies that would produce estimates of the real flows of EEE from the point of entry on the market till the post-consumer stage. However, it is being estimated that the quantity of EEE that are presently placed on the market might be around 6.5 kg per capita per year (Tugui pers. comm.). Other estimates suggest that some 5000 tonnes of WEEE might be produced annually in the country (Jolondcovschi pers. comm.).

Even though there is no official data on amounts of electronic devices placed on the market in Moldova, statistical data on value of imports of the electric and electronic equipment in the last few years (NSB 2011) indicates an increasing tendency. This fact suggests that the trend in consumption rate of EEE is growing. Consequently, numbers of WEEE discarded by consumers at the moment, as well as in a few years when the new equipment will reach its end-of-life stage, will increase as well.

Since there is no separate collection of WEEE in Moldova, this type of waste is usually randomly abandoned, especially in rural areas where most of the times there are no waste collection systems in place and where it is common practice for population to throw the garbage in unauthorised places. In cities where municipal waste collection systems function, used electronic appliances might be thrown away together with other MSW in the garbage bins. Because iron and steel are commonly found in EEE, accounting for over 50% of WEEE weight (Widmer et al. 2005), they are often collected from the garbage platform by scavengers

(Serghienco pers. comm.). The remaining unusable parts are mixed, nevertheless, with the rest of the solid waste going to the landfill.

Because electronic waste do not constitute a large proportion of the discarded products in the municipal waste of larger cities (Serghienco pers. comm.), they do not pose much additional burden for waste management services and is not perceived as a serious problem by them. The population, also, seems not to perceive WEEE as a problem. The media and the civil society do not raise the problem of poor waste management (Jolondcovschi pers. comm.). Nobody writes or talks about electronic waste, about the sites where they are deposited, about the subsequent contamination of the soil (Petrusevschi pers. comm.).

Hence, most people are not aware of the risks for human health and environment that some of the EEE may carry (Iordanov pers. comm.). WEEE often contains toxic substances such as lead, mercury, cadmium, flame retardants (Widmer et al. 2005). That is why, existing practices of disposing or recycling electronic equipment pose significant health hazards to people handling this equipment, and may lead to negative environmental impacts in landfilled sites. For this reason the occurrence of electronic waste in the general municipal waste stream cannot be ignored and a solution for the environmentally sound management of WEEE needs to be found.

An opportunity for addressing the existing issues in the management of electronic waste would be the application of a policy regulating the management of WEEE, similar to policies that that have been already implemented in other countries. A policy based on the Extended Producer Responsibility (EPR) principle, which extends producer's responsibility to the end-of-life management of his/her products, seems an appropriate approach. An EPR-based policy is perceived by many as a solution for the management of this waste stream, especially

because it takes off the burden for financing their management from taxpayers and assigns it to the polluters - the producers and users of EEE. Alternatively, producers and importers of EEE may take the initiative to establish individual WEEE collection and recycling schemes or a collectively-organised system for the management of their products at the end-of-life stage before a governmental policy assigning such responsibilities to them is put in place.

Among the drivers for development of EPR policies aimed at regulation of WEEE in the OECD countries can be listed the increasing volumes of these type of waste in the municipal waste stream that was going to landfills and which imposed an extra financial burden on local governments, as well as the limited capacity of waste management infrastructures for disposal of these growing amounts of waste (e.g. in Japan, Taiwan, South Korea) (Manomaivibool n.d.). In addition, severe health hazards and environmental degradation could result from uncontrolled activity of the informal WEEE recycling sector (Toxics Link 2003; BAN 2002). Several studies that have been published in the last decade on the backyard recycling practices of electronics in countries of Asia and Africa contributed to a greater awareness and acknowledgement of this problem among the general public and policy makers worldwide. Concerns over the harmful impact that the improper management of WEEE may have on human health and the environment determined policy-makers to search policy options for solving this issue in several non-OECD countries as well (Manomaivibool 2009).

1.2 Aim and Objectives

The aim of this thesis is *to explore the opportunities and barriers for the adoption of an EPR-based WEEE management system in Moldova*. With the view of achieving this purpose, the author seeks to highlight the factors that may influence whether and how soon such a system could be established in Moldova.

The objectives of the thesis are to:

1) Examine the current status and trends in the development of waste legislation in Moldova.

2) Analyze the experience of member states of the European Union in transposing the 2002/96/EC Directive on WEEE.

3) Identify potential opportunities and barriers for adoption of an EPR-based policy for the management of WEEE in Moldova.

1.3 Thesis structure

In chapter 1, the author offers the background for the problem researched in this thesis. The situation with regard to WEEE management in Moldova and its challenges are described, and the need for adopting a policy that may help address existing problems is highlighted. The main aim and objectives for achieving this aim are presented.

In chapter 2, the type of data collection and data analysis methods used for carrying out the thesis research is presented. Steps followed in the collection of interviews and in the analysis of interview transcripts are described in detail. Also, the scope and limitation of the research are highlighted.

In chapter 3, the author presents an overview of the concept of Extended Producer Responsibility, its definition, goal and significance. It is described how EPR has evolved as an environmental policy principle. In addition, the author discusses the approaches that are used for the implementation of EPR, the range of responsibilities that can be assigned to producers and how these responsibilities can be fulfilled. Beside that, the approaches taken by different

EU Member States for the transposition of requirements of the WEEE Directive with regard to producer responsibility.

In chapter 4, the author gives an overview of the national legislation on waste which is right now in force in Moldova. The main provisions of laws, regulations and policies in the field of waste management are outlined. The purpose of this review is to identify whether the existing legislation includes any provisions on WEEE management and which are these.

In chapter 5, the author highlights, analyzes and discusses the main research findings with regard to existing and potential opportunities and barriers for the drafting and adoption of an ERP-based policy for management of waste from EEE by the national government.

2. Data and methodology

For this study qualitative research was undertaken. Some distinguishing characteristics of qualitative research are the use of text as empirical material, the interest in the "perspectives of participants, in everyday practices and everyday knowledge referring to the issue under study" (Flick 2007). The types of methods that are used in qualitative research are numerous; there are various methods that can be used for data collection as well as various approaches for interpretation or analysis of the accumulated data. Data collection and data analysis methods that have been selected for this research are described in the following sections.

2.1 Data collection

Qualitative data include almost any form of communication – written, audio or visual. However, the most usual form of data used in analysis is text (Gibbs 2007). This can be in form of interview transcripts, field notes, web pages, e-mails or various types of documents such as journal articles, books, reports etc. Qualitative data may consist of quotations, observations, and excerpts from documents (Patton 1990). In this thesis, the methods used for data collection were review of literature pertinent for the purpose of the research and face-to-face interviewing of key stakeholders.

2.1.1 Literature review

In an attempt to realize an overall description of the definition and significance of Extended Producer Responsibility principle and the approaches used for its application in WEEE management programs, the most important findings of different relevant studies were outlined and discussed. The literature that was consulted includes journal articles and different studies on the implementation of EPR programmes in Europe and Asia. Also, the author looked at

several reports on the implementation of the 2002/96/EC Directive on WEEE in the Member States of the European Union in order to highlight various approaches used by the Member States in the transposition of producer responsibility requirements set by the Directive.

The literature reviewed included reports such as the two Environmental Performance Reviews for Moldova published by the United Nations, the book on Environment Protection Law and Policy – approximation to EU standards in the Republic of Moldova published within The Sectoral Law Approximation Guidelines Series, the Report on Evaluation of the National Capacity in the field of environmental management, and other similar studies. Also, the existing national legislative framework on waste was reviewed. Most of the consulted publications and documents were in English language and a few in Romanian language.

2.1.2 Qualitative Interviewing

Interviewing is a widely used data collection method, which can be defined as "a purposeful conversation in which one person asks prepared questions (interviewer) and another answers them (respondent)" (Frey and Oishi 1995). Various forms of interviews may be used to gain information on a particular topic from participants in a study: individual or group interviewing, face-to-face or through other means of communication such as telephone and e-mail. They can be structured, semi-structured or unstructured (Cohen and Crabtree 2006; Rubin and Rubin 1995). Each of these variants may have certain advantages over another depending on the purpose of interviewing.

In this thesis, semi-structured interviewing was used. Other terms used to refer to the first research tool are in-depth, intensive or semi-standardized interviewing (Webber and Byrd 2010). Individual, face-to-face semi-structured interviews were carried out with officials from

the Ministry of Environment of the Republic of Moldova, representatives of the Chisinau municipality and its waste management company, as well as representatives of non-governmental organizations and national experts working in the field of environment. A total of 12 interviews were carried out in the period between 12 and 26 May 2011.

Interviews were carried out in order to identify the specific conditions in the Moldavian context which could determine the prospect for the adoption of a EPR-based policy for the management of WEEE. In addition, the interviews allowed the author of this thesis to appreciate the current status of waste legislation in Moldova and factors influencing its speed of development and adoption. Since available literature on the development of waste legislation in Moldova, is rather scarce data was collected from various stakeholders directly or indirectly dealing with the issues of waste management in Moldova.

The selection of persons interviewed with the semi-structured technique was based on previous acquaintance of the persons within different institutions in Moldova dealing in their work with issues related to waste management and legislation drafting. The sampling strategy was purposeful, aimed at selection of 'information-rich' cases, people with vast experience in the environmental field and who could provide valuable and possibly diverging insights and perspectives with regard to the questions discussed in this study. Snowball sampling was used to some extent as well. In the discussion with the interviewees, two new contacts relevant for the study were suggested and interviewed.

