

**Exploring the potential for  
an Extended Producer Responsibility programme  
for Electrical and Electronic Equipment in Belarus**

Factors influencing the implementation and operation explored

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Thesis for the fulfilment of the  
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*Вялікі дзякуі усім!*

Katsiaryna Paulavets

15 September 2006



## **Abstract**

Electrical and electronic equipment (EEE) causes serious environmental impact in its end-of-life phase and it is the largest known source of heavy metals and organic pollutants in municipal waste. Moreover, waste electrical and electronic equipment (WEEE) contains valuable components that if recycled and reused, could reduce the use of virgin materials. However, nowadays WEEE is mostly land filled. The enormous volume of WEEE, and accompanying environmental impacts, encourages seeking an environmentally effective policy solution to control the problem of end-of-life EEE. The Extended Producer Responsibility (EPR) principle has been recognized by many countries from Organization for Economic Co-operation and Development (OECD) as an effective policy approach that addresses the problems associated with EEE in the waste stream and stimulates changes in three key priority areas: resource efficiency, cleaner products and waste management.

This thesis is an attempt to explore the potential for an EPR programme for EEE in Belarus because today there is no such programme and it is becoming urgent to deal with problems associated with WEEE in the country. To do so, the thesis attempts to identify key factors that will influence the successful implementation of an EPR programme for EEE in Belarus. The identification of key factors is carried out based on the existing approach of handling WEEE in Belarus, the EPR programme for plastic packaging in Belarus and two EPR programmes for EEE in Lithuania and Sweden. While studying these programmes, the main focus was on legislation, compliance scheme, allocation of responsibilities for collection and recycling, financial mechanism including financing of historical and orphan products, monitoring and enforcement, and public participation. Based on the experiences of these selected cases, the thesis work allowed to identify factors that affect collection and recycling rates, the provision of environmentally sound treatment of collected products, the design change of products for end-of-life management, and the solution of the problem of free riders, historical and orphan products. It was decided to focus on these areas, as, for the purpose of this thesis, an EPR programme is considered to be successfully implemented if the system addresses them. Discussion of these key factors may provide better understanding when developing and implementing an EPR programme for EEE in Belarus.



## **Executive Summary**

Each year, millions of Electrical and Electronic Equipment (EEE) are manufactured and sold worldwide, and the business is growing. The strong increase in the number and type of EEE results in the subsequent production of large quantities of waste electrical and electronic equipment (WEEE). Problems relating to EEE in the waste stream include its increase in variety, quantity, and recoverable resources they contain. Moreover, EEE consists of complex products, which contain many different materials and components, and has a relatively long life span. EEE also contains hazardous substances such as heavy metals, halogenated and ozone depleting substances. Therefore, improper treatment of these hazardous substances causes serious environmental impacts and poses a threat to human health.

Despite the fact that WEEE currently represents only about 1% of the total waste in the European Union (EU), a number of developed countries started to regard EEE waste as one of the priority waste streams. However, currently in EU more than 90% of WEEE is being land filled, incinerated and recovered without any pre-treatment.

Until now, the problem of WEEE has not been urgent in Belarus due to the relatively low consumption of EEE, as well as the public tendency to store EEE and not dispose of it. However, the wellbeing of the country is improving and consumption of EEE is increasing. People have therefore started to dispose of it, leading to an increase of WEEE generation. In Belarus, WEEE from households is land filled without any pre-treatment, which poses risk to the environment and human health. Therefore, the seriousness of the problem of WEEE generation and release of hazardous substances to the environment has increased in the country, attracting attention from the government and the public and requiring a solution.

Thus, this thesis attempts to explore the potential for an Extended Producer Responsibility (EPR) programme for EEE in Belarus, as the EPR principle has been recognized by many OECD countries as an effective policy approach that addresses the problems associated with EEE in the waste stream and stimulates the changes in three key priority areas: resource efficiency, cleaner products and waste management. To do so, the thesis attempts to identify key factors that need to be considered when implementing a successful EPR programme for EEE in Belarus.

To identify these key factors, the existing approach of handling WEEE in Belarus, the EPR programme for plastic packaging in Belarus, and two EPR programmes for EEE in Lithuania and Sweden were studied. It is important to mention that the analysis of these case studies is not aimed to compare systems, but to identify strengths and barriers of each of them and to learn from different experiences in order to identify and discuss key factors that influence the success of a system that then can be useful when developing an EPR programme for EEE in Belarus.

In these case studies, focus has been placed on legislation, allocation of responsibilities for collection and recycling, financial mechanism including financing of historical and orphan products, monitoring and enforcement, and public participation.

In this thesis, based on extensive study of literature available on the topic, an analytical framework was developed to examine selected EPR systems. In-depth case studies have been conducted through secondary data collection from various sources such as websites, books, and journals. Primary data was also collected by conducting personal interviews, telephone and email communications in order to clarify unclear information and to achieve in-depth research.

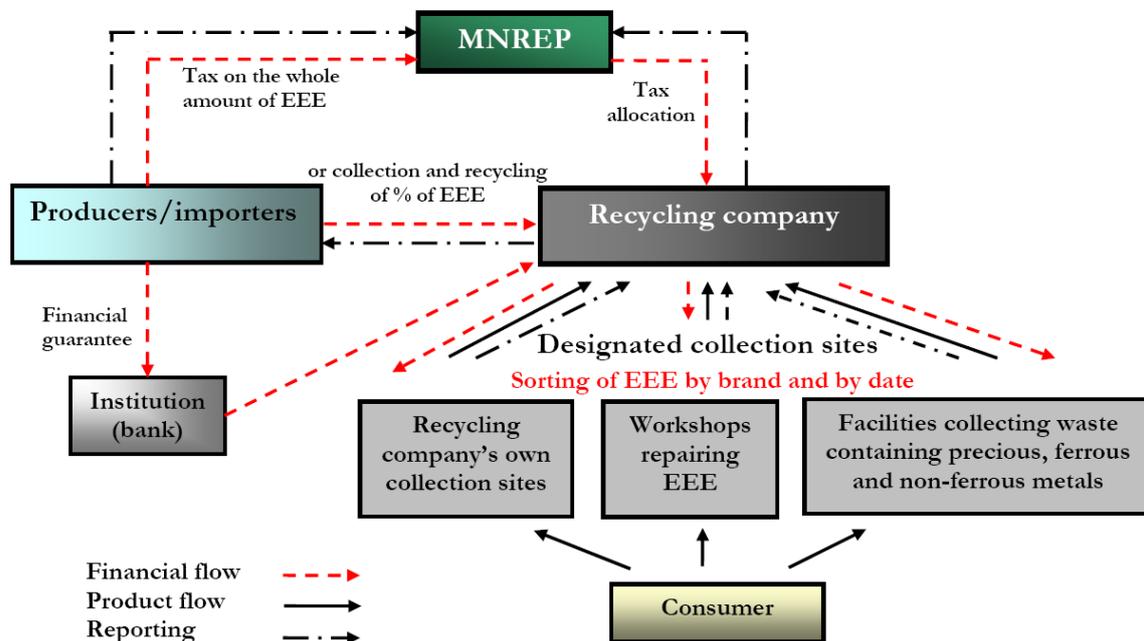
The main findings from the case studies are:

- In Belarus, there is an existing approach of handling WEEE from organizations, where owners of waste are responsible for collection and treatment of waste generated at their facilities. Moreover, the owners of waste are strictly required to organize the collection and treatment of precious metals (ferrous and non-ferrous metals should be also collected but the requirements are less strict) from any waste and equipment containing them, including EEE. Therefore, the system of collection and recycling of metals from EEE generated from organizations is in place and operates. However, the recycling of other end-of-life components of EEE is more complicated in the country. The reasons are a lack of treatment methods, low recycling capacity, and poor market development for secondary materials. EEE from households is land filled without any pre-treatment, collection infrastructure is not accessible to all population, and there is no information dissemination about risks posed by EEE. Therefore, public awareness is low.
- The EPR programme for plastic packaging in Belarus was implemented in practice in 2006 when it was supplemented with a tax on the whole amount of plastic packaging put on the market. Producers can be exempted from the tax payment if they provide collection from households and recycling of at least 20% of the weight of plastic packaging, they put on the market. This programme helps to divert plastic packaging from landfills. Moreover, introduction of a high disposal fee for materials that can be reused also facilitates this diversion. Implementation of the programme facilitates the development of recycling and collection infrastructures. However, the existing recycling capacity is still low and not all plastic collected is recycled. Moreover, the problem is complicated by poor market development for secondary materials. Money collected as a tax payment is partly allocated to recycling and collection infrastructures. These factors, among others, hinder their development. Moreover, although ads are being run on TV about the necessity of collecting and recycling plastic packaging, public awareness is still low and not all population has access to specific containers for separate collection of plastic packaging.
- The EPR programme for EEE in Lithuania is not finalized yet. The process is complicated by unclear allocation of responsibilities for collection between producers and municipalities. The collection schemes in the country are fragmented and organized by different actors leading to confusion and inefficiency in the system. Moreover, infrastructure for collection of WEEE from households is not sufficient in terms of geographical distribution and existing capacities. In addition, the Producer Responsibility Organization (PRO) has only been in operation for a couple of months, and therefore faces difficulties in negotiation with others actors, leading to inefficiencies.
- The Swedish EPR programme started in 2001. The long time in operation helps to achieve the required results. The creation of a PRO is considered one of the important factors that led to the achievement of high collection and recycling rates and low percent of free riders. Moreover, the achievement of the collection rate was facilitated, among others, by the allocation of responsibility for collection to municipalities, and by increasing public awareness. Use of other instruments such as the restriction of use of hazardous substances, the restriction on land filling and the introduction of a landfill tax facilitated the development of recycling infrastructure and encouraged producers to improve the design of their products.

Based on the experiences of these selected cases, the thesis identified factors that affect collection and recycling rates, the provision of environmentally sound treatment of collected products, the design change of products for end-of-life management and the solution of the problem of free riders, historical and orphan products. It was decided to focus on these areas, as, for the purpose of this thesis, an EPR programme is considered to be successfully implemented if the system addresses them.

The main factors, among others, that need to be considered when developing and implementing an EPR programme for EEE in Belarus are the enactment of the EPR legislation, the setting of requirements and mandatory collection and recycling targets, and the use of established collection infrastructure. In addition, allocation of responsibilities between different actors should be clearly and properly defined. Producers should be individually responsible for their own new products by providing financial guarantee and they should share financial responsibility for historical WEEE by paying a tax or participating in the collection and recycling of a certain percent of all EEE they place on the market. To involve consumers in the programme and make them discard WEEE at designated collection points, at the initial stage of the operation of the programme, a financial incentive could be provided.

All these factors, among others, influencing the implementation of EPR programmes are discussed and taken into consideration when the future possibility for implementation of EPR for EEE in Belarus is examined and when the compliance scheme for the programme is proposed (presented below). Identification of key factors provides better understanding of EEE programmes issues and may contribute to successful implementation of EPR programme for EEE in Belarus.



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# 1 Introduction

## 1.1 Statement of the problem

Electrical and electronic equipments (EEE) include a wide range of products, such as large and small home appliances (refrigerators, air conditioners), telecommunication and ICT (information and communication technology) equipments (telephones, computers), toys, or lighting and medical equipment.<sup>1</sup> Each year, millions of EEE are manufactured and sold worldwide, and the business is growing. The strong increase in the number and type of EEE results in the subsequent production of large quantities of waste electrical and electronic equipment (WEEE), and it is the largest known sources of heavy metals and organic pollutants in municipal waste.<sup>2</sup>

Despite the fact that WEEE currently represents only about 1% of the total waste in the European Union (EU), a number of developed countries started to regard EEE waste as one of the priority waste streams. WEEE amounts to 4-6% of the European municipal waste stream and its generation per inhabitant per year in the EU is about 14 kg.<sup>3</sup>

According to future projections, the volume of WEEE is expected to increase by 3-5% per year and therefore, in 12 years the amount of WEEE may have doubled.<sup>4</sup>

Each EEE consists of a combination of several basic building blocks, such as circuit boards/assemblies, cables, cords and wires, plastics containing flame retardants, display equipment such as cathode ray tubes and crystal liquid displays, accumulators and batteries, light generating devices, capacitors, etc. Environmentally problematic substances in these components include certain heavy metals (such as mercury, lead, cadmium and chromium) and halogenated substances (in particular CFCs, PCBs, PVCs and brominated flame-retardants).

Most of these substances are hazardous and that is why electrical and electronic waste can cause major environmental problems during the waste management, in particular land filling and incineration operations if not conducted properly. According to the United States Environmental Protection Agency, about 40% of the lead and 70% of heavy metals (including mercury and cadmium) found in landfills come from municipal electronic waste.<sup>5</sup> Up to now, in EU more than 90% of WEEE is being land filled, incinerated and recovered without any pre-treatment.<sup>6</sup>

Now, WEEE contains valuable materials, such as iron and steel, plastic, non-ferrous metals including precious metals, which, if recycled and reused, could reduce the use of virgin

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<sup>1</sup> Tojo, Naoko, Lindhqvist, Thomas. (2001). EPR Programme Implementation: Institutional and Structural Factors. Paris: OECD

<sup>2</sup> International Copper Study Group. (2003). Information Circular Waste Electric Electronic Equipment. [Online]. Available: [www.icsg.org/News/Infocirculars/ICSGInfoCircularWEEEDirective.pdf](http://www.icsg.org/News/Infocirculars/ICSGInfoCircularWEEEDirective.pdf) [14 July, 2006]

<sup>3</sup> EnviroSolution: features of WEEE [Online]. Available: <http://www.enviro-solutions.com/features/q-a-weee.htm> [14 July, 2006]

<sup>4</sup> EnviroSolution: features of WEEE [Online]. Available: <http://www.enviro-solutions.com/features/q-a-weee.htm> [14 July, 2006]

<sup>5</sup> Greenpeace. (2005). *Pulling the plug on dirty electronics in Southeast Asia*. Toxics Campaign, Greenpeace Southeast Asia, September 2005.

<sup>6</sup> EnviroSolution: features of WEEE [Online]. Available: <http://www.enviro-solutions.com/features/q-a-weee.htm> [14 July, 2006]

materials. The enhanced recovery or recycling of WEEE, and the use of more environmentally friendly disposal options, is an important step in reducing the considerable impact these products have when reaching end-of-life.

To deal with the problem associated with EEE in the waste stream, and to save resources for the production of virgin materials, countries have begun to develop programmes that incorporate the concept of Extended Producer Responsibility (EPR). The term “extended producer responsibility” was first defined by Lindhqvist as *«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 product. The Extended Producer Responsibility is implemented through administrative, economic and informative instruments. The composition of these instruments determines the precise form of the Extended Producer Responsibility»*.<sup>7</sup>

EPR has been recognised by many OECD countries as an effective policy approach that can stimulate the changes in three key priority areas: resource efficiency, cleaner products and waste management. EPR helps realise the objectives of sustainable development by, among others, helping to:

- Reduce waste,
- Reduce the release of potentially toxic substances into environment, and
- Reduce use of virgin materials inputs and lower energy consumption.

Today, there is no EPR programme for EEE in Belarus. Up to now the problem of WEEE was not urgent in the country due to the relatively low consumption of EEE, as well as the public tendency to store EEE and not dispose of it. However, the wellbeing of the country is improving and consumption of EEE is increasing, therefore people have started to dispose of them, leading to an increase of WEEE generation. In Belarus, WEEE from households is land filled without any pre-treatment, which poses risk to the environment and human health. Therefore, the seriousness of the problem of WEEE generation and release of hazardous substances to the environment has increased in the country, attracting attention from the government and the public.

Taking into consideration that the EPR principle has been recognised by many OECD countries as an effective policy approach that helps to divert WEEE stream from landfills, this thesis will attempt to explore the potential for an EPR programme for EEE in Belarus. In order to realise the benefits of EPR, a number of considerations should be taken into account to ensure that the policy yields desired effects in the areas it addresses. Effective policy design will depend on national circumstances, priorities, conditions, and market, as well as allocation of responsibilities between different actors involved in EPR programme (Tojo, Lindhqvist, 2001).

## 1.2 Research objective

The main objective of this thesis is to find out what factors need to be considered when developing and implementing a successful EPR programme for EEE in Belarus.

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<sup>7</sup> Lindhqvist, Thomas. (1992). Extended Producer Responsibility. In T. Lindhqvist, *Extended Producer Responsibility as a Strategy to Promote Cleaner Products*. (1-5). Lund: Department of Industrial Environmental Economics, Lund University.

In order to achieve this objective, the following questions should be answered:

- What are the objectives of the potential EPR programme for EEE in Belarus?
- What product groups should be covered by the programme?
- How should the responsibilities between different actors be allocated in order to achieve the objectives of the programme?
- What kind of financial mechanism should be used?
- What factors should be considered in order to:
  - develop the collection and recycling infrastructure and to provide an environmentally sound treatment of collected products?
  - give incentives to producers to improve of the design of products for end-of-life management?
  - address the problem of historical and orphan products and the problem of free-riders?
  - improve public participation?

This is not a fully-comprehensive list of the aspect that need to be viewed to assess the potential for an EPR system, as well as make recommendations with regard to how it should be organized; these questions however cover the main areas that have to be reviewed when trying to do so, and will allow to limit the scope of the research.

### **1.3 Scope and limitation**

The thesis focuses on the following areas:

- Gaining an understanding of the existing legislation relative to WEEE and approach of handling WEEE in Belarus,
- Analyzing the implemented EPR programme for plastic packaging in Belarus, including understanding its weaknesses;
- Analyzing strengths and barriers of the implemented EPR programmes for WEEE in Sweden and Lithuania;
- Discussing and proposing factors that need to be considered when developing and implementing EPR programme for EEE in Belarus.

The Belarusian, Swedish and Lithuanian EPR programmes mentioned above were looked at from the perspectives of existing EPR legislation, infrastructure for collection and treatment, financial mechanisms, how the problem of historical and orphan products are addressed, monitoring and enforcement, and how public participation influences the results of the programmes. The EPR programmes for EEE in Sweden and Lithuania were analyzed without limiting the scope of products.

In this thesis, consistently with the literature available on the topic, the assumption is made that an EPR programme is considered to be successfully implemented if the system facilitates:

- *Design improvements of products* – the EPR system provides incentives for manufacturers to improve the products, as well as the systems surrounding the life cycle of the products;
- *High utilization of product and material quality through effective collection and re-use or recycling* – the EPR programme should ensure high collection rates of the product, it should secure special treatment of hazardous components and materials, and improve the possibilities for re-use and recycling. In addition, it should secure that products or their components, when appropriate, are re-used, and that the materials are recovered and used as a substitution to the use of virgin materials, thus saving raw materials and avoiding the environmental impacts related to the extraction and processing of these materials.<sup>8</sup>

Moreover, the successful EPR programme should address the problem of free riders, historical and orphan products.

The main limitation of the thesis can be placed on the interviews. Relatively few interviews could be conducted for each given type of stakeholder, which raises a certain degree of uncertainty over the representativeness of the information obtained. In practice, the range of interviews undertaken was constrained by the amount of time available, as well as the variations in the availability and level of cooperation from different interviewees.

Under the current constraints, it simply cannot be verified that the interviewees hold views that are typical for their stakeholder group. Nonetheless, this research has proceeded under the assumption that the findings from the interviews are sufficiently representative to be able to conduct an analysis with confidence.

The geographical scope of the thesis is limited to Belarus (mainly Minsk city), Lithuania, and Sweden.

## 1.4 Methodology

The research was conducted during three months and a half, over the period of 1 June to 15 September 2006.

A multiple case study approach was used in order to achieve the main objective of the thesis and to get a concrete picture of how different EPR programmes work in reality, as well as how the experiences of different programmes can be used when implementing new EPR programmes in other countries, such as Belarus.

The following case studies were explored and analyzed:

- The existing approach of handling WEEE in Belarus;
- The EPR programme for plastic packaging in Belarus;
- The implemented EPR programme for EEE in Sweden; and

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<sup>8</sup> Lindhqvist, Thomas & Van Rossem, Chris. (2005). Evaluation Tool for EPR Programs. Lund: IIIEE, Lund University.

- The ‘not finalized yet’ EPR programme for EEE in Lithuania.

Using multiple examples has the advantage to make it possible to compare how a similar issue is dealt with in different context, facilitating the analysis of the issue from a wider angle.

The existing approach of handling WEEE in Belarus was investigated and analyzed in order to understand the existing fundamentals of the approach, and how they may influence the future development of a potential EPR programme for EEE in Belarus.

The existing EPR programme for plastic packaging implemented in Belarus will be discussed in order to understand how the scheme of collection and treatment of plastic packaging is organized, the difficulties faced in its implementation, and what the factors affecting its implementation are. This programme will be described because it is the first EPR programme in Belarus and the author considers that the EPR programme for EEE may face with the same challenges, despite the fact that these products groups have different characteristics.

In order to find out the issues that should be considered when developing and implementing a EPR programme for EEE in Belarus, two different EPR programmes for EEE will be analysed in the thesis, in Sweden and Lithuania. Despite the difference in the political, social and cultural background of societies, in the existing infrastructure for end-of-life management of EEE, and in types and magnitude of problems that resulted in their formation, these EPR programmes are likely to have common challenges to overcome.

Investigating and analyzing EPR approaches of these two countries will help clarify the strengths and potential weaknesses of the programmes that have resulted from the choice of a particular approach. Furthermore, discussion of common issues found in the EPR programmes for EEE may contribute to the development of a successful EPR programme in general, because virtually all EPR programmes require consideration of such issues.

The choice of Sweden is based on the fact that the implemented EPR programme for EEE in Sweden gave the right incentives for the producers to improve design for end-of-life management in terms of reduction of hazardous substances, enhanced source reduction of material use, increased reuse and recycle, and facilitated the development of recycling and collection infrastructure that led to high collection and recycling rates. Moreover, the problems of historical and orphan products are addressed in the programme, and the percent of free-riders in the country is low.

Analyzing the experience of the Swedish EPR programme for EEE will provide useful insights to issues surrounding the implementation of the programme, as well as factors and opportunities facilitating the successful implementation and operation of the programme. This information will be taken into consideration when making recommendations on how the EPR programme for EEE in Belarus should be organized.

The choice of Lithuania is based on similarities with Belarus in economical and cultural conditions. Exploring the experiences of EPR programme for EEE in Lithuania will provide useful insights to issues surrounding the implementation of the programme, difficulties and barriers arising during the implementation of the programme and the manners to deal with them, or the possibilities of avoiding them while implementing an EPR programme for EEE in Belarus.

The following methods were used in order to understand and analyze the case-studies: literature review, interviews with actors involved in the programmes, and survey.

The literature review was carried out in order to understand and find out the current approaches of dealing with WEEE in selected countries, and what are the barriers and strengths of the different programmes. In order to prove the data acquired during the literature review and find out how the programmes work in reality, interviews were carried out. The selection of the interviewees was based on the level of involvement of the actors in the EPR programmes. The interviews were conducted either in person or on the telephone, as well as using email.

In Belarus, the interviews were carried out with actors who are involved in the existing approach of handling WEEE as well as the actors that could be affected by a potential EPR legislation for EEE. Interviews were conducted with the representatives from the government, the manufacturing industry, dismantlers and recyclers.

The interviews have allowed to:

- Gain a reasonably broad and comprehensive, but perhaps incomplete understanding, of existing approaches of handling with WEEE in Belarus,
- Find out opinions of different actors about potential implementation of EPR programme for EEE and about the main barriers the actors would face with,
- Understand what factors can facilitate and hinder the implementation of the EPR programme for EEE, and how the allocation of responsibilities between different actors can influence its development and implementation.

In order to understand how the Lithuanian EPR programme for EEE works, an interview was carried out with the representative of the producer responsibility organization. Unfortunately the attempts to interview the representative from the government were not successful.

To explore the Swedish EPR programme for EEE, several interviews were conducted with representatives of the Environmental Protection Agency, producer responsibility organisation, recycling company, and insurance company.

In total, 9 interviews involving 11 interviewees were conducted. A list of the type of organisations visited, the place and time of the interviews are summarized in Appendix 1. The list of questions asked is presented in Appendixes 2, 3, 4, and 6.

Interviews were mainly conducted in person, and generally occurred at the place of occupation of the interviewee. The interviews in Belarus and Lithuania were conducted in Russian and then translated by the author. The interviews in Sweden were conducted in English. The results from each interview were transcribed into a summary on the same day as the interview to prevent ambiguities and information losses.

In addition, a small-scale telephone survey was carried out in one of the district centres of Belarus in order to find out what factors will influence the public participation in the potential EPR programme for EEE.

## **1.5 Definitions**

In the thesis, the following terms are used that are defined as:

*Electrical and electronic equipment (EEE)* means “equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in Annex IA and designed for use with a voltage rating not exceeding 1 000 Volt for alternating current and 1 500 Volt for direct current” (Directive 2002/96/EC).

*Waste electrical and electronic equipment (WEEE)* means “electrical or electronic equipment which is waste within the meaning of Article 1(a) of Directive 75/442/EEC, including all components, subassemblies and consumables which are part of the product at the time of discarding” (Directive 2002/96/EC).

*Producers* include domestic manufacturers of the final products, as well as professional importers of these products.

*Owner of waste* means an organization whose activity leads to waste generation, or an organization that bought waste from other organization (Law “About waste”, 2000, № 444 – 3).

*Orphan products* are products of producers who cease the market.

*Historical products* are products put on the market before the enactment of the EPR legislation.

*Free riders* mean producers who do not participate in the existing EPR programme but place their products on the market.

*Consumer waste* is waste that is generated during human life, including personal, family and home use of the things, not connected with the financial activity (Law “About waste”, 2000, № 444 – 3).

*Production waste* is waste that is generated during financial activity, i.e. the production processes, provision of services and work. (Law “About waste”, 2000, № 444 – 3).

*Design for end-of-life* means design changes that aim to reduce environmental impacts from end-of-life stage of a product’s life cycle.

*Individual producer responsibility* means producers take responsibility for the end-of-life management of their own products.

*Collective producer responsibility* means producers in the same product group together fulfill their responsibility for end-of-life management of their products regardless of the brand.

## 1.6 Structure of the report

The thesis consists of seven chapters, including the first introduction chapter. Chapter 2 presents theoretical background that introduces a profile of «Extended Producer Responsibility» (EPR) and reasons and outcomes of its usage. The next section presents EPR programme for EEE in general and the main aims of the implementation of an EPR programme for EEE. Then the types of responsibilities as well as activities to be fulfilled by producers are described. The last section of this chapter provides examples of different policy instruments that can be supplemented with an EPR programme.

Chapter 3 describes the current situation of WEEE in Belarus. Moreover, the general information about country as well as general waste situation is given. In the chapter the increase in consumption of some types of EEE and the rough estimation of WEEE (such as TV sets and refrigerators) generation in the following years is provided. Furthermore, the exiting approach of handling WEEE from households and organization is described.

Chapter 4 describes the existing EPR programme for plastic packaging in Belarus, EPR programmes for EEE in Sweden and Lithuania. The sections present the findings from literature review as well as the interviews conducted with actors involved in the programmes.

The programmes are described from the following perspectives: outline of legislation, compliance scheme, allocation of responsibilities for collection and recycling, financial mechanism, monitoring and enforcement and public participation.

Moreover, the chapter provides analysis of factors influencing the implementation of EPR programmes in these three case studies. The main focus is placed on factors that affect collection and recycling rates, the provision of environmentally sound treatment of collected products, the design change for end-of-life management and that influence the problem of free riders, historical and orphan products. The choice of focus is justified by the fact that an EPR programme successfully implemented should provide incentives to manufacturers to improve the products and the systems surrounding the life cycle of the products; ensure high collection rate of the product; secure environmentally sound treatment of collected products, and improve the possibilities for re-use and recycling. Moreover, the EPR programme should address the problem of free riders, historical and orphan products.

Chapter 5 presents the findings from the interviews conducted with actors that can be involved in the potential EPR programme for EEE in Belarus. Their views and attitudes about the programme in general and factors facilitating their participation in the programme are also provided. Moreover, the results of a small-scale telephone survey carried out in one of the district centers of Belarus with the aim of identification of factors that will influence the public participation in the potential EPR programme for EEE are presented in the end of the chapter.

Chapter 6 focuses on the future possibilities for an EPR programme for EEE in Belarus and proposal of how the programme could look.

The final chapter provides the summary of factors that should be taken into consideration when developing and implementing an EPR programme for EEE in Belarus.

## 2 Theoretical background

This chapter aims to introduce a profile of EPR. Moreover, the reasons of usage of EPR programme for EEE will be presented and the intended outcomes of the programme for EEE will be drawn up.

### 2.1 What is extended producer responsibility and why?

The term “extended producer responsibility” was first used and defined by Lindhqvist in a report for the Swedish Ministry of the Environmental and Natural Resources in 1990.<sup>9</sup> He defines the Extended Producer Responsibility as «*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 product. The Extended Producer Responsibility is implemented through administrative, economic and informative instruments. The composition of these instruments determines the precise form of the Extended Producer Responsibility*» (Lindhqvist, 1992).

Organisation for Economic Co-operation and Development defines EPR as an environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle. There are two related features of EPR policy: shifting the responsibility (physically and/or economically, fully or partly) for end-of-life management upstream to the producers away from the municipality and providing incentives to the producers to incorporate environmental considerations in the design of their products.<sup>10</sup>

The reason of making producers the primary actor responsible for the entire life cycle of their product is that they can change the properties of their products at source that in turn will prevent the impacts posed by their products on the environment to occur.

Transferring the responsibility to the producers enacts the ‘polluter pays principle’ and attempts to internalize waste management costs into the product price. This means that the product price will truly reflect the environmental impacts of the product. Moreover, assigning responsibility to one actor would avoid the situation where everyone's responsibility becomes no one's responsibility.<sup>11</sup>

It is considered that the main benefits of the EPR programme implementation, i.e. transferring the financial and/or physical responsibility to the producers, are:

- *Reduction of the financial and physical burdens upon waste management authorities;*
- *Cost reduction of waste management* because involvement of private actors tends to increase the efficiency of waste management practice;
- *Development of collection/recycling technology* due to demand for separation and recycling created by the EPR programmes;

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<sup>9</sup> Lindhqvist, Thomas, & Lidrgren, Karl. (1990). Modeller för Förlängt producentansvar [Model for Extended Producer Responsibility]. In Ministry of the Environment, *Från vaggan till graven – sex studier av varors miljöpåverkan* [From the Cradle to the Grave – six studies of the environmental impacts of products] (7-44). Stockholm: Ministry of the Environment. (DS1991:9).

<sup>10</sup> OECD. (2001). Extended Producer Responsibility. A Guidance Manual for Governments. Paris: OECD.

<sup>11</sup> Lindhqvist, Thomas, & Lifset, Reid. (1997). What's in a Name: Producer or Product Responsibility? *Journal of Industrial Ecology*, 1,2, 6-7.

- *Possibilities for closing material loops* - sufficient and steady supply of recycled materials with high quality would help create demand for the recycled materials (Lee, 2002; Peck, 2003);
- *Incorporation of environmental considerations of end-of-life management of the product at its design phase;*
- *Feedback loop from the downstream (end -of- life management) to the upstream (design of products) in order to minimise the costs associated with end-of-life management by changing the design of their products (both in terms of structure and material use).*

Therefore, EPR programme helps to lead to waste prevention and reduction; the improvement of waste management practice *per se*, in terms of both the reduction of environmental impacts and increased economic efficiency and life cycle environmental improvement of product systems.

## 2.2 EPR programmes for EEE

Since the early 1990s, a number of countries started to incorporate the concept of EPR into their regulations relating to the end-of-life management of various product groups. One of such product groups is Electrical and Electronic Equipment (EEE), which has been included in the priority waste stream in many developed countries. Problems relating to EEE in the waste stream include its increase in variety, quantity, and content of hazardous substances and recoverable resources, the complexity of structures, lack of information dissemination from the manufactures and lack of treatment plants that have expertise in handling EEE.<sup>12</sup>

The implementation of the EPR programmes for EEE was facilitated by adoption in 2003 of the Directive on Waste from Electrical and Electronic Equipment (WEEE) 2002/96/EC, which is complemented by the Directive on the restriction of the use of certain hazardous substances (RoHS) in EEE.

The main objectives of the WEEE Directive are:

- to prevent generation of electrical and electronic waste;
- to increase re-use, recycling and other forms of recovery thereby contributing to a higher level of environmental protection and encouraging resource efficiency; and
- to improve the environmental performance of all operators involved in the life cycle of electrical and electronic equipment, namely, producers, distributors including retailers, consumers and in particular, those operators involved in the treatment of WEEE.<sup>13</sup>

Moreover, the ultimate aim of an EPR principle embedded in WEEE Directive is not just improve the end-of-life management *per se*, but also to provide incentives to manufacturers to design products that generate less environmental impacts at the end-of-life phase.<sup>14</sup>

However, as it was mentioned above EEE is complex products that mean that EEE is composed of different types of parts and materials, which would pose significant difficulties to the waste managers when it comes to the end of its life. Complexity of the structure makes it difficult to disassemble, and use of different materials complicates efficient recycling. Another

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<sup>12</sup> Tojo, Naoko. (2000). *Analysis of EPR policies and legislation through comparative study of selected EPR programmes for EEE –Based on the in-depth Study of a Japanese EPR Regulation*. IIIEE Communications 2000:10. Lund: IIIEE, Lund University

<sup>13</sup> Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on the waste electrical and electronic equipment (WEEE). OJ L37 13/02/2003 p.24 –39

<sup>14</sup> Tojo, Naoko. (2001). *Effectiveness of EPR programme in Design Change. Study of the factors that affect the Swedish and Japanese EEE and Automobile Manufactures*. IIIEE Report 2001:19. Lund: IIIEE, Lund University

feature of complex products is that they have a long life span. This makes the calculation of the costs for end-of-life management of the products difficult, especially with the rather unpredictable development of recycling technology and recycled markets. Problems related to the handling of so called orphan products occur as well (Tojo, 2001).

## 2.3 Type of responsibilities

The extension of the responsibilities to the manufacturers varies between EPR programmes, both in terms of *types* of responsibility, as well as *activities* to be fulfilled within EPR-based policy instruments.

According to Lindhqvist (1992) categorization there are following types of responsibilities:

**“Liability** refers to a responsibility for proven environmental damages caused by the product in question. The extent of the liability is determined by legislation and may embrace different parts of the life-cycle of the product, including usage and final disposal.

**Economic responsibility** means that the producer will cover all or part of the costs for e.g. the collection, recycling or final disposal of the products he is manufacturing. These costs could be paid for directly by the producer or by a special fee.

**Physical responsibility** is used to characterize the systems where the manufacturer is involved in the actual physical management of the products or of the effects of the products.

The manufacturer may also retain the **ownership** of his products throughout their life cycle, and consequently also be linked to the environmental problems of the product.

**Informative responsibility** signifies several different possibilities to extend responsibility for the products by requiring the producers to supply information on the environmental properties of the products he is manufacturing”, as found in Figure 2-1.

