MINISTRY OF ENVIRONMENT AND WATER

REPUBLIC OF BULGARIA

P R O G R A M F O R I M P L E M E N T A T I O N

OF DIRECTIVE 94/62/EC ON PACKAGING AND PACKAGING WASTE

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CONTENTS:

ABBREVIATIONS

MOEW – Ministry of Environment and Water

RIEW – Regional Inspectorate for Environment and Water

EEA – Executive Environmental Agency

MF – Ministry of Finance

NSI – National Statistical Institute

CA – Custom Agency

BCC – Bulgarian Chamber of Commerce

BIA – Bulgarian Industrial Association

SAMTS – State Agency of Metrology and Technical Supervision

BAPE – Bulgarian Association for Packaging and Environment

RO – Recovery Organization

BGN – Bulgarian Levs

PCW – Paper and Cardboard Waste

NCIP(PRODPROM) - National Catalogue of the Industrial Production

INTRODUCTION

Bulgaria is between the Central and Eastern European Countries applying for membership in European Union. In regard with this one of the main tasks of the Bulgarian government is to achieve compliance with the various EU Directives in shortest possible time. At the beginning of 2001 Bulgaria presented to EC official negotiation position for membership in EU, including chapter 22 "Environment". The position covers the legislation adopted by the European Union and in force as per December 31, 1999.

In 2002 Bulgaria presented negotiation positions for the EC legislation adopted in 2000 and 2001.

The working hypothesis of the Bulgarian government is that Bulgaria will become equal member of the European Union on January 1, 2007.

The present program for implementation of Directive 94/62/EC for packaging and packaging waste define the requirements, the objectives and the necessary administrative, legislative and investment measures, providing compliance with the EC requirements in this field.

The program pays special attention to the staged achievement of the quantitative targets for recycling and recovery of packaging waste and define the obligation of the producers and importers of packed goods that generate waste after their use regarding the undertaking of specific measures for management of packaging waste.

1. REQUIREMENTS OF DIRECTIVE 94/62/EC

The overall target of the Community policy regarding the waste management is ensuring of high level of environmental protection without warping the functioning of the internal market with a view of encouraging the sustainable development. The following elements are of significant importance for achieving this bilateral target:

- Comprehensive and integrated legislative framework;
- Proper definitions of concepts related to waste;
- Proper rules and principles;
- Reliable and comparable data;

The Community Strategy for Waste Management from 1989[1], determine the principles, the political targets and the activities that the European Commission intends to follow during the development of the legislation and other activities in this field and it should be viewed as a declaration of intention without generating legal obligation for the Commission or for the Member States.

Taking into account that the waste management is a complex task, composite of great number of components, the Strategy is based on the following sustainable principles:

- Prevention principle – waste generation should be decreased and avoided, wherever it is possible;
- Producer responsibility and polluter pays principle – those that generate or contribute to the waste generation or pollution of the environment should cover all expenses for their actions;
- Precautionary principle – potential problems should be foreseen and avoided;
- Proximity principle – waste should be disposed at the closest possible place nest to the place of their generation;

The Strategy is based on the hierarchy of the principles indicating that the waste prevention is a main priority, followed by recovery and at last - the safety treatment of waste. In applying this hierarchy the best possible solution should be searched from the point of view of environmental protection, taking into account the different economic and social factors.

The overall structure of effective regime for waste management in EU is determined with Framework Directive 75/442/EC on waste and the complementary Directive on Hazardous Waste. These two Directives are further developed in two types of daughter Directives determining the requirements for permission and operation of the facilities for waste treatment as well as the requirements for specific waste types.

Directive 94/62/EC for packaging and packaging waste aims at harmonizing the national measures for limiting to minimum the impact of packaging waste upon environment and preventing the barriers building for free trade in the Community frame. The Directive is applicable for packaging and packaging waste despite whether it is industrial, commercial or domestic and despite the materials used. The main requirements of the Directive could be summarized as follows:

1. The Directive implied (Art. 6) packaging and packaging waste prevention and defines quantitative targets for recycling and recovery of packaging waste that should be achieved by the Member States. After 2001 50 - 65% of packaging waste has to be recovered and 25 – 45% of the

[1] Communication from the Commission on the Community Strategy for Waste Management (SEC (89) 934 final of 18.9.1989). Endorsed by the Council in its Resolution of 7 May 1990 (OJ C 122/2, 18.5.1990) and Communication from the Commission on the Review of the Community Strategy for Waste Management COM (96) 399 final, 30 July 1996

total packaging waste quantity has to be recycled and from every single packaging material not less than 15% have to be recycled.