The semi-structured interviewing technique was chosen because they have a rather open framework and flexibility, allowing the interviewer to obtain a range of insights on specific issues by probing for details and for what is not known (FAO 1990). Some advantages of this tool are that it can provide reliable qualitative data (Cohen and Crabtree 2006) and that the

information acquired from participants "will provide not just answers, but the reasons for the answers" (FAO 1990).

For carrying out the semi-structured interviews, as suggested by researchers using this qualitative research technique, the interviewer developed and used an 'interview guide' with several questions that had to be covered during the conversation (Cohen and Crabtree 2006). The interviews started with more general open-ended questions, followed by probes to draw out details about certain issues from the informants. Often, during the interviews new kind of information was brought out by interviewees who helped to identify questions that were subsequently probed in other interviews as well as to refine some others. Hence, the questions that were addressed to different respondents slightly varied. Most of the times they were adapted according to the profile of the informant and to the way how the discussion emerged during the interview. This is one of the advantages of semi-structured interviews, that it allows the interviewer to follow "topical trajectories in the conversation that may stray from the guide when he or she feels this is appropriate" (Cohen and Crabtree 2006). In order to facilitate the succeeding analysis of data collected in the discussions, audio recording was used.

2.2 Data analysis

The qualitative data that has been collected in the semi-structured interviews was analyzed in several steps. A series processes related to data handling such as sorting, retrieving and indexing were applied in order to be able to deal with the voluminous amount of data in interview transcripts and create analytic ideas, as suggested by various researchers (Miles and Huberman 1994; Ritchie and Lewis 2003; Kvale 2007; Flick 2007). These steps involved the reduction of data into summaries and interpretation of data (Flick 2007). Data organization and reduction was carried out by coding the transcriptions of interviews. The analysis of the

data involved the processes of immersion and crystallization which allowed the identification of patterns and themes relating to the purpose of the research. The strategies for coding and categorizing the themes included the techniques described by Schmidt (2004), Holliday (2002) and Gibbs (2007). Finally, the highlighted thematic categories were described by displaying direct quotes and excerpts from interviews. Direct quotes were used since they allow the reader to evaluate the plausibility and credibility of the author's claims (Cohen and Crabtree 2006).

2.3 Scope and limitations of the research

Scope of the carried out research was limited to the identification of opportunities and barriers for adoption of a legal act for the management of WEEE with EPR as an underlying principle in Moldova, and more specifically for the adoption of a regulation that would transpose the EU Directive on WEEE in the national environmental legislation of the Republic of Moldova.

Not all internal factors that may determine policy adoptions of governments were discussed in this thesis. The author focused primarily on the likely influence of the public opinion on the decision of legislators to develop and adopt a policy for the management of WEEE in Moldova.

Several limitations have been encountered related to data collection. Selection of people for interviews was largely constrained by the limited number of persons working in the field of waste management. There are only very few experts on waste issues and officials within the Ministry of Environment who are working or have worked at the drafting of the waste legislation in Moldova. Additionally, the author was not able to identify other non-governmental organizations dealing specifically with the issues of waste management except for the "Association for Waste Recovery – for a cleaner Moldova", which was established at

the end of the year 2010. Also, because of the limited time available for conducting the field research, it was not possible to interview more representatives of NGOs working in the field of environment protection.

3. Overview of Extended Producer Responsibility (EPR) and approaches to its application

This chapter provides an overview of the concept of Extended Producer Responsibility, its definition and goal. It describes how EPR has evolved as an environmental policy principle that is perceived by many countries around the world as a solution to the problem of waste management by shifting the responsibility from local governments to producers. In addition, it discusses the approaches that are used for the implementation of EPR, the range of responsibilities that can be assigned to producers and how these responsibilities can be fulfilled. Beside that, the author presents some of the experiences gained by countries with an EPR system in place, providing examples of policy instruments that have been adopted and some of their outcomes. Finally, the author mentions contextual factors which act as moderators in an EPR program.

3.1 Definition and significance of EPR

Extended Producer Responsibility (EPR) is an en environmental policy principle (Lindquist 2000), also referred to as an approach (OECD 2001) or strategy (Lindqvist 1992), which extends producer's responsibility for a product to its end-of-life management. This concept was first introduced by Thomas Lindhqvist at the beginning of the 1990s defining it as a policy strategy:

> "*an environmental protection **strategy** to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product responsible for the entire life-cycle of the product and especially for the take-back, recycling and final disposal of the products*." (Lindhqvist 1992)

Later, Lindhqvist (2000) revised the concept and formulated it as a policy principle:

> "*a policy **principle** to promote total life cycle environmental improvements of product systems by extending the responsibilities of the manufacturer of the product to various parts of the entire life cycle of the product, and especially to the takeback, recycling and final disposal of the product"* (Lindhqvist 2000).

In the EPR guidance manual for governments commissioned by the Organization for Economic Co-operation and Development (2001) this term is defined as a policy approach:

> *"an environmental policy **approach** in which the physical and/or financial responsibility of the producers for their products is extended to the post-consumer stage of the product life-cycle." (OECD 2001).*

Thus, EPR is assigned differently by different authors but the underlying assumption is the same: that producers' responsibilities are extended "beyond those for which they are conventionally responsible" (Van Rossem et al. 2006a). This is the distinguishing characteristic of this concept as it makes "producers the primary actor responsible for the entire life cycle of their products" (Van Rossem et al. 2006b). According to Lindhqvist and Lifset (1997) assigning the responsibility in such a way would prevent "the situation where everyone's responsibility becomes no one's responsibility".

This concept has emerged from several directions in environmental policy-making such as the prioritization of preventative measures and improvement of 'life cycle thinking' (Van Rossem et al. 2006b). Hence, EPR can be considered a derivative of the "pollution prevention approach", and "life-cycle thinking" principles (Manomaivibool 2009; Manomaivibool et al. 2009). The latter is defined as strategy that seeks to take into consideration the environmental impacts that a product will have at all stages of its life-cycle and identify ways in which the use of resources at all these stages can be reduced (CIRAIG n.d.; EC-JRC-IES n.d.). It is

being argued that by considering the whole life cycle, the shifting of problems from one life cycle stage to another will be avoided (EC-JRC-IES n.d.). A simple representation of a ***product's life-cycle*** is given in the scheme below:

Resource Extraction and Processing → Design → Manufacturing and Retail → Distribution → Use → Collection → **End-of-Life** (Re-use, Recycling, Energy Recovery, Disposal)

Figure 1. The life-cycle of a product
Source: adapted from EC-JRC-IES n.d.

Subsequently, EPR policies could encourage manufacturers to improve the design of their products in order to make easier and less costly their treatment at the end-of-life stage. Incentive mechanisms for that would be the allocation, either complete or partial, of physical and economic responsibility for waste management from local governments to upstream producers (Hotta et al. 2009a). In this way it would also supplement the 'polluter pays' principle (Tojo 2011).

Besides seeking to determine *upstream improvements* in product and system design, EPR aims also to achieve *downstream improvements* in utilizing end-of-life product and material quality in an environmentally sound way (Manomaivibool 2009). The latter includes a) effective collection, b) environmentally-sound treatment of collected products, and c) high use of products and materials in the form of re-use and recycling (Van Rossem et al. 2006b). Achievement of the two above mentioned goals is considered a key element of an effective EPR implementation.

Although a primary objective of EPR is to determine upstream changes, practical implementation of EPR programs in OECD countries so far has shown that downstream

effects are more apparent. Some of these downstream effects are in form of improvements in the treatment and recycling of historical waste collected in the programs that result from the mobilization of financial resources (Manomaivibool 2009). This situation potentially might be attributed to the way that policy makers have understood the purpose of EPR when designing an EPR policy. As Van Rossem et al. (2006b) suggest 'some understand it as a concept that primarily helps improve the situation surrounding waste management' and that 'this understanding reflects the application of the concept to date'.

3.2 Approaches to EPR programs

Application of the EPR concept may be done in a number of various ways depending on the mix of policy instruments chosen by policy-makers at the design stage of the EPR legislation. The selection of the most appropriate instruments will be done, however, with the proper consideration of a country's local contexts (Manomaivibool 2009). An important step preceding the selection of these instruments by policy-makers, according to Hotta et al. (2009a), is defining and understanding the kind of problems that they are trying to solve. In other words, it should be established what are the goals of an EPR program. In order for the EPR policies to be effective, it is necessary to develop a clear image of how EPR would contribute to addressing those problems and to specify in detail what kind of EPR is needed (Hotta et al. 2009a). In designing a mix of regulations that would be suitable to national conditions and needs, policy-makers should also take into account several other important points, as presented in Table 1 below:

Table 1. Key questions to consider when developing EPR-based legislation

Scope	Should the EPR scheme focus only on the recycling of end-of-life products or should it have a broader scope, including the greening of supply chains and product life-cycles? Which are the products covered by the program? How will be done the distinction between new and historical waste? How will be allocated the responsibility for historical and orphan products?
Mandatory or voluntary	Does the policy prescribe mandatory or voluntary actions?
Target setting	Does it set binding collection and recycling targets?
Producer definition	Who is to be regarded as the producer: the brand-owner, the manufacturer or the importer?
Range of producer responsibility	What kind of responsibilities should be required of the producer (e.g. financial or physical responsibility for end-of-life treatment of products, responsibility to provide correct and adequate information to users and other actors handling the products?)
Assignment of responsibilities to other actors	What kind of responsibilities should be assigned to other actors, such as consumers, local authorities and waste transportation companies, in addition to producers?
Individual or collective responsibility	Should the scheme be based on an individual producer responsibility where each producer takes responsibility for their own products or should all companies in an industrial sector have a shared responsibility in order to meet their obligations?
Funding mechanisms	How the financial mechanism be designed? So it can address the issues of: Who is paying? At what stage of the life-cycle should payments be made? Who should collect the payments? What principle should be used to determine the amount to be paid? And how should the collected resources be allocated and used?
Supporting policies	What kind of supporting policies, such as economic incentives and disincentives, should be adopted to facilitate the compliance of all actors and prevent any loopholes that allow actors to escape their responsibilities?
Monitoring	How and by whom should the effectiveness of the EPR system be monitored and evaluated?