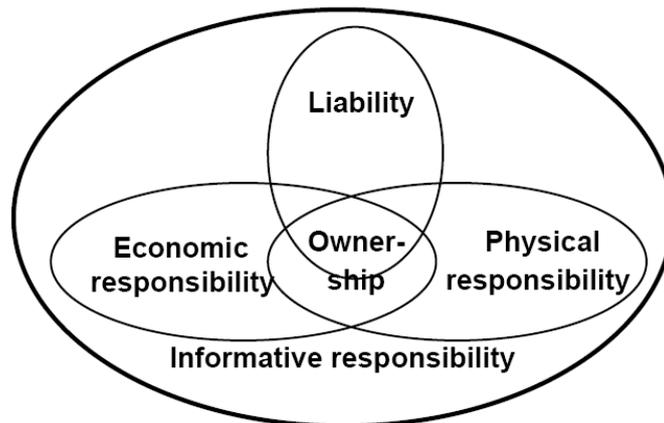


Figure 2-1 Model for Extended Producer Responsibility

Source: Lindhqvist, 1992

Producers may retain their *ownership* in a product service system. As suggested in Lifset (1992, p.35), the concept can also take the form of *liability*, such as hazardous waste collection and disposal liabilities and hazardous waste remediation liabilities.

The above classification helps to make the discussions concerning Extended Producer Responsibility more focused. It has illustrated the need for specifying the responsibility, both in terms of who is responsible and for what is he responsible.<sup>15</sup>

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<sup>15</sup> Lindhqvist, Thomas. (2000). *Extended Producer Responsibility in Cleaner Production*. IIIIEE Dissertations 2000:2. Lund: IIIIEE, Lund University.

## 2.4 Policy instruments

According to Lindqvist definition of EPR principle, the implementation of EPR programmes can be supplemented with different instruments: administrative, economic and informative. These instruments can be used separately or can be combined together. As the main purpose of an ERP programme to give right signals related to the environmental characteristics of products and production processes throughout the chain, several instruments and measures are used in combination to implement EPR programme.<sup>16</sup> The combination of these instruments varies depending on national environmental priorities and objectives of an EPR programme.

*Administrative instruments* are used as measures that concern the fulfilment of certain objectives. It can be, for example, take – back requirements, achievement of a certain recycling rates, elimination of the use of certain substances, land filling restriction or ban, fulfilment of treatment standards, etc. If the legislation requires achieve the objectives a responsible actor has to fulfil the requirements unless exemption is granted (Tojo, 2004).

*Economic instruments* are generally used in order to provide monetary incentives or disincentives to a responsible actor depending on what the instrument promotes. The examples of incentives can be subsidies, refund that are provided to the actor to fulfil the requirements. Tax can be an example of disincentives when producers do not fulfil the required actions.<sup>17</sup> The main difference between administrative instruments and economic instruments is that administrative instruments do not give a choice whether fulfil or not the requirements i.e. a responsible actor is obliged to fulfil them in order not to be punished. Economic instruments allow the actor to choose whether carry out the requirements or not (Tojo, 2004).

*Informative instruments* are used to collect and provide the information to the people because it is assumed that people behave differently when they have better information and understanding. Therefore, these instruments are used to influence people behaviour through the knowledge transfer, communication, etc.<sup>18</sup> Reporting to authorities, labelling of products and components, information provision to the consumers about producer responsibility/source separation, information provision to recyclers about the structure and substances used in the products can be examples of informative instruments.

From the perspective of level of coerciveness, the EPR programme and policy instruments can be categorised between mandatory and voluntary. Mandatory initiative requires all actors involved to fulfil the requirements laid down in legislation. However, in voluntary initiative actors can set up the goals themselves and strive to achieve them. Between these two *negotiated agreements* exist, where the government agrees with the actors that it will not enforce legislation in case the actors achieve a certain goal. One of the differences among these three approaches is the degree of participation of companies within the particular area in fulfilling their tasks. In mandatory approach all the companies are obliged to meet certain requirements while in the case of voluntary initiatives, individual companies can choose either participate in the system or not. Negotiated agreements lie in between. When more than a certain portion of companies

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<sup>16</sup> Tojo, Naoko. (2004). *Extended producer responsibility as a driver for design change – Utopia or Reality? IIIIEE Doctoral dissertation*. 2004. Lund: IIIIEE, Lund University

<sup>17</sup> Vedung, Evert & Van der Doelen, Frans C.J. (1998). The Sermon: Information Programs in the Public Policy Process – Choice, Effects, and Evaluation. In M.-L. Bemelmans-Videc, R.C. Rist & E. Vedung (eds.), *Carrots, Sticks & Sermons Policy Instruments & Their Evaluation*. (104-128). New Brunswick: Transaction Publishers.

<sup>18</sup> Vedung, Evert. (1998). Policy Instruments: Typologies and Theories. In M.-L. Bemelmans-Videc, R.C. Rist & E. Vedung (eds.), *Carrots, Sticks & Sermons Policy Instruments & Their Evaluation*. (21-58). New Brunswick: Transaction Publishers.

within the same area begins to make efforts that initially require extra resources, the problem of free-rider occurs. This problem is addressed by mandatory initiatives that require universal compliance.

### 3 The current situation of WEEE in Belarus

#### 3.1 General description of Belarus

The Republic of Belarus covers 207 600 km<sup>2</sup>; 38 % of the territory is covered by forests, 44% by agricultural land, 2% by water, and 16% by residential areas. The country occupies an advantageous geopolitical position at the centre of Europe. It is located at the crossroads of railways and motor roads, oil, gas and product pipelines and lines of communications between Western Europe and Russian regions as well as Asian countries. In the east, Belarus borders on the Russian Federation, in the west on Poland, in the north on Lithuania and Latvia, and in the south on Ukraine.

Belarus consists of six regions called ‘Oblasts’ (Brest, Vitebsk, Gomel, Grodno, Minsk and Mogilev Oblasts), 118 districts or ‘rayons’, 109 towns, and 104 urbanised settlements.<sup>19</sup> Minsk is the capital of the state with the population of over 1.7 million inhabitants.



Figure 3-1 Administrative units of Belarus

Source: Ministry of Natural Resources and Environmental Protection

In 2006 the population of the Republic of Belarus was about 9 750 300 people. The density of population is 47 persons per squarer kilometre (Belarus. Facts, 2006).

Economic performance of Belarus is constantly improving. In 2005, gross domestic product grew 9.2%.

There is an undergoing process of privatisation of public properties in the country since 1991. The process of transformation is slow in the country due to the fact that it is considered by authorities that accelerated transformation of public enterprises into non-governmental economic entities may result in a sharp reduction of personnel and social tension in the country.<sup>20</sup>

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<sup>19</sup> Ministry of Foreign Affairs of the Republic of Belarus. Belarus Facts. (2006). [Online]. Available: <http://www.mfa.gov.by/eng/index.php?d=publications/issue/facts&id=3> [15 June, 2006]

<sup>20</sup> Ministry of Foreign Affairs of the Republic of Belarus. Market reforms. [Online]. Available: <http://www.mfa.gov.by/eng/index.php?d=economic/policy&id=10> [15 June, 2006]

The main industrial branches are machine building and metalworking, the chemical and petrochemical industry, the electrical energy industry, light and food industries, the medical and microbiological industry, the forest and woodworking industry, and the construction materials industry. At least 80% of material, raw material, fuel and energy resources come from Commonwealth of Independent States (CIS) countries, mainly from Russia. As a heritage from the USSR times, the dominant share of finished products of the Belarusian industry remains supplied to the markets of these countries (Belarus. Facts, 2006).

The main foreign partner is Russia and its share in total volume of foreign trade is 47.9%. The main foreign partners from the European Union are the Netherlands - 10.2 %, then Germany - 5.5%, the UK - 4.3%, Poland - 4.2%, Italy and Lithuania – both 1.5 %, and France -1.3%. Outside the EU, other important commercial partners are Ukraine - 5.2%, China – 1.7%, and the USA – 1.6%.<sup>21</sup>

The following commodity groups have the greatest share in the export structure: mineral products (oil refinery products, mineral construction materials, etc.), transport vehicles (tractors, trucks, motorcycles, bicycles, etc.), machines, equipment and mechanisms (refrigerators and freezers, metalworking machines, TV sets, etc.), chemical products (potassium and nitric fertilisers, organic chemicals, etc.), and textile and textile articles (chemical fibres and threads, textile and knitted clothe articles, flax fibres, cotton fabrics, etc.).

The greatest share in the import structure comes for the following commodity groups: mineral products (oil, gas, electricity, etc.), machines, equipment and mechanisms (internal combustion engines, electrical motors, technological equipment, etc.), non-precious metals and articles made from them, and chemical products (cyclic hydrocarbons, non-cyclic alcohols, pharmaceuticals, etc.) (Belarus. Facts, 2006).

### **3.2 General waste situation in Belarus**

In 2005, 34 million tonnes<sup>22</sup> of solid waste were generated in the Republic of Belarus, of which 90% is industrial waste and 10% municipal waste.<sup>23</sup> Some of the main waste generating industries are the production of fertilizers (potash and phosphorus), the machine-building industry, the textile industry, etc.

Only 16% of industrial waste is reused. The list of wastes consists of 800 types. More than 79% of the amount of industrial waste comes from producing of potash fertilizes (halite). The amount of waste excluding those coming from producing of potash fertilizers is about 4.768 million tonnes. The treatment rate of industrial waste (except waste coming from production of potash fertilizes) is about 58%, but for some types of waste, it reaches the level of 70-98%. Hence, about 40% of industrial waste generated annually is stored and disposed of.

From those 40%, about 49% are disposed at special sites and 40% at sites for municipal waste, 6% are stored on production sites, and the rest is treated in other ways. Approximately 32% of

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<sup>21</sup> Экспорт белорусских товаров январь-май 2006. *Export of commodities of Belarus from January to May of 2006.* (2006). [Online]. Available: <http://open.by/511/2006-07-20/17147/> [20 July, 2006]

<sup>22</sup> Smith, Bronwen, Savola, Hanna, Rassoeva, Zarina & Baye, Bazezew. (2006) Looking forward: a sustainable waste management strategy for Belarus. Assignment for the course: Strategic Environmental Development. Lund: IIIIEE, Lund University.

<sup>23</sup> Darozhka, Siarhei., Kalinovskaya, Irina. (2004). *Overview of Waste Management in the Republic of Belarus.* Belarusian Association for Environmental Management.

the waste generated is hazardous and about 20% of it is treated (Darozhka, Kalinovskaya, 2004).

The generation of municipal waste is rapidly increasing. It has more than doubled over the past 10 years, from 1.5 million tonnes in 1995 to 3.4 million tonnes in 2005, which represents about 340 kg per capita.<sup>24</sup> The per capita waste generation is approaching the quantity generated in Western European countries, which generate 500 kg (or more) of municipal waste per capita annually.<sup>25</sup> This growth can be expected to continue as a direct consequence of the high economic growth that Belarus is currently experiencing. In 2005, the country's growth in real GDP was 9.2 %, third highest in the CIS countries.<sup>26</sup>

There are more than 160 sites for disposal of municipal wastes and about 80 sites for industrial wastes in the Republic of Belarus. They occupy a total of about 1360 hectares. Most sites for waste disposal were projected and are now operated with minimal environmental requirements. For instance, only 12% (about 20 sites) are equipped with special screens. There is no waste incineration plant in the country since 1993, when the last one was shut down (Darozhka, Kalinovskaya, 2004).

The key concern of Belarusian authorities with regard to waste management is that there is limited land filling capacity, as existing capacity is being used faster than expected due to the large increase in waste generation. Therefore, the authorities are currently in the process of evaluating different waste management alternatives to deal with this problem. The latest National Waste Management Plan states that starting from 2005, 30% of municipal solid waste in all regions of Belarus must be diverted from landfills. This target was raised to 50% in 2006.<sup>27</sup>

### 3.3 Assessment of the scale of the WEEE problem

The consumption of EEE is constantly increasing in the country due to the relative improvement of the population's wellbeing. However, the increase in consumption also means increase in WEEE generation that poses risk on the environment and human health.

However, no assessment of WEEE generation was conducted in Belarus, it was explained by a lack of problem awareness within the Ministry of Natural Resources and Environmental Protection as well as by a lack of financial resources.<sup>28</sup>

The main EEE that are produced in the country are TV sets, video equipments, and refrigerators and freezers. According to the United Nations Statistical Yearbook 2005, Belarus takes the eleventh place in the world by production of TV-sets, and the twelfth place by production of household refrigerators.

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<sup>24</sup> In the European Union municipal waste makes up 14% of the total waste generated. In Belarus, municipal waste amounts to some 8% of the total waste generated in the country (Darozhka and Kalinovskaya, 2004).

<sup>25</sup> Municipal waste generation in Western and Eastern Europe. (2005). [Online]. Available: [http://themes.eea.europa.eu/IMS/ISpecs/ISpecification20041007131809/IAssessment1116426884700/view\\_content/](http://themes.eea.europa.eu/IMS/ISpecs/ISpecification20041007131809/IAssessment1116426884700/view_content/) [8 September, 2006]

<sup>26</sup> United Nations. World economic situation and prospects 2006, p.130

<sup>27</sup> Malishevsky, Valentin. (2006, April 19). Interview with Deputy Minister of Environmental Resources and Environmental Protection of the Republic of Belarus.

<sup>28</sup> Gnedov, Aleksandr Nikolayevich. (2006, June 12). Head, Waste Management Department, the Ministry of Natural Resources and Environment Protection. Personal interview.

There are two companies in Belarus producing TVs and video equipment – “Horizont” and “Vitayz”, whose combined internal market share is of about 81%.<sup>29</sup>

In 2005 “Horizont” company sold 296 388 units of TV sets within Belarus. The Figure 3-2 shows the constant increase in TV sets sales in the country that can be, at least partly, explained by increasing well being of the population.

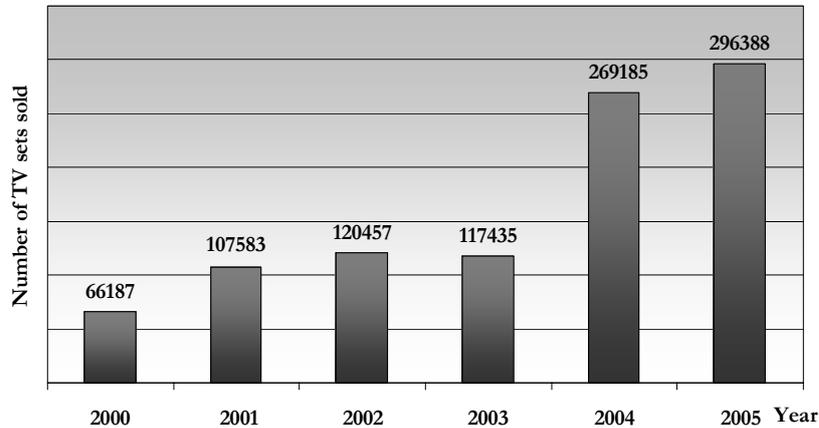


Figure 3-2 Sales of TV sets in Belarus by « Horizont » company

Source: Kratovich, 2004, June 14

It is difficult to identify the exact reason of such rapid increase in sales of TV sets by this company between 2003 and 2004: it might be the result of either increased purchasing capacity of population, or but can also be due to the internal market share of the company having increased rapidly during that period in the country, while the total quantity of TV sets sold in the country did not grow as fast as the company’s market share. Therefore, in order to estimate the generation of TV set waste in 8 - 10 years (the average life span of TV sets in the country due to the widespread secondary reuse and low purchasing capacity of population), the numbers of TV sets sold during the two last years, when the internal market share of the company was around 50 % will be taken for estimation. This will only provide a rough approximation, but given the time and data availability for the project, this is the best estimate that can be provided.

If the market share of the company was 51 % (Kratovich, 2006, June 14) during the years 2004 and 2005 extrapolating this figure means that the total consumption of TV sets in the country was 538 370 and 592 776 units respectively, that means that increase of TV set sales during these two years is about 10 %. In case the economic situation of the country improves at a constant rate, it can be assumed that the increase in TV sets consumption might be the same in the following years. It can be safely believed that the number of TV sets consumed will not diminish.

Therefore, assuming that the average life span of TV set is 8 – 10 years and that all TV sets will be discarded and not stored in the apartments after end-of-use stage, it can be estimated that in 2012 – 2014, the amount of TV sets that will end up at landfills will be approximately

<sup>29</sup> Kratovich, Victor Leonidovich. (2006, June 14). Head, Environment Protection and Work Security Department, “Horizont” company. Personal interview.

550 000 units. Assuming that the average weight of TV set is 15 kg<sup>30</sup> the total weight of TV sets waste will be 8 250 000 kg, approximately 0.85 kg per inhabitant. In France, for example, the weight of TV set waste per inhabitant in 2000 was 0.46 kg<sup>31</sup>, it was 0.43 kg<sup>32</sup> in 1998 in the Netherlands, 2.1 kg in Sweden in 2005 for TV, audio and video waste<sup>33</sup>. However, these numbers should be compared carefully because in these countries these numbers illustrate the amount of TV sets that was collected per inhabitant rather than the amount of TV sets generated per inhabitant as it is estimated for Belarus.

Concerning such products as refrigerators and freezers, there is only one company, “Atlant”, producing them in Belarus. The internal market share of the company is approximately 80%.

The production of refrigerators and freezers in 2005 was 995 000 units, and in comparison with 2000 the production increased by 18 %. Only 11% of produced refrigerators and freezers are sold within the borders of Belarus – 109 450 units in 2005 (Ministry of Statistics of the Republic of Belarus, 2005). Therefore, based on the company market share and volume of production, the total consumption of refrigerators in 2005 can be calculated for the country and it will be 136 813 units.

Assuming that the average life span of refrigerators is 10 years, that the average weight of a unit is 70 kg<sup>34</sup>, and that all owners of these refrigerators will discard them in 10 years, the approximate estimation for the disposal of refrigerators in 2015 is 9 576 910 kg, that is equal to 0.98 kg per inhabitant. In Sweden in 2005, this number was 2.5 kg per inhabitant (El-Kretsen, 2005). However, the same caution can be made here as in TV sets case when comparing the numbers because in Sweden the number presents the amount of refrigerators collected per inhabitant but not the amount of refrigerators generated. The numbers presented for approximate comparison are given just to show the necessity of problem solution.

There is a big uncertainty in the estimation for Belarus of waste generation of these product groups. However, with the consumption of these products being likely to increase continually over the next years, leading to waste generation increase, measures should be taken by the government despite the uncertainty in order to address the problem of waste generation of these products.

### 3.4 WEEE management in Belarus

In Belarus there is no EPR programme for EEE that obliges a producer to be financially and physically responsible for collection, transportation and recycling of WEEE from households and from organizations. The existing approach of handling WEEE will be presented in the following sections.

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<sup>30</sup> Sasaki, Kohei. (2004). *Examining the Waste from Electrical and Electronic Equipment Management Systems in Japan and Sweden*. LUMES Thesis. Lund: LUMES, Lund University

<sup>31</sup> Institute for Prospective Technological Studies. (2000). Towards a European solution for the management of waste from electric and electronic equipment. [Online]. Available: <http://www.jrc.es/home/pages/detail.cfm?prs=407> [2 September, 2006]

<sup>32</sup> European Environment Agency. (2003). Waste from electrical and electronic equipment: quantities, hazardous substances, and treatment methods.

<sup>33</sup> El-Kretsen AB, (2005). Annual report of 2005-2006

<sup>34</sup> Atlant company. [Online]. Available: <http://www.atlant.by/index.php?r=442&p=21&item=208#208> [2 September, 2006]

In Belarus, there is no clear definition of WEEE in legislation on waste. In the country WEEE arises from households and from organizations. However, according to the law “About waste” № 444 - 3, 26 October 2000, WEEE can be considered as consumer waste<sup>35</sup> – WEEE generated from households, and as production waste<sup>36</sup>- WEEE generated from organizations. Therefore, WEEE can be considered in different ways, depending on where and how the waste arises.

For instance, if the consumer disposes EEE near the collection site the waste is considered as consumer waste. The manner of collection and treatment of WEEE as consumer waste is presented in section 3.4.2.

If a consumer gives old EEE to the repair centre, service centre, or renting centre, or if an organization has its own EEE the waste from EEE will be considered as production waste and the owner of this type of waste will be obliged to fulfill the requirement of legislation regulating the production waste that will be described in section 3.4.1.

Moreover, production and consumer waste can be divided into hazardous and non-hazardous waste. In Belarus, hazardous waste is defined as waste that contains substances with toxic, infectious, flammable, reactive, explosive and others properties. There are 4 classes of waste hazardousness. The first class is considered the most hazardous; the hazardousness is decreasing to the fourth class. There are certain rules of identification of class of hazardousness of waste. The owner of waste should send an application to the Health Ministry that then identifies the class of hazardousness based on the waste toxicity. This is an expensive procedure and the price of identification of class of hazardousness for one type of waste is at least EUR 700. However, the list of class of hazardousness of each waste does not exist, therefore each time when producing a new type of waste, an owner has to apply to the Health Ministry and ask it to identify the waste hazardousness, which adds extra costs to the organization. There was a draft regulation listing all waste and their hazardousness, but it was not adopted, probably due to the fact that the current system is a source of income for the Health Ministry. However, this draft regulation contained some types of waste generated from end - of - life EEE and their respective levels of hazardousness. It also provided some examples: waste containing mercury – I class of hazardousness; waste containing lead - I class of hazardousness; waste containing PVCs – IV class of hazardousness; cables - non hazardous.

The management of WEEE from households is regulated by the legislation on waste and is controlled by the Ministry of Natural Resources and Environment Protection (MNREP) and by the Ministry of household-municipal affairs.

Management of WEEE from organizations is regulated by legislation on waste and legislation on waste containing precious metals and controlled by the MNREP and by the Treasury Ministry. Therefore, the main actors involved in current WEEE management are MNREP, the Ministry of household-municipal affairs, the Treasury Ministry, owner of waste, and recycler/dismantler.

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<sup>35</sup> *Consumer waste* – waste that are generated during human life, including personal, family and home use of the things, not connected with the financial activity. Закон “Об отходах”. [Law “About waste”]. (26 October, 2000, № 444 – 3). Republic of Belarus.

<sup>36</sup> *Production waste* – waste that are generated during financial activity, i.e. the production processes, provision of services and work. (Law “About waste”, 2000)

### 3.4.1 Collection and treatment of WEEE from organizations

As it was mentioned previously WEEE from organizations is considered to be production waste, therefore all requirements applied to production waste concerning waste management are also applied to WEEE from organizations. Thus, the system of collection and treatment of WEEE from organizations is more or less established and operates in the country and how it works will be presented further.

WEEE from organizations is regulated by the MNREP and by Treasury Ministry. This division of control is due to presence of precious metals in EEE. These metals are controlled by the Treasury Ministry and regulated by special legislation concerning waste containing precious metals. The approach of collection and treatment of EEE containing precious metals will be described in section 3.4.1.2.

The end of life of remaining components of WEEE (glass, plastics, and wood and other) is regulated by the legislation concerning waste and controlled by the MNREP.

As WEEE from organizations is considered to be production waste, the general requirements to the handling production waste are applied: the owner of WEEE has to develop the instruction of waste handling, where the way of handling and place of disposal are described. Moreover, the owner of waste is obliged to receive a permit for waste disposal on landfills and for waste storage on the area of the organization. However, the amount of waste that can be disposed and stored should not go above the limits developed by the owner of waste and agreed by the Ministry of Natural Resources and Environment Protection (Law “About waste”, 2000). Based on these limits and the class of hazardousness, the owner of waste has to pay a disposal fee and storage fee<sup>37</sup> that are described in section 3.4.1.1.

The producer of waste has to conduct the inventory of the waste it generates, and to submit a report to the Ministry describing types and amounts of waste generated, treated, disposed, as well as treatment methods and measures taken to prevent or reduce waste generation.

Moreover, the producer of waste is obliged to organize the collection and sorting of the waste generated. The collection of waste is performed at place of generation and the producer has to avoid secondary materials to be mixed with general waste. The producers of waste bear all costs for collection and treatment.

Moreover, the producer of waste is financially responsible for transportation of waste to a recycling centre, or to a disposal place. The producer can organize it himself or he can contract with an external transporter. The producer or transporter should secure safe transportation of waste and a driver should be trained to do this. Moreover, the producer and the transporter of waste should have the so called “passport” of waste transportation, where, among others the information about the type, hazardousness and amount of waste transported, and the owner of waste are detailed. This information allows governmental authorities and controlling bodies to control the transportation of production waste, to conduct the inventory of transported waste, and to provide information about measures that

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<sup>37</sup> In Belarus, in order to reduce the amount of production waste going to the landfills the enterprises are allowed to store certain amount of waste at facilities sites and not to dispose it. It is considered that it is better to wait when the method of waste treatment in the country will be developed and implemented rather than just to dispose waste. However, the amount of waste that can be stored within the territory of an organization and time period of storage are limited. The owner of waste has to pay the storage fee for storage of waste (that is much less than disposal fee) even the amount of waste is not over limited. However, in case of amount and time over limits the owner has to pay a fine. Therefore, storage fee and fines give incentives to the companies to treat their waste as soon as possible and it facilitates the development of waste treatment methods.

must be taken in cases of emergencies. In addition, transportation of hazardous waste requires labelling of waste and special training of a transporter (Law “About waste”, 2000).

### 3.4.1.1 Disposal and storage fees

To give economic incentives to organizations to reduce their waste generation and to divert waste from landfill, an economic instrument was used with the introduction of a disposal and storage fee. The fee is paid for storage of waste on the territory of the organization and for disposal of waste in the landfills. It is paid by the owner of the waste and is calculated on the basis of limits specified in the permits for disposal and storage of waste for each organization. The fee is differentiated according to the class of waste hazardousness, and depending on whether or not this waste can be reused as secondary materials.<sup>38</sup> The Table 3-1 and Table 3-2 show the disposal and storage fee differentiation based on the class of hazardousness.

Table 3-1 Disposal fee for 1 tonne of waste

Class of hazardousness of waste	Disposal fee for 1 tonne of waste
Non hazardous waste	EUR 2.3
Waste with I class of hazardousness	EUR 589
Waste with II class of hazardousness	EUR 177
Waste with III class of hazardousness	EUR 59
Waste with IV class of hazardousness	EUR 29
Waste that can be used as secondary materials	EUR 2 945

Source: Указ Президента Республики Беларусь “О ставках налога за использование природных ресурсов (экологический налог)” [Decree of President “About rates of tax for use of natural resources (ecological tax)”]. (15 June, 2005, № 275). Republic of Belarus

The disposal fee for waste that can be reused as secondary material<sup>39</sup> is set very high in order to encourage the reuse of secondary materials and to divert this waste away from land filling.

Table 3-2 Storage fee for 1 tonne of waste

Class of hazardousness of waste	Disposal fee for 1 tonne of waste
Non hazardous waste	EUR 0.5
Waste with I class of hazardousness	EUR 52
Waste with II class of hazardousness	EUR 15
Waste with III class of hazardousness	EUR 5
Waste with IV class of hazardousness	> EUR 1

Source: Decree of President №275, 2005

<sup>38</sup> Secondary raw materials are defined as materials that can be used again for the product or energy production, provision of services and works, for example, glass, metals, paper and carton, plastics, used oils etc. These wastes have to be collected and reused as secondary raw materials. (Law “About waste”, 2000)

<sup>39</sup> Указ Президента Республики Беларусь “О ставках налога за использование природных ресурсов (экологический налог)” [Decree of President “About rates of tax for use of natural resources (ecological tax)”]. (15 June, 2005, № 275). Republic of Belarus

If the amount of waste disposed of is more than the limits allowed, the fee for over limit disposal is 5 times more than the fee for disposal of waste within the limits (Decree of President № 275, 2005).

If an organization did not receive a permit for waste disposal, the disposal is considered as unauthorized. The owner of waste can be fined from 5-50 basic units<sup>40</sup> – EUR 55 – 550. In case of illegal dumping the fine for the organization can achieve 1000 basic units or EUR 11 000.<sup>41</sup>

### 3.4.1.2 Collection and treatment of waste from EEE containing precious metals

In the Republic of Belarus, a State Fund of precious metals was created in order to promote their reuse by selling these metals to enterprises using these metals in their production processes or products production within the country, to sell them to individuals, as well as to sell these metals abroad.

The amount of precious metal collected under the State Fund should increase each year and Treasury Ministry is responsible to control that targets are fulfilled. The Fund has to be raised annually by the organizations<sup>42</sup> using precious metals in production processes and generating waste containing these metals and by the recyclers who fulfill the extraction of these metals from different parts and waste. Therefore, the Treasury Ministry makes agreements with organizations and the certified recyclers concerning the amount of precious metals they will supply to the State Fund.

All organizations dealing with precious metals or with equipment containing them must conduct the inventory of these metals and equipment from all sources and organize the entire collection of them.<sup>43</sup> There are two organizations UNIDRAGMET and MHLDM that publish handbooks with the content of precious metals in different EEE products. Each organization should have this handbook in order to estimate the volume of these metals contained in all equipments of the company.<sup>44</sup> Then, this estimated volume of precious metals should be supplied to the State Fund directly or waste containing them to the recyclers for extraction.

When the equipment reaches the end of use stage it should be dismantled either by the organization itself or by contracting with a dismantler. All parts containing precious metals have to be extracted and sorted to facilitate transportation and treatment. Information about the weight and type of metals also has to be provided to the certified recyclers. If the organization contracts with an external dismantler all responsibilities for utilization of general waste and for supplying of precious metals to the State Fund are transferred to the dismantler.

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<sup>40</sup> 1 basic unit is 31 000 bel. rubles ~ 11 EUR

<sup>41</sup> Кодекс об административных правонарушениях [Code of administrative violations]. (26 January, 2006). Republic of Belarus

<sup>42</sup> These organizations can be any type of ownership and any type of activity, for example, plants, shops, factories, schools, hospitals and so on, which activities lead to the generation of waste containing precious metals and that use precious metals in production processes and product production

<sup>43</sup> Постановление Министерства Финансов Республики Беларусь от 15 марта 2004г., № 34 “Об утверждении инструкции о порядке использования, учета и хранения драгоценных металлов и драгоценных камней и отходов их содержащие”. [Decree of the Treasury Ministry “About the rules of usage, accounting and storage of precious metals and stones and waste containing them”], (15 March, 2004, № 34). Republic of Belarus

<sup>44</sup> MHLDM company. [Online]. Available: <http://www.mhldm.com/index.php?page=price&file=plist3> [10 August, 2006]

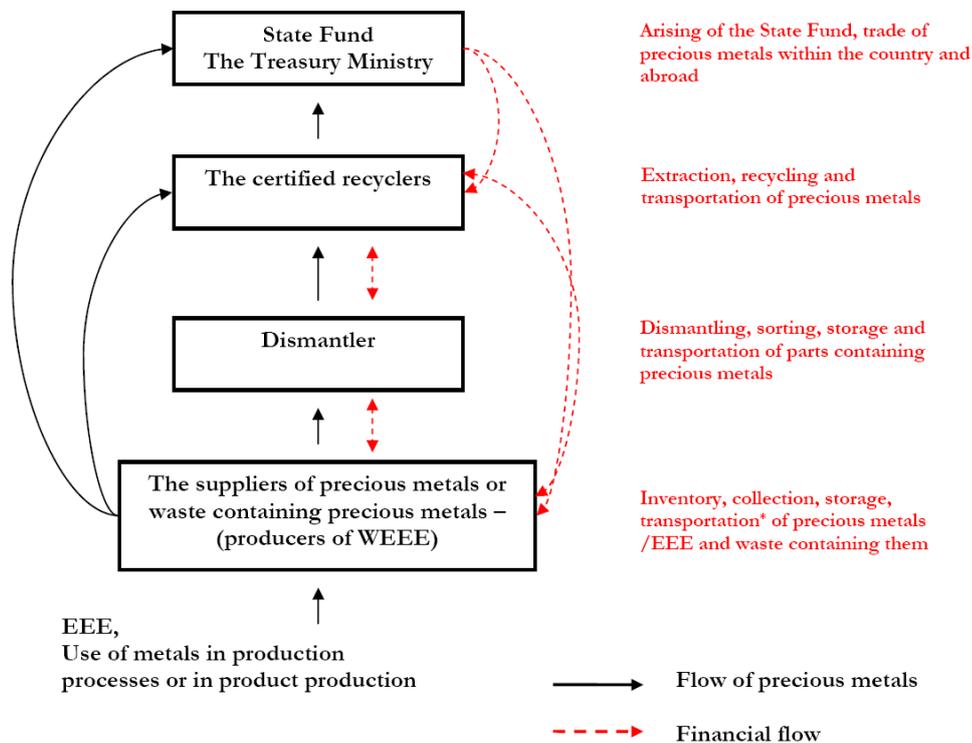
The certified recyclers contract with the organizations owning WEEE concerning the supply of precious metals for further treatment and extraction. Afterward the recyclers supply extracted precious metals to the State Fund for state needs.

The recyclers and the organizations have to organize themselves transportation to the State Fund of precious metals and waste containing them and have to cover all expenses. The Treasury Ministry just provides payment based on amount of precious metals delivered.

The suppliers (organizations) of waste containing precious metals are physically and financially responsible for their transportation to the recyclers. The suppliers are paid after the recyclers extracted and delivered these metals to the State Fund.<sup>45</sup>

In case it is not economically viable to treat small amounts of waste containing precious metals, the recycler can ask the supplier to store this waste and wait until the amount of waste is big enough to guarantee profitable treatment.

Figure 3-3 The existing approach of collection of WEEE containing precious metals



The suppliers of precious metals can deliver them directly to the State Fund and get payment from the Fund depending on the amount and type of metals delivered. In the case the precious metals need to be extracted, they can deliver the pre-treated waste containing them to the certified recyclers and initially pay for the recycling. The suppliers can also transfer responsibility for dismantling and sorting of the EEE to dismantlers and pay them extra for

<sup>45</sup> Постановление Министерства Финансов Республики Беларусь от 31 марта 2004г., № 59 “Об утверждении инструкции о порядке расчетов за поставки драгоценных металлов в Государственный фонд драгоценных металлов и драгоценных камней Республики Беларусь”. [Decree of the Treasury Ministry “About the rules of payment for supply of precious metals to the State Fund”], (31 March, 2004, № 59). Republic of Belarus

the service provided. After extraction of precious metals from waste, recyclers deliver them to the State Fund and get payment depending on the amount and type of metals delivered. Then the recyclers allocate part of the money received between the suppliers of the waste (either a supplier or a dismantler). If the value of metals is high, the dismantler will share the profit with the initial supplier of waste depending on the terms of contracts (Decree of the Treasury Ministry, 2004, № 59).

In the country, the procedure of handling ferrous and non - ferrous metals is similar to the approach applied to precious metals but the requirements are less strict.