2. The reuse, recycling and other forms of waste recovery (including incineration with energy recovery) are the methods of recovery. The recycling includes treatment and organic recycling (composting) but does not include incineration.
3. The competent authorities have to assess the recovery potential of packaging at a national level and have to define achievable target at national level within the limits required by the Directive.
4. The competent authorities have to provide for establishment of system for management of packaging waste, which should guarantee the achievement of the quantitative targets defined in the Directive (Art. 7). The present experience shows that often such systems are based on voluntary agreements, where all parties concerned (producers, traders, collectors, manufacturers) are obliged to achieve quantitative targets before the competent authorities administratively to impose this to them.
5. The Directive allows the use of economic incentives that would support the development and management of the system in the initial stage.
6. Directive 94/62/EC defines the limitations for admissible quantities of heavy metals in the packaging (Art. 11) by limiting concentration of cadmium, lead, mercury and six – valence chrome. The overall quantity of the mentioned heavy metals in every packaging or its separate component should not exceed the following limits:
   - 600 ppm from the packaging weight after June 30, 1998.
   - 250 ppm from the packaging weight after June 30, 1999.
   - 100 ppm from the packaging weight after June 30, 2001.
7. Requirements are introduced for harmonizing the national standards for packaging materials and packaging waste (Art 9).
8. The Directive require the implementation of a system for monitoring and control of the packaging waste generation and for this purpose harmonized data basis, providing comparable analysis at European level have to be developed (Art. 12).
9. The public have to be informed on the issues related to packaging waste generation, management and treatment and have to be encouraged to participate in the measures for packaging waste prevention and for implementation of the systems for separate collection.

The following Decisions of the European Commission regarding the implementation of the Directive have to be taken into account:

- Decision of the Commission 97/129/EC determining the system for identification of the packaging materials in conformity with Directive;
- Decision of the Commission 97/138/EC on the formats of the database system in conformity with Directive 94/62/EC;
- Decision of the Commission 97/622/EC on the questionnaire for the reports of the member states regarding the implementation of some Directives within waste management sector;
- Decision of the Commission 1999/177/EC on plastic crates and pallet;
- Decision of the Commission 2001/171/EC on glass for packaging.

2. REQUESTED TRANSITION PERIODS IN ACCORDANCE WITH THE NEGOTIATION POSITION OF REPUBLIC OF BULGARIA

Republic of Bulgaria has pointed January 1, 2007 as expected date for accession to the European Union and with the Common position on negotiation for Chapter 22 "Environment" has requested 5 years transition period i.e. up to January 1, 2012 for achieving minimum targets for recovery as per art.6, (1),(a) of Directive 94/62/EC.

Main reasons for this request are:

- Admission for considerably lower consumption of packaging within the country;
- Limited market for recycling materials and insufficient capacity for recycling for compensating the achievement of the main provision for recovery.
- Lack of installations for incineration with energy recovery as well as lack of public support for building such installations;
- Significant investments are necessary for building such facilities and for development of separate packaging collection and for separation system;
- Covering of required investments from other waste management measures such as closure of existing landfills, disposal of hazardous waste etc.

3. DESCRIPTION OF THE CURRENT SITUATION

3.1. LEGISLATION TRANSPOSING THE REQUIREMENTS OF DIRECTIVE 94/62/EC

With the adoption of the Limitation of the harmful impact of waste upon environment Act in 1997[2] (LHIWEA) the ground for legal regulation of the waste management in the country was established and considerable progress in the process of harmonizing the national legislation with the EU one was achieved.

For implementation of the requirements of the Act and the National Waste Management Program in the period 1998 – 2002 a number of secondary legislative documents in the field of waste classification, requirements towards the sites and the facilities for waste treatment, requirements towards specific waste flows were adopted.

Within the framework of PHARE Twinning project implemented together with the German Federal Ministry of Environment, Nature Conservation and Nuclear Safety a proposal for Regulation on the requirements for limitation, recovery and recycling the packaging waste. Its adoption will provide full compliance with the requirements towards the national legislation in the field of packaging waste management. The present program is based on the principles set in the indicated proposal for Regulation.

3.2. COMPETENT AUTHORITIES AND RESPONSIBILITIES

The economic operators according to the Directive are the suppliers of packaging materials, the waste producers and manufacturers, the bottling industries, packaging and all other producers, importers and distributors of packaging goods and consumers, the governmental and managing authorities and the state organizations and institutions.