Source: adapted from Hotta et al. (2009a) and Tojo (2011).

3.2.1 Range of producer responsibility

The way that the responsibility of the producers for their products is extended and the way it can be enforced varies among EPR-based policies (Van Rossem et al. 2006b; Hotta et al. 2009a). There are different types of responsibility that can be assigned to the producer. Lindquist (1992) classifies them into five categories: liability, economic (financial) responsibility, physical responsibility, informative responsibility and ownership (Figure 2). The description of the types of responsibilities that could be required of the producer is presented in Table 2.

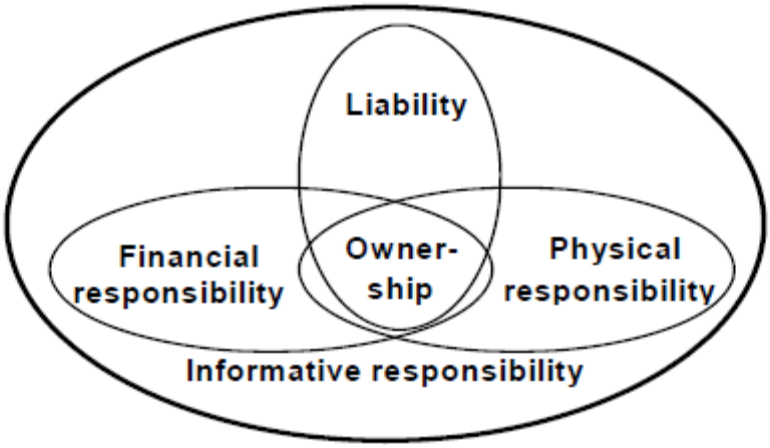

Figure 2. Model for Extended Producer Responsibility (Lindquist 1992)

Table 2. Types of responsibilities (Lindquist 1992)

Liability	The producer has responsibility for proven environmental damages caused by the product in question.
Financial responsibility	The producer has to cover all or part of the costs for e.g. the collection, recycling or final disposal of the products he is manufacturing.
Physical responsibility	The producer is involved in the actual physical management of the products or of the effects of the products.
Informative responsibility	Producers have to supply information on the environmental properties of the products he is manufacturing.
Ownership	By retaining the ownership of his products throughout their life cycle, the producer can be linked to the environmental problems of the product.

Source: adopted from Lindquist (1992).

In addition to the different types of responsibilities that can be assigned to producers, there are also differences in the range of activities that producers are required to fulfil within an EPR program (Van Rossem et al. 2006b). Thus, they could be expected to be physically and/or financially responsible for collection and/or treatment of their products at the end-of-life stage other key actors such as retailers (distributors) and local governments (municipalities) can be made physically and financially responsible for collection as well. The way the physical and financial responsibility for collection of WEEE from households is assigned to all these actors in the 27 member states of the European Union is presented in Table 3.

Table 3. Allocation of physical and financial responsibility for collection of WEEE in EU

	Physical	**Financial**		**Physical**	**Financial**
Austria	D/M/P	D/P	Latvia	P	P
Belgium (Brussels)	D/M	D	Lithuania	D/M/P	P
Bulgaria	P	P	Luxemburg	D/M	D/M
Cyprus	P	P	Malta	D/P	D/P
Czech Rep.	D/P	D/P	Netherlands	D/M	D/M
Denmark	M	M	Poland	D	D
Estonia	D/P	D/P	Portugal	D/M/P	D/P
Finland	D/P	P	Romania	M	M
France	D/M/P	D/P	Slovakia	D/P	D/P
Germany	M	M	Slovenia	D/M	D/M
Greece	P	P	Spain	D/M	P
Hungary	P	P	Sweden	P	P
Ireland	D/M	D/P	U.K.	D/P	D/P
Italy	D/M	D/M			

D – distributors; M – municipalities; P – producers. Source: Sanders et al. 2007 cited in Tojo 2011.

In many EPR programs, retailers have been allocated partial and full responsibility for collection (Tojo et al. 2003). In the case of retailers selling electronic and electric equipment (EEE), these are usually required to collect the used product brought by the consumer when a similar new product is bought (old-for-new, one-for-one responsibility). To fulfil the

responsibility for collection, retailers could also apply the reverse logistics: used product is taken back with the same vehicle upon delivery of the new product (Tojo et al. 2003).

Municipalities can also be assigned physical responsibility for establishing collection points and for collection of WEEE that are not covered under the producer or retailer take back responsibility (Tojo et al. 2003). In cases where a municipal solid waste collection infrastructure is in place, having local authorities involved in the collection of discarded products could be an advantage since duplication of infrastructure for collection could be avoided.

Who and how should be responsible for carrying out different activities in an EPR program has to be determined when devising such a program. A key question that needs to be answered in this process is: who should be assigned the physical, financial and informative responsibility for: 1) collection and sorting; 2) reuse, recycling and treatment; and 3) monitoring and enforcement (Tojo 2011). Other important questions are: should the EPR program be based on individual or collective responsibility, and how should it be implemented?

3.2.2 Individual vs. collective responsibility

The way producers fulfil their obligations for collection and end-of-life treatment of their products depends on the level of cooperation among each other (Van Rossem et al. 2006). This could be done either on an individual basis by the producer, taking responsibility for its own products (individual responsibility) or through shared responsibility among producers in the same product category (collective responsibility). Van Rossem et al. (2006) argue that a producer who bears an individual financial responsibility is someone who pays for the end-of-life management of his/her own products. This is in fact the aim of the WEEE Directive

2002/96/EC which states in Recital (20): “In order to give maximum effect to the concept of producer responsibility, each producer should be responsible for financing the waste from his own products.” On the other hand, individual physical responsibility is born by a producer when distinction of products is made by brand and when he/she has “control over the fate of their discarded products with some degree of involvement in the organisation of the downstream operation” (Van Rossem et al. 2006).

EPR programs which are based on individual responsibility are considered by many stakeholders as having a higher potential for creating incentives for producers to improve the design of their products than those based on collective responsibility (Lindquist and Lifset 2003 cited in Van Rossem et al. 2006). Nevertheless, they are also regarded as being more challenging to implement. This is due mainly to capacity and resources limitations of individual producers, the difficulty and inefficiency of establishing multiple take-back and recycling infrastructures, and the inefficiency of individual producers negotiating with different actors for end-of-life management (Tojo et al. 2003). For these reasons, collective systems are often established. However, it should be noted that it is not necessary for individual producers to establish their own and treatment infrastructure for pursuing individual responsibility since municipal infrastructure that is already in place could be used and improved (Ferrigno 2003). Other issues that may hinder implementation of individual producer responsibility and should, therefore, addressed are: identification of all manufacturers and importers and their market share, and distinction between historical and new waste by way of marking products (Van Rossem et al. 2006b).

Collective responsibility is achieved by establishing collective systems together with other producers, also called collectively-organized compliance schemes, where producers delegate the physical responsibility to a third party organization (Producer Responsibility

Organisation), while bearing financial responsibility for collection and recycling (Tojo et al. 2003; Van Rossem et al. 2006b). This responsibility is carried out by paying fees to this organization. The fee, in the case of EEE, is usually determined by the type of the product and its weight and/or size (Tojo et al. 2003).

In the EU there are two categories of collective systems: 1) the national collective system (monopoly) and 2) the competitive clearing house system (European Communities 2006). In the case of WEEE management, the national collective system is the dominant type of system which is responsible for collection, recycling and financing of all discarded products within the territory of the country. Generally, in such systems non-governmental, not-for-profit companies are set up and owned by one or more trade associations, which are usually organized into product categories. In the competitive clearing house system, multiple partners (producers, recyclers, and waste organizations) can provide services. In this case, a national registry of producers is required, as well as allocation mechanisms, and reporting and monitoring systems have to be established by a central national coordination body (European Communities 2006).

3.2.3 Policy instruments for implementation

As it has been already mentioned above, there is a range of policy instruments that can be selected and applied in an EPR program. These include administrative instruments, economic instruments and informative instruments (Lindquist 1992 cited in Van Rossem et al. 2006b). Examples of these different EPR-based policy instruments, as summarized by Van Rossem et al. (2006b) are given in Table 4.

Table 4. Examples of EPR-based policy instruments

Administrative instruments	Collection and/or take-back of discarded products, substance and landfill restrictions, achievement of collection, re-use (refill) and recycling targets, fulfilment of environmentally sound treatment standards, fulfilment of minimum recycled material content standards, product standard
Economic instruments	Material/product taxes, subsidies, advance disposal fee systems, deposit-refund systems, upstream combined tax/subsidies, tradable recycling credits
Informative instruments	Reporting to authorities, marking/labelling of products and components, consultation with local governments about the collection network, information provision to consumers about producer responsibility/source separation, information provision to recyclers about the structure and substances used in products

Source: Van Rossem et al. (2006b); Lifset (1992); OECD (2001); Stevens (2004); Walls (2004).