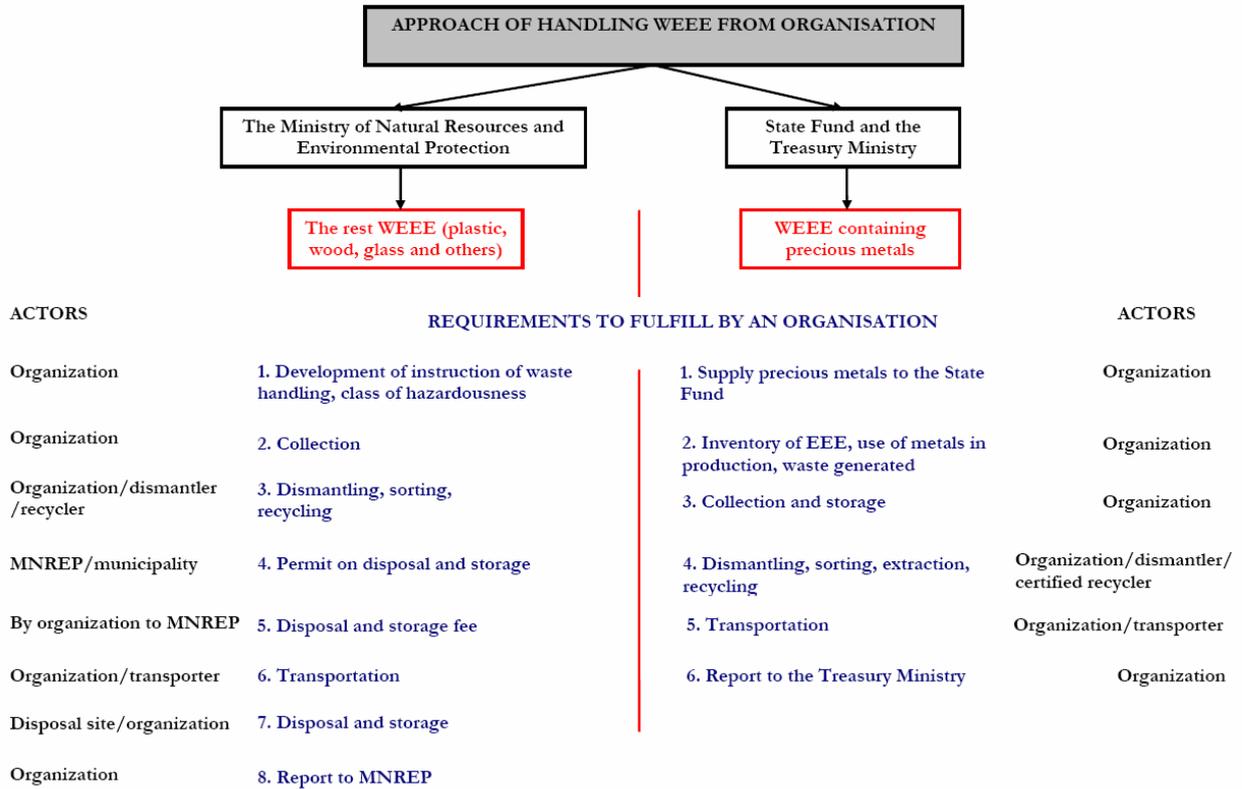
### 3.4.1.3 Summary

Summarizing the above approach of handling WEEE from organizations can be described as following:

- WEEE from organizations can be divided between WEEE containing precious metals and other WEEE. The first type is regulated by legislation concerning precious metals and waste containing them and controlled by the Treasury Ministry, the latter is regulated by legislation concerning waste management and controlled by MNREP;
- An organization should keep records on EEE bought and conduct inventory of all EEE in its possession, as well as keep records on generation of waste containing precious metals and other type of WEEE;
- Each year the Treasury Ministry sets certain volume of precious metals to be collected by each organization and to be supplied to the State Fund;
- An organization has to collect precious metals from WEEE generated within the organization. EEE reaching the end of use stage have to be dismantled, parts containing precious metals should be sorted and sent to a recycler for extraction. Extracted precious metals should then be sent by the recycler to the State Fund;
- Each year the inspection from the Treasury Ministry conducts audits of companies checking how the inventory of EEE containing precious metals is carried out, whether the organization fulfils the requirement concerning supply of certain volume of precious metals to the State Fund each year, and calculating the volume of precious metals to be delivered next year;
- The other WEEE (not containing precious metals) should be treated as production waste i.e. the same requirements are applied as to production waste. The organization has to develop instructions describing the way the waste is treated, and arrange for the treatment of waste by either itself or contracting with a recycling company. Waste that cannot be recycled is land filled and organizations generating such waste have to pay a disposal fee.
- However, the organization has a right to transfer responsibility for end of life management to a dismantler that can dismantle the equipment and sort the components. All responsibilities will be transferred to the dismantler, including providing information on utilization of metals and others types of waste to the MNREP and the Treasury Ministry. The dismantler receives money for dismantling and sorting from the organization producing the waste. The dismantler then pays for

recycling of this waste to the recycling plant. The dismantler can get a refund from the recycling company for valuable materials, precious metals as well as other valuable recyclables such as plastics and non-precious metals. The recycling plants then sell these secondary materials to different organizations that are interested in them.

Figure 3-4 Approach of handling WEEE from organizations



### 3.4.2 Collection and treatment of WEEE from households

WEEE from households is considered as consumer waste and regulated by legislation on waste and controlled by the MNREP and by the Ministry of household-municipal affairs.

In Belarus, people have a tendency to accumulate EEE in their houses and not throw them away. Therefore, the life span of any electronic product is at least 10 years, but can easily reach 15 or 20 years before disposal. Often, even if broken, the electronic equipment is repaired and then used again by other consumers, or is even kept broken by the first owner.

When consumers do discard their WEEE, in most cases they dispose of it at collection sites that are located near their habitation. Some repair centres can also accept WEEE and pay a compensation to the consumers, because WEEE can contain valuable parts that will be used to repair others products. But these centres do not disseminate information about such service, therefore, people do not know that they can bring their WEEE somewhere else except collection points and get paid for it.

The collection of discarded WEEE from collection points is organized by a municipal waste management facility. There is a specific day each week when it is allowed to discharge bulky waste (including WEEE) at collection sites, and by the end of the day this waste is collected. The municipalities have to provide the containers for collection of mixed waste and containers

for waste that should be separated, for example plastics, glass and paper, ferrous and non ferrous metals. The bulky consumer waste (as TVs, fridges) and waste containing hazardous substances should not be thrown in municipal containers. Thus, in practice, WEEE is disposed of next to these containers.

Municipalities have to secure the safe transportation of consumer waste.<sup>46</sup> However, the trucks are often very old and pose risks to the environment. The WEEE collected from households is transported to the landfills, where they are disposed of without pre-treatment.

If consumer waste is disposed of at unauthorized places or illegally dumped, the owner of waste (a person) can be fined for 10-50 basic units ~ EUR 110-550 (Code of administrative violations, 2006).

Municipalities also have to provide information to the public about the collection sites and about the separation of waste that can be used as secondary materials (Decree of the Ministry of household-municipal affairs, 2003, №26). There are ads on TV channels describing the necessity to separate waste. However, there is no information provided to the consumers about what they have to do with their WEEE and about environmental and health impacts of WEEE. Public awareness to the problem of WEEE is therefore low.

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<sup>46</sup> Постановление Министерства Жилищно-коммунального хозяйства Республики Беларусь от 30 июля 2003г., №26 “Об утверждении инструкции по организации раздельного сбора, хранения и перевозки коммунальных отходов”. [Decree of the Ministry of household-municipal affairs “About rules of separate collection, storage and transportation of municipal waste”]. (30 July, 2003, №26). Republic of Belarus

## **4 Implementation of EPR programmes**

In this chapter, the Belarusian EPR programme for plastic packaging, the Lithuanian and Swedish EPR programmes for EEE will be described. General information about countries except Belarus will be given.

The main areas of focus of the programmes are legislation relative to plastic packaging waste and WEEE, compliance schemes, allocation of responsibilities for collection and recycling, financial mechanism including financing of historical and orphan products, monitoring and enforcement. The problem of free riders and public participation in the programmes will also be looked at.

In addition, the analysis of factors affecting the implementation of EPR programmes for plastic packaging in Belarus and EEE in Lithuania and Sweden will be given at the end of this chapter in section 4.4. The main focus of the analysis will be on factors that affect collection and recycling rates, the provision of environmentally sound treatment of collected products, the design change of products for end-of-life management, and the solution of the problem of free riders, historical and orphan products.

### **4.1 Case study 1: EPR programme for plastic packaging in Belarus**

In this first section, the EPR programme for plastic packaging in Belarus will be described from the perspectives of the legislative authority, a recycling company, and a producer. In order to do so, the following actors were interviewed: the Ministry of Natural Resources and Environment Protection, the recycling plant “BelResources”, and the TV producer “Horizont” which uses plastic packaging for its products.

The information provided below is based on the review of the EPR legislation concerning plastic packaging and on the personal interviews with involved actors. The interviews were conducted with an aim to find out the opinions of the actors about the existing EPR programme and to uncover difficulties arising during its implementation and operation. The list of questions asked to the interviewees is presented in Appendix 2.

It is however too early to fully evaluate the system. Despite the legislation on producer responsibility for plastic packaging being enacted in 2003, the system was not practically implemented before 2006. Nevertheless, the EPR programme for plastic packaging in Belarus and the difficulties faced in its development as well as the initial phase of its implementation will be described in this chapter. As it is the first EPR programme in Belarus, the author considers that the EPR programme for EEE may face similar difficulties despite the fact that these products groups have different characteristics.

#### **4.1.1 Outline of the legislation**

In 2003, the EPR programme for plastic packaging was introduced by the Decree of Ministry of Natural Resources and Environmental Protection, 17 October 2003, № 35. This programme was introduced in order to shift the responsibility for collection and recycling of plastic packaging from the municipality (taxpayers) to the producers/importers and to divert this type of waste from the landfills, which, in turn, reduces the impact of plastic on the environment and human health as well as the extraction of raw materials.

In practice, the programme was implemented with introduction of tax on different types of plastic packaging put on the market in 2006. It was introduced by the Decree of the President from 18 April 2006, № 247 that amended the Decree of President of the Republic of Belarus from 15 June 2005, № 275 “About the rates of *“tax on use of natural resources”*”.

In 2003, the tax covered plastic packaging produced only from polyethylene terephthalate (PET).<sup>47</sup> It was then assessed that this limited scope could lead to subsidizing the other types of plastic packaging and could give an incentive to the producers to switch to other types of plastic, often not any better from an environmental and health perspective. Therefore, in 2004, the list of types of plastic packaging covered by the tax was expanded and today it includes polypropylene, polyethylene, polystyrene, and polyvinylchloride in addition to the initial polyethylene terephthalate.<sup>48</sup>

The tax is paid based on the weight of plastic packaging put on the market. The tax rate amounts to 230 000 Belarusian Rubble for 1 tonne of plastic packaging or approximately EUR 83.6.<sup>49</sup> The tax is imposed on all plastic packaging made of polypropylene, polyethylene, polystyrene, polyvinylchloride, polyethylene terephthalate, except packaging for bread, milk, cream, sugar, salt, flavour, meat, pasta, pharmaceutical products. Exporters of plastic packaging are excluded as well.

This tax goes to the National Environment Protection Fund and the money is then partially redistributed to the recycling companies in order to provide them financial support to collect and recycle the plastic packaging waste. The remaining money is spent to solve other environmental problems in the country.

According to the law, producers are also allowed to participate in the programme that in turn could lead to the development of recycling and collection infrastructures as well. To give them incentives to take part in the programme, the producers can be refunded the whole amount of tax on plastic packaging in the end of the each year if they provide the collection, recycling of 20 % or more of weight of the plastic packaging they put on the market. The set collection rate should be achieved by collection of plastic packaging from households only. In other words, it not allowed to include plastic packaging arising during production processes in order to achieve the targeted collection rate. (Decree of the President, 2006, № 247).

According to the Decree of Ministry of Natural Resources and Environmental Protection from 17 October 2003, № 35 “Instruction of collection and treatment of plastic waste”, the collection and recycling of plastic packaging waste can be carried out either by the

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<sup>47</sup> Постановление Министерства природных ресурсов и охраны окружающей среды Республики Беларусь от 18 марта 2003 г. № 9 “Об утверждении перечня пластмассовой тары, в отношении которой устанавливается норматив снижения вредного воздействия отходов пластмасс на окружающую среду” [Decree of MNREP about list of plastic packaging whose impact on the environment should be reduced]. (18 March, 2003, № 3). Republic of Belarus

<sup>48</sup> Постановление Министерства природных ресурсов и охраны окружающей среды Республики Беларусь от от 9 июня 2004 г. № 15 “Об утверждении перечня пластмассовой тары, в отношении которой устанавливается норматив снижения вредного воздействия отходов пластмасс на окружающую среду” [Decree of MNREP about list of plastic packaging whose impact on the environment should be reduced]. (9 June, 2004, № 15). Republic of Belarus. [Online]. Available: <http://pravo.kulichki.com/otrasl/pro/pro00059.htm> [1 August, 2006]

<sup>49</sup> Указ Президента Республики Беларусь от 18 апреля 2006 г. № 247 о внесении изменений и дополнений в Указ Президента Республики Беларусь от 15 июня 2005 г. № 275 “О ставках экологического налога за использование природных ресурсов” [the Decree of President of the Republic of Belarus about changes and additions of the Decree of President of the Republic of Belarus from 15 June 2005, № 275 “About the rates of *“tax on use of natural resources”*”] (18 April, 2006, № 247) Republic of Belarus

producers/importers themselves or by contracting with certified organisations that have licence to fulfil such types of activities.

There are two options for producer/importer to be responsible for the collection from consumers:

- Creation of their own collection network for plastic packaging;
- Agreement with organizations for collection of plastic packaging. These organizations deal with collection and treatment of secondary materials and they already have their own collection network.

Therefore, in case the producer/importer cannot organize own collection network, they can contract organisations dealing with collection and treatment of secondary materials. These organizations should have a permit from the Ministry of Natural Resources and Environment Protection to operate this type of activity. This permit is intended to guarantee the environment–friendly collection and recycling of waste.

In the contract with the organization, the producer/importer notifies the amount of plastic packaging that needs to be collected and recycled. There is no requirement for the collection and treatment of specific type of plastic packaging.

In order to pay the tax or to receive a refund, the producer/importer has to submit to the MNREP the information about the type, the weight of sold plastic packaging, the amount of packaging needed to be collected and recycled, and the amount of packaging collected and recycled by own collection and recycling system and by an external recycling organization.

When the recycling organisation has collected and treated the agreed amount of plastic packaging, it should submit to the Ministry of Natural Resources and Environment Protection the information about the amount of plastic packaging collected and recycled for the account of the producer/importer (Decree of MNREP, 2003, № 35).

If the data on amounts of plastic packaging collected and recycled provided by the producer and the recycling organisation is the same, the producer/importer is entitled to get money back that was paid as a tax if applicable.

Moreover, the EPR programme for plastic packaging is supplemented with restrictions on land filling of waste that can be used as secondary materials. Plastic packaging is one of them.<sup>50</sup> However, while studying the legislation, some controversial issues were found out: according to the Decree of MNREP “Rules of issuing the permits for waste disposal and storage”, it is prohibited to landfill waste that can be used as secondary materials but the Decree of President “About rates of tax for use of natural resources” says that waste that can be used as secondary materials can be disposed of but with a very high disposal fee i.e. EUR 2 945 for 1 tonne (Decree of President №275, 2005).

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<sup>50</sup> Постановление Министерства природных ресурсов и охраны окружающей среды Республики Беларусь “Правила выдачи, приостановления, аннулирования разрешений на размещение отходов производства” [Decree of MNREP “Rules of issuing the permits for waste disposal and storage”]. (11 February, 2004). Republic of Belarus

### 4.1.2 Collection and recycling in practice

In Belarus, the collection and recycling of plastic packaging can be carried out by:

- Municipal companies that are responsible for the collection and disposal of mixed waste;
- Municipal companies that are responsible for the collection and sorting, and sometimes treatment, of recycled fractions, mainly PET bottles; or by
- Private waste management companies that collect mixed waste and recyclables, sort and sometimes treat recyclables.

Each of the above mentioned actors have their own waste management facilities and equipment. In any case, most of the recycling work is carried out manually because the labour cost is relatively low compared to having to invest in expensive machinery to automate the processes.

As mentioned previously, the collection and recycling system can be organised either by the producers/importers or by contracting with recycling organisations. In practice, producers prefer to contract the recycling plants that already have established collection network and recycling facilities and then just cover the cost for collection and recycling of plastic packaging (Gnedov, 2006).

Based on the interview with the representative from the recycling company “BelResources” Yatsuk A.V. before the implementation of EPR legislation for plastic packaging the company made profit from selling the secondary raw materials produced from the collection and recycling of plastic packaging from households. The EPR legislation allowed recycling companies to contract producers/importers and make profit from providing the services to them such as collection and recycling, as well as from the selling secondary raw materials.

According to the research project “Looking forward: a sustainable waste management strategy for Belarus”, conducted by IIIEE students in Belarus in April 2006, the waste management company Bel 3K Sistema said that the recycling cost of 1 tonne of plastic packaging is about EUR 80, and that the price for this material is approximately EUR 240-320 per tonne in the secondary market. The difference gives a high incentive to companies to collect and treat plastic packaging themselves. The secondary material is then either used within the country or sold to China, Lithuania and Czech Republic.<sup>51</sup>

In case the producers decide to pay a tax, the government will redistribute part of the amount to the recycling companies in order to support them and to facilitate the development of recycling plant and infrastructure. However, as it was mentioned in section 4.1.1 the tax that goes to the National Environment Protection Fund is not completely allocated for the recycling infrastructure development. This money is also spent to solve other environmental problems in the country. Therefore, the capacity of the recycling plants is still not big enough to deal with all the waste generated from plastic packaging from households.

The limited capacity of recycling companies in the country gives an opportunity to the recycling companies to select the producers/importers of plastic packaging and make contract

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<sup>51</sup> Smith, Bronwen, Savola, Hanna, Rassoeva, Zarina & Baye, Bazezew. (2006) Looking forward: a sustainable waste management strategy for Belarus. Assignment for the course: Strategic Environmental Development. Lund: IIIEE, Lund University.

with those producers that offer the highest payment for collection and treatment of 1 tonne of plastic packaging.

The plastic packaging is collected without considering a producer of packaging. A recycling plant collects and treats the amount of plastic packaging specified in the contract. It provides their containers to the public for separate collection of plastic packaging. The limited capacity of recycling plants does not allow collecting and treating all plastic packaging waste generated and the containers are often overloaded.

If plastic packaging waste is delivered mixed with municipal waste, it has to be hand-sorted at sorting station, along with other valuable recyclables, and the remaining fraction is reloaded and transported to landfills.

Recycling plants submit an annual report to the MNREP that confirms the amounts of waste treated from each producer. The MNREP then takes decision concerning possible refund of money to producers having paid the tax on plastic packaging.

#### **4.1.3 Financial mechanism, monitoring and enforcement**

According to the law, producers/importers pay a tax on plastic packaging they put on the market. This tax goes to the National Environment Protection Fund and then this money can be allocated to the recycling organisations dealing with collection and recycling of plastic packaging. The producers/importers can receive back the money they paid as a tax on their plastic packaging if they collect and treat at least 20% of weight of plastic packaging put on the market.

The imposition of a tax on plastic packaging put on the market, or the alternative for producers to participate in the programme, provide guarantee that plastic packaging will be recycled and that this type of waste stream will be diverted from disposal. However, as mentioned above in section 4.1.1, producers only have to organize collection and recycling of plastic packaging from households. This means that producers finance the collection and recycling mostly of PET bottles because households generate mostly this type of plastic packaging. However, according to the law, producers should finance as well the collection and recycling of other types of plastics such as polypropylene, polyethylene, polystyrene, and polyvinylchloride.

To allow control and monitoring of compliance, producers/importers have to submit an annual report to the MNREP describing the amounts of plastic packaging put on the market and the amounts that were recycled either by the producers or by contracting with recycling companies. If producers/importers do not fulfil the requirements, they will not receive back the money paid as a tax on plastic packaging.

According to the head of the Waste Management Department of MNREP the problem of free riders is avoided because there is a strict requirement for registration of all tax payers. However, the lack of border with Russia and CIS countries can complicate the process of registration of importers.

#### **4.1.4 Impact of EPR programme for plastic packaging on the producers**

The company “Horizont” producing TVs and video equipment transferred its physical responsibility for collection and treatment of plastic packaging put on the market to a

recycling organization. Based on the weight of plastic packaging put on the market the company agrees with a recycling company to collect and treat 20% of weight of its plastic packaging put on the market.

The representative of the company expressed that the implementation of the EPR programme for plastic packaging created some extra '*headaches*' to the company but fortunately did not have an impact on the company's competitiveness as the price of final product has only increased marginally as a result of the extra cost due to the EPR system. Moreover, he underlined that the implementation of the legislation has reduced the use of plastic packaging for products. The technology department conducted researches on how to minimize the use of packaging for products. The interviewee pointed out that as a result, the use of packaging has been reduced to the minimum. However, the interviewee pointed out that it is not possible to avoid plastic packaging completely because the size and type of packaging are developed in such way to provide safe transportation of TVs and video equipment.

#### **4.1.5 Public participation**

According to the representative of waste management department of MNREP Gnedov A.N., public participation in separate collection of plastic packaging has dramatically increased since the enforcement of EPR programme for plastic packaging. Many people in the ministry and regional administrative positions now believe that citizens are willing to carry out source separation of waste. The Ministry of Natural Resources and Environment Protection gets many calls from the public asking where they can dispose their plastic waste because containers are often overloaded.

However, some actors still consider public participation as the main obstacles to the implementation of recycling programmes.

According to research "Looking forward: a sustainable waste management strategy for Belarus" the main cause of people's unwillingness to source separate is the design of the houses, especially the built-in waste chutes for waste disposal in high-story buildings. People do not want to carry down their waste. Instead, they collect waste in one container and throw it all down the waste chute. In Belarus citizens usually put their waste bins in the kitchen. Waste is hence sorted at source, in the kitchen. Unfortunately, people consider the space in kitchens too limited for putting additional bins or bags to sort out the household waste.

Waste is then taken to chutes or bins/containers outside the house if available. It is important that the location of the waste containers is convenient for the individual. However, the containers are usually not marked in a clear and easy-to-understand way, which creates confusion in terms of what is allowed to put in them.

According to the representative of the recycling plant "BelResources" Yatsuk A.V. it is necessary to provide economic incentives (refund) to the public to source separate their waste, for example a deposit refund system. He believes that no other means will give people a strong enough incentive to source separate their waste. He also thinks that economic incentives should be accompanied by educational campaigns such as the having the government running television ads promoting source separation of waste.

#### 4.1.6 Summary of EPR programme for plastic packaging in Belarus

The Figure 4-1 below summaries how the EPR programme for plastic packaging works and what actors are involved in the programme. The figure also provides the respective responsibilities of these actors.

Figure 4-1 Actors involved in EPR programme for plastic packaging and their responsibilities

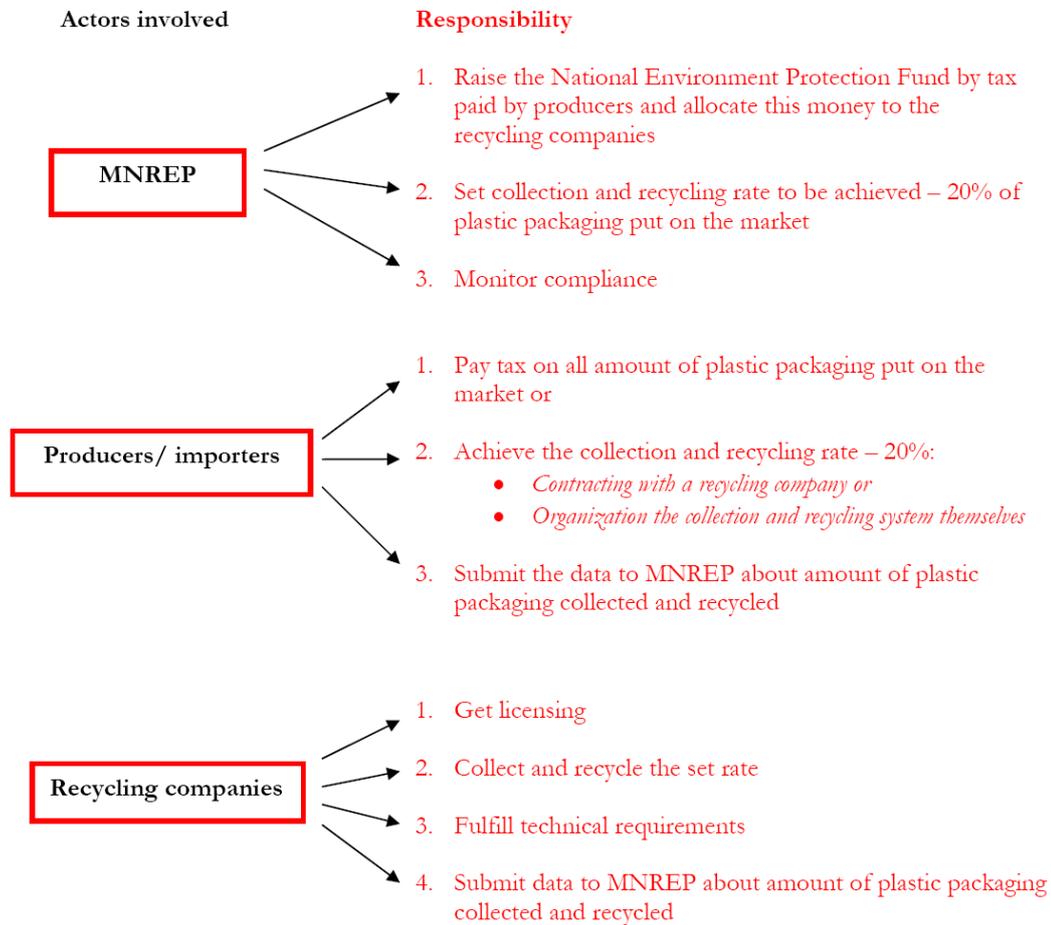
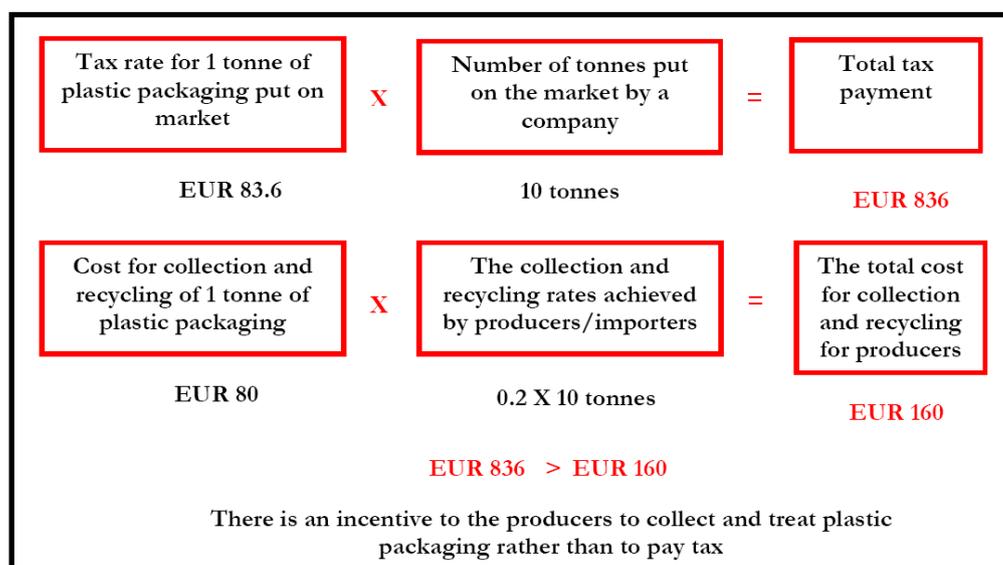


Figure 4-2 shows that it is more profitable for producers to organize the collection and recycling of plastic packaging from households rather than to pay the tax. Therefore, EPR programme for plastic packaging in Belarus gives incentive for producers to participate in the programme. The data provided in the figure is based on the legislation review and interviews with the actors involved. The number of 10 tonnes of plastic packaging put on the market by a producer was randomly taken as an example to demonstrate the above statement and simplify the calculation. As it was mentioned in section 4.1.2, the collection and recycling cost of 1 tonne for plastic packaging is EUR 80. There is big uncertainty about this amount, because it is not clear what is included in this cost and what is not. Moreover, this amount may vary from one recycling facility to another depending on the facility's location, technology used, etc. However, due to lack of information, it will be assumed that it is the average cost for recycling and collection of plastic packaging in the country.

Figure 4-2 The approximate costs for producers who participate in the EPR programme for plastic packaging or who pay tax



This figure shows that it would be better to recycling and collection infrastructures if the producers had to pay tax and not participate in the programme because in this case more money would be allocated to them. However, in practice the money collected from the tax imposition, as mentioned in section 4.1.1, is allocated partially to the development of this infrastructure, while the rest goes to solve other environmental problems. Moreover, the government does not allocate the money equally between all recycling facilities and there is no general procedure for applying for financial support by a recycling facility. The government provides financial support to some of them and as a result subsidizing them and creating unequal conditions to other facilities. Therefore, producer's involvement in the programme can help to develop other recycling facilities and create conditions leading to the competition on equal terms.

## 4.2 Case study 2: EPR programme for EEE in Lithuania

The main sources of the information provided below are the report “Impact assessment of implementation of Directive 2002/96/EC of the European Parliament and of the Council on WEEE in Lithuania”, (2003), prepared by Lina Sleinotaite-Budriene, and an interview with the director of Infobalt EPA association, the first Lithuanian electronic equipment waste management association. The list of questions is presented in Appendix 3.

### 4.2.1 General information about Lithuania

Lithuania is one of the Baltic States with an area of 65 300 km<sup>2</sup>. The population of the country is 3.7 million people. The largest cities are Vilnius with a population of 578 200 and Kaunas with 414 500 inhabitants. The population density is 55 inhabitants per km<sup>2</sup>.<sup>52</sup> The territory of Lithuania is divided into 10 counties. The counties are divided into 60 municipalities.<sup>53</sup>

<sup>52</sup> Sanitation country profile Lithuania, (2004). [Online]. Available: [www.un.org/esa/agenda21/natlinfo/countr/lithuan/lithuania\\_sanitation.pdf](http://www.un.org/esa/agenda21/natlinfo/countr/lithuan/lithuania_sanitation.pdf) [26 July, 2006]

<sup>53</sup> Counties of Lithuania. [Online]. Available: [http://en.wikipedia.org/wiki/Counties\\_of\\_Lithuania](http://en.wikipedia.org/wiki/Counties_of_Lithuania) [26 July, 2006]



Figure 4-3 Map of Lithuania

Source : <http://images.google.com>

The country borders with Latvia to the north, Belarus to the east and south, Poland and the Kaliningrad region of the Russian Federation to the south - west. The main natural resources are timber, peat, gravel, construction sand, quartz sand, dolomite, clay, limestone, brick clay, mineral water, amber, oil.<sup>54</sup>

In 2004 the Republic of Lithuania accessed the European Union. As a result, the country has to progressively adapt its national legislation to EU standards, including in the environmental field.

#### 4.2.2 General information about production, export and import of EEE in Lithuania

The information in the section is based on “Impact assessment of implementation of Directive 2002/96/EC of the European Parliament and of the Council on WEEE in Lithuania”, (2003), by Lina Sleinotaite-Budriene.

There are about 250 enterprises producing EEE, two thirds of them being SME’s. Those companies produce about 1.5 million units of EEE annually. Lithuania produces a large amount of EEE that belongs to the category of large household (20%) and small household (16%) appliances, consumer equipment (28%), as well as the category of monitoring and control instruments (32%). IT and telecommunication equipment (2%) and the category of lighting equipment (2%) are of less importance according to units produced. All these products categories are covered by WEEE Directive.

The sector exports about 30 % of the production, mainly to EU countries (40%) and CIS countries (25%). The export of EEE accounts for 450 million Lt<sup>55</sup> annually or approximately EUR 130 million. Lithuanian companies exports EEE products that belong to categories of large household equipment (46% according to value), consumer equipment (24%) and IT and telecommunication equipment (14%).

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<sup>54</sup> Sanitation country profile Lithuania, (2004). [Online]. Available: [www.un.org/esa/agenda21/natlinfo/countr/lithuan/lithuania\\_sanitation.pdf](http://www.un.org/esa/agenda21/natlinfo/countr/lithuan/lithuania_sanitation.pdf) [26 July, 2006]

<sup>55</sup> 1 Euro = 3.45 Lt. [Online]. Available: <http://www.penki.lt/news.aspx?Lang=EN&Element=Currency&&TopicID=111> [1 September, 2006]

There are 800 companies importing EEE into Lithuania. The import of EEE reached 11 324 thousand units in 2003, accounting for EUR 299 million. More than half of EEE is imported from EU countries (about 55% according to value). About 30% to 50% of imported EEE products belonging to the categories of large household appliances and IT and telecommunication equipment are second-hand.

### 4.2.3 Outline of the legislation

Having accessed to the EU in 2004, Lithuania was required to transpose the requirements of the WEEE Directive into Lithuanian national law by 13 August 2004. The requirement of a collection rate of 4 kg per inhabitant per year and recovery and recycling targets are supposed to be achieved by 31 December 2006.<sup>56</sup>

However, due to a deficit of collection and recycling infrastructure, low population density, a low level of consumption of electrical and electronic equipment, as well as geographical circumstances like the predominance of rural areas, Lithuania, along with other countries such as the Czech Republic, Estonia, Hungary, Latvia, Slovakia received an extension of 24 months (12 months for Slovenia) to fulfil the requirement of Article 5(5)<sup>57</sup> and Article 7(2)<sup>58</sup> of Directive 2002/96/EC<sup>59</sup>, collection rate and recycling/recovery rates respectively. In other words, Lithuania has been granted a two-year extension until the end of 2008 to meet the collection, recovery and reuse/recycling targets in Directive 2002/96/EC.

The Ministry of Environment is responsible for the transposition of WEEE Directive into the Lithuanian WEEE legislation and its enforcement. Some legal documents are already in force:

- The *Amendment of Law X-279 on Waste Management* has been discussed since January 2005. There was a discussion about what kind of system should be developed for WEEE management: either compliance through collective systems established by producers or a solution without collective producer systems e.g. by having producers contracting recycling companies directly or paying municipalities to do so. Finally, the law was adopted on 28 June 2005. It sets that producers are allowed to meet their obligations individually or by establishing an appropriate collective compliance system. According to the law, producers may take back WEEE themselves (with financial guarantee required), or set up individual contracts with waste managers (guarantee required), or collectively establish an organisation to run a waste management system (no guarantee required).<sup>60</sup>

- The *National Strategic Waste Management Plan* (adopted on 5 October 2004) requires that producers meet reuse, recovery and recycling targets from 2008 onwards. WEEE from households should be collected through municipal waste collection systems and/or collection systems set up by producers or Producer Responsibility Organisations (PRO). The rate to be

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<sup>56</sup> Sleinotaite-Budriene, Lina. (2003). Impact assessment of implementation of Directive 2002/96/EC of the European Parliament and of the Council on WEEE in Lithuania. [Online]. Available: [www.euro.lt/Pov\\_tyrimai/ATLIEKOS\\_santrauka\\_angl.pdf](http://www.euro.lt/Pov_tyrimai/ATLIEKOS_santrauka_angl.pdf) [12 June, 2006]

<sup>57</sup> Article 5(5) of Directive 2002/96/EC requires Member States to ensure that by 31 December 2006 at the latest a rate of separate collection of at least four kilograms on average per inhabitant per year of WEEE from private households is achieved

<sup>58</sup> Article 7(2) of Directive 2002/96/EC requires Members States to ensure that producers meet minimum targets for the recovery of WEEE and for component, material and substance reuse and recycling by 31 December 2006.