[2] Promulgated State Gazette No. 86/30.09.1997 amended No.56/22.06.1999; No.27/31.03.2000; No.28/4.04.2000.

The responsibilities of the different economic operators are interpreted in the content of the proposal for national legislation in the field of packaging and packaging waste.

3.2.1. Producers and importers of packaging goods

Every producer or importer whose products are sold in packaging is required to contribute to or provide for packaging waste recovery, in accordance with the quantitative requirements defined in the legislation. If the producers or the importers cannot be defined, the person responsible for the initial distribution at the market will have the same responsibilities as the producer does. The producers or the importers of the packaging products have the possibility to undertake their responsibilities in two ways:

- Providing by themselves the collection of packaging put on the market by establishment of deposit systems or by providing places (containers) for return acceptance of packaging waste;
- By transferring their responsibility to approved by the competent authorities Collective Compliance Scheme (Recovery Organization) that shall fulfill the requirements for collection and recovery instead of them against payment of certain charges. In this case the producers of packaging have the obligation to identify the packaging that are entrusted to the organization.

The producers and the importers of packaging goods are responsible for packaging put on the market to fulfill the legislative requirements as well as for submission to the competent authorities of statistical information regarding the quantity of packaging put on the market and the quantity of recovered packaging waste.

3.2.2. Producers and importers of packaging materials and empty packaging

The producers and the importers of packaging materials and empty packaging are required together with the producers of packaging goods to ensure compliance of the packaging put on the market with the requirements of the legislation. They are entirely responsible that the packaging and packaging materials produced by them should fulfill the requirements for maximum allowed content of heavy metals.

The producers and the importers of packaging materials and empty packaging are allowed to participate in the defined collective systems for achieving quantitative targets fro recovery and recycling and also to provide the possibility for return acceptance of the packaging offered by them.

Where this is technically feasible and practically reasonable these producers and importers should undertake the necessary measures for waste prevention, for increasing the proportion of the recycling components of the packaging as well as for putting of recyclable components in the packaging production.

The obligation for providing statistical information regarding the quantities of packaging put on the market and the packaging waste actually recovered are also applicable for these producers and importers.

3.2.3. Distributors of packed goods

The obligation for return acceptance of packaging waste covers also the distributors of packed goods in the cases when they are not served by the Collective Compliance Scheme (Recovery Organization).

3.2.4. Owners of packaging waste

The owners of packaging waste are obliged to either throw them or submit them to the designated for that purpose places.

The packaging waste from the industry and the commercial places[3] are obligatory submitted for reuse, recycling and recovery in the cases when this is technically possible. The owners of such waste are obliged to follow one of the following possibilities:

- To ensure by themselves the recovery of the packaging owned by them in own facilities permitted in accordance with the Limitation of the harmful impact of waste upon environment Act (LHIWEA);
- To submit them on the basis of a contract for recovery in installation possessing the respective permit;
- To submit them on the basis of a contract to a specialized company for collection of this type of waste;

3.2.5. Municipal Administrations

The municipal administrations are responsible for organizing the separate collection of packaging waste from the households on their territory on the basis of a contract concluded with the producers and the importers of packaging goods on behalf of the Collective Compliance Scheme (Recovery Organization). The municipalities have the right to negotiate and receive additional financing for implementation of separate collection of packaging waste, their sorting and transportation to the final manufacturer.

The municipalities can choose whether to perform by themselves the activities for collection and sorting of packaging waste (through the municipal companies) or to entrust them to either one or several specialized private companies. They also have the possibility to choose their own scheme of collection and recycling/recovery. The collected and sorted waste should correspond to the minimum technical specifications (quality requirements) defined for each material.

The municipal administration is obliged to update the relevant municipal programs for waste management and the regulations for collection, transportation, recycling and treatment of municipal solid waste in correspondence with the targets of the present program and legislative requirements.

3.2.6. State administration

The state administration has the task to provide effective control and access to information to the public regarding the implementation of the legislation in the field of packaging and packaging waste.

[3] The waste received as a result of unpacking of products at every stage of the production or the selling process except the use in the households.

The Ministry of Environment and Water is the national competent authority providing coordination between the interested state institutions regarding the implementation of the legislative requirements for packaging and packaging waste.

The Ministry performs the duties imposed by the legislation within the frame of its professional competence through the system of 15 Regional Inspectorates for Environment and Water (RIEWs) and the Executive Environmental Agency (EEA).