Approaches to EPR implementation can largely vary in different jurisdictions (Manomaivibool 2009), but most of the existing EPR programs include, at minimum, a ***take-back requirement*** for discarded products (Van Rossem et al. 2006). Take-back programs can be either mandatory or voluntary (OECD 2001). In mandatory product take-back programs, manufacturers, importers and/or retailers are required by the government to take the post-consumer products back that is to bear physical responsibility for collection of products at the end of their useful life (Nnorom and Osibanjo 2008). Producers may be also required to meet a certain recycling rate (Walls 2006). Reaching the assigned targets by the producers, as discussed earlier, can be done either individually or collectively, through a Producer Responsibility Organization (PRO). In voluntary take-back programs, producers agree to set up such systems and there are no government regulations demanding their compliance (Walls 2006). Thus, in an EPR-based program, governments can set: 1) no target; 2) only collection or recycling targets; 3) or both collection and recycling targets (Manomaivibool 2009).

Among the ***economic instruments*** that are considered effective in implementing EPR are advance disposal fee systems and deposit-refund systems (Hotta et al. 2009a). In the latter

system consumers pay the deposit when purchasing the product and receive the refund when they return the used product (Tojo et al. 2003; Hotta et al. 2009a). However, it has been used mostly for packaging.

In the *advance disposal fee system*, consumers pay an advance disposal fee (ADF) or advance recycling fee (ARF) for the cost of treatment and recycling of products at their end-of-life when purchasing the product (Tojo et al. 2003; Hotta et al. 2009a; Nnorom and Osibanjo 2008). In such a system, the fees that are collected from products purchased in the present are used to pay for products purchased in the past and being discarded now. In Switzerland, which is regarded a pioneer in legislating WEEE management; the ARF is used to pay for the entire system for collection, transport, dismantling, decontamination and recycling of the disposed products (Khetriwal et al. 2009).

It should be noted that in the Swiss system the largest part of the ARF goes to the recyclers and it covers the difference between the recoverable value and the overall processing costs (Khetriwal et al. 2009). Therefore, special consideration should be given to the calculation of this fee "so it does not cover only costs related to collection and transportation but for the actual recycling as well" (Hotta et al. 2009a). Hotta et al. (2009a) also highlight that in addition to the ADF system, physical responsibility needs to be assigned as well to the producer "to ensure that the post-consumer products are properly treated and recycled".

The advance disposal fee can be made visible or invisible for consumers. In visible ADF systems, consumers are made aware that they are paying for the end-of-life treatment of the purchased product, which may have an educational effect (Tojo et al. 2003). By applying a visible fee, a level playing field for all distributors is created preventing them to undercut prices on recycling fees, as well as preventing retailers and recyclers from charging the consumers for taking back the used EEE (Khetriwal et al. 2009). In the invisible ADF

systems, the costs of end-of-life management are invisible for consumers as they are completely internalised within the price of the product (Tojo et al. 2003). One advantage of this system, according to Tojo et al. (2003), is that the extra cost of the product is not perceived by the consumer as a government-imposed tax.

A criticism of the ADF system is that it does not give any consideration to new generation products with environment friendly designs (Khetriwal et al. 2009). Since the advance fee reflects the costs for treatment of older products, it penalizes rather than promotes improvements in product eco-design. Moreover, correct estimations of the future flows of sold and discarded products are necessary in order to avoid any potential destabilization of the system (Khetriwal et al. 2009).

Another financial instrument that can be selected by governments when designing EPR policies is the end-user-pays, also called the *last-owner-pays system*. In such a system the recycling fee is collected at the time of disposal of the product and is referred to as pre-disposal fee or fee on disposal (Khetriwal et al. 2009; OECD 2001). This type of system is used in Japan for several types of EEE, where end-users buy recycling tickets upon delivery of the used products to the collection points (Manomaivibool 2009). The advantage of such a system is that it makes the fee charged for take back and recycling as close to the recycling costs as possible. However, its drawback is that it can lead to undesired practices such as illegal dumping, mixed disposal with the municipal solid waste and the export of used products as second-hand products (Tojo et al. 2003).

In order to secure the financing of an EPR policy that would cover the costs for the collection and environmentally safe treatment of discarded products, such as WEEE, governments may choose one of the following strategies, as described by Manomaivibool (2009): 1) to establish and control a governmental fund to administer the system, designated as the *'rowing' strategy*;

2) to prescribe only targets and conditions that have to be met by producers and leave the operational aspects to them (the *'steering' strategy*). In the 'rowing' strategy, the fees from producers or consumers are collected in the governmental fund which finances all the activities related to end-of-life management of post-consumer products and there are no mandatory targets set for producers. In the 'steering' strategy, producers may be assigned binding targets or provided a framework for voluntary actions Manomaivibool (2009). Consequently, there is a great variety of policy tools that are used in various EPR programs to meet the targets set by the government. Several examples of strategies and policy instruments applied in different countries with an EPR program in place or with EPR policy proposals are given in Table 5 below.

Table 5. Applied and proposed EPR strategies and policy instruments in different countries

Strategy	**Country, products covered**	**Existing requirements**	**Financial mechanism**	**Fee**	**Target**
Rowing	Taiwan, WEEE	Producers pay recycling fees into a governmental fund. The fund provides subsidies to authorized recyclers for the verified amount of waste.	PAYG	Invisible	No
	China, WEEE	A governmental fund will be erected under the Ordinance (art. 7). Producers contribute financially to the fund.	n/a	n/a	No
	Thailand, WEEE	A proposal to establish a governmental fund.	n/a	n/a	n/a
	Argentina, WEEE	A proposal to establish a governmental fund.	n/a	n/a	n/a

Steering (Mandatory)	Korea (until 2007) WEEE	Producers have to meet annual collection quotas calculated from the amount of product shipments	PAYG	Invisible	Collection, Recycling
	Japan, SHARL	End users buy recycling tickets when delivering waste to the collection points.	Return share	Visible	Recycling
	Japan, PC	Producers label and arrange future guarantees for new products. End users pay for products without the label including historical products.	Return share for historical products/ Future guarantee for new products	Visible for historical products/ Invisible for new products	Recycling
Steering (Voluntary)	India, WEEE	The government issues a guideline with a passing attention to EPR	n/a	n/a	n/a

Source: adapted from Manomaivibool (2009).

3.3 EU Directive on WEEE and its transposition by Member States

This section presents and discusses some of the policy instruments that have been adopted in EPR programs in the European Union. The key components of these programs and approaches for transposition of the requirements of the EU Directive on WEEE with regard to producer responsibility are highlighted. The experiences gained in these countries may provide useful lessons for countries that consider adopting EPR-based policies. Knowing which the possibilities for implementing EPR are should allow policy-makers to make more informed decisions and select policy instruments that would be more appropriate for their national contexts.

Presently, Europe is considered to be the leader in the adopting of legislation for management of WEEE (Khetriwal et al. 2009). In 2002, the European Union adopted the 2002/96/EC Directive on waste electrical and electronic equipment which introduced the principle of producer responsibility by placing the responsibility for collection, treatment, recovery and environmental disposal of used products on producers. EU member states had to transpose the WEEE Directive until 13 August 2004.

In addition, some of the member states as well as Switzerland and Norway had WEEE legislation and take-back systems in place before the implementation of the Directive (Savage et al. 2006; Khetriwal et al. 2009). Even before the WEEE legislation was introduced in these countries, systems for collection and recycling of WEEE had been organized by PROs on a voluntary basis (Khetriwal et al. 2009). Hence, establishing WEEE collection and treatment systems was driven initially by voluntary initiatives in countries like Switzerland, Sweden, Norway, Belgium and Netherlands, whereas in other EU member states producers have been obliged by the legislation.

3.3.1 Goal and scope of the WEEE Directive

The key **aims** of the WEEE Directive, as summarized by Savage et al. (2006), are to:

- Reduce WEEE disposal to landfill;
- Provide for a free producer take-back scheme for consumers of end-of-life equipment;
- Improve product design with a view to both preventing WEEE and to increasing its recoverability, reusability and/or recyclability;
- Achieve targets for recovery, reuse and recycling of different classes of WEEE;
- Provide for the establishment of collection facilities and separate collection systems of WEEE from private households;

- Provide for the establishment and financing of systems for the recovery and treatment of WEEE, by producers including provisions for placing financial guarantees on new products placed on the market.

The **scope** of products that were included in the WEEE Directive comprises 10 product categories ranging from large and small household appliances to consumer equipment, lighting equipment and medical devices (Figure 3). In Switzerland, on the other hand, the initial scope of collected products was limited to refrigerators, freezers and IT equipment, which was expanded to include all household appliances, also categorized as 'white goods' (Khetriwal et al. 2009; SENS 2004).

WEEE Directive 2002/96/EC – Product Categories

1. Large household appliances
2. Small household appliances
3. IT and telecommunications equipment
4. Consumer equipment
5. Lighting equipment
6. Electrical and electronic tools
7. Toys, leisure and sports equipment
8. Medical devices
9. Monitoring and control instruments
10. Automatic dispensers

Figure 3. Categories of EEE equipment in the WEEE Directive.
Source: Van Rossem et al. 2006b.

3.3.2 Allocation of physical responsibility

In order to achieve the targets set in the Directive, the Member States need to ensure that WEEE collection systems from private households are established. In this view, Art. 5 (2) (a) of the Directive states that "For WEEE from private households, Member States shall ensure that [...] systems are set up allowing final holders and distributors to return such waste at least free of charge". However, the modalities for organization of the take-back schemes are not

defined in the Directive (Savage et al. 2006; Van Rossem et al. 2006b). Therefore, Member States are given the option to decide the approaches for establishing the collection scheme. For this reason, in the process of WEEE Directive transposition in the national legislation by the Member States, responsibility for setting up of the necessary infrastructure for WEEE collection has been allocated in different ways (IEEP 2009; Sander et al. 2007). A summary of the approaches taken by Member States for allocation of physical and financial responsibility was given in Table 3 of section 3.2.1 Range of producer responsibility.