<sup>59</sup> Council Decision of 30 March 2004 granting the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovakia and Slovenia certain temporary derogations from Directive 2002/96/EC on waste electrical and electronic equipment (2004/312/EC). OJ L 100/33 6/4/2004

<sup>60</sup> Perchards. (2005). *Transposition of the WEEE and RoHS Directives in other EU Member States*.

achieved is 4 kg of WEEE per inhabitant from 2008. In case producers fail to create a system which achieve the targets set, a tax on EEE products might be introduced in the future.

In Lithuania, the so called 'pollution tax' was used to introduce a charge on pollution by products and packaging. The charge on pollution by products and packaging waste shall be paid by producers and importers of used tires, batteries and accumulators, packaging, fuel oil filters, air filters, hydraulic (oil) shock absorbers, vehicles and packaging. Producers and importers of these products can be exempted from the charge on pollution by products and packaging for the whole amount of products and packaging, if they meet the targets established by the Government and present the documents confirming the amount of such product or packaging waste re-used, recycled or recovered.<sup>61</sup> In order to introduce reasonable tax rates for EEE products, it is necessary to estimate the collection, transportation, recovery and recycling costs.

There are six Ministerial Orders, which define the details of WEEE Directive implementation:

- *Rules on registration of producers and importers* were adopted on 17 November 2005. According to these rules, it is mandatory for producers and importers to register at a Central Register. The Environment Agency is responsible for maintaining the register. Producers and importers placing EEE on the Lithuanian market must be registered from January 2006;
- *Rules on licensing of organisations of producers and importers* adopted on 11 January 2006;
- *Rules on annual reports of organisations of producers and importers* adopted on 30 January 2006;
- There is a draft Amendment of the Law on the Administrative Code still to be adopted. The anticipated penalties include fines of EUR 300 -- EUR 29 000 for breaches of the legislation, including failure to register, failure to comply with reporting requirements, failure to provide treatment for WEEE, failure to inform user or waste treatment facilities, as well as failure to comply with mandatory take-back rule (1:1);
- *Rules on establishment of waste collection schemes and agreements with municipalities*;
- *Rules on financial guarantee* adopted on 19 January 2006 (Perchards, 2005).

Therefore, according to the existing legislation, the EPR programme for EEE looks as follows: the Ministry of Environment sets annually collection and recycling targets that should be achieved by the producers. Usually collection and recycling targets are a percent of total weight of products put on the market. According to the representative of Infobalt EPA, the collection rate was 15% in 2006, and will be raised in 2007 to 20% of weight of EEE put on the market.

Producers can meet their obligations individually, by setting up individual contracts with waste managers, or by establishing an appropriate collective compliance system. Municipalities, in turn, have been allocated with the responsibility of collecting WEEE, establishing collection points in each municipality, accepting end-of-life household appliances free of charge. Producers finance take-back from existing municipal collection points. However, producers can set up their own collection schemes. Nevertheless, in order to achieve the collection rate of 4 kg per inhabitant, retailers are obliged to take back the old equipment on a 1 to 1 basis.<sup>62</sup> How the compliance scheme works in practice will be presented in the following sections.

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<sup>61</sup> Sleinotaite-Budriene, Lina. (2003). Impact assessment of implementation of Directive 2002/96/EC of the European Parliament and of the Council on WEEE in Lithuania. [Online]. Available: [www.euro.lt/Pov\\_tyrimai/ATLIEKOS\\_santrauka\\_angl.pdf](http://www.euro.lt/Pov_tyrimai/ATLIEKOS_santrauka_angl.pdf) [12 June, 2006]

<sup>62</sup> Business Alert - EU is a biweekly newsletter providing up-to-date information on the latest developments in EU trade policy and trade regulations. [Online]. Available: <http://www.tdctrade.com/alert/euweeenew.htm#LITHUANIA> [18 July, 2006]

#### 4.2.4 Compliance schemes

The collective WEEE scheme in Lithuania has not yet been finalised and is still under development. It was proposed that compliance scheme would be developed as the collective scheme would be run by Infobalt EPA association, Zaliasis taskas (Green Dot Lithuania)<sup>63</sup> and CECED<sup>64</sup>.<sup>65</sup>

However, in practice there is currently only one company involved in collective WEEE scheme, Infobalt EPA. Infobalt EPA is a newly organized Lithuanian electronic equipment waste management association that comprises 30 Lithuanian producers, wholesalers and importers of IT equipment (11 members), lighting equipment (9 members) and household electronics (10 members). The internal market share of members within the country is 60% of total sales.<sup>66</sup>

As per the figure below, the main actors involved in the compliance scheme in Lithuanian WEEE compliance scheme are State authorities, PRO run by Infobalt EPA association, municipalities, operators providing collection and recycling services, and consumers.

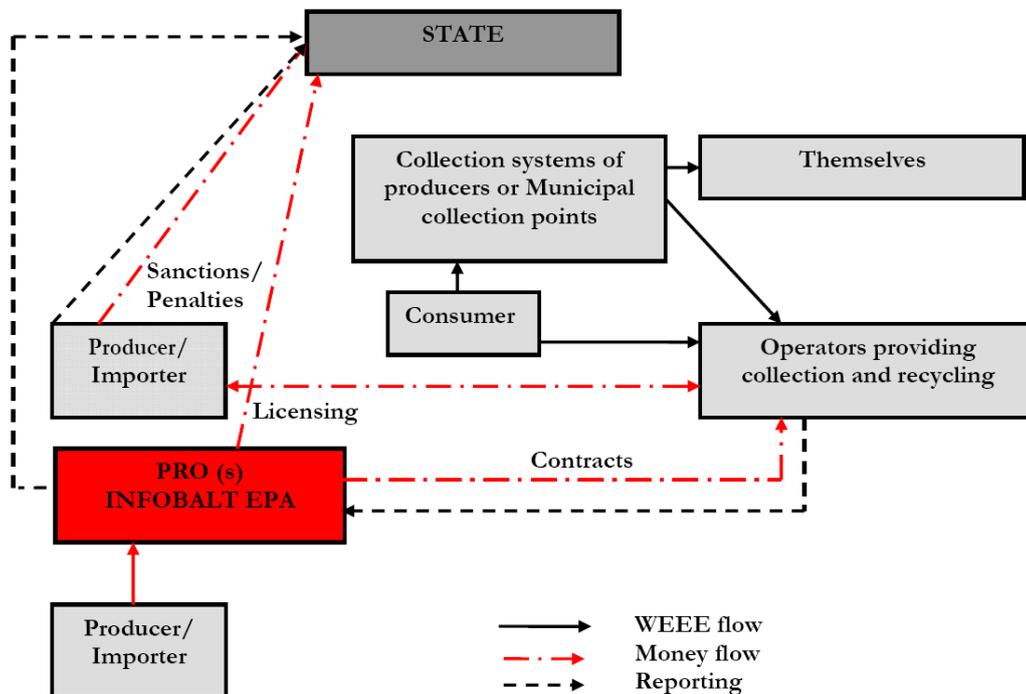


Figure 4-4 Compliance scheme for WEEE in Lithuania (not finalised yet)

Source: Budrienė, 2005 and Kriukonis, 2006

<sup>63</sup> Zaliasis taskas (Green Dot) is a compliance organisation which was set up in 2002 to comply with packaging legislation, is considering coordinating WEEE management. ZT's shareholders are 26 fillers and importers, 6 packaging producers, and 3 waste management companies and recyclers. According to information provided on company website the main reason of not participation in compliance scheme for WEEE is unclear and messy national legislation.[Online]. Available: <http://www.greendot.lt/> [18 July, 2006]

<sup>64</sup> CECED represents the European committee of household appliance manufacturers and has an industrial profile, a local branch set up by Phillips, Electrolux and Whirlpool in 2004.

<sup>65</sup> Business Alert - EU is a biweekly newsletter providing up-to-date information on the latest developments in EU trade policy and trade regulations. [Online]. Available: <http://www.tdctrade.com/alert/euweeeneu.htm#LITHUANIA> [18 July, 2006]

<sup>66</sup> Kriukonis, Edgaras. (2006, July 26). Director, Infobalt EPA. Skype interview.

The compliance scheme for WEEE can be described as follows:

- The consumer can discharge WEEE free of charge at collection points run either by municipalities, producers, or by recycling companies, or alternatively at retailer facilities on the 'old for new' basis;
- Producers are obliged to achieve a certain collection and recycling rate per year, set by the Ministry of Environment. They can fulfil it either by organising the collection and recycling themselves, by participating in a collective system (Infobalt EPA in this case), or by contracting with operators providing collection and recycling services;
- Collection points can be organised either by producers, municipalities and/or by PRO. As an alternative, these actors can contract with operators providing collection and recycling services and then cover the recycling and collection costs;
- To be allowed to operate PRO, operators providing the collection and recycling services have to receive licensing from the Ministry of Environment;
- Individual producers themselves or PRO have to report annually to the Ministry of Environment on whether or not they achieved the collection and recycling percent set by the Ministry;
- If a producer does not fulfil the requirements concerning the achievement of the collection and recycling percent, does not provide the report to the authorities, and/or does not register in the Central Register of EEE producers/importers, he can be fined by the Ministry of Environment.

#### **4.2.5 Collection**

In 2002 it was estimated that the potential annual WEEE generation was between 17 000 and 27 000 tonnes/year (6.3 kg per inhabitant in average) and the amount of WEEE was estimated to be growing by 6% to 7% annually. In 2002, the actual quantities collected from private households was 575 tonnes - 0.16 kg per inhabitant, covering only for categories of large household appliances, consumer equipment and lighting equipment, IT and telecommunication equipment, because only these categories were collected in Lithuania back then (Sleinotaite-Budriene, 2003).

According to the representative from PRO Infobalt EPA, in 2004 the collection rate in 2004 was of 0.2 kg per inhabitant, 0.45 kg in 2005. There is a forecast that it will reach between 1.5 kg and 2 kg per inhabitant in 2006, with a plan to achieve 3 kg in 2007 and 4 kg in 2008. This would imply that Lithuania will comply with the required collection rate and deadlines of the WEEE Directive.

However, there is still no clear allocation of responsibilities for collection of WEEE in the country. According to Amendment of Law X-279 on Waste Management, the collection in the country can be organized either by the recycling company, municipality, the producers/importers themselves, or by PRO. Moreover, consumers have a right to bring WEEE to a retailer on old for new basis.

In Lithuania, producers regard collection of WEEE as a municipal responsibility, and currently refuse to provide additional resources or infrastructure. Therefore, the collection in

the country is mostly organized by municipalities who contract with recycling companies<sup>67</sup>, giving them the right to collect and treat WEEE. Thus, they established their own collection points, with consumers also being allowed to call a recycling company asking it to pick up WEEE free of charge.

PRO Infobalt EPA and individual producers/importers contract with recycling companies, asking them to collect and treat certain amounts of WEEE. Infobalt EPA and individual producers/importers cover all costs incurred by a recycling company. Infobalt EPA initially tried to organize its own collection and treatment in order to reduce the recycling and collection costs, but it is difficult nowadays because the recycling companies are very active and have a big lobbying power i.e. contacts among authorities that prevent the establishment of individual collection system (Kriukonis, 2006, 26 July).

According to the representative of Infobalt EPA, in approximately 6 months the Ministry of Environment will support the development of the collection system organized by association.

Regarding the retailers, who, according to the law, are obliged to accept WEEE on old for new basis, they are not really interested in doing so because they do not want to become an ‘accepting garbage station’, especially as there is not enough space to store WEEE. Therefore, they oppose to participate in the collection chain for WEEE. Moreover, they are not allowed to accept any EEE product that is not exchanged for new one. If a shop does so, it can be fined because any organization should have a licensing to be allowed to be a collector for WEEE (Kriukonis, 2006, 26 July).

#### 4.2.6 Recycling

In 2003, only three categories of EEE were collected and treated in Lithuania: mercury lamps that are exported to Latvia and Ukraine for recycling, IT and telecommunication equipment, and consumer equipment. In 2003, the WEEE recycling capacity in Lithuania was 6110 tonnes/year, with about 2060 tonnes being recycled. Capacities in Lithuania are larger than generated waste amounts.

WEEE containing valuable metals are recovered and not reported as WEEE treatment activities. This fact complicates the achievement of a collection rate and recycling/recovery rates.<sup>68</sup>

Today about 30 recycling companies provide collection and recycling services. Five years ago the recycling companies anticipated the implementation of WEEE Directive and could predict that producers will be forced to treat their WEEE. Hence, since that time, recycling companies started developing additional treatment capacity. Today, they have big power in the country. Individual producers, and even PRO Infobalt EPA, cannot compete with them trying to organize their own collection and recycling facilities (Kriukonis, 2006, 26 July). This fact could prevent the establishment of more efficient collection and recycling of WEEE.

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<sup>67</sup> In 2002, for example, 44% of the amount collected in 2002 was collected at 7 municipal civic amenity sites, 56% at the collection points established by WEEE recycling and metal shredding/ recycling companies

<sup>68</sup> Bremere, Ingrida. (2003, November). *Workshop on WEEE: Implementation of the EC Directive 2002/96/EC in the Baltic States*. [Online]. Available: [www.bef.lv/data/file/WEEE\\_report.pdf](http://www.bef.lv/data/file/WEEE_report.pdf) [20 July,2006]

#### **4.2.7 Financial mechanism**

In 2002, Lithuanian authorities considered two options of financial model for WEEE management:

- Introduce a charge on pollution by EEE products and leave the possibility to producers and importers to be exempted from the charge for the whole amount of EEE products if they meet the recycling/ recovery targets established by the Government and present the documents confirming the amount of such EEE products reused, recycled or recovered; or to
- Create a new EPR programme for WEEE management, where the whole responsibility will be taken over by producers (Sleinotaite-Budriene, 2003, November).

The charge on pollution by EEE products has not been introduced so far. According to the interviewee from Infobalt EPA, it will be introduced in 2008 if the current compliance system does not achieve the required collection/recycling targets.

Currently, as previously mentioned, the Ministry of Environment sets each year a percent of WEEE weight put on the markets by producers that should be collected and treated. The producers can meet the requirements by either organizing the collection and treatment themselves, by contracting with waste either management facilities, or participating in PRO. In each case, the producers bear the financial responsibility for collection and treatment.

Moreover, on 1 January 2006, the Law on Waste Management was amended. According to the amended law, producers and importers of EEE must ensure that WEEE will be managed, leading to avoidance of the problem of orphan products in the following way: producers and importers of EEE not participating in the collective system are obliged to conclude bank guarantee or other agreements in order to prove that the management of WEEE put on the market of Lithuania will be financed. However, forcing individual producer to provide financial guarantee and not applying the same requirements to the collective system can discourage the establishment of individual compliance scheme.

The producer or importer of EEE must submit documents proving that he has fulfilled its waste management obligations to the respective Regional Environmental Protection Department of the Ministry of Environment within the time framework i.e. documents proving that WEEE was collected, treated and disposed. If the documents are not submitted, the Ministry of Economy is entitled to ask the respective organization that concluded the financial agreement with a producer of EEE to transfer the appropriate amount of money to the Lithuanian state budget in order to finance WEEE management.<sup>69</sup>

#### **4.2.8 Free riders**

According to Rules on registration of producers and importers, it is mandatory for producers and importers established in Lithuania to register with a Central Register from January 2006. The Environment Agency is responsible for maintaining the register.

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<sup>69</sup> Regulations on the conclusion and execution of bank guarantee, surety and other contracts, proving that electric and electronic devices waste management will be financed, and on accumulation, operation. (2006). [Online]. Available: <http://www.infolex.lt/portal/ml/start.asp?act=legupd&lang=eng&biulid=102> [12 July, 2006]

However, the problem of registration of all producers and importers of EEE is still relevant to Lithuania. According to the representative from Infobalt EPA, there are only about 200 companies officially registered, while the total number of producers and importers in the country is estimated to around 1 000. It means that about 80 % of companies do not participate in the compliance system and can be considered as free riders. The representative said that the Ministry of Environment is making efforts in order to identify them but the process is complicated by the fact that importing companies are small and numerous. According to the interviewee, the competition within the EEE sector will help to decrease the number of free riders because officially registered companies are in a disadvantageous position. Hence, they are likely to make efforts to participate in the identification of the free riders as well (Kriukonis, 2006, 26 July).

#### **4.2.9 Monitoring and enforcement**

To monitor the compliance of producers with the requirements concerning WEEE management, producers of EEE must submit an annual report confirming the fulfilment WEEE management related obligations to the Ministry of Environment within the time framework.

According to the representative of Infobalt EPA, the Amendment of the Law on the Administrative Code was adopted in June 2006. According to the amended law, the penalties for breaches of the legislation, including failure to register, failure to comply with reporting requirements, failure to provide treatment for WEEE, failure to inform user or waste treatment facilities, and failure to comply with mandatory take-back rule (1:1), vary from EUR 300 to EUR 29 000, depending on the seriousness of breach. One of the most serious breaches is not participation in the programme.

#### **4.2.10 Public participation**

As mentioned previously, the consumer can discharge WEEE either at municipal collection points or collection points run by recycling companies, or bring WEEE to retailer on old for new basis i.e. the last option is only possible when the consumer purchases a new similar EEE.

However, due to the tendency of WEEE storage and low level of awareness, public participation was low (Kriukonis, 2006, 26 July).

Therefore, Infobalt EPA started to conduct educational campaigns, increasing the awareness of population about the impact of WEEE on the environment and human health. The representative of Infobalt EPA expressed that the collection rate is also likely to be increasing at least partly due to these educational programmes. The Ministry of Environment and Infobalt EPA are receiving many calls from the population asking where it is possible to discharge their EEE. The educational programmes are planned to be carried out in August 2006 and then again periodically because it is being realized that consumer awareness is one of the important factors leading to collection rate increase (Kriukonis, 2006, 26 July).

### **4.3 Case study 3: EPR programme for EEE in Sweden**

The findings provided in this section are mainly based on:

- The Ordinance on Producer Responsibility for Electrical and Electronic Products of 13 August 2005,
- El-Kretsen<sup>70</sup> annual report of 2005-2006,
- The Department of Trade and Industry, 2003. Study into European WEEE schemes. Future energy solutions,
- Personal interviews with the representatives of recycling company SYSAV AB<sup>71</sup>: Department of Electronic recycling, Bo Thulin, and Environmental Coordinator Kristofer Kvernes, and
- Telephone interviews with the representative of the Swedish Environmental Protection Agency - Lars Eklund; the representative of the insurance company Lansforsakringar AB - Anders Sverkman; e-mail questionnaire to the representative of El-Kretsen - Jan-Olof Ericsson.

The list of question asked during the interviews and e-mail questionnaire is presented in Appendix 4.

### 4.3.1 General information about Sweden

Sweden is the largest of the Scandinavian countries, both in land size and population. It is bordered by Norway in the west, Finland in the northeast, the Skagerrak Strait and the Kattegat Strait in the southwest, and the Baltic Sea and the Gulf of Bothnia in the east.

The area of Sweden is 450 000 km<sup>2</sup>, 53% of the area is covered by forests, 11% by mountains, 8% by cultivated land, 9% by lakes and rivers. The population of the country is 9 077 628 people (Statistics, August 2006), and the population density is about 20 people per km<sup>2</sup>. The capital of Sweden is Stockholm. The country is divided into 21 counties. There are 290 municipalities in the country. The main natural resources of Sweden are water, timber, and iron ore.<sup>72</sup>



Figure 4-5 Map of Sweden

Source: [http://www.lib.utexas.edu/maps/europe/sweden\\_rel96.jpg](http://www.lib.utexas.edu/maps/europe/sweden_rel96.jpg)

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<sup>70</sup> El-Kretsen AB is a Producer Responsibility Organization in Sweden that fulfills the responsibility of producers to organize collection and recycling of WEEE and negotiates with different actors on their behalf.

<sup>71</sup> SYSAV AB – is waste company that receives, recycles and treats waste, including WEEE, from households and business in southern Skane, Sweden. The company is owned by 14 municipalities in the southern Skane with a population of 635 000 and has approximately 6000 companies as customers. SYSAV is one of recycling companies employed by El-Kretsen to receive and dismantle electrical and electronic scrap. The amount of WEEE treated by SYSAV is 10% out of total amount of WEEE treated in Sweden.

<sup>72</sup> Information about Sweden. [Online]. Available: <http://en.wikipedia.org/wiki/Sweden> [5 August, 2006]

Electrical and telecommunication equipment, machinery, and passenger cars are the most imported and exported goods in the country. The other most important export goods for the country are paper, pharmaceuticals, iron and steel, and the most important imported goods are foodstuffs, crude oil, textile products, and footwear.

#### 4.3.2 Outline of the legislation

The EPR programme for EEE in Sweden started after adoption and enforcement of the Ordinance on Producer Responsibility for Electrical and Electronic Products on 1 July, 2001. The aim of the Ordinance was “*to create a driving force for producers to develop less environmentally burdensome products and simultaneously to achieve environmentally appropriate handling*”.<sup>73</sup> The main driving forces leading to the creation of this Ordinance were the concerns about the use of hazardous substances and the efficient use of resources.

The Ordinance was replaced on 13 August 2005. The new Ordinance covers the following product groups: household appliances, tools and garden equipment, IT and office equipment, telecommunication equipment, television, audio and video equipment, cameras and photo equipment, clocks and watches, games and toys, lighting equipment, medical equipment, laboratory equipment, refrigerators and freezers - all product groups covered by WEEE Directive (refer to Appendix 7).

The main provisions of the Ordinance are that:

- Producers<sup>74</sup> are obliged to register at the Swedish Environmental Protection Agency;
- Producers are financially and physically responsible to collect and treat, free of charge, WEEE from households put on the market before 13 August 2005 according to their market share. Producers have to deal with WEEE other than from households if they are delivered to the producer and if an organization buys new products of the same function and if a quantity of new products corresponds to a quantity of discarded products;
- Producers have to organize the collection and treatment of WEEE put on market after 12 August 2005. Producers are obliged to ensure financing for the fulfilment of these responsibilities by providing a financial guarantee in forms of either the participation in an appropriate compliance scheme, or subscription to a recycling insurance, or the provision of a blocked bank account;
- Producers have to provide the systems for collection of WEEE. The collections sites should be arranged in a simple and practical way. When organizing the collection sites, producers have to consult with municipalities in order to coordinate the producers' waste collection duty in the light of local conditions in the municipality;
- Producers have to ensure that WEEE collected are transported, pre-treated, reused, and recycled at certified facilities;
- All new products sold must be labelled with a ‘crossed over wheel dust bin’ and an identification code to make it possible to trace the producer responsible when the product is finally treated for recycling. In addition to this symbol, there must be further

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<sup>73</sup> Regeringskansliet, *Dealing with the end-of-life products, - the responsibility of everyone: Summary of Government bill 1996/97:172*, Regeringskansliet, Stockholm, Sweden, 1998

<sup>74</sup> In the Ordinance the producer is defined as manufacturers, importers of EEE

information on the equipment, such as data showing that it was placed on the common market after 12 August 2005;

- Producers have to provide information to the treatment plants about the content of EEE;
- Producers have to report to the Swedish Environmental Agency about how they fulfill their duties;
- Producers can be fined if they do not fulfill their obligations concerning products labelling, WEEE management, financial guarantee and supply of information about the content of products.<sup>75</sup>

These provisions are to be fulfilled by producers according to the Ordinance, however, in practice, some provisions are fulfilled in a different way and the differences will be described in the following sections.

### **4.3.3 Compliance scheme**

A first proposal on producers' responsibility on WEEE in Sweden was handed in 1995, but it took 6 years before it was activated. Well-organized cooperation of larger trade associations in Sweden with good market coverage led in 2001 to the creation of a Producer Responsibility Organisation, El-Kretsen, that achieved high levels of membership very quickly.<sup>76</sup>

El-Kretsen was created to fulfill the responsibility of organizing collection, transportation, recycling of WEEE in practice (originally allocated to individual producers, who transferred it to El-Kretsen) by running the physical infrastructure, as well as fulfilling some of the requirements given to producers on their behalf, such as negotiation with municipalities. El-Kretsen is a not for profit company. There are over 800 members<sup>77</sup> covering more than 90% of EEE put on the Swedish market by volume (El-Kretsen AB, 2005).

El-Kretsen is responsible for the following product groups: large white goods, hand tools, gardening tools, IT, office equipment, telecommunication equipment, TV, video, audio equipment, cameras, watches, toys, light sources, armatures, medical equipment, laboratory equipment, since 13 August 2005 for fridges and freezers as well.

In 2005, El-Kretsen collected 126 000 tonnes of discharged electronic products, the equivalent to 14 Kilos per person (El-Kretsen AB, 2005). However, in this amount collected, some WEEE from business to business is also included because it is allowed for businesses to discard their WEEE at municipal collection sites if the amount is not more than 2 units.

The main actors involved in the Swedish EPR programme for EEE are the Swedish Environmental Protection Agency, El-Kretsen, producers/importers, households, commercial enterprises, municipalities, commercial collection sites, transport and logistics contractors, and treatment and recycling contractors.

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<sup>75</sup> Ordinance on producer responsibility for electrical and electronic products, 13 August 2005. (SFS 2005:209). Sweden.

<sup>76</sup> Bremere, Ingrida. (2003, November). *Workshop on WEEE: Implementation of the EC Directive 2002/96/EC in the Baltic States*. [Online]. Available: [www.bef.lv/data/file/WEEE\\_report.pdf](http://www.bef.lv/data/file/WEEE_report.pdf) [20 July,2006]

<sup>77</sup> El-Kretsen AB, (2005). Annual report of 2005-2006

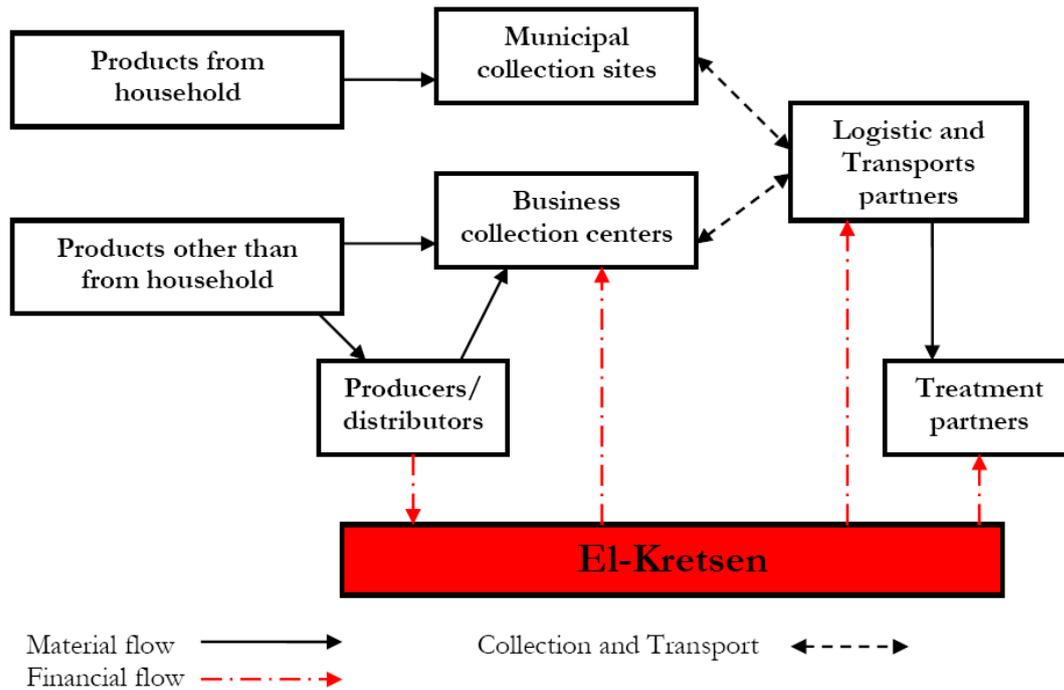


Figure 4-6 Basic material and financial flows

Source: The Department of Trade and Industry, 2003

In short the Swedish compliance scheme can be presented as following: to manage take-back and other requirements according to the Ordinance, producers have to pay El-Kretsen based on their current market share for the products being sold. This applies both to household and commercial WEEE. These costs are absorbed in the retail supply chain and are not visible to the end consumer.

In turn, households may return their WEEE free of charge to municipal collection sites. In order to support the operation of municipal collection sites for WEEE and other waste, households pay local municipal taxes.

Commercial enterprises may return WEEE free of charge to producers on a “new for old basis”, otherwise they may pay a charge levied by El-Kretsen or they can be redirected to the business collection sites, which is organized and financed by El-Kretsen. There they can deposit WEEE free of charge. Transport and logistics contractors collect WEEE from designated collection sites free of charge or from offices and workshops but charge for this service. Then El-Kretsen covers costs based on weight of WEEE transported. Costs of treatment and recycling contractors are covered by El-Kretsen as well. A more detailed description of compliance scheme will be presented further.

#### 4.3.4 Collection

Until 13 August 2005, the EPR programme for EEE in Sweden did not have mandated collection targets by weight or by percent of products put on market. According to the Swedish Environmental Protection Agency, the main aim of the programme was to collect and recycle as much WEEE as possible.<sup>78</sup> In 2005, El-Kretsen collected 126 Million Kilos of

<sup>78</sup> The Department of Trade and Industry, (2003). Study into European WEEE schemes. Future energy solutions. p. 104

discharged electronic products, the equivalent to 14 Kilos per person. According the El Kretsen's 2005/2006 report, "practically no electronic waste ends up today in Sweden at the landfill, and is instead treated by recyclers".

The Ordinance on 13 August 2005 set a mandated collection target of 4 kg per inhabitant, as required in the WEEE Directive. According to the Ordinance, the producers are physically and financially responsible for setting up collection system and sorting of WEEE from private households. It means they have to organize and run the collection infrastructure. For WEEE other than WEEE from private households, the old products should be delivered to the producers in connection to the sale by the producer of a corresponding quantity of new products. This obligation only applies to products that are of the same product type as the new products sold, or a product that essentially fulfils the same function as the products sold. If this requirement is fulfilled the producers has to accept old products free of charge.

However, according to the producers' experience (members of El-Kretsen), it was too costly to organise the collection system themselves i.e. for the producers the collection cost is 25-30% of the total cost of WEEE handling (Bremere, 2003, November). Thus, an essential agreement was concluded between the Association of Municipalities and El-Kretsen. The agreement is called *El Retur*. The sense of agreement is that the municipalities set up collection points, called a Recycling Centre, where households can dispose old electronic products free of charge. El-Kretsen, in turn, is responsible for the transportation of the collected electronic products in order for them to be pre-treated and recycled in accordance to legal requirements. El-Kretsen collects products from some 650 collection points/recycling centres around the country run by municipalities and then transports them to different pre-treatment facilities for dismantling.

The system can be considered as simple for households to use, as they can return their electrical waste at the same place where they dispose their 'usual' bulky waste. It is also convenient for producers, who, through El-Kretsen, get access to a nationwide well-established collection system.<sup>79</sup> Moreover, according to the representative of SYSAV AB, the municipalities in southern Skane region provide the following service: there is one day in a month when the municipality can arrange the transportation of old bulky WEEE directly from an apartment free of charge. This service is provided for people who may not have a car. The person just needs to call in advance.

Therefore, in practice municipalities are responsible for collection of WEEE in municipal collection sites (based on existing infrastructure). All municipal activities are financed by municipal tax, only containers are provided by El-Kretsen.

Municipalities are also obliged to inform households about WEEE management in the municipality, providing information concerning the potential effects of WEEE on human health and the environment, the obligation to sort WEEE, the collection systems available to households, and the recycling outcome that sorting contributes.<sup>80</sup>

El-Kretsen is responsible for the transportation of the electronics collected from the municipalities at their collection facilities. Producers cover the corresponding costs.<sup>81</sup> In 2005,

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<sup>79</sup> El-Kretsen AB. [Online]. Available: <http://www.el-kretsen.se/index-e.htm> [1 August, 2006]

<sup>80</sup> Ordinance on producer responsibility for electrical and electronic products, 13 August 2005. (SFS 2005:209). Sweden. Section 21

<sup>81</sup> Thulin, Bo. (2006, August 3). Representative, Department of Electronic recycling, SYSAV AB. Personal interview.

El-Kretsen had contracted with 20 transport companies. The price and quality of service are the main criteria for choosing the transport company. In order to work for El-Kretsen, all transport companies must obtain permits that guarantee the safe transportation of waste. The selection process of transport organizations is conducted through tender offering, with the companies providing optimal logistics and cost reduction being awarded with the contracts.<sup>82</sup>

The collection from organizations is organized partly in co-operation with the municipalities and partly through directly contracted transporters. In 2005, El-Kretsen provided and ran some 300 delegated collection facilities around the country, where organizations and businesses could return end-of-life electronics free of charge. Moreover, if the amount of WEEE is less than 2 units, organizations can discharge their WEEE at municipal collection sites, or can bring them directly to a recycling facility free of charge. If the amount of WEEE is more than 2 units, they have to pay a flat fee that will cover the transportation costs. However, the amount of units a company is allowed to discharge is limited. Otherwise, recycling plants would be overloaded and it would be not profitable for them to operate.<sup>83</sup>

### 4.3.5 Recycling

The Swedish Ordinance of 2001 did not require the achievement of any specific recycling rate. In 2001, 70% of products collected and sorted were recovered and recycled, 20% were incinerated with energy recovery, and 10 % were disposed of (The Department of Trade and Industry, 2003). Today, reuse and recycling rates for different appliances are set up in the Ordinance on Producer Responsibility for Electrical and Electronic Products on 13 August 2005 and they correspond to the rates set up in the WEEE Directive (refer to Appendix 7).

According to the Ordinance, the producers are responsible for treatment, recycling (including transportation) of discarded EEE. They also they have to ensure WEEE treatment in an environmentally sound manner. Moreover, the producers are obliged to provide information on components and materials used in the products to the treatment facilities. Finally, the producers have informative responsibilities towards the government, to which they have to send a report describing how they are fulfilling their duties.

In order to fulfill the requirements, producers can arrange the recycling and treatment of discarded products by either delegation of the physical responsibility to existing recycling plants, or by cooperation with existing recyclers and establishment of their own recycling facilities. In Sweden, the majority of producers (90% out of all as it was mentioned in section 4.3.3) delegated their physical responsibility to El-Kretsen, which is a collective system. El-Kretsen facilitates the reduction of recycling costs and provides safe and proper treatment of WEEE by selecting recycling plants through open tender offering based on price, geographical location and technical know-how, as well as by requiring environmental certificates from them.

According to the environmental coordinator of SYSAV AB, the plant usually gets a contract with El-Kretsen for a period of two years. In order to get the contract, SYSAV AB has to compete with other recycling companies. Strict requirements from El-Kretsen stimulate recycling plant to develop their offer. Moreover, El-Kretsen takes into consideration the image of the company, as well as whether the company has a stable economic situation that will not lead to the bankruptcy during the period of the contracts. In addition, audits from El-Kretsen make the company to follow all requirements (Kvernes, 2006, 8 August).