The distribution of the obligations between the different state institutions and the municipalities is as follows:

– Control on the producers of the packaging goods for achieving the obligatory targets for recovery and recycling;	MOEW (RIEW)
– Identification of affected economic operators;	NSI[4], MF (Tax administration)
– Permission and control over the activities of the Collective Compliance Schemes (Recovery Organizations) and inspection of the implementation of the conditions of the permit issued by the competent authorities;	MOEW, RIEW
– Control over the producer and importers of packaging goods and distributors implementing individually their duties for recovery and recycling (duties for return acceptance)	Municipalities, RIEW
– Control of the activities for collection, sorting, treatment, pretreatment and recovery of waste regarding the requirements posed by environmental legislation.	RIEW
– Control over the implementation of the requirements for the heavy metals content	SAMTS[5]
– Collecting and processing information of information for quantities of packaging put on the market and the quantities of recovered packaging waste	EEA, RIEW, NSI, CA[6]
– Reporting to the European Commission (after accession)	MOEW

[4] NSI - National Statistical Institute
[5] SAMTS – State Agency Metrology and Technical Supervision
[6] CA - Custom Agency

3.3. QUANTITIES OF GENERATED PACKAGING AND PACKAGING AND EXISTING PRACTICE FOR THEIR TREATMENT

3.3.1. Quantities of packaging and packaging waste

For preparation of assessment of the packaging consumption within the country is used the assessment made in 1998 and 1999 during the project "Database for packaging and packaging waste in Republic of Bulgaria", implemented within the frame of bilateral agreement with the Federal Republic of Germany and financed by the German Federal Ministry of Environment, Nature Conservation and Nuclear Safety.

The assessment of the quantities of produced packaging for 2000 and 2001 are based on the information submitted by the National Statistical Institute for packaging production within the country per codes in accordance with the National Classification of Economic Activities (NCEA), which has been applied for the relevant year. The assessment of the quantities of imported and exported packaging is based on the information submitted by the Customs Agency in accordance with the Custom Tariff of Republic of Bulgaria in force for the relevant year.

Detailed information for the quantities of packaging produced, imported and exported packaging is presented in Annex 1.

Summary of the existing information related to the consumption of packaging by main types of packaging materials is presented below:

– Paper and Cardboard packaging

The production of paper and cardboard packaging for the period 1998 – 2001 varies in the range of 119 thousand tons per 2001 and 157 thousand tons per 1998. The values pointed include the quantities of paper and corrugated cardboard for which, based on expert evaluation is accepted that are used for production of packaging. With this assumption the values pointed should be considered as maximum.

The quantities of imported paper and cardboard packaging are considerably lower than those produced in the country and for the years 2000 and 2001 they amount to approximately 14 thousand tons. The overall quantity of imported packaging exceeds the exported ones and as a result the quantity of the packaging for consumption in the country is increasing with 9 – 10 thousand tons per year.

Taking into account the quantities of paper packaging exported from the country and the packaging goods, the annual consumption for 2001 is estimated at 125 thousand tons or approximately 16 kg. per capita.

– Plastic packaging

The quantities of produced plastic packaging are assessed on the basis of the information for the production of the goods included in the National Nomenclature for industrial production. In the cases where there is information for the production of certain goods (as unit - numbers), correction factors have been used to re - estimate the quantities into kilograms.

The production of plastic packaging in the country is stable in 2000 and 2001 and amounts at approximately 150 thousand tons. These quantities are approximately 30 thousand tons higher than the produced in 1998. The assessment does not include the quantities of group and transport packaging from temperature resisting folio.

The quantity of the imported plastic packaging during the pointed years exceeds the quantity of the exported ones with 3 thousand tons in 2001 and 6 thousands tons in 2000, and the total quantity of the import amounts at 12 thousand tons for 2001.

– Glass packaging

The production of glass packaging in the country has an increasing tendency from 1999 and in 2001 it achieves 214 thousand tons. Despite this fact the quantities pointed are significantly lower than the produced ones in the period up to 1997 when the produced glass packaging is approximately 400 thousand tons per year.

Significant part of the produced quantities is exported as empty packaging and for 2001 the export amounts to 103 thousand tons. The quantities of the imported packaging waste are several times lower than the exported quantities – approximately 10 thousand tons.

– Metal packaging

According to the data of the NSI the metal packaging produced in 1998 – 2001 vary in the range of 7.9 –32.5 thousand tons. The big difference in the values should be attributed mainly to the lower scope of the metal packaging groups that were monitored for the assessments in 1998 and 1999. The quantities of the imported empty metal packaging are higher than the imported and are approximately 10 thousand tons per year.