In addition to allocation of responsibility for setting up of points for collection of WEEE from private households, according to Article 5(4), Article 6(1) and Article 8(1) of the 2002/96/EC Directive, Member States need to allocate responsibility for collection, treatment, recovery, recycling and disposal of WEEE from households deposited at collection points. This responsibility has been assigned by all Member States to producers (Sander et al. 2007).

3.3.3 Individual or collective responsibility

Complying with the requirements for the separate collection of WEEE from households, producers have been given the possibility to set up an individual system or join a collectively-organized compliance system. Nevertheless, how producers decided to fulfill their responsibilities in practice varies in EU countries. There are two main approaches taken by producers for collective system organization: multiple collective systems or a single non-competing system (Van Rossem et al. 2006b). The different practices of producer participation in compliance schemes in several Member States is summarized in Table 6, based on the information supplied by the Member States to the European Commission and integrated in the Report on the Implementation of 2002/96/EC Directive on WEEE by the

Institute for European Environmental Policy in April 2009. As these examples suggest, individual schemes for WEEE collection from households are rarely used by producers.

Table 6. Producer participation in compliance schemes for WEEE collection from households

	Collective systems	**Individual systems**
Austria	In practice participation in collection and recovery schemes has become generalized	No single EEE manufacturer for private households which fulfils its obligation individually
Belgium (Brussels)	Single non-competing collective system	Some individual return systems have been set up
Bulgaria	Collective system "Ecobulteh"	
Estonia	Almost all producers have joined some collection scheme	
Hungary	Two types of systems: 1) run by local governments; 2) 7 collective take-back systems set up by producers	No producer has opted for individual system
Latvia	6 collective systems set up by manufacturers	3 individual systems
Romania	3 collective organizations	
Slovakia	Collective systems for take-back have been created	
Slovenia	Producers fulfill obligations collectively	No individual systems
Sweden	Single non-competing collective collection system	No other individual systems for return of private household WEEE

Source of information: IEEP 2009.

3.3.4 Allocation of financial responsibility

As mentioned earlier in section 3.2.2 Individual vs. collective responsibility, the WEEE Directive encourages the individual responsibility of the producer stating in Recital (20) that each producer of EEE should be financially responsible for managing waste from his/her own products. Yet, it recognizes that this can be achieved only for new products placed on the market. Thus, the Directive distinguishes between historical and new WEEE (Van Rossem et al. 2006b; Sander et al. 2007). Article 8(2) of the Directive allocates individual financial

responsibility to producers for their own products put on the market after 13 August 2005, whereas financial responsibility for historical products is assigned collectively to "all producers, existing on the market when the respective costs occur, e.g. in proportion to their respective share of the market by type of equipment" in Article 8(3).

The way in which Article 8(2) relating to individual financial responsibility has been interpreted by the Member States and transposed in their national legislation largely varies. Some countries like Czech Republic, Estonia, Netherlands, Romania and Slovakia have clearly specified in the legal text that producers are required to finance the waste from their own products for new WEEE, while others did not explicitly formulated or missed to assign individual financial responsibility for new EEE placed on the market (Sander et al. 2007). Thus, in several countries the financing mechanism for new WEEE is the same as for historical WEEE – based on the market share when costs are incurred or on a pay-as-you-go (PAYG) model (Sander et al. 2007).

The Directive gives producers the possibility to show costs of recycling historical waste as a separate part of the product price in form of a 'visible fee'. This fee was made mandatory in some Member States, whereas in others not (see Table 7). In the latter case, Savage et al. 2006a argue that the recycling cost tends to be absorbed into the product price. A summary of approaches taken by new member states of the EU to allocating financial responsibility for collection (from collection sites onwards), treatment, recycling and recovery of WEEE from households is presented in the table below.

Table 7. Financing mechanisms for WEEE from households in new EU member states

	Historical WEEE (based on market share)	New WEEE (individual by own product)	Product fee	Mandatory visible fee
Bulgaria	•		A product tax is payable for the financing of the system to the Enterprise for the Management of Environment Protection Activities if producers or importers fail to meet their obligations through a recovery organization or individually, or if they fail to achieve the quantitative targets for separate collection and recovery.	
Czech Rep.	•	Producers contribute in proportion to their market share through the established collective systems		The use of visible fees for sales is decided on by each collective system
Estonia	•			
Hungary	•		•	In the legislation producers are allowed to show purchasers the costs of recycling
Latvia			A natural resource tax is paid in proportion to the amount of EEE placed on the market	
Lithuania	•	The requirement for EEE producers and importers to produce documents showing that the management of WEEE will be financed is established by legal acts		
Poland	•	Persons placing EEE on the market must provide financial security (a deposit paid into a separate bank account of the National Environmental Protection and Water Management Fund; a liability insurance contract or a bank guarantee) if they have not concluded an agreement with a collective organization	•	•
Romania	•	When placing a product on the market, the producers provide a guarantee showing that management of all WEEE will be financed		

Slovakia	•	Producers that satisfy their obligations individually are obliged when placing EEE on the market to provide a guarantee in form of a tied bank account or insurance.	•	Producers are entitled upon sale to state the amount of the recycling fee
Slovenia	•		•	

Source: adapted from Van Rossem et al. 2006b; Information source: IEEP 2009.

In order to ensure that end-of-life management of new EEE placed on the market by a producer will be financed even in the case that the producer disappears from the market, producers are required by the WEEE Directive to provide a financial guarantee. This would avoid the problem of financing the 'orphan' products by other producers. Article 8(2) states that "The guarantee may take the form of participation by the producer in appropriate schemes for the financing of the management of WEEE, a recycling insurance or a blocked bank account". Van Rossem et al. (2006b) claim that such a financial guarantee is necessary for individual financial responsibility to work in practice.

The requirement for the financial guarantee for new WEEE has also been transposed in various ways in the Member States (Van Rossem et al. 2006b; Sander et al. 2007). Some of them provided for the exemption of setting aside a financial guarantee if producers join a collectively-organized compliance scheme (see Table 7). That means that a producer choosing to establish his/her own compliance system would have to provide either a blocked account or recycling insurance as a financial guarantee, which could be more costly than the previous option (Sander et al. 2007).

4. Overview of waste legislation framework in Moldova

In this chapter, the author gives an overview of the national legal, regulatory and policy framework in the field of waste management in Moldova. The main provisions of laws, regulations and policies in force are outlined. The review of the waste legislation in force is carried out in order to identify whether it includes any provisions on WEEE management and which are these.

4.1 The legal framework

The current environmental legislation in Moldova does not contain laws or regulations that would address different categories of waste such as WEEE separately. The 1993 Law on environment protection[1] and the 1997 Law on production and household waste[2] make up the national legal framework on waste management. Law on environment protection provides the legal framework for development of special normative acts and regulations on waste management, while the Law on production and household waste provides a framework for the regulation, record keeping, planning, control, supervision and monitoring in the field of waste management (Howard and Gofman 2010).

Law on production and household waste

Law on production and household waste reflects in general all problems related to waste (Guvir pers. comm.). Provisions with regard to the 'polluter pays' principle and mechanisms for the payment for waste management are included. It assigns different responsibilities related to waste management to different actors. Individuals and companies are obliged, among the others, to ensure the collection and selection of different type of waste such as

[1] Law on Environment Protection No. 1515-XII of 16 June 1993, Monitorul Oficial No.10/283.

glass, cardboard, plastics, metal, food residues, yet electronic waste is not specified. Also, it includes an interdiction on collection and acquisition of ferrous and non-ferrous metal waste and scrap, excluding waste batteries, from natural persons[3].

> *"At the time when the Law on production and household waste was developed, from 1995-1997, there was not even such an idea of electronic waste, and we did not have their problem in general. We could not imagine that Moldova can encounter the problems that it faces today.*" (Guvir pers. comm.)

Other laws that incorporate provisions related to waste management are the Law on the regime of harmful products and substances[4] and the Law on the payment for environmental pollution[5]. Law on the regime of harmful products and substances sets the legal framework for the manufacture, storage, transportation, handling, use and neutralisation of harmful products and substances as well as their import and export. Law on the payment for environmental pollution includes provisions regarding the payment for the storage of production waste, the payment for the import of products which cause environmental pollution in their use stage, and the payment for plastic and 'tetra-pack' packaging.

4.2. The regulatory framework

The regulatory framework on waste includes the Regulations on the control of trans-boundary waste transportation in Moldova[6] and the instructions to the regulations. The Regulations introduce the mechanism for the implementation of the Basel Convention provisions with the

[2] Law on Production and Household Waste No. 1347-XIII of 9 October 1997, Monitorul Oficial No. 16-17/101 of 5 March 1998.
[3] This provision was introduced through Law No. 313-XVI of 26 December 2008, Monitorul Oficial No. 12-15 of 27 January 2009.
[4] Law on the regime of harmful products and substances No. 1236-XIII of 3 July 1997, Monitorul Oficial No. 067 of 16 October 1997.
[5] Law on the payment for environmental pollution No. 1540-XIII of 25 February 1998, Monitorul Oficial No.54-55/378.
[6] Government Decision on control of transboundary waste movement and their disposal No. 637 of 27 May 2003, Monitorul Oficial No. 099 of 6 June 2003.

aim of ensuring compliance with environmental security requirements for the export, transit and disposal of hazardous waste.