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<sup>82</sup> El-Kretsen AB, (2005). Annual report of 2005-2006

<sup>83</sup> Kvernes, Kristofer. (8 August, 2006). Personal interview with environmental coordinator of SYSAV AB

EEE collected by municipalities are transported to one of the specialized recycling plants contracted by El-Kretsen. In 2005, the discarded electrical products were dismantled and treated at 28 different recycling plants. Figure 4-7 shows that 112 000 tonnes of WEEE were recycled by these plants affiliated to El-Kretsen in 2005. The figure also shows the percent represented by specific product groups out of the total amount recycled.

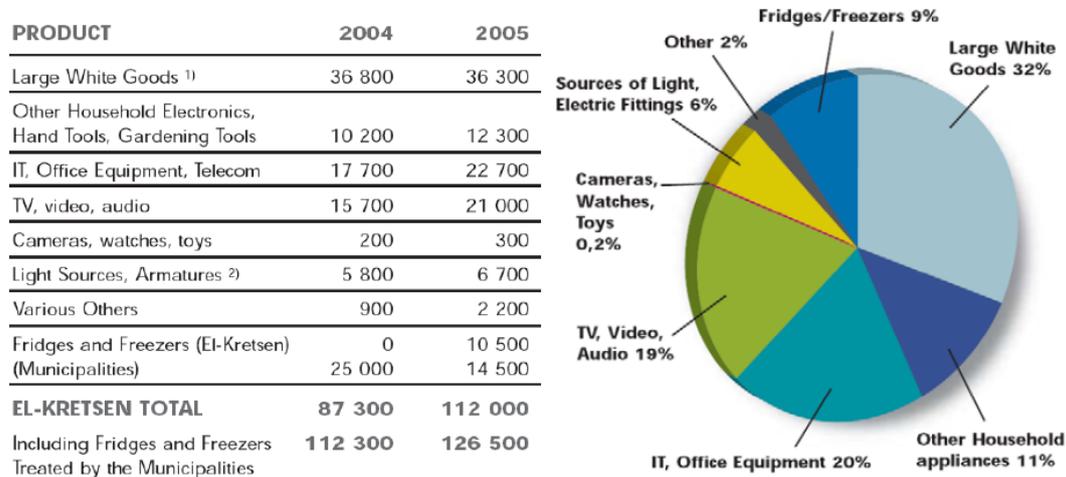


Figure 4-7 Recycling of WEEE in 2005 and percent of specific product group recycled

Source: Annual report of El-Kretsen, 2005-2006

According to the representative of the Department of Electronic Recycling, SYSAV AB, only 1% of WEEE collected by the company is land filled. This is due to the fact that in Sweden, WEEE is defined as hazardous waste and the one of the environmental objectives is that land filling of hazardous waste should be reduced to the minimum. Moreover, there is a landfill tax that makes the disposal of hazardous waste very expensive.

The rest of WEEE is treated in one way or another. For instance, the problem of cathode-ray tubes (CRT) has been solved. While recently CRT was just land filled, incurring big expenses for the company, nowadays, collected CRT are sent to another recycling company in Sweden that crushes them, washes glass containing lead and then adds it to the material used in road construction (Thulin, 2006, August 3).

#### 4.3.6 Financial mechanism

El-Kretsen is financed by its members. It has a financial guarantee as an operating reserve of some months to a year. The organization collects a fee from the producers for every products put on the market. The fee builds an operating reserve fund to guarantee operational activity for a period of a few months. At the end of a set period, costs are reconciled against income. Any surplus is returned to the producers and the fee system adjusted to represent better the waste volumes and costs.

However, in this system there is a risk that the system could collapse if a producer with significant market share was to exit from the market or leave the collective system. It means that the market share of producers left in the system would increase causing their cost to rise as well. This would likely be opposed by the producers remaining in the system because they do not want to be responsible for WEEE of other companies (orphan products).

Since 13 August 2005 (Swedish Ordinance), to avoid the problem of orphan products and to give incentives to producers for design change of products, all producers are required to

finance the future management of their own WEEE from private households deposited at collection sites, independently from whether producers participate in the collective or have set up an individual system. The producer will be not responsible for the products whose owner is out of the business or products of free riders. The guarantee can be in forms of following options: participation by the producer in an appropriate scheme for the financing of the management of WEEE, subscribing to a recycling insurance, a provisioning a blocked bank account.

However, in practice the producers still do not provide the financial guarantee for WEEE management, especially producers participating in the collective system. The main reason of not providing financial guarantee is the absence of regulation that will force the producers to do it. This regulation was supposed to be implemented in August 2006. It was however not, meaning that the problem of financial guarantees is still unsolved in the country.<sup>84</sup>

Moreover, the advantages and disadvantages of different forms of financial guarantee are still discussed in Sweden. The challenge of choosing one is that it is necessary to identify what financial guarantee will provide the safest form of ‘money storage’ for the future, as well as create incentives for design changes.

According to the representative of Lansforsakringar AB<sup>85</sup>, the system will give correct signals to manufacturers only if it is possible to differentiate the premiums based on dismantling and recycling properties, thus representing the real future costs. However, because EEE are complex and durable products, the differentiation of premiums can be complicated to calculate and implement.<sup>86</sup> Moreover, the identification of producers of EEE can also be a complicated task, especially for small appliances. However, according to interviewee from Insurance company, all these issues can be solved and the system for recycling insurance for EEE can be developed if the regulation obliging producers to provide financial guarantee is implemented in the country (Sverkman, 2006, August 17).

Concerning historical waste, producers are responsible for its management based on their current market share. In order to distinguish between historical and new WEEE, it is necessary to mark products in a way that makes it possible to differentiate products put on the market before and after 13 August 2005.

However, in practice, the producers just pay the fee to El-Kretsen based on their market share and collection and recycling of WEEE is carried out without distinction between historical and new waste.

### **4.3.7 Free riders**

Some producers can avoid paying the fee, relying on weak governmental enforcement of the law. However, products of these producers still enter the collection system. The problem creates unequal conditions for producers, because the producers participating in the system incur higher costs. The problem of free riders mostly occurs in voluntary systems.

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<sup>84</sup> Sverkman, Anders. (2006, August 17). Representative, Insurance company Lansforsakringar AB. Telephone interview.

<sup>85</sup> Lansforsakringar AB is Swedish insurance company that also provides recycling insurance as financial guarantee for management of end-of-life vehicles. The company would like to provide recycling insurance for WEEE management.

<sup>86</sup> Kim, N. 2002. Exploring determinant factors for effective end-of-life vehicle policy: Experiences from European end-of-life vehicle systems. IIIIEE Report 2002:07. Lund, Sweden: IIIIEE, Lund University.

To cope with the problem of free riders, the registration scheme has to be set up by the Swedish Environmental Protection Agency. According to the representative of the EPA, there will be a charge of 3000 SEK per year to be registered in the National register. There will also be a charge for the supervision of the producers and the register. However, the opening of the register is postponed until the end of August 2006. According to the Swedish EPA, the reason for the delay is that the EPA has decided to accept producers from other EU countries as well. Hence, more time is needed to translate into English all the material (information, forms, functions, etc.) to be included in the register.<sup>87</sup>

#### **4.3.8 Monitoring and enforcement**

According to the Ordinance, all producers have to send all data concerning how much has been collected, reused and recycled, disposed of to the Swedish Environmental Protection Agency. The information can be used to monitor the performance of WEEE management. El-Kretsen takes charge of producers' information obligation. That is why El-Kretsen sends an annual declaration of the total weight collected and treated for verification by the authorities.

El-Kretsen, in turn, has a right to check the recycling companies and transporters at any time. If a breach to the agreement occurs, El-Kretsen can take measures, such as issuing a warning, or going as far as cancelling the contracts depending on the seriousness of the problem (The Department of Trade and Industry, 2003).

Under the Swedish WEEE legislation, a fine may be imposed on a responsible actor who fails to fulfil obligations (including failure to ensure that EEE is marked and failure to supply required data). The level of the fine depends on the nature and seriousness of the violation. In addition, it is possible to impose an environmental fine on a producer who sells products without informing the Swedish EPA (ranging from SEK<sup>88</sup> 5 000 to 100 000 or approximately EUR 538 – 10 770). Producers can be fined as well if they do not provide the EPA with information regarding how the products are dealt with (with a fine amounting to SEK 20 000 or EUR 2153).<sup>89</sup>

#### **4.3.9 Public participation**

Public participation in an EPR programme for any products is one of the most important prerequisites of successful implementation. Therefore, to increase the awareness of consumers about the existence of the recycling programmes, as well as about environmental and health impacts of WEEE, the national scheme has undertaken a variety of public information campaigns, such as information dissemination through mass media, at retailers, and at municipalities.

According to the environmental coordinator of SYSAV AB, the company distributes the booklet to each inhabitant of the southern Skane region each year, where information about impact on the environment of different waste is explained. Moreover, the booklet also

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<sup>87</sup> Swedish EPA: Producer responsibility for electrical and electronic products. [Online]. Available: <http://www.internat.naturvardsverket.se/> [27 July, 2006]

<sup>88</sup> 1 EUR= 9.288 SEK [Online]. Available: <http://cbrf.magazinfo.ru/textual/EUR/SEK> [1 September, 2006]

<sup>89</sup> Business Alert - EU is a biweekly newsletter providing up-to-date information on the latest developments in EU trade policy and trade regulations. [Online]. Available: <http://www.tdctrade.com/alert/eu0603d.htm> [29 July, 2006]

includes information about existing collection sites and programmes, and about how and where households have to throw away their waste including WEEE.

Disseminating the information and providing convenient and accessible collection sites where consumer can discharge their WEEE free of charge facilitated the achievement of high collection rates of WEEE in Sweden.

#### **4.4 Analysis of factors influencing the implementation of EPR programmes in three case-studies**

In this section the analysis of factors affecting the implementation of EPR programmes for plastic packaging in Belarus and EEE in Lithuania and Sweden will be given. The main focus will be on factors that affect collection and recycling rates, the provision of environmentally sound treatment of collected products, the design change for end-of-life management and the solution of the problem of free riders, historical and orphan products. The choice of focus is justified by the fact that an EPR programme successfully implemented should provide incentives to manufacturers to improve the products and the systems surrounding the life cycle of the products; ensure high collection rate of the product; secure environmentally sound treatment of collected products, and improve the possibilities for re-use and recycling. Moreover, the EPR programme should address the problem of free riders, historical and orphan products.

##### **4.4.1 Factors influencing collection and recycling rates**

As it was mentioned in section 4.3.3 the collection rate in Sweden achieved 14 kg per inhabitant in 2005. One of the main factors that facilitated the achievement of high collection rate is enforcement of EPR legislation for EEE that requires producers to take back WEEE.

The EPR legislation in Lithuania requires producers placing their EEE on the market to achieve a mandatory collection percent set by the Ministry of Environment. This fact also facilitates the increase of collection of WEEE.

The Belarusian programme for packaging requires producers to pay tax on the whole amount of plastic packaging put on the market. Producers can be exempted from the tax if they provide the collection and treatment of at least 20% of their plastic packaging put on the market. Therefore, producers can choose either collect and treat WEEE themselves or to pay tax.

However, according to the representative of MNREP, the way the tax imposed is not appropriate. Though it is profitable for the producers to collect and recycle plastic packaging waste, i.e. the tax rate is rather high, often the producers prefer to pay the tax based on cultural particularity “pay tax and sleep well”. He thinks that obliging producers to pay the total tax in case they do not collect and recycle certain amount of waste will give more incentives for the producers/importers to collect and recycle their packaging waste. This could develop collection and recycling infrastructure.

This necessity of producers’ participation is caused by the fact that money collected from tax is allocated just partly for development of recycling infrastructure. Moreover, the government decides itself to whom give financial support creating unequal conditions for recyclers. Therefore, involvement of producers in the programme could facilitate the development of other recyclers.

These three cases showed that implementation and enforcement of EPR legislation and making the programme mandatory for all producers is one of the main factors that forces producers to participate in the programmes and collect and recycle waste of their products and therefore diverting these wastes from landfills.

Another factor that influences the achievement of targets is setting of the mandatory targets with penalties in case of non-fulfilment of requirements. Moreover, mandatory collection and recycling rates stimulate the development of collection and recycling infrastructure.

In Belarusian programme, the mandatory collection rate that has to be achieved is 20% out of the total weight of plastic packaging put on the market. Producers can be released from the tax if they achieved this rate. Producers can either organize the collection and treatment of plastic packaging from household themselves or contract a recycling company that has established collection network and recycling facility. This provision in the law facilitates the development of collection and recycling infrastructure.

In Belarus, the recycling companies mostly concentrate on towns and cities in order to achieve set collection rate and therefore not all population has access to separate collections points. Another problem in Belarusian programme is that collection requirements are set higher than the existing recycling capacity. The development of recycling facilities cannot meet the rapid increased collection of plastic packaging. There are a lot containers overloaded and not emptied by the recyclers.

For the recycling system to work properly it is also important to develop the market for the secondary materials. The market could be supply or demand driven. A policy instrument that could lead to a demand driven situation is the recycling content legislation. However, there is no such legislation in Belarus requiring producers to manufacture products that contain certain amount of secondary materials. Often for recycling companies, it is hard to find market for recycled products since potential customers prefer using virgin materials in their production process because often it can be cheaper and the quality of virgin materials is perceived to be better.

In Belarus, the process of getting licensing complicates the development of recycling infrastructure. To start the recycling business a company needs go through many institutions to be allowed to operate this type of activity. This complicated and often too bureaucratic process of getting licensing makes a person reluctant to start a business. According to the representative of the MNREP, some years ago the government tried to make the licensing process easier for the recycling companies, however, there were cases when recycling companies did not fulfill their requirements of safe waste treatment and just illegally dumped their waste. Therefore, now the recycling companies have to go through all strict rules and fulfill all requirements in order to be allowed to operate.

EPR programme for EEE in Lithuania also sets mandatory collection target that should be achieved by producers placing their EEE on Lithuanian market. If the producers do not fulfil the requirements, they can be fined. Moreover, since January 2006 the producers that do not participate in the collective system have to provide financial guarantee for future management of their WEEE. The Ministry of Environment can transfer money from an institution that concluded such guarantee with the producers and it allocates this money for WEEE management.

In the Swedish programme for EEE there were no collection and recycling targets set up before 13 August 2005. The Swedish EPA expressed that the main aim of the EPR programme for EEE was to collect and recycle as much WEEE as possible. In addition, to set up a collection target for durable product is a challenging task. The difficulty is that the products sold in one period are not the same as the products discarded in that time period, and sales can vary significantly while the collection numbers stay the same.

The next factor that facilitated the achievement of collection rate in the Swedish EPR programme for EEE is creation of collective producer responsibility organization El-Kretsen that is responsible for fulfilment of the producer responsibilities for organizing collection, transportation, recycling of WEEE in practice and time in operation of the system. Producer responsibility for EEE was proposed since 1995 and it was enacted in 2001. Hence, the Swedish PRO has been in operation for a long time. It is considered that the longer the scheme has been established, the greater the opportunity to run the system more efficiently, negotiate better contracts with suppliers, rationalize overheads and invest in capacity. Usually, establishing a new system leads to extra costs, difficulties can occur in estimation of WEEE volume. Moreover, unforeseen capital investment may take place that are reflected in the overall costs of the new system.<sup>90</sup>

Though any collective system has the disadvantages such as not giving incentives for design change, creation of monopoly that hinders opportunities for cost reduction and recycling technology development, lack of transparency, the collective system El-Kretsen provided the simplest route to meeting the challenges of WEEE legislation.

Moreover, according to the representative of Swedish EPA, individual system faces more administrative challenges than collective one. He expressed that setting individual system for collection requires from a producer a lot of efforts and high initial investments. Furthermore, he considers that the identification of free riders is more difficult under individual systems than it is under collective systems (Eklund, 2006, August 15).

The environmental coordinator of SYSAV AB expressed that creation of individual collective system will cause a lot of confusion among consumers. Moreover, it will lead either to the duplication of collection system in case producers will decide to set up their own collection sites or it will require a lot of containers located within an existing collection site, however, often there is lack of space.

In Lithuania, the EPR programme for EEE is in place from 2006. Thirty EEE producing companies representing 60% of Lithuanian market share established the collective producer responsibility organization Infobalt EPA. However, the PRO has been operating for just 3-4 months, therefore it faces with difficulties in negotiation with others actors, for example it does not have power yet to influence the decisions made by municipalities and the Ministry of Environment. For example, according to the representative of Infobalt EPA, the association would like to set up its own collection and recycling infrastructures, as it is allowed according to the law, however, municipalities prefer to give permit for collection and recycling of WEEE to the recycling companies that have big lobbying power in the country and contacts among the authorities. According to the interviewee, this fact leads to economical inefficiencies for producers participating in the collective scheme who cover the cost incurred by the recycling companies not being able to have control over the collection system or set its own collection

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<sup>90</sup> Savage, Matthew, Ogilvie, Steve, Slezak, Jozsef, Artim, Eniko, Lindblom, Josefina, & Delgado, Luis. (2006). Implementation of the Waste Electric and Electronic Equipment Directive in the EU. European Commission, Luxembourg

and recycling infrastructure. The interviewee from Infobalt EPA considers that association could operate a more efficient system.

There is no collective system in Belarusian programme for plastic packaging, the producers/importers have either to pay tax that then will be reimbursed to recycling facilities or collect and treat plastic packaging from households themselves or contract with recycling companies. However, as it was mentioned in section 4.1.2 the collection and recycling of plastic packaging is organized both by public and private recycling facilities at the same time that causes duplication and inefficiencies in the system. In addition, some of the equipment used is relatively old, for example, the trucks used for waste collection, which do not have equipment to compact waste (pressing waste to reduce its volume during transport). In practice, this means that transport trucks need to make more collection rounds than necessary, which increases the cost of transport significantly.

Moreover, the scope of the EPR programme also has impact on collection rate, the broader the scope the easier to achieve the set collection and recycling targets. The Swedish and the current Lithuanian programmes for EEE cover 10 product groups listed in the WEEE Directive (refer to Appendix 7). However, in 2003, only IT and telecommunication equipment, lighting equipment and consumer products were collected and treated in Lithuania. It could take time to develop appropriate scheme for collection and treatment of all EEE covered by Directive, as above mentioned, a new system requires more time and efforts, capital investments in order to achieve the required results.

In addition, concerning the scope of the programme, the limited scope creates an unfair subsidy for producers of products not covered by the programmes. Moreover, it can force producers to switch to another type of products, as likely happened in the Belarusian programme where initially programme covered just PET plastic packaging. Only after a year, the scope of the programme was expanded to other types of plastic packaging. The limited scope can also create the confusion among the consumers who will not aware about which products are covered by a programme and which are not.

Allocation of responsibilities for collection can also influence the collection rate. In Swedish case the responsibility for collection of WEEE is allocated to producers according to the law. However, in practice El-Kretsen made an agreement with Association of municipalities that makes municipalities responsible for organizing and running the infrastructure for collection of WEEE. It was decided to allocate the responsibility for collection to municipalities because they have already established collection infrastructure – about 650 collection points spread around the country (El-Kretsen AB, 2005). The system is simple for households to use, as they can return their electrical waste at the same place where they dispose bulky waste. It is also convenient for producers, who through El-Kretsen get access to a nationwide well-established collection system.

However, making municipalities responsible for collection contradicts EPR principle that requires producers to be responsible for collection and recycling. The existing approach can be called as shared responsibility but not producer responsibility. Moreover, producers who want to be responsible individually do not have access to established collection system. This means that individual producers have disadvantageous position in comparison with producers participating in collective system. This fact discourages the development of individual systems for producers that want to recover their own WEEE.

In Lithuanian programme for EEE the allocation of responsibility for collection is still unclear. The producers are refusing to be responsible for collection and consider that the

municipalities have to be responsible for collection of WEEE. CECED, representing the European committee of household appliance manufacturers, expressed: «*achievement of collection rate of 4 kg/inhabitant is the responsibility of the MS and not for the producers. The Directive clearly says that MS shall ensure that the rate is achieved by 31 December 2006. How this is implemented depend on negotiations and internal structure of economy, but this is not the producers responsibility*».<sup>91</sup>

However, according to the representative of Infobalt EPA, in case municipalities bear physical responsibility for collection of WEEE producers are financially responsible and cover all cost linked to collection and recycling. Being financially responsible, producers (collective PRO) do not have control over the collection system that leads to tension between municipalities and PRO because it believes that it could operate a more efficient system.

The collection schemes in Lithuania are fragmented and organized by municipal authorities/their companies, retailers, recyclers. This fact leads to confusion and inefficiency in the system. Moreover, infrastructure for collection of WEEE from households free of charge is not sufficient in terms of geographical distribution and existing capacities (Sleinotaite-Budriene, 2003).

According to the National Strategic Waste Management Plan, the municipalities should construct at least one bulky waste site per 100 000 people by 2007 in order to optimize the availability and geographical distribution of collection points for WEEE. If the establishment of the site is not possible, municipalities are obligated to provide other means of waste collection. The bulky waste sites shall be used to collect, sort and transfer different types of waste including WEEE to the waste treatment companies.<sup>92</sup> It is believed that with proper improvements (technical, logistics, and administration) these collection points could remain as a strong alternative collection route within the future WEEE management system in Lithuania until producers will set up their own systems.

In Belarus, producers bear the financial responsibilities for collection and treatment of 20% of plastic packaging or they pay tax on all amount of plastic packaging put on the market. However, the physical responsibility for collection and treatment is not clearly defined. Producers have right to set up their own system or it can be organized by either municipal collection services or by private recycling companies. Presence of many actors creates confusion and leads to inefficiency.

One of the most important factors that influenced the collection rate is public participation in the programme. To involve public participation in collection three factors need to be considered:

- financial incentives for consumers to separate certain type of waste from general waste stream and bring it to the designated collection points and deposit – refund system is considered to be the most efficient instrument used in order to achieve high collection rates;
- level of convenience of collection system - how much of an effort the consumer should take to dispose of the waste product at the designated collection system; and

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<sup>91</sup> Bremere, Ingrida. (2003, November). *Workshop on WEEE: Implementation of the EC Directive 2002/96/EC in the Baltic States*. [Online]. Available: [www.bef.lv/data/file/WEEE\\_report.pdf](http://www.bef.lv/data/file/WEEE_report.pdf) [20 July,2006]

<sup>92</sup> Government of the Republic of Lithuania (2006, January). National waste management plan revised. [Online]. Available: [http://www.lrv.lt/main\\_en.php?id=en\\_aktualijos\\_su\\_video/p.php&n=103](http://www.lrv.lt/main_en.php?id=en_aktualijos_su_video/p.php&n=103) [20 July, 2006]

- level of information and awareness; that is, how well known the system is and how important the public finds it to comply with the intended system. Another side of this factor is whether the system is understandable for the ordinary person or not (Lindhqvist, 2000).

Therefore, in order to achieve a high collection rate either all of these factors should be in place or combination of some of them.

In order to increase public awareness about the impact of WEEE and the existence of EPR programme, the Swedish national scheme has undertaken a variety of public information campaigns, such as information dissemination through mass media, at retailers, and municipalities. According to the representative of El-Kretsen, two factors attributed to high collection rate of WEEE in the country and they are building of collection on existing infrastructure and properly educated public on separate waste collection (Bremere, 2003).

According to the representative of the Lithuanian collective system, it has been realized that the consumer awareness is one of the important factors that leads to increase of collection rate. Therefore, Infobalt EPA plans to carry out educational campaigns increasing the awareness of population about the impact of WEEE on the environment and human health.

In Belarus, none of the factors affecting public participation mentioned above works properly. First there is no financial incentive for consumers to bring back plastic packaging. All actors interviewed in Belarus expressed that a financial incentive needs to be provided to the consumers in order to increase their participation. Moreover, in order to bring back plastic packaging there should be designated collection points or reverse vending machines in the shops. However, the amount of these collection points is not large enough to ensure their availability to all population. Moreover, there is no collection system running by shops where people can return their plastic packaging and be refunded. Though since the implementation of EPR programme the public participation has been increased the representative of recycling company expressed that it still need to be improved and it can be achieved by increasing the awareness and disseminating the information about the existing system. There are ads on TV programme promoting source separation of plastic packaging; however, the public awareness is still low and the number of information campaigns should be increased.

The achievement of reuse and recycling rates in the Swedish EPR programme for EEE was facilitated by the restriction on land filling of hazardous waste (and WEEE defined in Sweden as hazardous waste). The imposition of landfill tax also facilitated the diversion this type of waste from the general waste stream as well as the development of recycling infrastructure and market for the secondary materials. Today there are 28 recycling plants employed by El-Kretsen that are geographically spread around the country. This fact could provide reduction of the transportation costs. Furthermore, the increase in the communication between designers of products and personnel in the recycling plants also facilitated the achievement of recycling rates. Producers provided information to recycling companies about their products such as location of hazardous substances, manner of dismantling, types of materials used (Thulin, 2006, August 3).

With regards to recycling system in Lithuania, recycling capacities are larger than generated waste amount. Low collection rate of WEEE could affect the profitability of the recycling plants because the recycling costs depend a lot on the amount of WEEE recycled. Furthermore, the achievement of recycling rates is complicated by the fact that WEEE containing valuable metals are recovered and not reported as WEEE treatment activities.

The table below summarizes all factors influencing the collection and recycling rates that were discussed in this section.

Table 4-1 Summary of factors influencing the achievement of collection and recycling rates

Country	Factors leading to achievement of collection and recycling rates	
<b>Sweden</b>	<ul style="list-style-type: none"> <li>• EPR legislation (take back requirement, mandatory recycling rates)</li> <li>• Establishment of collective producer responsibility organization and long time in operation</li> <li>• Collection of WEEE by municipalities, presence of established infrastructure</li> <li>• Distribution of collection sites around the country, their convenience and access</li> <li>• The broad scope of products covered by the EPR programme</li> <li>• Dissemination of information, increase in public participation</li> <li>• Restriction on land filling and imposition of landfill tax</li> <li>• Development of recycling infrastructure and market for secondary materials</li> <li>• Distribution of recycling plants around the country</li> <li>• The communication between downstream and upstream</li> </ul>	
	Factors facilitating the achievement of collection and recycling rates	Factors hindering the achievement of collection and recycling rates
<b>Lithuania</b>	<ul style="list-style-type: none"> <li>• EPR legislation (mandatory collection and recycling targets)</li> <li>• Penalties in case of not achievement of set targets</li> </ul>	<ul style="list-style-type: none"> <li>• Short time in operation of collective system: no power to influence authorities decision, no real possibility to set collection points by PRO no control over collection system leading to inefficiency</li> <li>• No clear allocation of responsibility for collection, fragmentation of the collection schemes</li> <li>• Collection infrastructure is not sufficiently geographically distributed and existing capacities are low</li> <li>• Low level of public participation due lack of available and convenient collection system, low level of information dissemination</li> <li>• Treatment capacities are larger than generated waste amount, low collection rate of WEEE affects the profitability of the recycling plants</li> </ul>
<b>Belarus</b>	<ul style="list-style-type: none"> <li>• EPR legislation (tax imposition in case of not achievement of mandatory collection and recycling targets)</li> </ul>	<ul style="list-style-type: none"> <li>• Low mandatory collection and recycling targets</li> <li>• Short time in operation of EPR legislation, lack of EPR programme experience</li> <li>• Collection infrastructure is not developed enough, no access to separate collections points for all population</li> <li>• No clear allocation of responsibility for collection, fragmentation of the collection schemes</li> <li>• Focus of recycling plants just on towns and cities</li> <li>• Low level of public participation due to lack of financial incentives for consumers, lack of available and convenient collection system, low level of information dissemination</li> <li>• Collection target is set before recycling capacity online</li> </ul>

	<ul style="list-style-type: none"><li>• Market for secondary materials is not developed enough (no recycling content legislation)</li><li>• Complicated process of getting licensing</li><li>• Use of old equipment which increases the transportation cost</li></ul>
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#### 4.4.2 Factors influencing the provision of environmentally sound treatment of collected products

Sound waste treatment is an important element for the protection of human health and the environment. It also helps to avoid the loss of resources and pollution emissions.

In the Swedish EPR programme for EEE the provision of environmentally sound treatment of collected products is facilitated by the enforcement of Ordinance on Producer Responsibility for Electrical and Electronic Products that requires all electrical and electronic equipment to be treated in a correct manner. These provisions are contained in the Swedish Environmental Protection Agency Regulations (NFS 2005:10) on Professional Pre-treatment of Waste Consisting of Electrical or Electronic Equipment. The result of waste management has to be reported to the Swedish EPA. In case the requirements concerning waste management are not fulfilled, the responsible actor can be fined.<sup>93</sup>

Moreover, the treatment of collected products can be performed only by facilities that have the certificates that secures safe treatment. And this certificate is one of the mandatory criteria that allow the recycling company to be employed by El-Kretsen. In addition, the recycling companies and transporters can be checked by El-Kretsen at any time. If the breach of the agreement occurs, El-Kretsen can take measures like issuing a warning or the cancellation of the contracts depending on the seriousness of the problem.

There are similar requirements in Lithuania: in order to stimulate safe waste management any recycling company is obliged to get licensing from the Ministry of Environment to be allowed to collect and treat WEEE. Moreover, to be employed by a municipality the recycling companies go through competitive tendering process and one of criteria is provision of safe waste management treatment. Annually a recycling company has to provide a report confirming the amount of collected and treated WEEE, also it should provide information confirming safe WEEE treatment otherwise the company could be fined.

In Belarus it is also necessary for a recycling company to get a licensing from MNREP to be allowed to operate, however, the process of getting licensing is very complicated and too bureaucratic that makes a person reluctant to run a business. In addition to licensing, annually any company in the country is checked by controlling inspectorate how the former fulfils the requirements concerning environmental protection. In case a company breaks environmental protection law, it can be fined. However, often the requirements from inspectorate are stricter to the private waste management facilities than to public ones. This fact leads to unequal conditions for recyclers and placing some of them in disadvantageous position. Moreover, there are cases of bribery in the country that also hinders the fulfilment of requirements of sound treatment.

Despite the similarities in requirements to provide environmentally sound treatment the term “environmentally sound treatment” can be perceived differently in different countries, therefore the level of safety and the cost of treatment may vary significantly.

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<sup>93</sup> Swedish EPA: Producer responsibility for electrical and electronic products. [Online]. Available: <http://www.internat.naturvardsverket.se/> [27 July, 2006]

Table 4-2 Summary of factors influencing the provision of environmentally sound treatment of collected products

Country	Factors influencing environmentally sound treatment of collected products
<b>Sweden</b>	<ul style="list-style-type: none"> <li>• EPR legislation – the requirement to treat WEEE in safe manner</li> <li>• Regulations (NFS 2005:10) on Professional Pre-treatment of Waste Consisting of Electrical or Electronic Equipment</li> <li>• Requirement of certificate from recycling companies by El-Kretsen</li> <li>• Audits by El-Kretsen</li> <li>• Submission of data to Swedish EPA</li> <li>• Use of penalties, cancellation of contracts with El-Kretsen</li> </ul>
<b>Lithuania</b>	<ul style="list-style-type: none"> <li>• Requirement of licensing from the Ministry of Environment</li> <li>• Competitive tendering process (safe waste management treatment is one of criteria) by municipalities</li> <li>• Reporting to the Ministry of Environment</li> <li>• Use of penalties</li> </ul>
<b>Belarus</b>	<ul style="list-style-type: none"> <li>• Requirement of licensing from the MNREP, however, the process is very complicated and bureaucratic</li> <li>• Audits by controlling inspectorate</li> <li>• Use of penalties</li> </ul>

#### 4.4.3 Factors influencing the design change for end-of-life management

One of the main aims of an EPR programme is to provide incentives to manufacturers to design products that generate less environmental impacts at the end-of-life phase. Designing their products producers can make changes *at source*, thus preventing or reducing problems before they occur (Tojo, 2001).

Industries, government and experts generally assume that an EPR programme based on individual responsibility (a producer takes responsibility for the end-of-life management of his own products) would promote design change more than one based on collective responsibility (producers in the same product group together fulfill their responsibility for the end-of-life management of their products regardless of the brand). This can be explained by the fact that in individual responsibility the producers are responsible for their own products, therefore, producers have an incentive to change their product's design if it reduces recycling costs. In collective responsibility, there are little or no incentives for a producer to spend extra resources improving product design to reduce environmental impacts from end-of-life if other producers do not do it i.e. producers reducing environmental impacts from their products would subsidize the producers who did not make such efforts.

The Swedish EPR programme for EEE is based on collective responsibility where the fee paid by producers is just differentiated based on the product group, but the fee within the product group is flat. On the one hand, the collective system in Sweden can be blamed in not

providing incentives to the producers to improve the design of their products. On the other hand, EEE is complex, durable products, therefore it is difficult for the producers to pay in accordance with the environmental impacts their products pose at the end-of-life. The longevity of such products creates uncertainty regarding the actual duration of the product use, the development of future recycling technologies and the development of the markets for recycled materials. The number of components and materials used within one product raises the level of uncertainty even more.

Tojo in 2001-2002 conducted a study of manufacturers of EEE and cars in Sweden and Japan where she investigated the manufacturers' perception of the role of EPR on their environmentally related activities. The one of main findings was that upstream measures, both in terms of reduction of hazardous substances and enhancement of source reduction of material use, reuse and recycling, have been undertaken in two industry sectors in both countries (Tojo, 2001).

According to the study, the main factor that provides the big incentives for the producers for environmentally conscious design is *EPR legislation* – high targets facilitated the design change for increased recyclability. She also found out that there are other factors providing positive impacts on EEE manufacturers in Sweden in taking measures to improve the design and reduce the environmental impacts from the end-of-life management of their products. These factors include:

- *company's internal drivers*;
- *customers' demands* – the environmental awareness and concern of the Swedish customers are high;
- *economic benefit* due to high material value;
- *potential competitive advantages* - design for the end-of-life gives potential competitive advantages to the companies in the future and
- *image* - it is important for companies to keep their image as an environmentally conscious company.

However, these factors facilitating the design change can be not a case for other countries where environmental concern and awareness within a company and among consumers is not big enough to provide incentives for the producers to improve the product design.

Another factor that facilitates the design improvement is transposition of RoHS Directive into national legislation. It helps to reduce the usage of hazardous substances and therefore decrease the impact of the product on the environment at the end-of-life stage. Furthermore, as a result of EPR requirements, especially in relation to reuse and recycling, the communication between designers and recyclers has been increased, as it was mentioned in section 4.4.1, that also made producers to think about the design of their products.

Since 13 August 2005, a date of the enforcement of the Ordinance, producers have been obliged by law “*to supply the information about the contents of products that is necessary in environmental or health terms in order to facilitate maintenance, upgrading, repair, reuse, pre-treatment, material recovery, energy*

*recovery and disposal of all or parts of the products*”.<sup>94</sup> This provision could make easier the dismantling and recycling of EEE.

In addition, restriction on use of certain substances facilitated the communication between producers with their suppliers requiring them to switch to other substances. Therefore, in order to survive on the market, material suppliers started to develop alternative with less hazardous substances (Tojo, 2004).