The summary data from the assessment of packaging consumption in the country in 2001 are presented in Table 1. The quantities of the consumed packaging by different packaging materials for the relevant year is defined as a difference between:

- the sum of the quantity of packaging produced, the quantity of empty packaging imported and the quantity of the imported packaging together with the packaging products,

and

- the quantity of the exported empty packaging and the quantity of the exported packaging together with the packaging products.

Table 1. **Assessment of quantities packaging and packaging waste generated in the country in 2001**

Material	Production of packaging	Import (empty packaging)	Export (empty packaging)	Export – Import (filled packaging)	Quantity released at the market
	Tons	Tons	Tons	Tons	Tons
Glass	214012	9991	103249	33024	**87729**
Plastic	105348	11956	8777	3014	**105514**
Paper/Cardboard	119271	14205	5300	3014	**125163**
Metals	32529	8633	6673	13017	**21473**
Wood	37436	1603	17044	13017	**8978**

Total	508596	46389	141043	65086	**348856**

Taking into account the amounts of wooden packaging, the overall consumption in the country is assessed at approximately 350 thousand tons per year.

3.3.2. Collection of waste for recycling

The existing system for collection of recycling components such as paper, glass, plastic and metals is limited to buying back of waste that is separately collected by the population or represents residual products from production. The system is organized independently from the municipal systems for collection of municipal solid waste, on the base of collection centers, collection at the place of waste generation (when big quantities are generated) and implementation of periodic campaigns. The collection of waste destined for recycling is limited only to the waste for which the expenses for collection, sorting and transport exceed the market price paid by the final consumers and is strongly dependent on the current demand of the market[7].

- **Paper and cardboard packaging waste**

The total quantity of collected and treated paper and cardboard packaging waste generated in the country for the period 1998 – 2001 varies in the range of 65 thousand tons in 2001 and 80 thousand tons in 1998. These values do not include the quantity of the imported treated waste.

The existing collection systems are limited to buying back of separately collected paper and cardboard waste (PCW) by population or the same produced by different industry branches. The system is organized independently from the municipal systems for collection of municipal solid waste using collection centers, collection at the place of waste generation (when big quantities are generated) and implementation of periodic campaigns.

The main part of the companies collecting waste through collection centers has the necessary equipment and capacity for treatment at the place of waste generation. The collection centers serve the population living in the region (households) and the voluntary collectors of PCW. The centers give information and provide explanations regarding the quality, type or groups PCW, the prices and the way of delivery, unacceptable pollutants, etc. The centers also provide preparation for separate storage, packing of PWC for pooling into bigger units, facilitating the transportation, compacting of the transport vehicle, containers or other type of transportation packaging. The companies serving several centers have basis equipped with transport and lifting equipment, sites, warehoused for storage, equipment for treatment and other necessary facilities for weighting and control of waste quantities. The treatment is made mainly by sorting – balling lines that exist in 20 of the big cities and by balling presses (60 units).

- **Plastic packaging waste**

At present the expenditures for collection, sorting and transportation of plastic waste to the final consumer exceed the market prices of the demand and at the same time they are higher than the expenditures for disposal, which makes their collection ineffective. The buying back of plastic waste as

[7] At present these are mainly paper and cardboard waste as well as metal waste.

far as it exists is organized in centers, which collect other types of waste (mainly paper and cardboard waste).

At present there are not functioning installations for plastic waste separation in the country.

The collection of plastic waste is limited mainly to technological waste such as PET, LDPE, and PP, where there are available in big quantities (up to 3000 tons per year) and of homogeneous origin. The quantities of household or commercial packaging waste collected through the system of collection centers is in the range of 400 –500 tons/year and is mainly consisted by LDPE and PS.

Different regions in the country have started experiments for buying back of PET through the collection centers. The collected PET after preliminary treatment is exported for recycling outside the country.

Despite the fact that the import of plastic waste is decreasing during the last several years, the waste quantities, which are imported for recycling, are equal or higher compared with the quantities collected in the country.

- **Glass waste**

There are collection centers for baying back of glass bottles in the bigger cities, which in most of the cases collect paper waste as well. The collection centers buy and sort bottles in accordance with their type and size. The buying back is directed mainly towards reuse.

Nowhere in the country collection of glass through containers for separate collection is applied.

The collection of glass waste is limited to the technological waste from the bottling companies and the canned foods producers. There are also some cases of uncontrolled separation from the landfills of the settlements that are near the manufacturing plants.

There is a well functioning system based on the principle of volunteer deposits and acceptance of empty – full glass bottles for beer and beverages. The bottling companies manage the system together with the participation of the suppliers, the warehouses for storage, the distributors, the petty traders, the restaurants and the public catering establishments.