4.3 The policy framework

Policy documents guiding the national policy on waste management are: the 2001 Concept of environmental policy[7] which specifies, among others, that waste management is direct towards waste utilisation and neutralisation, implementation of separate collection of municipal solid waste, stimulation of private waste management sector though the application of economic mechanisms; the National Program for production and household waste recovery (NPPHWR) for the period 2000-2010[8]; and the 2007 Concept of settlements sanitation in Moldova[9]. The latter determines the sanitation policy of settlements, with the following priority directions: diversification of sanitation services organisation and delivery; expansion of sanitation services and increased public access to these services; creation of the legal, regulatory and institutional framework for promoting the development of market economy approaches in regard to sanitation services; promotion of social partnerships (Howard and Gofman 2010).

The National Program for production and household waste recovery (NPPHWR)

The NPPHWR was developed immediately after 1997 Law on production and household waste, based on the principles of waste minimization, maximum inclusion in the economic circuit (through treatment and recycling processes) and safe disposal in the environment. It aimed to develop and implement some measures for reduction, neutralization and recovery of

[7] Concept of environmental policy adopted by the Parliament Decision on approval of the Concept of environmental policy of the Republic of Moldova No. 605 of 2 November 2001, Monitorul Oficial No.009 of 15 January 2002.
[8] Adopted by the Government Decision on approval of the National Programme of production and household waste recovery No. 606 of 28 June 2000, Monitorul Oficial No.78-80/698 of 8 July 2000.
[9] Adopted by the Government Decision on approval of the Concept of settlements sanitation in Moldova No.486 of 02 May 2007, Monitorul Oficial No.67-69/524 18 May 2007.

waste, for all types of waste, without putting major accents on WEEE (Guvir pers. comm.). These were among the first efforts to solve waste management related issues in Moldova (Howard and Gofman 2010).

Because the implementation period of the NPPHWR has ended in 2010, it has to be replaced by a new one. The draft law on waste provides that a National Program on waste management shall be developed within 5 years from the date of entry into force of the law.

5. The prospect for adoption of an EPR-based policy for the management of WEEE in Moldova

In a view of addressing the research problem of this study, in this chapter, the author highlights, analyzes and discusses the main research findings with regard to existing and potential opportunities and barriers for the drafting and adoption of an ERP-based policy for management of waste from EEE by the national government.

As suggested by Manomaivibool (2009), whether and how fast a EPR-based policy for the management of WEEE may be implemented in certain country, including in the Republic of Moldova, is largely dependent on local circumstances. In an attempt to identify the specific conditions in the national context which could determine the speed for such a policy to be developed and adopted in Moldova the author interviewed key persons within the MoE dealing with waste policy drafting.

5.1 Determinants for EPR-based WEEE policy adoption

Generally, policy adoptions of states can be explained by internal determinants and diffusion models (Roh 2004). According to the first models, internal stimuli influence the adoption of policies. Among these internal stimuli are the political, economic and social characteristics of a state. Diffusion models, on the other hand, view that states are influenced by policy adoptions of other states and those intergovernmental relations play an important role in this regard. Regional diffusion models appear to be largely used by governments when adopting a policy (Roh 2004).

In the case of policies for management of WEEE with EPR as an underlying principle, both internal determinants and diffusion models can be used for explaining the adoption of policies addressing this issue around the world.

Internal factors such as the limit in waste disposal capacity seem to determine how fast an EPR-based policy for WEEE may be developed in certain countries. The experience of countries in East Asia with an EPR-based WEEE management system like Japan, South Korea and Taiwan shows that this circumstance was an important driver for the development of policies addressing this waste stream (Manomaivibool n.d.). The same factor might have been an important driver for the adoption of EPR policies for the management of EEE in other countries in Europe such as Sweden, Switzerland, Norway (Widmer et al. 2005). Advancement of EPR principle for WEEE management at the EU level, on the other hand, appears to be the result of regional policy diffusion through implementation of the WEEE Directive.

In these countries economic and social conditions seem to influence the appearance of the above problem. As a result of constant product innovation, as well as shorter life spans of products, EEE tend to be rather quickly replaced. In this way, more and more equipment is discarded by users. Thus, WEEE is becoming a fast growing waste stream increasing the financial burden of local municipalities responsible for provisioning of waste management services.

In addition to waste disposal capacity constraints, there are also concerns over the harmful impact that the improper management of WEEE containing various hazardous components may have on human health and the environment. This aspect appears to be triggering discussions over policy options for dealing with the WEEE problem in several non-OECD countries such as India, China, Argentina and Thailand (Manomaivibool 2009).

Policy makers in these developing countries consider adopting policies based on the EPR principle similar to those that have been already implemented in developed countries. Diffusion of EPR in this case is being lobbied by environmental NGOs such as Basel Action Network, Greenpeace and Toxics Link. which act as policy transfer networks (Manomaivibool 2009). EPR policies and practices are being promoted among policy actors and electronic producers in these countries after problems associated with informal recycling of WEEE in developing countries have been exposed by these organizations.

5.2 Determinants for WEEE policy adoption in Moldova

In Moldova, policy discussions on the problem of WEEE are not evident so far. Until recently there have not been any proposals to develop a policy that would regulate specifically the management of WEEE in Moldova (Guvir pers. commun.). Whether and how soon such a policy could be drafted and adopted in Moldova might depend on internal factors and/or policy diffusion processes in neighbouring states.

5.2.1 Internal determinants

Limitation in waste disposal capacity might not become an important driver for Moldova to adopt EPR-policies for WEEE management, as it was for developed countries. Even though Moldova is being confronted with the issue of limited space available for landfilling of waste (Garaba pers. commun.), volumes of WEEE that are transported to landfills in cities are so far small (Serghienco pers. commun.). This is either a result of metal scrap collection by scavengers from platforms for temporary storage of municipal solid waste (Serghienco pers. commun.) or because residents of larger cities may store large home appliances at home or send them to relatives in the countryside (Cotet pers. commun.). Therefore, WEEE does not

represent a constraint to existing infrastructures for waste disposal and is not likely to influence the adoption process of a WEEE policy in Moldova.

Among other internal factors which may influence the policy adoption process in a country are the public opinion (Neiman and Stambough 1998). The role of public opinion in the formulation of a proposal for a WEEE policy in Moldova is rather insignificant. As it has been already mentioned in the introduction, the issues of waste management in Moldova are rarely discussed in the national media (Jolondcovschi pers. comm.; Petrusevschi pers. comm.). As a result, majority of population is not well informed about the consequences of uncontrolled disposal of waste on different environmental components such as water and soil, and on human health. In such circumstances, there is also limited awareness about the hazards of electric and electronic equipment for health and environment as well (Iordanov pers. comm.; Petrusevschi pers. comm.).

Moreover, the public generally does not manifest dissatisfaction with existing practices of waste management in the country. The only instance of public outcry so far concerned the impact of the landfill where waste collected on the territory of Chisinau municipality is disposed (Cotet pers. comm.). In January 2010, the inhabitants of the village situated in the vicinity of that landfill blocked the access road for waste transportation vehicles in an attempt to prevent the municipal waste management company from further depositing of waste (Serghienco pers. comm.). The motivation behind the organisation of the protest was the acknowledgement of locals about the effect of deposited waste on the quality of water used by them for drinking purposes and their health.

Nevertheless, this manifestation of public dissatisfaction did not determine policy-makers to respond by enacting policies that could contribute to problem solving. In fact, the permit for functioning of the landfill which was expiring in December 2010 has been extended by central

authorities for another 5 years (Cotet pers. comm.). This suggests that despite public recognition of the negative impact of waste, the policy with regard to waste management is not greatly influenced.

The chances for manifestation of discontent by the population with regard to WEEE management are even smaller, since people know very little or do not know at all about the potential hazards of WEEE on human health and environment. Furthermore, if their impact cannot be directly attributable to incidences of illnesses among the population, then formation and change of public opinion on the WEEE issue is going to be difficult. Consequently, the prospects that public opinion may influence policy makers to adopt a policy on WEEE are small.

5.2.2 Policy diffusion

Policy adoptions of governments may be greatly influenced by neighbouring states through policy diffusion processes. This appears to be the case for Republic of Moldova as well. A range of policies from the European Union, the national government agreed to transfer in the national legislation following the signing of the Cooperation and Partnership Agreement (CPA)[10] between the two parties in 1994.

This Agreement entered into force in 1998 and provides a framework for the political dialogue between the parties, and a basis for legislative, economic, social, financial, and cultural cooperation. CAP also provides for the development and consolidation of environmental cooperation in Article 61.

Additionally, Article 50 of the CAP on Legislation Harmonization provides that Republic of Moldova will make efforts to ensure that its legislation becomes compatible with the EU

[10] Partnership and Cooperation Agreement between the European Communities and their Member States, of the one part, and the Republic of Moldova, of the other part. Brussels. 28 November 1994.

legislation in seventeen sectors, including in the field of environment. This provision had important implications on legislative development in the country since the CAP entered into force. Along with ratification of multilateral agreements and national reform process, Moldova's aspiration to harmonize its national legislation in accordance to the EU legislation has become one of the main driving forces for development of legislation, including in the environmental sector (Howard and Gofman 2010).

Fourty one EU legal acts in the environmental sector have been proposed for approximation by the country. More than twenty of these acts are now subject of negotiations taking place in the framework of a proposed EU-Moldova Association Agreement (Howard and Gofman 2010). As a result, development of environmental policies at the moment in Moldova is primarily shaped by the efforts to harmonize the environmental legislation with the requirements of these legal acts.

Among the legal acts considered for approximation by the Ministry of Environment by the Republic of Moldova are nine Directives and one Regulation covering the waste management sector. Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) is one of them. Thus, adoption of a policy for management of WEEE based on the EPR principle in Moldova would be possible when this Directive will be transposed.