However, according to Tojo findings, the producers faced with difficulties undertaking the measures to reduce the environmental impact from the end-of-life management from their products. They can be summarized as following:

- *competing design priorities*, for example, use of certain substances, such as brominated flame retardants is required by some national legislation for safety reasons, while being phased out in other countries;
- *cost* - it is difficult to justify the use of recycled plastics that would be more expensive than using virgin plastics, moreover costs are required to develop new technologies;
- *collective financial responsibility* - companies expressed the necessity of establishing a system where producers could become responsible for their products individually. This will give them incentives to make efforts to improve the design for the end-of-life management of the products; otherwise, it gives competitive advantage to the producers who do not take such efforts.

In the Lithuanian EPR programme for EEE producers can participate in collective PRO Infobalt EPA or can contract individually with waste management facilities that will collect and treat certain percent of WEEE set by the Ministry of Environment and producers will cover the costs. The former case sounds like individual responsibility that, according to the above mentioned, could provide incentives to the producers for design change for end-of-life management. However, according to the representative of Infobalt EPA, in both cases WEEE are collected regardless brand, thus eliminating incentives for design change.

However, as in the Swedish case, the transposition of RoHS Directive into Lithuanian national law could give incentives to improve the design for end-of-life management. Restricting use of certain substances could lead to improvement of product design that could reduce the impact of the product on the environment during end-of-life stage.

With regards to the existing approach of the collection and treatment of plastic packaging in Belarus there is no collective producer responsibility organization. The existing system in a way can be considered as an individual system where producers contracts with waste management facilities in order to transfer physical responsibility for collection and treatment of 20% their plastic packaging put on the market. However, in Belarusian EPR programme the plastic packaging is collected regardless brand that does not give incentives to companies to improve the content of the packaging.

However, the representative of TV set producing company expressed that implementation of EPR legislation led to reduction of use of plastic packaging. This can be an example of how EPR legislation affects design change of product.

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<sup>94</sup> Ordinance on producer responsibility for electrical and electronic products, 13 August 2005. (SFS 2005:209). Sweden. Section 19

However, the factors affecting the design change for end-of-life management in the Belarusian and Lithuanian EPR programmes needs further investigation.

Table 4-3 Summary of factors influencing the design change for end-of-life management

Country	Factors facilitating the design change for end-of-life management	Factors hindering the design change for end-of-life management
Sweden	<ul style="list-style-type: none"> <li>• EPR legislation</li> <li>• Company's internal driver</li> <li>• Customers' demands</li> <li>• Economic benefits</li> <li>• Potential competitive advantages</li> <li>• Image</li> <li>• Enforcement of RoHS Directive</li> <li>• The communication between downstream and upstream</li> <li>• Requirement to supply information about EEE content to the recycling companies</li> </ul>	<ul style="list-style-type: none"> <li>• Flat fee within product groups</li> <li>• Competing design priorities</li> <li>• Cost</li> <li>• Collective financial responsibility</li> </ul>
Lithuania	<ul style="list-style-type: none"> <li>• Enforcement of RoHS Directive</li> </ul>	<ul style="list-style-type: none"> <li>• Collection of WEEE regardless brand</li> </ul>
Belarus	<ul style="list-style-type: none"> <li>• EPR legislation</li> </ul>	<ul style="list-style-type: none"> <li>• Collection of packaging regardless brand</li> </ul>

#### 4.4.4 Factors influencing the solution of the problem of free riders, historical and orphan products

Key to the successful operation of a national compliance system is ensuring that producers and other players in the WEEE supply chain feel that the burden of compliance is fairly shared. Free riders, historical and orphan products create equity problems for scheme members who have to pick up the additional costs for the recycling of additional product. The problem of free riders can arise in any country where small manufactures and importers exist only a very short period of time and where the national industry registration systems are not fully developed or fail to recognize all manufactures or importers. National collective compliance schemes are generally thought of as a way of ensuring good market coverage and reducing the problems of free riders, if full enforcement by competent authorities is guaranteed. Enforcement is considered the key issue regarding the cost effectiveness and equity of the schemes.<sup>95</sup>

The problem of free riders exists as well in Sweden; however, the percent of free riders in the Swedish EPR programme for EEE is less than 10%. According to the representative of the Swedish EPA, the main reason of such small free riders percent is creation of collective compliance scheme for WEEE that was making efforts to identify free riders itself. The EPA

<sup>95</sup> Savage, Matthew, Ogilvie, Steve, Slezak, Jozsef, Artim, Eniko, Lindblom, Josefina, & Delgado, Luis. (2006). Implementation of the Waste Electric and Electronic Equipment Directive in the EU. European Commission, Luxembourg

representative considers that government should not intervene too much because it can spoil the relationship between producers and the government, according to him, there is an element of industry self-policing. Moreover, long time in operation of collective system facilitated the identification of free riders.

However, the government plays as well essential role in enforcement of legislation. According to the representative of EPA, the government provides the enforcement through the registration scheme (however, the opening date is postponed), reporting and sanctions against offenders. According to the representative the penalty for not participating in EPR programme can reach EUR 10 770, he considers that this severe penalty forces producers to participate in the system.

In the Lithuanian compliance scheme the market share of the producers participating in the collective system is 60% of total sales (Kriukonis, 2006, 26 July). The rest producers either contract with recycling companies themselves or not participate in the programme at all.

The problem of free riders can be explained by the short time in operation of compliance scheme in the country. The Infobalt EPA got the licensing to operate just in April –May 2006 that means the system has been in operation just 3-4 months. It is considered that the longer the scheme has been established, the greater the opportunity to identify free riders. Another reason of free riders is that the system of registration of all producers is not finally developed yet in the country. According to the *Rules on registration of producers and importers* producers and importers placing EEE on the Lithuanian market must be registered from January 2006. However, the representative of Infobalt EPA expressed that there are only 200 companies registered in the Central register, but there are approximately 1000 companies placing their EEE on the market. It can be explained by the small size of the producers and importers that complicates the process of identification of all free riders. In addition, the enforcement of EPR legislation might be not strict enough to force all producers placing their EEE on the market to participate in the programme.

Moreover, there is uncontrolled import of second-hand EEE products in the country. It was investigated that roughly 30-50 % of all imported products covered by the 2002/96/EC Directive from the period of 1995-2002 were second-hand. In case of second-hand products, it is impossible to define the producer responsibility under Directive and therefore the financing of treatment becomes unclear (Sleinotaite-Budriene, 2003, September).

In the Belarusian programme for plastic packaging, presence of strict requirement for registration of all tax payers in the country and making the programme mandatory helps to avoid the problem of free riders. However, there are cases when the government supported the producers that are in poor economic situation, especially state-owned companies, therefore, some of them did not participate in the programme and did not pay the tax. This fact creates unequal conditions for different producers and put producers participating in the programme in disadvantageous position.

In the table below there is a summary of factors affecting the identification of free riders in three case studies.

Table 4-4 Summary of factors influencing the problem of free-riders

Country	Factors facilitating the solution of free-riders problem	Factors hindering the solution of free-riders problem
<b>Sweden</b>	<ul style="list-style-type: none"> <li>• Collective compliance scheme, element of industry self-policing</li> <li>• Long time in operation of the system</li> <li>• Enforcement through reporting and severe penalties</li> </ul>	<ul style="list-style-type: none"> <li>• The registration of all producers is not in place yet</li> </ul>
<b>Lithuania</b>	<ul style="list-style-type: none"> <li>• Mandatory EPR programme</li> </ul>	<ul style="list-style-type: none"> <li>• Short time in operation of the system</li> <li>• The registration is not in place yet</li> <li>• The small size of producers</li> <li>• Uncontrolled import of second-hand EEE</li> <li>• Not strict enforcement</li> </ul>
<b>Belarus</b>	<ul style="list-style-type: none"> <li>• Mandatory EPR programme</li> <li>• Strict registration of all tax payers</li> </ul>	<ul style="list-style-type: none"> <li>• Exclusion of producers with poor economic situation</li> </ul>

With regards to the problem of historical waste, according to the Swedish Ordinance, producers have to share the cost based on their current market share. With regard to orphan products, the financial guarantee for future WEEE management has to be provided by all producers placing their EEE on the Swedish market, despite whether producers participate in EPR programme individually or collectively.

However, producers in Sweden do not provide yet the financial guarantee. Participating in the system they pay flat fee to El-Kretsen to create an operating reserve of some months to a year. The main reason for not provision of financial guarantee by producers in the country, according to the representative of insurance company Lansforsakringar AB, is lack of regulation requiring producers to provide such guarantee. Producers in Sweden were lobbying for being only responsible for their own waste and not incur cost for WEEE recycling of other producers. Therefore, producers approve the financial guarantee; however, the regulation has to be implemented.

Moreover, there is still discussion what type of financial guarantee will give right signals to the producers to improve the design of their products. According to the interviewee from insurance company, the flat fee paid participating in collective system El-Kretsen and being responsible for all WEEE regardless brands does not give incentives to the producers to improve the design of their products. Therefore, the representative expressed that the premium that will be paid by producers in the future recycling insurance system should be differentiated based on the type and content of EEE that will stimulate the producers to improve the design of the products. However, the system of recycling insurance for WEEE is not in place yet (again due to lack of regulation). When establishing system of financial guarantee it would be necessary to consider many factors such as identification of the producers of EEE, for large equipment it can be easy, however, for small appliances it can be complicated. Moreover, in order to differentiate the premium the life span and content of EEE should be taken into consideration. However, the interviewee believes that all these issues can be solved and the system for recycling insurance for EEE can be developed if the regulation obliging the producers to provide financial guarantee is implemented in the country.

In the Lithuanian EPR programme for EEE there is no clear distinction between historical and new WEEE. According to the representative of Infobalt EPA the financing of WEEE management based on current market share will be not implemented soon because there is no clear picture of all producers placing their EEE on the market. In the country, the producers have to achieve the certain percent out of whole amount of EEE put on the market. When collecting WEEE the division on new and historical waste is not carried out.

However, since January 2006 producers have to ensure that WEEE will be managed. The guarantee is required if producers decide to take back WEEE themselves or set up individual contracts with waste managers. However, the guarantee is not required if the producers participate in collective system discouraging the development of individual systems.

In case producers do not fulfill their obligation to collect and treat certain percent out of all EEE manufactured the appropriate amount of money could be transferred to the Lithuanian state budget to finance WEEE management.

Concerning financial mechanism in Belarus the tax imposed on plastic packaging can be a good financial guarantee that will cover the collection and treatment costs if a producer decides not to participate in collection and treatment. However, if the producers decide to collect and treat plastic waste he will be financially responsible just for 20% of plastic packaging that means the costs of collection and treatment of the rest 80% plastic waste will be paid by municipalities. This fact as well contradicts with Extended Producer Responsibility principle that requires producer be completely responsible for collection and treatment of waste.

Table 4-5 Summary of factors influencing the problem of historical and orphan products

Country	Factors facilitating the solution of historical and orphan products problem	Factors hindering the solution of historical and orphan products problem
Sweden	<ul style="list-style-type: none"> <li>• Collective compliance scheme</li> <li>• EPR legislation requiring financial guarantee</li> </ul>	<ul style="list-style-type: none"> <li>• Financial guarantee is not in place yet</li> <li>• Lack of regulation requiring financial guarantee</li> </ul>
Lithuania	<ul style="list-style-type: none"> <li>• Mandatory EPR programme</li> <li>• The provision of financial guarantee since January 2006 by individual producers</li> </ul>	<ul style="list-style-type: none"> <li>• No clear distinction of historical and new products, collection without division on new and historical waste</li> <li>• No provision of financial guarantee by producers participating in the collective system</li> </ul>
Belarus	<ul style="list-style-type: none"> <li>• Mandatory EPR programme</li> <li>• Tax imposition on producers responsibility</li> </ul>	<ul style="list-style-type: none"> <li>• Not producer responsibility but shared responsibility</li> </ul>

All these factors influencing the implementation of EPR programmes that were discussed in this chapter will be taken into consideration when the conclusion of the future possibility for implementation of EPR for EEE in Belarus will be given.

## **5 EPR for EEE in Belarus: actors, potential and barriers**

In order to find out the opinion and vision of potential EPR programme for EEE by various stakeholders, the author visited and interviewed the following actors: the head of Waste Management Department from Ministry of Natural Resources and Environment Protection, the manufacturer of TV sets and video equipment – “Horizont”, the recycling company - centre for reuse of secondary materials - department of “BelResources” concern, and dismantler - TSNITTU – research institute. Moreover, a telephone conversation with the head of Environmental department of the one company producing refrigerators and freezers “Atlant” was carried out, which helped to understand what factors will influence the company’s participation in the potential EPR system. In the following sections the profile of the interviewed actors, list of issues discussed during interviews and answers gained from them will be presented. Moreover, the results of small-scale survey conducted to identify factors influencing public participation are given in this chapter.

### **5.1 Profile of interviewed actors**

A brief profile of actors that could be involved in the potential EPR programme for EEE in Belarus and that can be affected by the programme is presented in Appendix 5. The purpose of giving this overview is to provide the reader with some ideas regarding the main activities carried out by the actors involved, as well as the representativeness of the comments provided by the interviewees.

The description is limited to the time and location, the main services and activities provided by the actors, the role of the interviewee in the organisation. The information presented below is material collected either from the actors or taken from actors websites, unless specified otherwise. The full list of interview and their position is presented in the Appendix 1, together with the websites of the actors.

### **5.2 List of issues discussed in the interviews**

The main focus area of the interview with the Waste Management Department of MNREP was:

- to identify the place of the problem of WEEE in the environmental policy of the country,
- to understand the existing approach of WEEE handling,
- to find out whether government gives the incentives to the producers to recycle waste, use secondary materials, and to reduce or eliminate the use of hazardous substances,
- to find out about the recent development of collection and recycling infrastructure in the country and the main factors and barriers influencing its development, and whether government provides support to the recycling companies.

Moreover, the interview was directed to find out future vision of the potential EPR programme for EEE and to identify the main barriers for the implementation of EPR legislation and what measures could be taken to overcome the barriers. In addition, the questions concerning the current EPR programme for plastic packaging were asked to

understand the problems arising during its implementation and operation. The exact list of questions asked the representative of Ministry is presented in Appendix 6.

Concerning the EEE producer, the main purpose of the interview was to find out whether the company was concerned with the impact of product on the environment at the end-of-life stage and what measures are taken by the company to reduce the impact. Part of the objective was also to identify the main driving forces, barriers to the company that facilitate or hinder the consideration of life cycle impact of the product. Also the aim of the interview was to find out whether the company thought about providing the leasing of product instead of selling it. Moreover, the author aimed to find out the company's opinion and attitude to implementation of EPR programme for EEE and the main difficulties that can arise during its implementation. Furthermore, the interview was aimed to discover how the company sees the scheme of EPR programme for EEE and whether the programme will influence the design of the product and what kind of incentives, responsibilities should be given in order to provide such motivation. The total list of questions asked the representative of the EEE producer is presented in Appendix 6.

In regards to the recycling company and dismantler, the interviews were focused on the following issues: types of waste treated by the company, the organization of collection, transportation and treatment scheme. Moreover, the author tried to find out the main incentives to the companies to carry out their activities and the main barriers preventing the development of the companies, their opinion about factors facilitating the development of recycling infrastructure as well as the market for secondary materials. Also, such issues as whether companies get the support from the government and what their attitude to the potential implementation of EPR programme for EEE were identified. The questions asked the interviewees can be found in Appendix 6.

### **5.3 View of actors**

The section presents the answers gained from the actors that can be involved in the potential implementation and development of EPR programme for EEE in Belarus.

Often the interviews did not follow the order and some of the answers given are maybe related to other questions. Therefore, the comments given during the interviews were analyzed in order to find out whether the comments answer the questions listed above and in Appendix 5.

In some cases, answers to some questions were not given, however, if the answers were received concerning the focus area the author did not try to get answers for other questions.

The interviews were conducted in Russian and then were translated in English by the author.

#### **5.3.1 Waste Management Department of the Ministry of Natural Resources and Environmental Protection**

According to the interview with the representative from Waste Management Department, the consumption of EEE is increasing in the country due to improving of wellbeing; therefore, the percentage of the WEEE in municipal waste stream has a tendency to increase. Estimation of WEEE generation was not conducted in the country, the reason for this is lack of awareness about the problem in the Ministry, and up to now, the problem has not been urgent because people were accumulating their WEEE at their home and did not throw WEEE at the disposal site.

The representative considers that the problem of collection and treatment of WEEE will become one of the priorities in Belarus. He believes that this problem will need a solution not just only because of valuable materials in the EEE that can be recovered and recycled but also because of hazardous substances that EEE contain and that can be released to the environment.

MNREP conducted investigation in order to find out different foreign approaches dealing with WEEE and concluded that the most effective and efficient way of dealing with WEEE is application of the extended producer responsibility principle. Therefore, the law “About waste” is being revised by MNREP and the principle of EPR will be embedded in the law. This will be done in order to make the producers financially responsible for collection, recycling and reuse of generated WEEE. This draft is currently under the usual process of review and acceptance.

The interviewee believes that EPR legislation can work in the country only if it is supplemented with economic instruments. Based on the experience of tax imposed on plastic packaging, MNREP suggested expanding the scope of products covered by the tax in order to include EEE. According to the head of WMD, at the initial stage while the EPR programme will be developed, TV sets and refrigerators can be covered by EPR legislation and by the tax. A bigger scope of products would lead to confusion and mess. *“When the system will be in place and will operate efficiently the scope of the products can be expanded. Moreover, the collection and recycling infrastructure is not developed enough in the country for the whole range of EEE”*.<sup>96</sup>

Nowadays this tax is imposed on produced or imported plastic packaging. The list of plastics and other goods on which the tax imposed is determined by the President of the country and there are no clear criteria for selection.

To give to the producer incentives to participate in the EPR programme for EEE the tax rate should be higher than costs of collection and treatment of WEEE. According to the interviewee, the income raised from the tax will go to the budget and then it will be allocated between organizations dealing with WEEE collection and treatment.

The interviewee believes that the tax imposition on produced and imported EEE together with the requirements of the revised law “About waste” will help to solve the problem of WEEE. However, before tax imposition it is necessary to consider the following issue: as it was mentioned in section 3.4 precious metals contained in EEE are regulated by legislation concerning the collection and treatment of waste containing precious waste, however the other components of WEEE (plastics, glass, wood, etc.) are regulated by waste legislation in general. In this case confusion occurs. The strict requirements of legislation concerning waste containing precious metals do not allow recycling organizations participating to fulfill collection, and sorting of the WEEE.

The representative considers that it is necessary to add changes in the legislation dealing with waste containing precious metals taking into account changes in law “About waste” and tax imposition, and in order to give opportunities to the recycling companies to collect, dismantle and sort WEEE from households and commercial organizations, and then to send these components for treatment according to legislation concerning waste and waste containing precious metals.

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<sup>96</sup> The reply about the scope of EEE covered by EPR legislation and the tax was gained by e-mail from the head of WMD

It is also important to determine the issues of licensing of companies dealing with collection, dismantling, sorting of the components, and recycling of WEEE. According to the law, any organization that deals with hazardous substances should have licensing to operate. Getting this licensing is a very complicated process in the country because of bureaucracy, and because of the amount of requirements. These difficulties can make the companies reluctant to start any activity. The company does not have any advantage if it is going to solve social problem. It is caused by the fact that recently there were cases when government allowed the recyclers/dismantlers to operate without licensing but they ended up not fulfilling their obligations. They did not treat waste properly or just illegally dumped it. Therefore, all conditions of licensing are now equal for all the companies.

According to the interviewee, if the EPR programme for EEE is implemented, the collection and dismantling, sorting of WEEE can be fulfilled by organizations that: repair EEE, collect municipal waste, collect and treat waste containing precious metals. He thinks that centralization of WEEE collection and treatment can be inefficient. He expressed that the system should involve the existing infrastructure due to the poor economic situation of the country.

The organizations collecting, dismantling, sorting and recycling WEEE can be compensated either by income raised in Environmental Protection State fund which will be formed by tax payment imposed on EEE, or by producers and importers of EEE, who will decide to treat WEEE and not to pay taxes, therefore they will contract with recycling companies and cover their costs.

With regards to the issue of free riders the interviewee said that it will not be a real problem because there is clear registration scheme of taxpayers in the country. The collection and recycling of historical waste can be addressed by income from tax payment. The problem of orphan products is unlikely to happen, especially if the scope of product is limited, as there are only two main producers of TVs and one producer of fridges and washing machines. There is also a clear registration system of import products.

The interviewee expressed that monitoring and enforcement should be improved in the country because such methods as penalties are considered ineffective instruments for fulfilling the requirements. This is especially common for state owned enterprises that give to the state big income and provide jobs. The government supports these companies, for example by excluding them from tax payment, or issuing them permits to pollute.

With regards to the public participation in collection of WEEE, the representative expressed that it is necessary to provide financial incentives to them. For example, when bringing products back to the collection organizations, the consumer can receive a manifest that can be showed in the shop to receive a discount when buying new EEE.

### **5.3.2 EEE producer – “Horizont” – TV sets producing company, Minsk**

In the beginning, the company produced all components used in assembling of TVs. Today the company buys different components and assembles TVs, video equipment, DVD players, microwave ovens and vacuum cleaners.

According to the representative of the company, the selection of suppliers of the components is an important issue. The selection is based on the quality of materials, component content whether it contains restricted hazardous substances, and price.

The company has the certificates ISO 9001 and ISO 14001. The main driving forces to the company to implement ISO 14001 were the competitive advantage, attraction of investment, and costs reduction. Moreover, according to the legislation, the implemented environmental management system allowed to receive a 10 % discount when paying the tax on use of natural resources<sup>97</sup>. The discount is given for 3 years until the certificate has to be updated by a certification body. If the certification body confirms the fulfilment of all requirements by the company, the certificate will be prolonged and the company will get the discount on tax payment for an additional three years.

With regard to the end-of-life management of the products, it is not a priority for the company. The representative explained this by the lack of legislation requiring the company to be responsible for the end-of-life management of products. Therefore there is no life cycle thinking approach when designing the products. The company focuses mostly on impact of the products only during life-cycle stages.

The interviewee expressed that the implementation of an EPR legislation for EEE will force the company either to organize the collection and treatment of products or to transfer physical responsibility to an external recycling company. The representative said that before the enforcement of the law will be necessary to develop a convenient collection system and to develop the recycling plants that will be able to treat WEEE. Moreover, the potential law should provide the financial incentive to the consumers to bring their EEE. Without it, the consumers are likely to store their old EEE in their houses or just dispose them. He suggested giving a discount to the consumers buying a new product if they would bring the same old product to the shop. The discount will be paid by the producers. Alternatively, the consumer can be given a manifest when discharging WEEE at designated places. This manifest can also serve as discount when purchasing new products.

When asked whether the company would prefer to organize its own collection and treatment system for its EEE or to participate in collective system the representative expressed that it is necessary to estimate all advantages and disadvantages of this. According to the interviewee the dismantling and sorting of products can be carried out better by the producer because the producer knows the product better. However, he believes that for the company it would be better to contract with a recycling company that would collect and treat TV sets regardless of brand. The company would just cover the recycling and collection costs. The reasons for transferring physical responsibility to a recycling company are the small capacity of repairing workshop to treat the potential WEEE. In order to increase it the company needs investments which it does not have. Moreover, organization of collection and recycling system would add extra burden to the company.

According to the representative, the main barriers that could arise during the implementation of EPR programme for EEE could be the allocation of responsibilities for collection and transportation of WEEE from different collection points to the recycling plants. He also expressed that the physical responsibility can be allocated to the repair and service centers, municipal services organizing the collection of municipal waste. The representative considers that the transportation of WEEE could be a problem – it could be very expensive.

The main driving forces for the company to change the design of its product are consumer demand, legal requirement, and reduction of production costs. Consumers are requiring the

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<sup>97</sup> Each organization pays a “*tax on use of natural resources*” that is imposed on extraction of natural resources, on emissions to the atmosphere, on wastewater discharged to the environment, and on disposal of waste.

products that are less heavy, therefore the company tries to minimize the use of material and moreover, it reduces the cost caused by use of raw materials.

Moreover, the representative expressed that implementation of an EPR system can also influence the design of the products because easier disassemble of product and lower content of hazardous substances will reduce the costs of recycling. However, the company expressed that its products can already be dismantled very easily.

With regards to defect products management, the representative said that the company usually shreds the plastic of the product and adds 10 % of new plastics. Then this material goes for the production of new product. The representative said that PVC is not used in their plastics. The broken parts and products that come during guarantee period (3 years) are sent for recycling. Then if the quality of recycled raw material does not allow using it in production process the secondary materials are sold to other companies and the company makes money out of it. With regards to broken cathode ray tube the company can change it. However, this tube is just shredded and sent for disposal because the treatment methods of cathode ray tube are not well developed in the Republic.

Concerning the design of the product the representative showed a draft regulation that will require the producers/importers of TVs to label their products. This labelling will require from producer/importers:

- to decrease or eliminate the use of certain types of hazardous substances (however, there is no information what they are),
- to use raw materials for assembling TVs that have the recycling rate of 90%,
- the products should be easily repaired that will prolong their life span,
- the energy consumption during use stage should be minimized,
- information about product content should be provided to the consumer,
- all products should be as much utilized before final disposal as possible, and
- hazardous substances have to be dismantled before final disposal.

However, the representative expressed that there are many uncertainties in the documents, because it does not specify what substances will be prohibited to use. Moreover, the document obliges to recycle the product but it does not specify which recycling plant will be able to do it. In addition, the representative would be interested to know what kind of advantages the label would give to the company if it fulfilled all requirements.

Regarding the question about provision of leasing of products instead of selling them, the representative answered that the company has recently started providing renting of its products to consumers. The reason for the provision of such service is the fact that many people move to the summer houses during the summer. Often the family cannot afford to buy one more TV set; therefore taking the TV set from the company for a small payment can be a solution. Moreover, the company considers that such service prolongs the life span of the products due to proper maintenance.

There are other services provided by the company, such as the maintenance of its products. The owner of the product can just call the company who sends a worker to come and repair the product free of charge if the product is still within the guarantee period.

### **5.3.3 Center for reuse of secondary materials in “Belresources” concern, Minsk**

Company “Belresources” collects and treats different types of waste from households and organization. The representative expressed a big concern about waste impact on the environment and he considers that there is no waste, that everything can be used. About 250 stations around the country organize the collection of waste from households that can be used as secondary raw materials. The company provides its own containers for separate waste collection.

The company gets its profit from selling the secondary raw materials and gets financial support to collect and treat waste from the government. This support comes from taxes imposed on plastic packaging and on use of natural resources.

The activity of the centre is organized as following: searching of suppliers of waste to be treated, signing the agreement, employing different specialists that decide how to treat this waste and where the secondary materials can be used. Then the centre either treats the waste itself or looks for an organization that will do it.

The costs for collection, transportation and recycling are covered by a supplier of waste who according to the waste legislation is responsible to utilize the generated waste. The income from the selling of secondary raw materials is then divided between the waste supplier and the centre in accordance with the terms of the contract.

Recently, the centre started a pilot project to treat WEEE. A company providing renting of TV sets had some broken products. According to the waste legislation, the company is obliged to utilize the waste. The company signed a contract with the centre to treat WEEE. The centre contracted with a dismantler (TSNIITU, Minsk) that dismantled, sorted the waste and found the different recycling plants that can treat different types of WEEE.

The parts containing precious metals were sent to the certified recycler specialized in extraction of precious metals. The plastics containing PVC were shredded and added to asphalt. This material has success on the market. The cathode ray tube was broken and mixed with building material.

According to the representative from the centre, the main factor that will facilitate the development of recycling plants in the country is implementation of EPR legislation for EEE. He thinks that the current absence of the law is the main barrier. Another barrier is lack of technologies and capacity of recycling company. In addition, according to the representative the consumers should be given a financial incentive to bring their WEEE to designated places. He also expressed the dissemination of information should be improved.

### **5.3.4 The dismantler of EEE – Research institute TSNIITU, Minsk**

The research institute, which dismantles and sorts the waste in order to get profit from this type of activity, agrees with the centre for reuse of secondary materials on the exact number of TVs and others EEE supplied to him each month. Then taking into account labour, dismantling and sorting costs, and cost of utilization it requires from the centre certain payment.

The institute began its activity a couple of months ago and it plans to expand it. It considers that this type of activity can be profitable and that it is possible to help to solve the social problem at the same time.

The representative of the company expressed that the legislation is one of the prerequisites for successful development of business. He also thinks that the punishment for illegal disposal should be very high in order to prevent illegal dumping of EEE. He said that any company should be 'scared' to dump WEEE by being caught and have to pay big penalty. Strict 'punishment' will facilitate the development of recycling business and provide safe treatment and disposal of WEEE.

According to him, implementation of EPR system for EEE will develop the communication between producer and recycler/dismantler. From the company's point of view the requirement of design for easier dismantling and less use hazardous substances could be a result of this communication.

However, a complex approach is needed when implementing EPR programme for EEE. The allocation of responsibilities for collection should be clearly defined and the government should support the recycling plants more and provide them support when they are trying to obtain the licensing.

#### **5.4 Survey on public willingness to discharge EEE**

There is a tendency among population of Belarus to accumulate their things and not throw them away. Implementation of the EPR programmed for EEE in Belarus will require public participation and willingness to discharge their WEEE at collection points.

In order to find out public willingness to discharge their WEEE and what factors influence on their willingness a small survey was conducted by author by phone among citizens of district city Osipovichy<sup>98</sup>. There were made 30 calls and selection of citizens was random. The calls where citizens denied talking are not taken into account.

The participants were asked to answer the following questions:

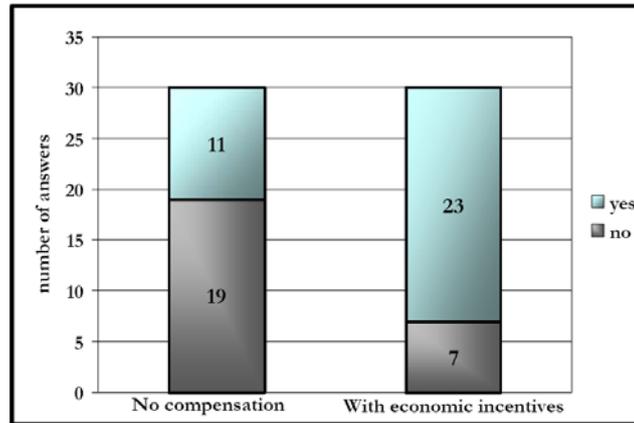
- 1) In case you had an old EEE would you discharge it at specialized collection point without compensation?
- 2) Would you discharge old EEE if the certain refund was provided?
- 3) What factors you think would influence your willingness to discharge old EEE:
  - Information about the impact of EEE on environment and about existence of collection system for EEE
  - Convenience and access to the collection system
  - Economic incentives
  - All of them?

Participants were not restricted to choose only one factor.

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<sup>98</sup> Osipovichy is a district city of Mogilev region, with population of 30 000 people.

Figure 5-1 Public willingness to discharge EEE free of charge and with economic incentives for consumer



The result shows people are reluctant to discharge their EEE without getting any monetary advantage. Therefore, providing the economic incentives to the consumer will stimulate his willingness to discharge. The people who replied “no” motivated their answer that it can be costly to deliver EEE to designated collection points and will require efforts, in this case, they would try again to repair equipment or use it with another purposes.

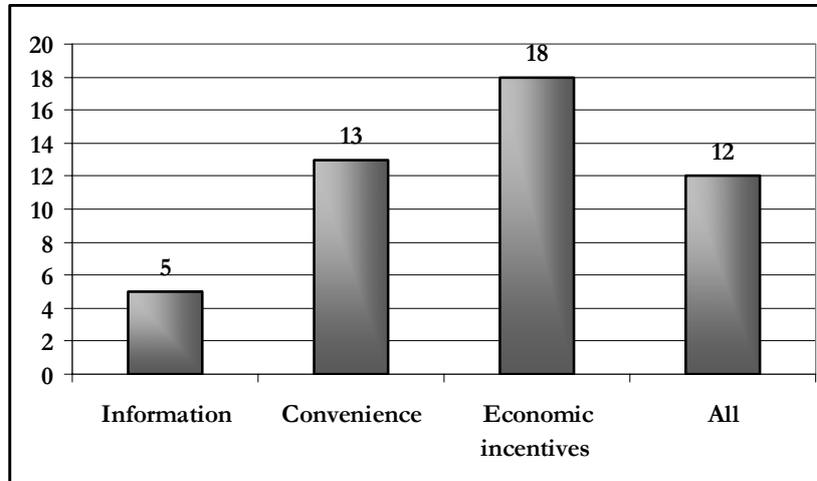


Figure 5-2 Factors influencing public willingness to discharge old EEE

It is evident that the survey does not represent the opinion of the whole population. However, analysis of the survey results shows that creation of economic incentives for population, convenience and access of collection sites will influence people’s willingness to discharge their WEEE. It was expressed by number of people that convenience and access to collection points is very important, because even if the economic incentives were provided people would not deal with it if they would have to transport their WEEE far away. Moreover, some people expressed that all factors should be used together and this will lead to high collection rate of EEE.

Conducting the survey the author was impressed by public interest and some people were giving advices how the collection system should be organised in order to achieve high collection rates.

## **5.5 Attitudes towards a potential EPR programme for EEE from different actors in the sector**

Conducting the interviews with different actors of the potential EPR programme for EEE the author was impressed by the interests expressed by the actors.

The representative of the MNREP expressed that the system for EEE has to be implemented because there is evident increase in consumption of EEE that will lead to increase of WEEE generation. WEEE generation, in turn, will pose risk on environment and human health. The interviewee said that the main law that regulates the waste management in the country is under the process of revision and the EPR principle for EEE will be embedded in the law. According to him the main reasons for its implementation is lack of landfill space and release of hazardous substances.

The representative of “Horizont” company was more negative about the implementation of EPR programme for EEE because it will lead to extra problems for the company and extra costs, that in the end will result in the consumer unwillingness to buy the products. Moreover, it was expressed that up to now the products of the company were competitive on the market due to their low prices. If the price of the products increases due to the EPR system the products can lose their competitive advantage, especially if the system will be not able to identify all free riders. Moreover, he said that there are not many recycling companies that can recycle the EEE, therefore before implementation of the law this issue should be taken into account. Otherwise the problem of the EEE recycling will be not solved and it will just add extra costs and burden to the company.

However, finally the representative expressed that if the law concerning EPR programme for EEE was implemented in the country the company would follow it but all details should be analyzed before its implementation.

Unfortunately it was not possible to conduct the interview with the head of Environmental department of “Atlant” company, producing refrigerators and freezers, due to his vacation. However, the author had small conversation by phone with him, where he expressed that the implementation of the programme definitely will incur extra expenses for the company in the beginning. In addition, it is not good for the economic state of the company. However, as the representative of “Horizont” company he expressed that the company would follow the law if EPR legislation was implemented in the country.

Both representatives of the recycling company and dismantling company expressed approval of the implementation of EPR legislation for EEE. They consider that it is one of the main factors that will develop the recycling infrastructure, market for secondary material and will help to solve the social problem of WEEE disposal.

However, all of the representatives expressed that before the implementation of the system all details should be analyzed and allocation of responsibilities should be clearly defined. Otherwise EPR implementation can put some actors in economic disadvantage. Moreover, all of them expressed that it is necessary to involve the public participation in order to reduce the collection costs and they consider that it can be done only with economic incentives for consumers. The survey conducted in Osipovichy city proved that economic incentives to the

consumers would facilitate public participation in the programme. Moreover, the collection system should be organized in convenient and accessible way, dissemination of information about the impact of WEEE generation and existence of such programme should be in place as well.