- **Waste from the metal packaging**

At present there is not precise information regarding the proportion of the packaging waste as part of the total quantity collected and recycled metal packaging. It is assumed that the percentage of metal packaging collection except of the aluminum packaging waste, is lower than the average for the country and the total quantity of collected waste is evaluated to 10 – 12 thousand tons/year.

The collection from the households and the sorting at the landfills is performed by the informal sector.

The metal packaging waste is collected together with other metal waste through the system of licensed collection centers. After their collection are applied techniques of sorting and balling by quality and type. The waste from steel packaging is treated within the country, while the aluminum waste is mainly exported.

3.3.3. Capacity for recovery and recycling

Despite the fluctuations in the activities of the recycling industry in the last several years, and the difficulties faced by significant number of manufacturing enterprises, the country has significant

capacities for waste recycling, which exceed considerably the quantities of collected waste within the country.

The existing capacities for recycling for the different types of packaging materials are assessed as follows:

Table 2. **Capacity for recycling and quantities of recycled packaging waste in 2001.**

Waste Material	Capacity for recycling	Actually recycled packaging waste [Thousands tons]
1. Paper and Cardboard	200	65
2. Plastic	12	3
3.Glass	60	12
4. Metals	-	11
TOTAL:		**91**

Information for the existing capacities for waste recycling by type of packaging materials is presented in Annex 2.

Exept of the recycling installations, there are no other possibilities in the country for packaging waste recovery including incineration with energy recovery and installations for composting of paper waste.

3.4. MAJOR PROBLEMS AND CONSTRAINS

3.4.1. Provision for information

The analysis of the existing information allows to be confirmed and complemented the contradictions [1] found in the data collected from the different institutions as well as the identified many "white spots", where information is missing, a doubt regarding the reliability of the available information is exist and/or the information exists, but it is not processed. The main "white spots" could be summarized in the following way:

- The existing information gives an overall picture for the consumption of packaging in the country, but does not allow to be identified separately different packaging waste streams from the households, trade and industry.
- In the existing sources the information for consumption of packaging per capita by different types of materials is incomplete. Despite this fact, a conclusion could be made that the quantities of packaging waste generated per capita/annually, especially the paper, cardboard and plastic packaging waste, is lower than the minimum and significantly lower than the average level for EU.
- The existing data for import/export of packaging through packaging products is incomplete, especially at the level of different packaging materials.

- There is a lack of assessment for the distribution of the consumed packaging per groups in the frame of every packaging material – for example white, green and brown glass, as well as for the various types of plastic.
- At present there is not quantitative assessment about the quantities of re-used packaging including packaging for re-use in circulation, etc.
- The big number of small companies and their low turnover, the changes in the subject of their activities, the temporary inactive companies and other factors make more difficult the precise identification of all participants in the process.

3.4.2. Administrative capacity

The administration at municipal level, which is busy with the control of the waste management, collection and retrieval of information and planning, does not have the required capacity.

3.4.3. Collection and sorting

- The collection of considerable quantities of waste from the containers for domestic waste and from the landfills is a fact, which in the most of the cases is ignored by the municipal authorities, the companies collecting waste and the landfill operators. Using a rough assessment at present approximately 10 000 representatives of the minorities, scavengers and old people earn their living with waste collection. Beside that this creates problems to the waste collection companies by breaking the containers and polluting the surrounding areas, such an alternative for waste collection is very risky for the human health.
- The collection of recycling waste is mainly by buying back from the population rather than free of charge delivery. The collection of recycling waste is entirely organized on a commercial principle and is limited to the waste for which the price paid by the final manufacturer covers the expenses for collection, treatment and transportation. In this sense the recycling is a result of commercial interest and it is not a practice, which is implemented because of realized benefit for the environment.
- The participation of the public in the schemes for separate collection is not significant.
- The market for recycling waste strongly depends on the condition of the recycling industry. The declines in the demand for recycling materials due to fluctuations in the production as well as the periodical declines in the prices given by the final manufacturers lead to limitation and suspension of the collection process.
- In the most of the cases the collecting companies have limited possibilities for investments. The existing specialized equipment as presses, balling installations and facilities for separations are strongly amortized and are not sufficient as a whole. Because of this reason, considerable part of the hand manipulations with the waste exists.
- The planning of the future measures requires to be taken into account the lower levels of recyclable waste generated into the country in comparison with the quantities in EU. A basis for this conclusion is the lower consumption of paper, plastic and metals per capita. The lower waste quantities would require higher expenditures per unit waste collected.