5.3 Opportunities and barriers for adoption of an EPR-based policy transposing the WEEE Directive

Transposition of the EU Environmental *acquis* in the national environmental legislation, including the Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) will depend on the national capacity to carry out this commitment and other political, social and economic factors that may influence this process. In order to identify the opportunities and

barriers for adoption of a legal or regulatory act that would transpose this Directive, the author reviewed the progress of the Republic of Moldova in the harmonization of the EU environmental legal acts proposed for approximation and the level of implementation of the EU-Moldova Action Plan in the field of environment protection. Additionally, the position of different stakeholders on the prospects for adoption of an EPR-based policy for the management of WEEE transposing the WEEE Directive was researched by carrying out semi-structured interviews.

5.3.1 EU Environmental law harmonization opportunity

In 2005, Moldova declared its aspiration for European integration in the Declaration of the Parliament of the Republic of Moldova on political partnership for achieving the goals of European integration[11]. This policy document recognized that future development of the country can be ensured only through a consistent and irreversible strategic course towards European integration. Furthermore, European integration is viewed as the main priority of country's domestic and foreign policy in the Government Activity Program for 2011-2014[12]. It supports the idea that the most efficient way to achieve development of the country is to responsibly implement the commitments deriving from the European course.

Therefore, this commitment of the government of the Republic of Moldova to follow the process of European integration and harmonize its national legislation to the EU standards represents a significant opportunity for adoption of a policy for the management of WEEE based on the EPR principle which would transpose the 2002/96/EC Directive on WEEE.

[11] Declaration of the XVI Parliament of the Republic of Moldova on political partnership for achieving the goals of european integration. 24 March 2005.

[12] http://www.gov.md/doc.php?l=en&idc=445&id=3729

5.3.2 Barriers

How the government, and the Ministry of Environment in particular, will take advantage of this opportunity for adoption of a policy addressing the issue of WEEE by transposing the EU Directive on WEEE is likely to be influenced by a series of factors. A number of reports assessing the progress in environmental legislation development and implementation have identified several important challenges for adoption of environmental legislation in Republic of Moldova. These and other barriers for adoption of a policy transposing the WEEE Directive that have been identified during the interviews are presented and discussed below.

5.3.2.1 Institutional capacity constraints

The greatest challenge for the adoption of environmental legislation in Moldova and approximation with the EU *acquis* identified in the reviewed literature is the institutional capacity constraints. This barrier for policy adoption was mentioned also by a vast majority of interviewees, especially independent experts and representatives of non-governmental organizations.

Assessment of the impediments for a full approximation of the environmental legislation with the EU Environmental *acquis* in the Republic of Moldova which has been carried out by the authors of the Guide on the harmonization of environmental legislation and policy suggests that the Ministry for Environment suffers from critical capacity constraints (Howard and Gofman 2010). The same constraint is being identified in both Environmental Performance Reviews for Moldova published by the United Nations. Both in the 1998 and 2005 editions, the need for a capacity-building programme on drafting principles, and on implementing and enforcing environmental laws are highlighted (UN 1998; UN 2005).

An overview of the existing institutional capacity of ministries in Moldova, including the MoE, is given by Tatiana Tugui, project coordinator and former employee in the ministry:

> *"Generally speaking, state institutions are in a deplorable situation from the point of view of the quality of personnel working there. Persons which have worked in these institutions are either retired or in the process of retirement. Without a flux of young people that could take the knowledge from those persons who know and can share their experience to the young people, it's a total disaster in the staff policy. Even through restructuring, there is a need for a lot of training courses for the new employed staff. But without a financial motivation, without a change in the attitude of the government towards the ministries, towards the payment of salaries, I think the country will arrive in an end to a total disaster from the point of view of budgetary administration. Because everyone is going to private institutions, everybody is going abroad, nobody wants to work for such salaries. Respectively, without having well trained personnel, without a flow of young staff, we risk to become in total incapacity of promoting something at the national level."* (Tugui pers. comm.)

As noted by the above respondent, the limited institutional capacity for promotion of legislation at the national seems to be determined primarily by the untrained newly employed personnel and the small salaries paid to employees. The latter in turn leads to lack of motivation among persons with some experience, especially the young, to stay in the ministry. The problem of great fluctuation in the staff and hiring of unqualified persons is also mentioned by Vladimir Garaba, the President of the Environmental Territorial Movement of Moldova.

The problem of insufficient salarization among ministry officials is also highlighted in the 2nd Environmental Performance Review, which states that because of the small salaries in the public sector, attracting of qualified personnel is difficult (UN 2005). For the same reason, it is difficult to maintain the new employed people. The same report draws attention to the need for continued education and training of the staff, suggesting the issue of untrained employees discussed above.

A similar view with regard to the issue of salarization is shared also by Daniela Petrusevschi, a freelance environmental expert, who points out that: "There is incapacity at institutional level because very few people work in the field, salaries are very small, and consequently there is no interest, no will." (Petrusevschi pers. comm.).

Thus, the insufficient number of people working in the ministry appears to be a problem as well.

> *"Every time it is said that the Ministry has a very small number of persons. This is true. Now, as I understood, there are around 50 people and this is very little since there are many sectors. Capacities are very few, limited."* (Iordanov pers. comm.)

In the period of the implementation of the EU-Moldova Action Plan, the number of employees in the ministry ranged between 25 and 33 persons (Eco-Tiras 2009). The limited human capacity of the ministry was discussed at that time in particular. The same issue of human capacity was raised in the 2nd Environmental Performance Review (UN 2005). From 2005, when this review was published, the number of employees of the MoE seems to have increased from only 25 to 50 at the moment. This increase perhaps can be attributed to the implementation of the Institutional Development Plan approved by the ministry for the period 2009-2011.

Still, with 50 persons working in the Ministry of Environment, the tasks connected to the approximation of national environmental legislation to the EU environmental legal acts proposed in the negotiations of the EU-Moldova Association Agreement, are enormous. As highlighted by Howard and Gofman (2010), carrying out the tasks related to the implementation of the Environmental *acquis* requires sufficient capacity and staff. For this reason, in order to ensure that the Ministry of Environment has the capacity to meet the legal, institutional and administrative challenges presented by approximation with the EU Environmental *acquis*, capacity building and additional institutional strengthening should be considered a priority (Howard and Gofman 2010).

In addition, approximation of the EU legislation requires strengthening of human capacity in terms of professionally qualified staff such as environmental law experts, environmental scientists and engineers (Howard and Gofman 2010). This could be a great challenge for the ministry in the light of the issues presented above regarding the low salarization level, which is preventing the possibility of employing qualified persons, and employment of untrained staff. Moreover, another issue concerns the limited number of experts who would be specialized on very specific topics or fields. "Frankly speaking, there are no experts well oriented towards narrow fields. We are specialists of a broad field." (Iordanov pers. comm.)

All of the limitations related to institutional capacity of the Ministry of Environment that have been highlighted above may represent a serious barrier in the way of transposing the EU environmental acts planned for approximation in the Republic of Moldova. This concerns the 2002/96/EC Directive on WEEE as well. Special staff within the ministry will have to be involved in the development and promotion of a policy transposing this Directive. Probably, "one person has to commit herself/himself to promote this policy" (Isac pers. comm.).

However, due to the large volume of work pertaining to review of letters, petitions, authorization requests, etc ministry workers do not have enough time and capacity to do additional work on legislation drafting (Isac pers. comm.). The issue of time limitation and work overload is also mentioned by a ministry official:

> *"Physically we are not able to do everything. In this pace of work from morning till evening, we don't even have time to sit together and discuss [different questions related to the development of legislation] in an unrushed manner when planning meetings are being organized. Everybody has urgent issues of current matter, letters, documents that have to be rapidly executed."* (Plesco pers. comm.).

Unavailability of time for the qualified staff that may be involved in legislation drafting hinders the possibility for one person to initiate the development of a new legal act. "I consider that just one person is not capable [to develop a new law from the start] by himself/herself. A group of elaborators is needed. It is impossible for one person to do it." (Plesco pers. comm.). This factor is also discussed in the report assessing the implementation of the EU-Moldova Action Plan. The results of this study show that "realization of activities related to European integration is less successful due to the fact that the trained staff is not dedicated exclusively to the problematic of European integration, having to execute a series of other activities which are considered as having a higher priority" (Eco-Tiras 2009).

Moreover, the personnel who realizes the necessary amount of work with regard to legislation harmonization are not stimulated (Eco-Tiras 2009). Therefore, persons who would be capable of initiating and developing a WEEE EPR policy that transposes the WEEE Directive might not be sufficiently motivated to do so. Such lack of motivation maybe further supported by the small remuneration received for their work.

As noted earlier, the draft law on waste that is currently in the process of adoption by the Government incorporates several provisions on waste electric and electronic equipment setting, in this way, the framework for later development and adoption of a secondary act on WEEE. The speed with which the draft law on waste will be adopted by the Parliament of the Republic of Moldova influences in turn how soon a regulation on WEEE could be developed by the MoE.

> *"After the draft law on waste will be adopted in the Parliament, the development of secondary acts may take another year or two, and maybe even more, depending on the staff and the capacity of the ministry to develop and promote these legal and normative acts."* (Tugui pers. comm.)

Appreciating the current capacity of the ministry to develop and promote the secondary legislation for WEEE in order to be adopted, it seems that it is rather limited.