## 6 Future possibility for an EPR programme in Belarus

In this chapter, conclusion with regard to the future possibility for an EPR programme in Belarus and proposals of how the programme could look are presented. These findings are based on the analysis of factors that influence the implementation of EPR programme for plastic packaging in Belarus and for EEE in Lithuania and Sweden, as well as on the interviews with potential actors that might be involved in the programme. The current WEEE management in Belarus is taken into account as well.

### 6.1 Objectives of potential EPR programme for EEE in Belarus

One of the most important steps in designing the effective EPR scheme is the establishment of the programme's objectives. According to the interviewee from the Waste Management Department of MNREP, the main concerns regarding WEEE in Belarus are the environmental impact from EEE end-of-life stage, the constantly increasing amount of WEEE generated from households that is just disposed without pre-treatment, as well as the disposal of valuable materials contained in WEEE that could be recycled and reused leading to resource conservation. Moreover, taking into account the four criteria used to assess the success of an EPR programme implementation, the main objectives of a potential EPR programme for EEE in Belarus could be:

- Risk minimization of hazardous substances generated from EEE at end-of-life stage and therefore promotion of design for environment;
- Promotion of reuse, material recovery and recycling;
- Provision of environmentally sound treatment of WEEE.

In addition, a key to the successful operation of a national compliance system is to ensure that producers feel that the burden of compliance is fairly shared. This relates both to the allocation of responsibilities both for historic and future WEEE, but also to the ability to ensure that all producers participate in the system i.e. avoidance of free riding.

To achieve the objectives of the programme, a number of key elements affecting the results of the EPR programme should be taken into account and they will be described and analyzed in the following sections.

### 6.2 Defining the term “producer”

It is essential to define the term “producer” from the beginning, in order to avoid the confusion in the future and to clarify to whom the EPR legislation will be applicable.

The producer could be defined as a manufacturer of EEE, particularly of TVs and video equipment, as well as refrigerators and freezers, the reason for limiting the scope will be presented in the following section. In order not to create a disadvantageous economic condition to national manufacturers of these products, an importer of these products (or the first distributor of these products in the country) should also be covered by the programme and participate in it.

However, taking into consideration that products manufactured in Belarus are mainly exported to CIS countries, where there is no EPR legislation requiring the national

manufacturers of those countries to participate in collection and recycling of WEEE, exported Belarusian products could be excluded from the participation in the programme. This would avoid obstacles to the national producers when exporting products and would not influence their competitiveness.

### **6.3 Scope of products covered: advantages and disadvantages of scope limitation**

For the purpose of the thesis, it is proposed to limit the scope of products covered by the potential EPR programme for EEE to TV sets and video equipment, as well as refrigerators and freezers. Moreover, the programme is a proposal covering products that are discarded by households and not by organizations. There is an approach for handling of WEEE from organizations that is already in place (however, the recycling infrastructure is not developed properly in the country, the measures that could be taken to facilitate its development are listed in section 6.8).

As it was described in section 3.4.1, an organization itself (the owner of waste) is financially responsible for WEEE management in Belarus. Now, it can be argued that EEE sold to the organizations will finance the treatment of WEEE from households i.e. if these products from users other than private households are not included in the municipal collection system, organizations will pay twice for WEEE management i.e. when buying the new EEE and then incurring the cost for WEEE management. Therefore, organizations buying new EEE have to be granted with a discount equal to the fee paid by the producers of the products for collection and recycling of WEEE. Another possibility could be to exempt producers from tax payment on amount of EEE sold to organizations. In this case, the administration cost could be reduced.

The limitation of the scope to above-mentioned product groups can be justified by the following facts:

- The internal market shares of the national producers of these groups of products are high within the country – 81 % for TVs sets and video equipment and approximately 80% for refrigerators/freezers. In addition, the number of national producers is low: two companies producing TVs and video equipment, and one company producing refrigerators and freezers. Therefore, it will be easier for the government to enforce and monitor compliance with the requirements. It will also be easier to influence the national producers to reduce the environmental burden placed by their products as well as encourage them to improve the design of their products;
- Up to now, there has been no EPR programme for EEE in the country. In fact, the country has had little experience of EPR programme implementation in general. It would therefore be difficult to establish and control an EPR programme that covers all EEE. Covering all EEE at once means developing many sub-regulations that map out different system at the same time. It can lead to the establishment of many systems with a number of loopholes;
- Even if the programme cannot cover all EEE at once, it is necessary to initiate the system that will cover those products imposing a relatively high environmental problem in waste streams. TVs, video equipment, refrigerators and freezers are regarded to be problematic, as they contain hazardous substances and those products from households are mostly just land filled in the country without pre-treatment. In addition, the chosen product groups contain valuable resources that can be recycled;

- The capacity of the recycling infrastructure in the country is not large enough to cover very wide range of EEE.

Therefore, the main advantage of limiting the scope is that it will be easier to implement the system at the initial stage and then eventually expand the scope of products covered. However, having a wider scope would ensure the treatment of all hazardous substances in WEEE, and avoid the confusion among consumers because there will be no need for them to think which products are covered by the programme and which are not.

## 6.4 Development of EPR legislation for EEE in Belarus

Taking into consideration the factors influencing the implementation of EPR programmes in the three case-studies as well as opinions expressed by the actors involved in the potential EPR programme, the first step necessary to take is to adopt an EPR legislation that will make producers financially and physically responsible, at least for collection and recycling of WEEE from households.

The potential EPR legislation for EEE should be flexible enough to give an opportunity for producers to choose the most efficient way to fulfil the requirements. It is essential that a producer retains the ability to leave one system and join a new one or establish its own system. This will force the various actors to continuously improve their systems.<sup>99</sup>

Therefore, the producers should be allowed to meet their obligations either by:

- Taking back WEEE themselves;
- Setting up individual contracts with waste management facilities.

The representative of Waste Management Department opposed the establishment of a collective system for WEEE management. He expressed that the number of national producers of the products covered by the programme is small and that their market shares are high in the country. Therefore, it is possible for national producers to participate in the programme individually by contracting with a recycling facility or setting up own infrastructure. According to the representative, a collective approach should not be considered as a possible compliance scheme. This fact will encourage the development of individual compliance scheme that will result in covering all costs by producers and in shifting the responsibility from the public to the producers. Moreover, an individual scheme will give financial signal to producers to change the design of their products, as it would reduce their recycling costs.

When developing the EPR legislation, MNEPR should negotiate with all actors involved in the potential EPR programme for EEE. Consulting with all stakeholders could help to find out the most efficient compliance model for all stakeholders and the key elements of successful implementation of the programme. Moreover, the producers could play an active role in the development of the legislation and system itself.

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<sup>99</sup> Van Rossem, Chris, Tojo, Naoko & Lindqvist, Thomas. (2006). Lost in Transposition. A study of the implementation of Individual Producer Responsibility in the WEEE Directive, (Draft). Report commissioned by Greenpeace International, Friends of the Earth and the European Environmental Bureau. Lund: IIIEE, Lund University.

## **6.5 Establishment of requirements**

Considering the Lithuanian and Belarusian experiences of EPR programmes for EEE and plastic packaging, in order to increase the collection and recycling of discarded products, the EPR legislation for EEE has to set mandatory collection and recycling rates as targets that have to be achieved by each producer annually.

Setting the collection and recycling rates will promote WEEE to be separately collected and treated and will divert this type of waste from landfills, which in turn will minimize the impact associated with disposal of WEEE. Moreover, this diversion from land filling will stimulate the development of collection and recycling infrastructures.

However, there is a challenge to find out the appropriate level for the collection target. It is necessary to conduct a pilot project that will estimate the amount of products covered by the EPR programme that are discarded each year. However, this estimation can be complicated by the fact that the length of use of EEE differs from one owner to another. In addition, the monitoring of the amounts of products being collected upon the enforcement of the regulation has not been carried out in the country.

To minimize the risk posed by hazardous substances released from EEE at end-of-life stage, and taking into account the Swedish experience, it appears to be necessary to prevent them at their origin i.e. to restrict or ban their use. Problems related to hazardous substances will disappear if such substances are not used at all. However, producers may be faced with a challenge to find alternative substances that are economically viable to replace substances to be banned. Therefore, the government needs to inform the producers of products covered by the programme in advance in order to give them time to find alternatives.

As for the promotion of design for environment, one of the possible requirements can be the use of recycled material content in the products. Moreover, this could help to develop market for secondary materials and would therefore help to develop the recycling industry.

In addition, a draft regulation, as mentioned in section 5.3.2, requiring producers to eliminate the use of certain hazardous substances should be finally adopted. This regulation should specify the substances that will be banned. These substances could be the same as in RoHS Directive. Fulfilling these requirements would facilitate the design improvements of the products, moreover, it could give opportunities to producers to expand market for their products.

## **6.6 Financial mechanism**

In order to guarantee the proper functioning of the EPR programme (i.e. fulfilment of collection and recycling requirements), the financial mechanism should be established in the country in case a producer does not fulfil his responsibilities according to the legislation.

In this section, three scenarios of financial mechanism will be discussed. The first scenario is when producers are to pay tax imposed on produced EEE or they can be exempted from it if they participate in collection and recycling of a certain percent of EEE put on the market. The second scenario is when producers are individually responsible for end-of-life management for their own products i.e. financial guarantee should be provided by each producer placing EEE on the Belarusian market, and the third scenario is the use of both methods together. The possibility of the introduction of a financial incentive to consumers in order to increase their participation in the programme will be viewed in the section as well.

### **6.6.1 Tax imposition or producers participation in the EPR programme for EEE**

The representative of the MNREP expressed that it is necessary to use the state tax imposed on EEE as financial mechanism for WEEE management. However, in order to make the programme more efficient and provide incentives for design change, it is crucial to provide the producers with a right to choose either to pay tax or to participate in the programme. This means that the producers can be exempted from the tax on products if they meet the requirements set by the government and present the documents proving the amount of products re-used, recycled or recovered.

Such approach means that the tax will guarantee collection and recycling of WEEE in case the producers do not want to fulfill the requirements and it will give the opportunity for producers to fully participate in the programme to avoid having to pay any tax.

Therefore, the MNREP could set the collection and recycling targets that should be achieved by each producer in order to be exempted from the tax payment. These targets could be a certain percent out of total amount of EEE put on the Belarusian market by produces covered by the programme. However, in order to set the appropriate percent, the estimation of the amount of products currently disposed of has to be carried out as a prerequisite.

The producers can be exempted from the tax on the whole amount of products, if they meet the targets established by the government and present the documents confirming the amount of such products, recycled, recovered or amount of components reused. The tax rate has to be high enough in order to give incentive to producers to participate in collection and recycling of EEE, which in turn will support the development of collection and recycling infrastructures. However, in order to introduce appropriate tax rates for these products, it is necessary to carry out pilot projects that will estimate the collection, transportation and recycling costs. Doing such estimation can be a complicated process due, among others, product complexity and longevity, as well as different types of technology used.

The tax collected from producers should be redistributed to waste management facilities in order to facilitate their development. It is necessary to consider the issue of money allocation from the National Environment Fund, because as it was mentioned in previous sections, not all money collected from tax imposition on plastic packaging is being spent on the development of recycling and collection infrastructure. The same could happen with the potential EPR for WEEE. Moreover, a clear procedure should be developed for application for financial support by all recycling companies, in order to create equal conditions for all of them and avoid unfair subsidizing of some of them.

One of the main disadvantages of tax imposition could be that the historical and new waste would be collected together because a producer will try just to achieve a set collection rate set by the government without taking in account whether it is historical or new EEE. Moreover, differentiation of the tax based on product content would be difficult to introduce and monitor. The issue is that a unique tax rate for all products can hinder the incentives for producers to improve the design of their products. However, the advantage of tax imposition is that the problem of free riders can be avoided if strict requirement of registration of all tax payers is enforced.

## **6.6.2 Financial incentive to consumers**

As it was mentioned in previous sections, there is a tendency among the population in Belarus to store their old EEE at home. In a way, it is good because these stored EEE do not end up in the landfills. However, ultimately these EEE will be discarded and if the programme is not in place, they will end up just at disposal sites.

Therefore, to make consumers discard their EEE at designated collection network and as well as to reduce collection costs<sup>100</sup>, it is necessary to provide individuals with a financial incentive to bring back their old equipment. All interviewees as well as respondents of the small-scale survey conducted identified this as a necessary feature of the potential system. The financial incentive can be provided to consumers at least at the initial stage of the programme while the collection network will be developed enough so all population will have access to it and while the information about the programme will be disseminated among population that could make them discard their WEEE without financial incentive.

In practice, at the initial stage of the programme, consumers bringing back the EEE to one of designated collection points can, for example, be given a credit which then they can then show in the shops to get a discount when purchasing the new EEE of the same function from a producer who paid tax or participates in the programme. However, it means that when selling retailers have to commit to systematically provide the discount if a consumer shows a credit.

A credit should be set equally to the average collection and transportation costs. The producers can use this approach in order to increase the collection of the products and reduce the share of collection and transportation costs.

In order to show how the system could work in reality; two scenarios will be described. The first one is the scenario when producers decide to pay tax on the total amount of EEE put on the market and do not participate in the programme; the second one is when producers participate in the programme and take responsibility for collection and treatment of certain percent out of the total amount put on the market.

### **6.6.2.1 Scenario 1: financial incentive to consumers in the system where producers pay the tax**

Figure 7-1 provides a visual presentation of the first scenario. The system in operation can be explained as following: a producer pays the tax<sup>101</sup> on the total amount of EEE he puts on the market to the MNREP (1). The producer will include this tax in the price of the product sold to the retailers (15, 16). Then MNREP partly allocates the taxes collected to recycling companies for treatment of certain amounts of WEEE. At the same time, the MNREP provides a certain number of credits to recycling companies. The number of credits given to recycling facilities is equal to amount of WEEE the MNREP wants to collect and recycle (2 and 3). Then the recycling facility distributes these credits among designated collection sites. When bringing EEE to these sites, the consumer will receive a credit that can be used as discount when buying new EEE of the same function from a producer who initially paid the

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<sup>100</sup> All interviewees expressed that the highest cost in WEEE management is collection and transportation costs.

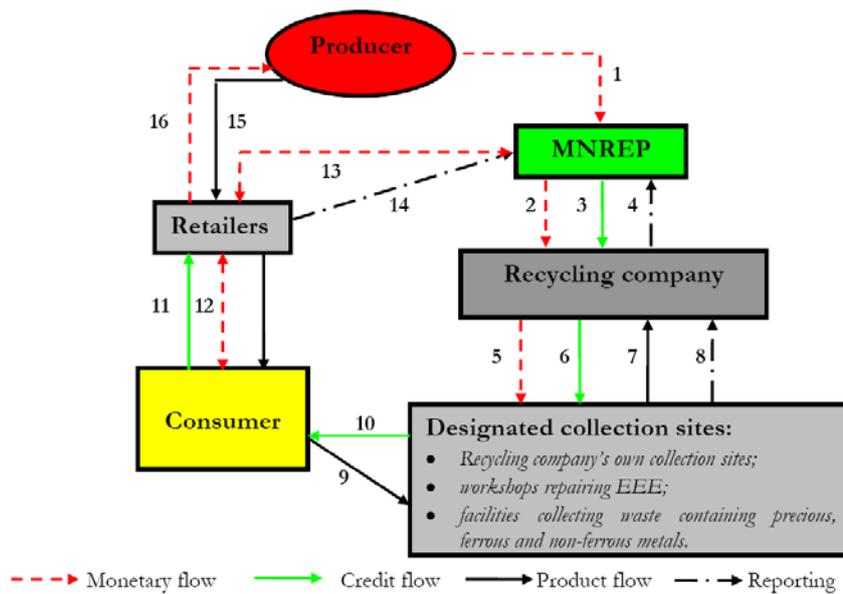
<sup>101</sup> The tax should be equal to the sum of the recycling and collection costs. Therefore, it is necessary to carry out a pilot project that will estimate the approximate collection, transportation and recycling costs. The estimation of these costs could be a challenging task as EEE is complex and durable products, which complicates calculations of the future recycling cost. Moreover, location of facilities can be spread around the country, which complicates the calculation of collection and transportation costs.

tax. The incentive given to the consumers will encourage them to bring their WEEE to the designated collection sites. In addition, this will avoid the subsidization of producers not participating in the programme.

The credit will be given to the consumers as discount if they bring their WEEE to the designated collection sites (9 and 10). The collection network will be described in following sections. Then the consumer can show this credit to the retailer and get a discount equal to the average collection and transportation costs (11 and 12). Afterward, the retailer provides data on the credits collected to the MNREP and the MNREP returns money to the retailer. Moreover, the Ministry covers the administrative costs incurred by the retailer (13 and 14).

Therefore, in this scenario the system is administrated by the government who initially collects the tax from the producers, the revenue of this tax is allocated between recycling companies, designated collection sites, retailers, and also consumers in the form of a discount that should be equal to the average collection and transportation costs. Then the government should set strict procedure of reporting by all actors involved in the scheme in order to track the financial flows and check whether the requirements are fulfilled by the responsible actors.

Figure 6-1 Monetary, credit, product and reporting flows in case a producer decides to pay a tax on EEE



### 6.6.2.2 Scenario 2: financial incentive to consumers in the system where producers participate in the EPR programme for EEE

In the second scenario, producers participate in the programme and arrange the collection and treatment of a certain percent of the total amount of EEE put on the market. In this scenario, it is less costly for the producers to arrange collection and treatment of WEEE than to pay tax (if the tax rate is high enough) as the Belarusian EPR programme for plastic packaging showed in section 4.1.6. Therefore, the products will be cheaper allowing to develop a competitive advantage.

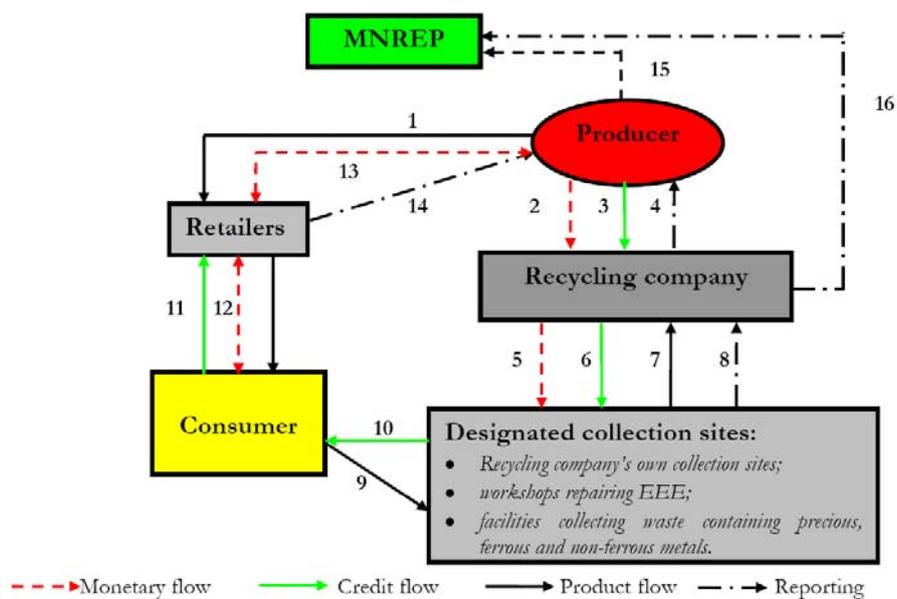
In this scenario, the producer will contract with a recycling organisation for collection and treatment of agreed amounts of EEE. The producer will allocate money to the recycling facility, including credits for consumers bringing their products to the designated collection

sites (2 and 3). Afterwards the recycling facility will have to report to the producer confirming the amount of EEE treated and the number of credits spent (4).

The retailer then provides the report to the producer about the number of credits collected and then the retailers can deduct the money that was provided as a discount to the consumer from the total amount of money that the retailer returns to him. Moreover, in this scenario, producers will have to cover the administrative costs incurred by the retailers otherwise the retailers will not participate in the programme because for them administration of credits will be an extra burden and if there is no financial benefit out of administration there will be no reason to participate in the programme.

At the end of a year, producers have to provide a report to the MNREP confirming that a certain percent of WEEE was collected and recycled. The recycling company, who fulfilled this, also has to report to the MNREP in order to prove that producers fully fulfilled their obligations. Only then can the producers be exempted from the tax payment on the total amount of EEE placed on the market.

Figure 6-2 Monetary, credit, product and reporting flows in case a producer participates in the EPR programme for EEE



This scenario can promote design changes. This can be explained by the fact that a producer will try to minimize the collection and recycling costs in order to reduce the price of the products. Moreover, if the amount of the credit is determined in advance, producers will try to keep recycling costs lower than the money collected by producers from consumers for recycling of certain amount of EEE.

### 6.6.2.3 Potential drawbacks of provision of financial incentive to consumers

However, both these scenario could lead to high administrative costs and create confusion between retailers concerning to whom they have to report and who should cover their administrative costs i.e. either the government or producers. In addition, the consumer could be confused, not knowing where they can bring their WEEE in order to get the credit. Furthermore, participating individually in the system will mean that it is necessary to create different types of credits in order to distinguish the producers. And in case if different

producers contracted with different recyclers the consumers could be confused where they would be allowed to bring their WEEE in order to use the specific credit they received and buy the brand they want to. Moreover, these credits should be protected enough in order to avoid cases of the production of fake credits. The protection of the credits will cause extra expenses for the producers.

As it was mentioned above, the number of credits issued to recycling facilities will be equal to amount of WEEE the MNREP or producers want to collect and recycle. This fact does not stimulate increase in collection and recycling rate of WEEE. It could happen that the number of credits will be fewer than the amount of WEEE collected from the households. This means that not all consumers will be able to get a discount, or even the collection points would refuse to accept WEEE if the amount of WEEE collected increases the amount specified in a contract. This can lead to public disagreement. Moreover, it will mean that there will not be a financing for such collected products. To solve this problem in the following year the percentage of WEEE that has to be collected by each producer will need to be increased. It could also happen that the percent of WEEE that has to be collected is set too high, making it impossible to achieve the target. In this case, the amount of the discount could be increased or the percentage of WEEE to be collected reset in the following year according to the current WEEE collection.

Another potential problem could be when consumers, bringing WEEE to the designated collection sites, get a credit but do not purchase new EEE. This will lead to money accumulation on the producers' side, money that was supposed to be spent on collection of WEEE. However, if the money is stored as blocked bank account it could be spent later on collection of WEEE at times when there is a surplus of WEEE to be collected.

Such financial incentive could also lead to illegal import of WEEE from other countries in order to get a credit and to buy products cheaper.

Hence, the provision of discount as financial incentive can increase public participation in the programme and, therefore, increase the collection rate. Moreover, it can help in avoidance of illegal dumping. However, when implementing this system all results of the system positive and negative should be considered and taken into account in order to avoid undesired circumstances.

Now, in order to involve public in programme participation, attention should be paid on additional factors influencing public participation such as information dissemination and availability of collection sites; these factors will be discussed in the following sections.

### **6.6.3 Individual Producer Responsibility**

The second scenario is making producer individually responsible for end-of-life management of his own products i.e. the financial guarantee for fulfilment of the producers' take back obligation for products placed on the national market after the effective date of the national legislation should be provided by all producers. The examples of guarantee can be either a blocked bank account or a recycling insurance.

In practice, this means that when placing products on the market a producer has to ensure the future waste management of his own products. Then a producer has either to contract with a recycling company who will organize the collection and recycling of products of this producer or to do it himself. Therefore, the distinction between different brands should be made either at designated collection sites or at recycling facilities.

In the end of a year, based on amount of WEEE collected by a recycling facility, a producer should cover all cost for collection and recycling of his products incurred by this recycling facility. This fact will encourage producers to increase the life span of their products as they will be paying for the management of their own products returned to collection sites.

Such financial guarantee will ensure the management of future WEEE i.e. the problem of orphan products is likely to be avoided. Financial guarantee can also provide the necessary financial feedback mechanism to producers to design their products for better end-of-life management. This means that being responsible for management of own products will give incentives to the producers to improve the design of products that will reduce recycling costs in the future. In this scenario, the producers would be financially rewarded if they had products that were better designed.

However, this scenario will require government ensure that all producers participate in the programme. Otherwise, the products of producers participating in the programme have competitive disadvantage that can cause opposition from producers to participate in the programme.

This scenario does not provide financial guarantee for historical waste and it means that the burden for treatment of historical products would be again shifted to the municipalities i.e. tax payers. Another challenge with the provision of a guarantee is that it could take into account inflation in collection and treatment costs, thereby making it expensive for producers to provide such guarantee.

Moreover, it can be challenging to identify what type of financial guarantee to use in the country i.e. what financial guarantee will provide the safest form of storing money for the future and create incentives for design changes.

#### **6.6.4 Combination of tax on EEE (or producer participation in collection and recycling of a certain percent of EEE put on the market) and Individual Producer Responsibility**

The third scenario is a combination of a tax imposed on EEE/or producer participation in collection and recycling of a certain percent of EEE put on the market and Individual Producer Responsibility for future waste management of own products.

In this scenario, in order to finance management of historical waste the tax can be imposed on the whole amount of EEE put on the market. However, producers can be exempted from the tax payment if they provide the collection and recycling of a certain percent of EEE put on the market. This condition of tax payment or producers participation in the programme should be in place until historical waste will not arise from households anymore. Therefore, the estimation of current WEEE generation should be carried out in order to set appropriate tax rate and percent that has to be collected and recycled by producers in order to finance waste management of historical products.

Making producers individually responsible for end-of-life management of own products will ensure financing of future WEEE management, as described in the previous section.

Hence, the distinction between historical and new products should be made. This can be achieved by requiring the producers to mark their products with date of production. The sorting of the products can then be carried out either at designated collection sites or recycling facilities.

Therefore, this approach will solve the problem of both historical and orphan products and encourage producers to improve the design of their products.

This scenario can be costly to the producers but it will achieve the goal of the producer responsibility principle by shifting the responsibility from the consumers to the producers, and forcing internalisation by the producer of the real cost of WEEE management.

## 6.7 Allocation of responsibilities

Analysis of the factors influencing the EPR programmes in chapter 4.4 showed that one of the important prerequisites for the successful implementation of an EPR programme is a clear allocation of responsibilities between different actors, in order to avoid tension between different actors and cases when none of them is responsible. Moreover, responsibilities have to be allocated in such a way that creates equal conditions for all participators of the programme.

### 6.7.1 Responsibility for collection and treatment of end-of-life products

According to the Swedish experience one of the main factors that led to high collection rate is the use of a collection system that has been developed prior to the enactment of the laws. In Belarus, the representative of Waste Management Department of the MNREP expressed that it is necessary to organize the collection network using existing infrastructure, while developing additional infrastructure would lead to avoidable additional expenses that would not pay-back. According to him, the collection network where consumers can bring their end-of-life EEE free of charge can be organized by using the following existing facilities as collection points:

- Workshops repairing EEE;
- Municipal and private waste management facilities;
- Facilities collecting waste containing precious, ferrous and non-ferrous metals.

The choice of these facilities can be justified because all of them deal with WEEE to a certain extent. In addition, all these types of facilities are geographically well distributed around the country and almost all the population has access to them. Making the retailers responsible may cause their opposition due to the space limits at their facilities as it was shown in the cases of the Swedish and Lithuanian programmes. Therefore, making these existing facilities responsible for collection can make the collection network more convenient and accessible to the general public.

Collecting WEEE from households these collections points could be obliged to sort WEEE by brand and date of production that will allow to allocate costs for management of historical and new waste and also will provide producers with data on waste management costs of their own products. Then WEEE collected by these facilities can be transported to contracted recycling facilities that will organize their recycling and treatment.

Now, all costs associated with the collection, transportation and recycling of WEEE have to be covered by producers or by income formed by tax imposed on EEE. The scheme can be described as following: producers can decide that they want to be responsible for collection and treatment themselves or contract a recycling company and be exempted from the tax, or, alternatively, they can pay the tax that can then be reallocated to waste management facilities

responsible for WEEE handling. Moreover, producers have to ensure the financing of future end-of-life management of their new products.

In case producers decide to contract recycling companies, these companies will organize the collection and recycling of the products either setting their own collection network or using already available networks such as the ones established by those types of facilities mentioned above. The producers will allocate money for collection and treatment of agreed amount of WEEE to recycling facilities. And the recycling facilities, in turn, will allocate this money between different actors involved in collection and treatment of WEEE. This means that the producers will cover the total cost for collection and treatment.

In order to run the collection and recycling systems efficiently the cooperation and information sharing between all these actors involved has to be developed in order to exchange ideas and best practices.

### **6.7.2 Responsibility for information dissemination**

Both the Swedish and Lithuanian programmes for EEE showed that public participation is one of the most important prerequisites of achievement of collection rate. One of the factors that can influence public behaviour is consumer awareness.

As it was mentioned above, the potential programme for EEE can involve many actors, which in turn can confuse consumers when trying to understand where they are allowed to discard their old EEE and what products are covered by the programme. Therefore, it is necessary to inform customers of the characteristics of the system.

The responsibility for information dissemination can be allocated between the producers and MNREP. Currently MNREP runs ads on TV channels describing the existence of EPR programme for plastic packaging, explaining the necessity of its separation, as well as its impact on the environment and the benefits of its separation. The same can be done for products covered by the EPR programme for EEE.

As it was mentioned in the previous section, the retailers will be not involved in collection of WEEE. However, producers should use the facilities of retailers in order to provide information to the consumers about designated collection network. Moreover, they can provide information to the recycling facilities they have contracted with on the products content, in order to make the dismantling and recycling of the products easier, which will allow to reduce recycling costs.

Moreover, the recycling companies should cooperate with producers concerning difficulties arising during recycling of the products. Raising awareness of producers to the issues faced when trying both to dismantle their products and recover or recycle their components, can encourage them to reduce the use of hazardous substances as well as improve the structure of the products to make dismantling and recycling easier. As a result, this would reduce the environmental impact of EEE at end-of-life stage and reduce recycling costs.

## **6.8 Recycling infrastructure and the role of recycling requirements**

When exploring the current WEEE management and EPR programme for plastic packaging in Belarus, it was found out that the recycling and collection infrastructures are not developed enough in the country. Therefore, measures should be taken by the government in order to create more favourable conditions for the development of recycling infrastructures.

First, the government should create the conditions for competition on equal terms for all recyclers participating in the programme because it is a fundamental prerequisite to achieve efficiency of the system. It means in particular that it must be possible for new actors to enter the market without facing major barriers and to compete on equal terms. For the management of WEEE, equal competition means that it must be possible for alternative collection, treatment and recycling systems to be established. It also means that it must be possible for producers to select the way they want to exercise their producer responsibilities i.e. by establishing their own systems or by partly or fully using the services of other organizations (Van Rossem, Tojo & Lindqvist, 2006).

Moreover, having the MNREP setting the collection and recycling rates that need to be achieved by each producer will stimulate the collection and recycling infrastructure development. However, it is necessary to set a collection rate at a appropriate level to facilitate the development of recycling infrastructure. In order to conduct recycling in an economically feasible manner, a substantial amount of the same material has to be gathered and treated at the same time. However, when setting the collection rate the existing recycling capacity has to be considered in order to set achievable targets. Hence, setting the collection rate too high will lead to the same results as in the EPR programme for plastic packaging, where recycling facilities could not meet the rapid increase of the quantities of plastic packaging collected.

Furthermore, for the recycling system to work properly, it is important to develop the market for secondary materials. The market can be stimulated both on the supply and demand sides. A policy instrument that could lead to a demand driven situation is the introduction of 'minimum recycled content requirements' that are currently not in place in Belarus. These requirements would develop the market for the secondary materials, reduce the use of raw materials, and give a positive signal to producers to improve the design of their products for better recyclability. However, such recycled content requirements could be opposed by some producers who perceive that products containing recycled content are inferior in quality to primary products, and who believe that it will negatively influence the product competitiveness.

In order to exchange ideas and best practices regional cooperation and information sharing should also be developed. This could help to develop network between waste management facilities. Through network, economies of scale could be achieved. Moreover, it could also help develop new markets for recycled products and help obtain better prices for the sale of these goods.<sup>102</sup>

Furthermore, in order to facilitate the development of recycling infrastructure, other instruments can be used such as landfill restrictions and taxes, material restriction, or virgin material taxes.

In addition, the conditions of getting licensing for the recycling facilities should be more favourable. For instance, the previous cases of illegal dumping and improper waste treatment can be avoided by improved monitoring procedure and enforcement of severe penalties.

Taxes collected from the producers that have decided not to participate in the programme will go to the National Environmental Fund, and should then be allocated for the development of recycling infrastructure and not for other environmental problems.

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<sup>102</sup> Smith, Bronwen, Savola, Hanna, Rassoeva, Zarina & Baye, Bazezew. (2006) Looking forward: a sustainable waste management strategy for Belarus. Assignment for the course: Strategic Environmental Development. Lund: IIIEE, Lund University.

Regarding the provision of environmentally sound treatment and recycling, strict requirements should be implemented. Taking into account the Swedish experience, it may be useful to set requirements in relation to the method of treatment in order to promote environmentally sound treatment of hazardous substances contained in the EEE. This could be achieved by adoption of another law together with the EPR legislation that, for example, would prohibit the land filling of end-of-life EEE. Moreover, it would require dismantler to be certified in order to be allowed to handle EEE. In addition, a producer could use competitive tendering process when selecting the recycling facility and one of criteria can be the presence of certificate that will secure safe waste treatment. It is however important that the standards and requirements are enforced through well-functioning control. This means that there must be resources for control, either within the responsible authorities or through private certification body. The re-use and recycling requirements must also be enforced in a way that secures the intended results.

## **6.9 Promotion of design change**

Concerning the promotion of design change, it is perceived that a proper assignment of the waste management responsibility to the producers may in itself lead to the achievement of the objective of design for environment. Making the producers individually responsible for end-of-life management of their own products will give them incentives to improve the design of their products because it will reduce their end-of-life management costs (Van Rossem, Tojo & Lindqvist, 2006).

An individual system does not necessary mean that producers have to establish their own collection and recycling infrastructure, which can often be economically too intensive for the producers since the full setting-up cost has to be paid upfront at initial stage. The producers should have a choice between setting their own collection and recycling infrastructure or contracting with waste management facilities and, by doing so, transfer physical responsibility for collection and recycling of WEEE to them. However, the costs should be covered by producers in both cases, they will be a driver for the producers to change the design of their products. Moreover, the negotiation between the producers and waste management facilities will provide producers with information concerning difficulties raising during the recycling of their products, giving them a signal to improve the design.

Therefore, in order to facilitate the design for environment in the potential EPR programme for EEE, it is necessary to make each producer responsible for the management of its own products.

Another factor that will facilitate the promotion of design change is final adoption of regulation for labelling of products, as discussed in section 5.3.2. The criteria that need to be fulfilled to be awarded with the label are: elimination of use of certain hazardous substances, use of raw materials that have a recycling rate of 90 %, easy-reparability of products that will prolong their life span, maximum utilization of products before final disposal, etc. These criteria will promote design change for environment. However, the draft regulation does not say which substances should be eliminated, which does not allow producers to prepare for hazardous substances ban and try to find the substitutes before the enforcement of the legislation. Moreover, it is necessary to provide the producers who will have such label with advantages. This will give them incentives to participate in the labelling system and fulfill all criteria required in order to be awarded with label. The good example of such incentive is 10% environmental tax reduction for companies in Belarus that have ISO 14001.