3.4.4. Recycling and recovery

- Significant part of the enterprises needs additional investments for compliance with the environmental legislative requirements.
- The import of recycling waste also has a negative impact on the quantity of collected and treated waste in the country. Most probably the problem would go deeper with the determination of higher quantitative targets for recycling in the EU countries and with the expected higher quantities of waste that will be put on the market.

4. METHODOLOGICAL APPROACH

4.1. FORECAST FOR CONSUMPTION OF PACKAGING IN THE COUNTRY

For the preparation of the forecast for the future consumption of packaging waste, the evaluation of the consumption in 2001 has been used. It is assumed that the quantity of generated packaging waste is equal to the consumption of packaging in the country for the relevant year.

The forecast is based on the assumption that the total quantity of consumed packaging will gradually increase as a result of the economic growth and the improvement of the population living standard.

The forecast of the National Statistical Institute, prepared at the end of 2002 during the negotiations between the Bulgarian Government and the World Bank, is used as a basis for estimating the macroeconomic indicators in the program.

For the purposes of the program it is assumed that the quantity of the paper, cardboard, plastic and metal waste consumed per capita would increase with 1,5% annually, while for the glass packaging the assumption is that the current levels of consumptions shall remain. The forecasted values for consumption of packaging in the country are presented in Table 3.

Taking into account the limitations imposed by the existing information, the forecasted values for the consumption of paper, cardboard and plastic packaging should be considered as minimum ones.

During the future reporting and update of the program, this forecast should be carefully reassessed and adapted in accordance with the data entering the packaging information system.

Table 3 **Forecast for the packaging consumption and packaging waste generation by types of packaging materials**

Indicator	Measure	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Population	Number	7785091	7740829	7696568	7652307	7608045	7563784	7519522	7475261	7437373	7399484
GDP	Mln. Leva	35 287	38 431	41 797	44 848	48 211	51 827	55 714	59 893	63 486	67 295
GDP Growth	%	4,72	5,41	5,26	4,30	4,50	4,50	4,50	4,50	3,50	3,50
Inflation	%	3,5%	3,5%	3,5%	3,0%	3,0%	3,0%	3,0%	3,0%	2,5%	2,5%
Average Income for Social Security Payments Purposes	leva	282	305	328	351	374	398	429	462	494	526
Annual Increase of Real Income	%	5,36	4,53	3,95	3,94	3,66	3,35	4,91	4,76	4,42	3,88
QUANTITIES OF PACKAGING WASTE											
Paper and Cardboard	tons	127 496	128 673	129 856	131 046	132 242	133 445	134 654	135 870	137 209	138 557
Plastics	tons	107 481	108 473	109 470	110 473	111 482	112 496	113 515	114 540	115 668	116 805
Glass	tons	86 743	86 250	85 757	85 263	84 770	84 277	83 784	83 291	82 869	82 446
Metals	tons	21 873	22 075	22 278	22 482	22 687	22 893	23 101	23 309	23 539	23 771
Wood	tons	9 145	9 230	9 315	9 400	9 486	9 572	9 659	9 746	9 842	9 939
TOTAL	tons	**343 593**	**345 470**	**347 361**	**349 265**	**351 182**	**353 112**	**355 054**	**357 009**	**359 285**	**361 580**
QUANTITIES OF PACKAGING WASTE PER CAPITA											
Paper and Cardboard	kg/capita/year	16,38	16,62	16,87	17,13	17,38	17,64	17,91	18,18	18,45	18,73
Plastics	kg/capita/year	13,81	14,01	14,22	14,44	14,65	14,87	15,10	15,32	15,55	15,79
Glass	kg/capita/year	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14
Metals	kg/capita/year	2,81	2,85	2,89	2,94	2,98	3,03	3,07	3,12	3,16	3,21
Wood	kg/capita/year	1,17	1,19	1,21	1,23	1,25	1,27	1,28	1,30	1,32	1,34
TOTAL	kg/capita/year	**44,13**	**44,63**	**45,13**	**45,64**	**46,16**	**46,68**	**47,22**	**47,76**	**48,31**	**48,87**

4.2. ORGANIZATION OF THE SEPARATE COLLECTION, RECYCLING AND RECOVERY

The selected planning period is 2003 – 2012, and at the end of the period is assumed that the country will be able to achieve the quantitative objectives, set in Directive 94/62/EC.