> "*If we consider the fact that a version of the draft project of the law on waste was ready in 2008. Then in 2009 it was revised according to the new Directive and in 2010 we managed to pass the State Commission for regulation of enterprise activity. Now we are in 2011 and we did not reach the Government yet. An already developed legal act took 3 years to be promoted to the State Chancellery, and to be returned back due to the change of the Government. Consequently, a new legal act to be developed from the start, from zero, by the Ministry it is almost an impossible mission*." (Tugui pers. comm.)

The reasons for such a situation, in the view of the same person, are the following:

> "*Due to the untrained personnel, unqualified for this field. Probably also due to lack of financial motivation of the ministry employees. In addition, a major responsibility perhaps rests on the administration, starting from the head of department until the*

leadership of the ministry, who does not see the role and the importance of the ministry in promoting the legislation." (Tugui pers. comm.)

Therefore, it can be concluded that the reduced capacity of the ministry in terms of human potential capable of drafting legislation and the inactive role of leaders in urging the adoption of legal acts that have been already prepared, coupled with the long procedure of the policy adoption might represent significant barriers to adoption of an EPR-based policy on WEEE that would transpose the requirements of the EU WEEE Directive.

In order to overcome the impediments of institutional capacity presented and discussed above a series of suggestions were offered by the interviewed stakeholders. These pertain to institutional capacity building through financial stimulation of ministry workers, which would contribute to the control of staff fluctuations, and the increase of the number of employees. Suggested solutions and arguments for these are presented below.

1) Financial stimulation of employees

"Higher salaries would be a solution, because at the moment one of the values is money. Therefore, when you provide a person with a rather decent salary, he/she will have the interest to keep his job and offer qualitative services." (Petrusevschi pers. comm.)

'If there were an adequate salary people would return to the ministry and the fluctuations of personnel would be controlled. Let's take the example of Georgia in paying public servants salaries of around 1000$. If such salaries would be paid, people that left to work in private firms or projects would return to work for the ministry." (Tugui pers. comm.)

"For the ministry, in order to maintain the youth, I think that the provision which stipulates that public officers cannot have additional revenue should be excluded. According to the legislation, public servants do not have the right to have additional revenue beside academic or scientific activity, which is in fact not very well paid. Many environmental specialists could work as experts. This provision should be changed through a mechanism which would stipulate what other revenue, from which activities, the conflict of interests to be clearly stated, what does the traffic of influence mean." (Iordanov pers. comm.)

2) Increase in staff numbers

"Increasing the number of persons activating in the field is necessary, and especially of people who understand the issues. In the moment, when we want to overcome an institutional crisis, which we are currently experiencing, we need to find again people who have the courage to step in this field." (Petrusevschi pers. comm.)

An overarching recommendation to the Ministry and the Government with regard to existing human capacity constraints given by one of the interviewees is presented below.

"The main problem that the Ministry should see is that with the current staff we are not going to move anywhere. The government has to take attitude towards the staff that it hires, towards maintaining the qualified staff and motivating them so they do not leave." (Tugui pers. comm.)

5.3.2.2 Low priority attached to environmental issues

Another important factor that may hinder the adoption process of the regulation on WEEE transposing the EU WEEE Directive is the fact environmental sector is not recognized as a national priority by the Government of Moldova.

> "*I think the main hindrance is the decision making element. Environmental problems should be a priority for the government. As long as environment protection will not be a priority for the government, that long we will have what we have. Even the Government Program suggests this; that environment protection is the last point on the list of Government's priorities*." (Tugui pers. comm.)

As noted by the above interviewee, the low priority assigned to environment on the governmental agenda is suggested by the Activity Program "European Integration: Freedom, Democracy, Welfare" of the Government of the Republic of Moldova for 2011-2014. Its title confirms the European integration aspiration of the country; however, it misses to declare environmental protection as a priority, as it is in the European Union. Furthermore, it constitutes the last chapter in Program. The same is true about the National Development Strategy until 2011[13]. Environment in this policy document is perceived as part of balanced regional development and not as a priority in itself.

The relatively low priority attached to environmental protection and sustainability by the government of Moldova was noted back in 1998 when the first Environmental Performance Review was published (UN 1998). The authors of the report then recommended that "environmental policies should be formulated, with the support of authorities, at the highest government level to direct and coordinate the activities of the ministries" (UN 1998). A

similar recommendation was given in the second Environmental Performance Review which stated that "the government has to recognize environment protection as a national priority" (UN 2005). This necessity was mentioned as well in the 2005 EU-Moldova National Action Plan (Eco-Tiras 2009).

However, as proven by Government's Activity Program for 2011-2014, environmental matters are still not given the due attention it would require. Howard and Gofman (2010) in their guide book on harmonization of national environmental legislation to EU standards argue once again the necessity for high level political commitment in order to ensure that the environment is given a greater importance on the national agenda. In their view, such a commitment is required if approximation of the EU environmental laws is to be achieved in Moldova.

An explanation for the little consideration to the necessity of addressing environmental problems when setting the government agenda might be attributed to the "lack of perception of environmental problems by decision makers" (Tugui pers. comm.). As argued by Neiman and Stambough (1998), personal perceptions of decision makers about a specific issue influence the chances for a policy on that issue to be adopted. Hence, appreciation of the significance for solving environmental issues by high government officials and politicians is important for development and adoption of environmental legislation in Moldova. Failure to do so, due to the limited apprehension of environmental issues of these could be an important impediment to the recognition of environment protection as a national priority in forthcoming national policy documents.

[13] Law of the Parliament of the Republic of Moldova No. 295 of 21 December 2007 for the approval of the National Development Stratagey for years 2008-2011. Monitorul Oficial No. 18-20/57 of 29 January 2008.

Consequently, in the context when environment is not recognized as a national priority, it is uncertain whether a new policy on waste, such as for management of WEEE, could be considered as a priority by the Government and the Parliament of the Republic of Moldova when it is going to be forwarded for adoption by the Ministry of Environment. Other policies on issues with a higher status on the government agenda might compete with it and might be advanced faster for final adoption.

6. Conclusions and recommendations

Factors which could influence the prospects and the speed for adoption of an EPR-based policy for the management of WEEE in Moldova were explored in this thesis. The opportunities and barriers for the adoption of regulations transposing the EU Directive on WEEE were identified and discussed in more detail.

No internal determinants that might determine policy makers to adopt such a policy in Moldova were identified. The existing volume of WEEE in Moldova at the moment does not have a visible impact on the waste disposal capacity of landfills that could be recognized by the authorities. Therefore, despite the fact that there is capacity limitation for waste disposal in the country, this does not seem to be a strong driver for adoption of legislation addressing the WEEE problem.

The role of public opinion in the formulation of a proposal for a WEEE policy in Moldova is rather insignificant due to limited awareness about the hazards of electric and electronic equipment for health and environment and to limited public manifestation of dissatisfaction with existing practices of waste management in the country. Prospects that public opinion may influence policy makers to adopt a policy on WEEE are small.

The European Union plays an important role in the diffusion of its policies in the field of environment in Moldova, especially after the EU-Moldova Cooperation and Partnership Agreement was signed in 1994. The commitment to harmonize the national legislation with the EU environmental *acquis* is one of the main factors that influence the current process of legislation development in the field of environment in Moldova.

The inclusion of the Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) in the list of legal acts proposed for approximation in Moldova and the strong commitment of the national government to follow the course of European integration provides the opportunity for an EPR-based policy for WEEE management to be adopted in Moldova once this Directive is transposed in the national legislation.

However, the prospect for the transposition of the WEEE Directive in the environmental legislation of Moldova might be constrained by institutional capacity limitations such as the limited number of qualified staff working in the MoE that would be able to make a significant contribution to the approximation of the planned EU environmental legal acts, as well as by the low priority attached to environmental problems in the agenda of the Government of the Republic of Moldova. Taking into consideration existing constraints in human capacity for legislation drafting within the MoE and the difficulty in promoting environmental legal acts by the ministry, the chances that a policy transposing the WEEE Directive will be adopted by 2016, when approximation of this Directive is scheduled, are relatively low.

In order to overcome the barriers in the way of adoption of the regulations transposing the EU Directive on WEEE, financial stimulation of the employees of the MoE to prevent fluctuations of staff and maintain the qualified workers, and increasing the number of staff in the ministry is necessary. In addition to that, greater importance needs to be attached to environmental problems in agenda setting of the Government. Environment should be recognized as a national priority.

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APPENDIX

List of interviewed persons

N/o	Name	Position and Institution
1.	Radion Bajureanu	Deputy Minister, Ministry of Environment of the Republic of Moldova
2.	Tamara Guvir	Head of Pollution Prevention and Waste Management Division, Ministry of Environment of the Republic of Moldova
3.	Ludmila Marduhaeva	Senior Advisor in the Pollution Prevention and Waste Management Division, Ministry of Environment of the Republic of Moldova
4.	Tatiana Plesco	Senior Advisor in the Policy Analysis, Monitoring and Assessment Division, Ministry of Environment of the Republic of Moldova
5.	Vladimir Cotet	Deputy Mayor, Chisinau municipality
6.	Victor Serghienco	Deputy Director, municipal enterprise Autosalubritate
7.	Tatiana Tugui	Project coordinator for Moldova, "Waste Governance – EINP East" Project
8.	Alexandru Jolondcovschi	President of the "Association for Waste Recovery – for a cleaner Moldova"
9.	Vladimir Garaba	President of the Chisinau Branch of the Environmental Movement of Moldova
10.	Iordanca-Rodica Iordanov	Doctor of law; Associate professor; Consultant for the Development of the National Environmental Strategy of the Republic of Moldova for the period of 2012-2022
11.	Andrei Isac	Consultant for the Development of the National Environmental Strategy of the Republic of Moldova for the period of 2012-2022
12.	Daniela Petrusevschi	Freelance environmental consultant