## 6.10 Monitoring and enforcement

Usually the problem of free riders occurs, especially in individual compliance approach<sup>103</sup>, when there is weak government enforcement and monitoring. Therefore, taking into account the Swedish experience the system of severe penalties should be in place that will force producers to participate in the programme. Moreover, the enforcement could be provided through the mandatory registration of all participants. Unregistered producers should be prohibited from placing EEE on the market. Retailers should also be prohibited from supplying EEE from unregistered producers, unless they want to take on the producer responsibilities.

The registration of producers should not be a challenge in Belarus because the number of national manufacturers is small and their market share is large. Moreover, there is strict requirement for registration of all taxpayers, therefore, it will be easier to track whether an organization participates or not in the programme. In addition, the cooperation between producers and the government should be developed as this also will result in easier free rider identification.

Moreover, in order to check whether the actors fulfill their obligations, it is necessary to improve the monitoring system. The producers would have to report to the MNREP the amount of EEE they put on the market in order to calculate the required amount of EEE to be collected and recycled. Then the producer would have to provide the ministry with a report confirming that it fulfilled the obligations. At the same time the contracted recycling facility should provide the ministry with data, concerning the amount of WEEE collected and treated. Only then can producer be released from the tax payment.

In addition, the MNREP should organize the control of waste management facilities in order to check whether they fulfill the requirements of environmentally sound treatment. In case the requirements of sound waste management are not fulfilled, the responsible actor should be fined. Therefore, the system of penalties must be in place and enforced. Penalties must be high enough in order to give incentives to the responsible actor to fulfill the requirements. The monitoring requirements should be identical for all companies, independently from the type of ownership: it should be the same whether a company is publicly or privately owned. This will create equal conditions for all actors.

Moreover, the representative of the producers could carry out the audits of waste management facilities as well. If a breach of the agreement occurs, e.g. in case the facility does not provide safe waste treatment, a producer could take measures like issuing a warning or the cancellation of the contracts depending on the seriousness of the problem. Strict enforcement will encourage recycling facilities to fulfill the requirements.

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<sup>103</sup> In collective compliance approach Producer Responsibility Organization will make efforts itself to identify all free riders as it was shown in the Swedish programme.

## **7 Conclusion and recommendations**

This chapter will summarize, based on all findings of the research, the answers to the research objectives of the thesis are listed in section 1.2 and they are:

- What are the objectives of the potential EPR programme for EEE in Belarus?
- What product groups should be covered by the programme?
- How should the responsibilities between different actors be allocated in order to achieve the objectives of the programme?
- What kind of financial mechanism should be used?
- What factors should be considered in order to:
  - develop the collection and recycling infrastructure and to provide an environmentally sound treatment of collected products?
  - give incentives to producers to improve of the design of products for end-of-life management?
  - address the problem of historical and orphan products and the problem of free-riders?
  - improve public participation?

### **7.1 Summary**

The consumption of EEE is continuously increasing in Belarus and the increase in EEE consumption might be the same in the following years or at least the consumption remains at the same level leading to an increase of WEEE generation. Up to now, WEEE from households have been land filled without pre-treatment posing risk to the environment and human health. Taking into consideration these facts, the problem of WEEE generation should be addressed in the country.

With regards to the fact that the EPR principle has been recognised by many OECD countries as an effective policy approach that helps to divert WEEE stream from landfills, this thesis attempted to explore the potential for an EPR programme for EEE in Belarus. To achieve the objective of the thesis the factors that need to be considered when developing and implementing the EPR programme for EEE were identified based on the existing EPR programmes for EEE in Lithuania and Sweden and programme for plastic packaging in Belarus.

Therefore, the answers to the research questions are presented below.

#### ***Objectives of the potential EPR programme for EEE in Belarus***

Designing the effective EPR scheme, it is important to establish of the programme's objectives. Based on the findings they are proposed to be following:

- Risk minimization of hazardous substances generated from EEE at end-of-life stage and therefore promotion of design for environment;
- Promotion of reuse, material recovery and recycling;
- Provision of environmentally sound treatment of WEEE;
- The avoidance of free riders and fairly shared responsibilities for historic and future WEEE.

### ***Scope of product groups covered by the programme***

It is proposed to limit the scope of products covered by the EPR programme for EEE in Belarus to TV sets and video equipment, as well as refrigerators and freezers discarded from households because there is already an existing approach for handling of WEEE from organizations that works fairly well.

The scope limitation can be justified by the high internal market shares and small number of the national producers of these product groups that will make easier for the government to enforce and monitor compliance with the requirements and to influence the national producers to reduce the environmental burden placed by their products at end-of-life stage. Moreover, these product groups contain valuable resources that can be recycled and reused leading to the resource conservation. In addition, the country has had little experience of EPR programme implementation in general. Therefore, limiting the scope will allow to implement the system at the initial stage and then eventually it is possible to expand the scope of products covered. Another reason of scope limitation is low recycling capacity in the country that does not allow to cover wide range of EEE.

### ***Establishment of requirements***

Take back requirements should be set in order to make producers participate in the system. In order to implement the efficient programme producers should have a right to choose either to take back WEEE themselves or to set up individual contracts with waste management facilities.

Hence, in order to increase the collection and recycling of discarded products, mandatory collection and recycling rates that have to be achieved by each producer annually should be set by the government. In case producers do not fulfill the requirements the tax can be imposed on the whole amount of WEEE placed on the market.

### ***Allocation of responsibility***

#### ***Responsibility for collection and treatment of end-of-life products***

At least initially, collection of WEEE should be organized involving the existing collection infrastructure in order to avoid the additional expenses. The following facilities should be set as collection points for WEEE:

- Workshops repairing EEE;
- Municipal and private waste management facilities;
- Facilities collecting waste containing precious, ferrous and non-ferrous metals.

These facilities are chosen due to the well geographical distribution around the country and accessibility to the general public. Then WEEE collected is transported to the recycling companies that organize their recycling and treatment.

All costs associated with the collection, transportation and recycling of WEEE have to be covered by producers who either organize own collection and recycling of certain amount of WEEE put on the market, or contract with the waste management facilities or pay tax on whole amount of EEE put on the market. In all cases, the producers should cover all costs that will mean the internalization of real waste management cost in the price of the products, and will promote the design change.

### ***Responsibility for information dissemination***

The responsibility for information dissemination can be allocated between producers and MNREP. Currently MNREP can be responsible for running ads on TV channels describing the existence of EPR programme for EEE, explaining the necessity of its collection, as well as its impact on the environment and the benefits of its recycling.

Producers can be responsible for provision of information to the consumers about designated collection network at the facilities of retailers. Moreover, mutual exchange of information between producers (providing information on product content) and recycling facilities (describing difficulties arising during recycling of the products) should be developed that will make the recycling more efficient and encourage producers to improve the design for better recyclability and reduction of use of hazardous substances.

### ***Financial mechanism***

Three types of the financial mechanism for the proper functioning of the EPR programme (i.e. fulfilment of collection and recycling requirements) are proposed:

- tax imposition/or producers participation in collection and recycling of a certain percent of EEE put in the market,
- individual producer responsibility where a producer provides financial guarantee for waste management of his own products, and
- use of both mechanisms together.

The summary of advantages and disadvantages are given below, they should be taken account when deciding what type of financial mechanism to use in order to provide functioning of the EPR programme for EEE in Belarus.

Table 7-1 *Advantages and disadvantages of some financial mechanisms*

	<b>Tax imposition</b> or producers participation in collection and recycling of a certain percent of EEE put in the market	<b>Individual Producer Responsibility</b>	<b>Use of both mechanisms</b>
<b>Advantages</b>	<p>Financing of current WEEE arising</p> <p>Development of collection and recycling infrastructures, in case tax allocated properly</p> <p>The avoidance of free riders due to strict registration of taxpayers</p>	<p>Guarantee of management of future WEEE i.e. the avoidance of the problem of orphan products</p> <p>Provision of financial feedback mechanism to producers to design their products for better end-of-life management</p>	<p>Financial guarantee for historical and new waste</p> <p>Promotion of design change</p> <p>Internalisation of the real cost of WEEE management in the price of product</p>
<b>Disadvantages</b>	<p>No distinction between historical and new waste – low incentive to improve the product design</p> <p>Tax differentiation based on product groups, not on product content</p> <p>Partial allocation of tax to the development of recycling and collection infrastructure</p> <p>No clear procedure for application for financial support by all recycling companies that results in subsidization of some of them and creation of unequal conditions for others</p>	<p>Probability of the problem of free riders</p> <p>No financing for historical waste i.e. shifting the burden on the municipalities</p> <p>Inclusion of inflation in collection and treatment costs, thereby making it expensive for producers</p> <p>Challenge to identify a proper financial guarantee providing safest form of storing money for the future and creating incentives for design changes</p>	<p>Too costly to the producers</p>

***Factors influencing the development of the collection and recycling infrastructures, provision of environmentally sound treatment***

The following measures could be taken into consideration in order to develop the recycling and collection infrastructures and secure environmentally sound treatment of WEEE collected:

- Creation of conditions for competition on equal terms for all recyclers participating in the programme i.e. it must be possible for alternative collection, treatment and recycling systems to be established;

- Setting the appropriate collection and recycling rates that need to be achieved by each producer i.e. allowing to conduct recycling in an economically feasible manner and to meet the rapid increase in the quantities of WEEE collected;
- Development of the market for secondary materials, for example, the introduction of 'minimum recycled content requirements' that would also reduce the use of raw materials, and give a positive signal to producers to improve the design of their products for better recyclability;
- Regional cooperation and information sharing should also be developed in order to exchange ideas and best practices;
- Use of instruments such as landfill restrictions and taxes, material restriction, or virgin material taxes;
- The conditions of getting licensing for the recycling facilities should be more favourable;
- The total allocation of tax collected to the waste management facilities;
- Requirements of certification of the recycling facilities;
- Proper enforcement and monitoring of standards; the monitoring requirements should be identical for all companies, independently from the type of ownership: it should be the same whether a company is publicly or privately owned;
- Audits carried out by producers.

### ***Factors influencing the design improvement***

Concerning the promotion of design change, the following factors should be considered:

- Individual responsibility for the management of own WEEE;
- The negotiation between the producers and waste management providing information concerning difficulties raising during WEEE recycling of their products, giving them a signal to improve the design;
- Final adoption of regulation for labelling of products requiring producers to eliminate the use of certain hazardous substances, to use raw materials that have a recycling rate of 90 %, to make products easier-reparable, to utilize the products maximum before final disposal;
- Provision of incentives for participation in the labelling system, for example, environmental tax reduction for companies having this label.

### ***Factors addressing the problem of free riders***

In Belarus, the problem of free riders is likely to be avoided due to the fact that the number of national manufacturers is small and their market share is large. Moreover, in case of tax

imposition on EEE there is strict requirement for registration of all taxpayers, therefore, it will be easier to identify producers not paying a tax or not participating in the programme.

In case where producers will be individually responsible for future waste management of their own EEE the problem of free riders is likely to occur. Therefore, well functioning system of enforcement and monitoring run by government should be in place. The enforcement could be provided through the system of severe penalties forcing the producer to participate in the programme and through the mandatory registration of all participants. Unregistered producers should be prohibited from placing EEE on the market. Retailers should also be prohibited from supplying EEE from unregistered producers, unless they want to take on the producer responsibilities. In addition, the cooperation between producers and the government should be developed this also will result in easier free riders identification.

### ***Factors increasing public participation in the programme***

There are three factors that influence the public participation in the programme: convenience and accessibility of collection network, level of information about the programme and financial incentives to the consumers.

With regards to the accessibility of collection network the collection facilities mentioned above were chosen as designated collection sites because they are fairly well distributed around the country and almost all population has accesses to them. However, despite the fact that it will require extra expenses the collection network needs to be improved in the future.

To avoid confusion among the consumer concerning where they are allowed to bring their WEEE and what products are covered by the programme it is necessary to increase their awareness. This can be achieved by running ads on TV channels describing the programme for EEE and the reason of its implementation and what benefits it gives. Moreover, the information about designated collection sites can be disseminated at facilities of retailers.

Financial incentive to the consumers can be a good instrument used to increase the public participation that in turn would increase the collection of WEEE. In this case a discount can be provided to consumers when buying new product if they show a credit to a retailer. Consumers would be able to get this credit when discarding WEEE at designated collection sites. However, before introduction of a discount as financial incentive it is necessary to take into account all circumstances it can result in. For instance, it can lead to high administrative costs, the amount of money collected can be not enough to cover the costs for waste management of all EEE collected. Moreover, there can be cases of production of fake credits.

## **7.2 Proposed compliance scheme for the EPR programme for EEE in Belarus**

In this section, based on findings and analysis of the factors, the compliance scheme for the EPR programme for EEE in Belarus is proposed and it can be summarized as follows:

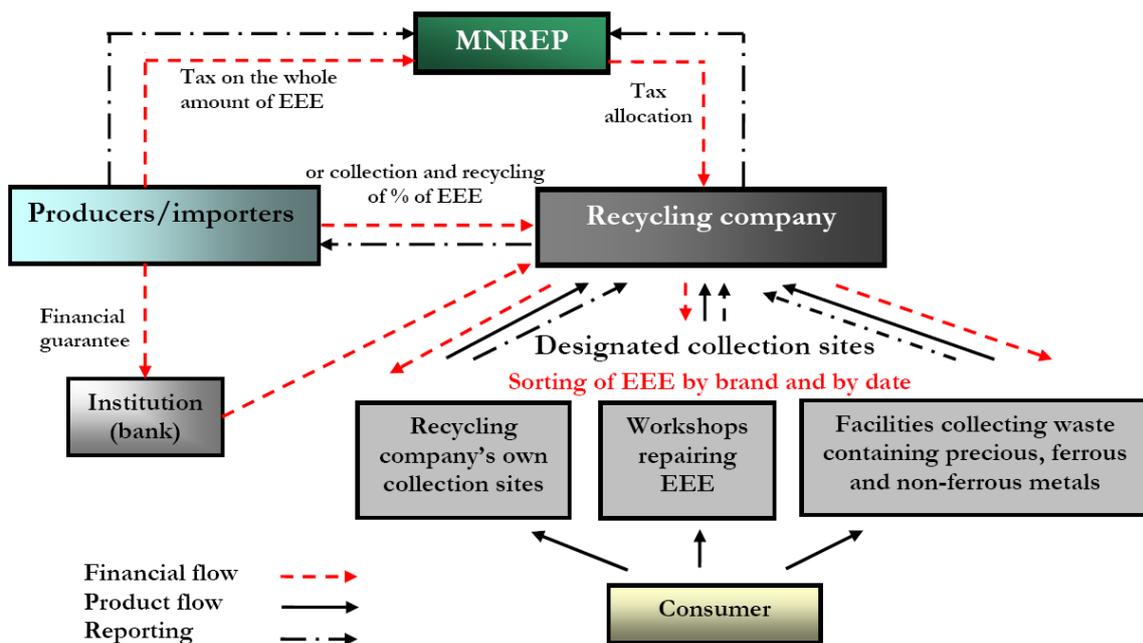
- In order to provide the financing of historical WEEE it is proposed to impose tax on all EEE (covered by the programme: TV sets, refrigerators and freezers) placed on the market by each producer. Then MNREP should allocate all these money between recycling facilities involved in collection and recycling of WEEE;

- Producers can be exempted from the tax payment if they provide the collection and recycling of a certain percent (set by MNREP) of EEE put on the market. Producers can organize collection and recycling themselves or use services of waste management facilities;
- The tax or producers participation in collection and recycling of a set percent of EEE should be in place while historical waste will be generated. Roughly, it can be 10 years after enactment of the EPR legislation, as 10 years is the average life span of EEE in the country. This assumes that approximately in 10 years the generation of historical WEEE will be finished;
- At the same time, producers have to provide financial guarantee for future WEEE management of their own new products. This means that in case producers do not fulfill their take back obligations the money can be transferred to the MNREP for financing of WEEE management;
- Hence, after enactment of the EPR legislation producers will be individually responsible for WEEE management of their own new products and during the next 10 years they will pay tax on all amount of EEE placed on the market or participate in collection and recycling of a certain percent of EEE that will finance management of historical WEEE;
- In order to distinguish new and historical WEEE producers have to mark their products with the date of production;
- In 10 years, when it is assumed that the generation of historical WEEE will be over, producers will stop paying a tax and they will be responsible just for WEEE management of their own products;
- When recycling companies receive money from either the MNREP or producers they have to organize the collection and recycling of WEEE from households (as previously mentioned, the EPR programme should not cover WEEE from organizations because approach of handling WEEE from organizations is already in place in the country). The collection of WEEE can be organized either by own collection sites of recycling companies, or by workshops repairing EEE, or by facilities dealing with collection of waste containing precious, ferrous and non-ferrous metals. Then recycling companies should allocate money received from MNREP or producers between these designated collection sites and recycling process itself. Designated collection sites or recycling facilities themselves should be obliged to sort WEEE collected by brand and by date of production. This will allow allocating costs for management of historical WEEE and new WEEE. Also this will provide producers with a data on treatment costs of their own new products;
- Consumer should be allowed to discard their WEEE free of charge at any designated collection sites (the proposal of financial incentive to consumers to increase their participation in the programme should be considered as well, however, all its advantages and disadvantages should be taken into account);
- In the end of a year, producers have to provide a report to the MNREP about the amount of EEE manufactured and about fulfilment of their take back responsibility for historical waste in order to be released from the tax payment. Moreover, producers

have to provide how they fulfill their obligations concerning new waste. Recycling companies have also report to the MNREP in order to prove that producers fulfilled their obligations.

- In case producers do not fulfill obligations concerning historical waste, producers will have to pay tax on the total amount of EEE put on the market. If producers do not fulfill their responsibility for new waste, the MNREP will be entitled to transfer money from either producer's bank account or recycling insurance in order to finance WEEE management.

Figure 7-1 Proposed compliance scheme for the EPR programme for EEE in Belarus



### 7.3 Suggestions for further research

As described in the thesis, there was no estimation of WEEE generation carried out in Belarus. This makes difficult to assess the seriousness of WEEE problem in the country and its impact on the environment and human health. Moreover, it complicates setting of the appropriate tax rate and percent of EEE that has to be collected and recycled by each producer in order to finance management of historical waste. Realizing the seriousness of the problem can facilitate the involvement of different actors in the programme. Therefore, estimation of WEEE generation in the country can be a one of directions for further research.

Estimation of average collection and recycling costs of WEEE in Belarus can be also researched in order to allow setting appropriate tax rate that will illustrate potential waste management costs incurred by producers.

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## **Abbreviations**

CIS	Commonwealth of Independent States
CFCs	Chlorofluorocarbons
CRT	Cathode ray tube
EC	European Commission
EEE	Electrical and Electronic Equipment
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
GDP	Gross domestic product
IT	Information technology
MNREP	Ministry of Natural Resources and Environment Protection
OECD	Organisation for Economic Co-operation and Development
PC	Personal computer
PCBs	Polychlorinated Biphenyls
PET	Polyethylene terephthalate
PRO	Producer Responsibility Organisation
PVC	Polyvinyl chloride
RoHS	Restriction of hazardous substances
SEK	Swedish Kronar
SME	Small and medium enterprise
WEEE	Waste Electrical and Electronic Equipment



## Appendix 1: List of all interviews conducted

Interviewees in Minsk, Belarus			
Interviewee and website	Type of the interview	Time	Name and position of the interviewee
Ministry of Natural Resources and Environmental Protection, Waste Management Department <a href="http://minpriroda.by/">http://minpriroda.by/</a>	Personal interview, follow-up E-mail	19:00-20:30, June 12, 2006	Gnedov Aleksandr Nikolayevich, the head of Waste Management Department
“Horizont” company, Environment Protection and Work Security Department <a href="http://www.horizont.by/english/">http://www.horizont.by/english/</a>	Personal interview, follow-up E-mail	9:00-10:30, June 14, 2006	Kratovich Victor Leonidovich, the head of Environment Protection and Work Security Department
“BelResources” concern, Centre for reuse of secondary materials <a href="http://belres.by/main.aspx?uid=33982">http://belres.by/main.aspx?uid=33982</a>	Personal interview	18:00-19:45, June 15, 2006	Yatsuk Anatoliy Bacileyvich, director of the center for reuse of secondary materials
Research institute TSNIITU, the dismantler of EEE	Personal interview	17:00-19:00, June 21, 2006	Solovey Sergey Anatolyevich, the executive director of research institute
Interviewee in Lithuania			
Infobalt EPA, Lithuanian electronic equipment waste management association – producer responsibility organization <a href="http://www.epa.lt">http://www.epa.lt</a>	Interview by Skype	11:00-12:00 July 26, 2006	Edgaras Kriukonis, the director of Infobalt EPA
Interviewee in Sweden			
SYSAV AB Elektronikätervingning [Recycling of electronics] <a href="http://www.sysav.se/Templates/Page.aspx?id=299">http://www.sysav.se/Templates/Page.aspx?id=299</a>	Personal interview	13:30-14:30, August 3, 2006	Bo Thulin
SYSAV AB <a href="http://www.sysav.se/">http://www.sysav.se/</a>	Personal interview	13:00-15:00 August 8, 2006	Kristofer Kvernes, environmental coordinator
Swedish Environmental Protection Agency <a href="http://www.internat.naturvardsverket.se/">http://www.internat.naturvardsverket.se/</a>	Telephone interview	14:00-14:30 August 15, 2006	Lars Eklund
El-Kretsen AB <a href="http://www.el-kretsen.se/">http://www.el-kretsen.se/</a>	E-mail		Jan-Olof Ericsson
Lansforsakringar AB <a href="http://www.lansforsakringar.se/">www.lansforsakringar.se/</a>	Telephone interview	14:00-14:30 August 17, 2006	Anders Sverkman

## Appendix 2: List of questions asked concerning EPR programme for plastic packaging in Belarus

### List of questions

When was the EPR programme for plastic packaging implemented?  
According to the law, who is obliged to participate in the programme?  
What type of plastic and what type of plastic packaging are covered by the system?  
Why this type of plastic was chosen?  
What kind of instrument is supplemented with the programme? What is the rate of tax? Does the rate of tax give incentives to companies to treat plastic packaging? How is the income raised used?  
How does the EPR programme work? Is it collective or individual system? Or do the companies need to contract with recycling companies?  
How is the collection, transportation, recycling organised in the country?  
Who does provide the containers?  
Do the companies ask to collect plastic packaging of their products or the collection is organised regardless the owner?  
Does the implemented system influence the content and quantity of plastic packaging?  
How did the companies react on the implementation of the programme?  
Do the companies or government try to increase the public awareness and participation in the programme?  
What the methods are used?  
Do all companies participate in the programme or is there any subsidization of some of them?  
How does the government try to avoid the problem of free riders?  
Is there the government's support to the recycling companies and does the government stimulate the development of the market for secondary materials?  
Is the capacity of all recycling plants in the country enough to treat all plastic packaging?  
What are the main difficulties and barriers the EPR programme for plastic packaging facing with?

### **Appendix 3: List of actors interviewed and list of questions asked concerning the Lithuanian EPR programme for EEE**

Infobalt EPA
<p>How is the compliance scheme organized in the country? Is it collective producer responsibility organization, or companies themselves organize the collection and treatment of WEEE?</p> <p>What are the main difficulties for Collective organization to start its operation? What is the market share of producers participating in the PRO?</p> <p>Who will be responsible for collection: a municipality or producers collective organization, and who pays the costs of collection? What are the opinions of both sides about allocation of responsibilities for collection?</p> <p>Are EEE products collected according to the brand or regardless of EEE brand?</p> <p>How is the system financed in the country? Is there already a tax imposed on EEE products, requiring the companies either to treat their waste themselves or to pay a tax? What products are or will be covered by the system and tax? Is it profitable for producers to pay tax or treat their waste?</p> <p>What percentage of EEE products is necessary for producers to treat in order to avoid paying the tax? Where does this money go?</p> <p>Where can consumers discharge their WEEE: municipal collection station, or retailers or someone else? Do retailers agree to accept WEEE, on what basis?</p> <p>What are the incentives for to the consumers to bring their WEEE? What is being done to involve public participation?</p> <p>What are the main difficulties the country facing during registration of all producers process? How is the problem of free riders addressed?</p> <p>How is the problem of historical waste addressed in the country?</p> <p>Are the producers required to provide the financial guarantee?</p> <p>Are penalties used in case of non fulfilment of requirements?</p> <p>What are the main barriers preventing the implementation of WEEE directive in the country?</p>

## Appendix 4: List of actors interviewed and list of questions asked concerning the Swedish EPR programme for EEE

SYSAV AB
<p>Out of total weight of WEEE treated in Sweden, what percentage is being taken care of by SYSAV AB?                      How is the collection organized by the company? Who is financially responsible for collection?                      How is the collection of EEE organized from the business to business?                      What are criteria are applied to SYSAV AB in order to have contract with El-Kretsen? Does El-Kretsen conduct audits to find out whether the company complies with the requirements?                      Does SYSAV AB provide its services for collection and recycling to the individual producers of EEE?                      Is the sorting of EEE done according to the brand or not?                      Does the company communicate with producers to improve design of products for better recycling? Do producers provide information about content of their products?                      What are the main factors that promoted the development of the company?                      What are barriers that still exist?                      What is the company's opinion concerning individual responsibility?                      What is done with parts of EEE that can be recycled? How are CRT treated?                      What are the main factors that led to increase in public involvement?</p>
El-Kretsen AB
<ol style="list-style-type: none"> <li>1. How is the registration of all producers organized in the country and what actions are taken in order to find out free-riders?</li> <li>2. In practice, do participants of El-Kretsen still need to provide the financial guarantee for recycling of WEEE in the future, as the Ordinance requires?</li> <li>3. What kind of financial guarantee is implemented in the country: block account or recycling insurance? Why? What is reaction of producers to provide such guarantee and what are the main difficulties?</li> <li>4. In practice, who is financially responsible for collection of WEEE?</li> <li>5. What are the factors that led to the 90% rate of producers' participation in the programme?</li> </ol>
Swedish Environmental Protection Agency
<ol style="list-style-type: none"> <li>1. What are the factors that led to the 90% rate of producers' participation in the programme?</li> <li>2. How the problem of free riders is addressed in the country? How does the government cope with this problem?</li> <li>3. What are the reasons of registration postpone? In the future, will be the process of registration free of charge or will producers have to pay and how the government will trace whether all producers are registered?</li> <li>4. Do producers provide already the financial guarantee for future recycling of WEEE? What are the main difficulties?</li> <li>5. Does EPA give incentives for producers to establish individual system for WEEE? Does EPA provide any support to them?</li> </ol>
Insurance company Lansforsakringar AB
<ol style="list-style-type: none"> <li>1. How often nowadays do companies apply to the insurance company for recycling insurance? Is it becoming normal phenomena or is it more exemption?</li> <li>2. Is there any differentiation of premiums paid by the producers of EEE or is the premium flat? Is differentiation based on the type and content of EEE?</li> <li>3. Do you think that this recycling insurance and premium paid by the producers will facilitate the design change of EEE?</li> <li>4. How does the process of insurance work in general: when the producers pay, how much they pay, when they receive their money back to recycle and etc.?</li> </ol>

## **Appendix 5: Profile of the interviewed actors**

### **Waste Management Department in the Ministry of Natural Resources and Environment Protection, Minsk**

The interview was carried out with the head of Waste Management Department in the Ministry of Natural Resources and Environment Protection – Gnedov Aleksandr Nikolayevich. The interview took place 19:00-20:30, June 12, 2006 in at the Waste Management Department, Minsk.

MNREP is the highest authority responsible for environmental activities in the Republic of Belarus. The main responsibilities of Waste Management Department are to set environmental standards and follow up their implementation, concede permissions for waste disposal to large industries, collect waste taxes from industry, concede licences for trans-boundary movement of wastes and develop international cooperation.

### **EEE producer – “Horizont” – TV sets producing company, Minsk**

The interview was carried out with the head of Environment Protection and Work Security Department of “Horizont” company, Kratovich Victor Leonidovich. The interview took place 9:00-10:30, June 14, 2006 in at headquarter, Minsk.

“Horizont” company was established in 1950s and today it is a leading producer of TV sets and video equipment in Belarus and CIS countries. The internal market share of the company in Belarus for TV sets is 51%. The external market share within CIS countries is 4%. The sale of TV sets in the country accounts for 25 % of the total volume of product production; the rest is exported to CIS countries. Moreover, the company recently started the production of microwave ovens and vacuum cleaners.

In 2005 the company sold 296 388 units of TV sets within the borders of the country. Between 2000 and 2005, the increase in sale of TV sets within the country is about 348%.<sup>104</sup>

### **Centre for reuse of secondary materials in “BelResources” concern, Minsk**

The interview was carried out with director of the centre for reuse of secondary materials, one of the departments of “BelResources” Concern - the collection and recycling company, Minsk, Yatsuk Anatoliy Bacileyvich. The interview took place 18:00-19:45, June 15, 2006 in at the headquarters in Minsk.

Concern “BelResources” was established to optimize the use of resources and to implement the state policy for efficient use of resources. The concern consists of 37 organizations that are spread around the country. This organisation provides free investment capital to enterprises that carry out recycling activities.

The main aims of the centre for reuse of secondary materials are to optimize the waste management system, to provide the secondary materials to the recycling plants, and to develop new technology using waste as secondary raw materials. The centre provides the

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<sup>104</sup> The increase in sale was calculated according to the data provided by Kratovich B.L. the sale of TV sets in 2000 amounts 66 187 units, and in 2005 – 296 388 units, therefore the increase in sale is about 348%.

following services: collection, treatment of waste in order to sell it as secondary raw material; treatment of waste from machine building, chemical, wood-processing industries. The following wastes are collected and treated by the centre: plastics, paper, carton, glass, galvanic waste, used oils, used tires, electrolytes, sludge from wastewater treatment plant etc.

#### **Research institute TSNITU - dismantler of EEE, Minsk**

The executive director of research institute, Solovey S.A. was interviewed. The interview took place 17:00-19:00, June 21, 2006 in at the headquarters in Minsk.

The main activity of the institute is to conduct researches with regard to the properties of electronic and electric equipment, especially TV sets. Recently the institute started a pilot project on dismantling and sorting of EEE, particularly TV sets, computers. However, the institute plans to expand the scope of products included in its project.

## **Appendix 6: List of questions asked to actors involved in potential EPR programme for EEE in Belarus**

<b>Waste Management Department in the Ministry of Natural Resources and Environment Protection, Minsk</b>
<p>What place does the problem of WEEE take in the environmental policy of the country?                      Was the evaluation of WEEE generation conducted in the country or not? If not what are the reasons?                      What is the general approach of WEEE handling in the country? Who is responsible for collection, transportation, recycling of WEEE and are there any specific requirements for disposal of WEEE?                      Do any incentives exist to the producers to recycle waste, use secondary materials, and to reduce or eliminate the use of hazardous substances? For example, tax on the primary material, restriction on land filling, requirement to use certain percent of secondary raw material in new product, restriction on use of certain substances, etc.                      Is the infrastructure for recycling developed enough or not, and what are the main factors influencing on its development, and what are the main barriers? How many recycling plants are in the country? Is their capacity enough for recycling?                      Does the Ministry provide the financial support for companies conducting waste recycling?                      What are the main barriers for the implementation of legislation concerning the EPR programme for EEE?                      Are measures taken to overcome the barriers, when is it planned to implement the EPR legislation for EEE?                      If the EPR legislation will be enforced what products will be covered by the legislation? What are criteria for selecting them?                      How the problem of historic waste will be addressed in the legislation?                      Is there scheme of registration of all EEE producers in the country and EEE importers?                      Is there control and monitoring of second-hand EEE crossing the border of the country?                      1. Is it common for the Ministry to communicate with different actors before implementation of the legislation and to know their opinions?</p>
<b>TV sets producer - “Horizont” company</b>
<p>What is the market share of the product in Belarus?                      How many units are produced each year and whether the production of product is increasing or decreasing?                      How many units are consumed within the territory of Belarus?                      What is the average life span of the product?                      Which countries does the producer export the product?                      In case of export to the Western Europe is the producer required to fulfill the obligations under WEEE and RoHS Directives?                      Did the producer think about the impact of product at the end-of-life stage?                      Are any regulations within the country restricting the use of certain substances in production process? Does the producer think to reduce or eliminate the use of hazardous substances? What are the main driving forces to do this?                      Is the producer obliged to mark product and provide information about product content?                      Does the producer think about providing the leasing of product instead of selling it?                      How does the producer deal with defect product? Is it recycled and used in the process again or not?                      What is happening with broken parts of product that is still under guarantee period, after guarantee period?                      Are they recycled and used in the process again or not?                      What does producer think about implementation of EPR principle?                      According to the producer’s opinion what are the main barriers for EPR principle implementation?                      In case of enforcement of legislation concerning EPR for EEE would the producer like to be responsible itself for collection, treatment of WEEE or he would delegate these responsibilities to external organization?                      What is the producer’s opinion about impact of implementation of ERP principle on design change?                      What are the main driving forces for producer to think about design change?                      Does the producer think about design change for easier dismantling?</p>
<b>Centre for reuse of secondary materials –the department of the collection and recycling concern “Belresources”, Minsk and the dismantler of EEE – TSNITU,</b>

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What types of waste are treated by the company?  
How is the scheme of collection, transportation and treatment organized?  
What are the main incentives for the company to treat waste?  
What are the main barriers for conducting the activity?  
What factors will facilitate the development of recycling infrastructure?  
What is their opinion about the development of the market for secondary materials?  
Do the dismantlers/ recyclers receive the support from the government?  
What are their attitude to the potential implementation of EPR programme fro EEE?

## Appendix 7: List of categories of products covered by WEEE Directive and the recycling rates specified in the Directive

Product categories covered by WEEE Directive		
<ol style="list-style-type: none"> <li>1. Large household appliances (refrigerators, washing machines, stoves);</li> <li>2. Small household appliances (vacuum cleaners, toasters, hair dryers);</li> <li>3. Information and telecommunications equipment (computers and peripherals, cell phones, calculators);</li> <li>4. Consumer equipment (radios, TVs, stereos);</li> <li>5. Lighting (fluorescent lamps, sodium lamps);</li> <li>6. Electrical and electronic tools (drills, saws, sewing machines);</li> <li>7. Toys, leisure, and sports equipment (electric trains, video games);</li> <li>8. Medical devices (ventilators, cardiology and radiology equipment);</li> <li>9. Monitoring instruments (smoke detectors, thermostats, control panels);</li> <li>10. Automatic dispensers (appliances that deliver hot drinks etc).</li> </ol>		
Targets for Recovery and Reuse/Recycling, by weight		
Product Category	Recovery Target	Recycling Target
Large household appliances	80%	75%
Small household appliances	70%	50%
Information and telecoms	75%	65%
Consumer equipment	75%	65%
Lighting	70%	50%
Tools	70%	50%
Toys, Leisure, Sports	70%	50%
Medical equipment	NA*	NA*
Monitoring instruments	70%	50%
Dispensers	80%	75%

Source: (Savage, Ogilvie, Slezak, Artim, Lindblom & Delgado, 2006)