It is also assumed that the collection of packaging waste will be organized in two main flows:

- Through the introduction of municipal systems for separate collection of the packaging waste, financed by the producers and the importers of packed goods, within the framework of collective compliance schemes (Recovery Organizations);
- Through the existing collection points (bringing centers) for buying out of waste and through direct delivery of industrial and commercial packaging waste by their holders to the final processing companies.

The distribution of the quantities of collected waste between the existing systems for buying out and delivery and the new systems for separate collection is shown in Table 4, under the assumptions made for the covered population. The following assumptions for the annual increase of the collected total quantities of packaging waste, within the framework of the programme were made:

- 1,5% – 5% increase of collected metal, paper and cardboard packaging waste;
- 5% – 20% increase of collected plastic packaging waste;
- 5% – 25% increase of collected glass packaging waste.
- 10% – 20% increase of collected wooden packaging waste.

Taking into account the above assumptions, quantitative targets for recycling and recovery of different packaging materials are presented as average annual values in Table 4.

4.3. SYSTEMS FOR SEPARATE COLLECTION, FINANCED BY THE RECOVERY ORGANIZATION (S) AND IMPLEMENTED BY THE MUNICIPALITIES

The program is based on the assumption that the producers and the importers of packed goods will establish in short terms at least one Collective Compliance Scheme (Recovery Organization).

The main role of the organization will be to ensure financial flow to the municipalities in order to support the separate waste collection and recovery, through a system of fees, paid by the producers and importers of packed goods.

Under the selected approach for implementation, the Collective Compliance Schemes should have a leading role compared with the Self Compliers, based on the return of packaging waste.

4.3.1. Requirements towards the Collective Compliance Schemes (Recovery Organizations)

It is assumed that the collective compliance scheme(s) can be organised by Recovery Organisation, which is in line with the following requirements:

- commercial company, registered under the provision of the Commercial Law;
- the activities of the organization should not be connected with generation of profit;
- it should not have the right to collect and recycle waste on its own. The achieving of the recycling and recovery targets on behalf of the producers and the importers of packed goods, has to be made through the relevant contracts with the municipalities and the waste processing companies.

The programme allows the probability in the recovery organization to participate producers and importers of empty packaging and packaging materials, as well as the existence of more than one recovery organization.

4.3.1.2. Relationship between the Recovery Organization and the producers and importers of packed goods

- The relationship between the Recovery Organization and the producers and importers of packaging are based on bilateral contracts, in compliance with the provisions of national legislation. The contracts should guarantee the fulfillment of principles of equality and possibility for any producer and importer of packed goods and packaging, carrying out activities on the territory of the country, to join the organization.
- The contracts between the producers or the importers of packed goods and the Recovery Organization should be concluded for a specific time, limited by the term of the permission, issued to the organization. The contract gives the right to the respective producer, to transfer its obligations for recycling and recovery of packaging waste to the Organization. In exchange the producer pays to the Recovery Organization a fee, calculated on the basis of the packaging type and quantities put on the market.
- The concluding of a contract between the producer or the importer of packed goods and the Recovery Organization, offers the following opportunities:
    - it gives the right and obliges the producer and/or importer to print the logo of the Recovery Organization on the packaging of their products;
    - it specifies the type of packaging, the expected volumes of the packaging waste, the targets for recycling and recovery for each year, as well as the amount of fee which the producer/importer pays to the organization, based on the quantity of packaging put on the market during the previous year;
- The contract covers all packaging produced, imported, sold or distributed in Bulgaria, destined for household use or with possible household use, as well as commercial packaging, similar to household packaging, but used in shops, public catering establishments, hotels and restaurants or in other trade activities.
- The Recovery Organization should have the right, on its own, or through its authorized representatives, to perform the necessary checks in order to prove that the producers and the importers, participating in the collective scheme, have calculated and paid the exact amount of the remuneration fee, as well as to receive samples of the packaging, which is subject of the contract.

Table 4. **Forecast of the collected, recycled and recovered packaging waste for the period 2003 - 2012**

Parameter	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Population	inhabitants	7785091	7740829	7696568	7652307	7608045	7563784	7519522	7475261	7437373	7399484
GDP	mln.BGN	35 287	38 431	41 797	44 848	48 211	51 827	55 714	59 893	63 486	67 295
GDP Growth	%	4,72	5,41	5,26	4,30	4,50	4,50	4,50	4,50	3,50	3,50
Inflation	%	3,5%	3,5%	3,5%	3,0%	3,0%	3,0%	3,0%	3,0%	2,5%	2,5%
Average Income for Social Security Payment Purposes	BGN	282	305	328	351	374	398	429	462	494	526
Annual Increase of Real Income	%	5,36	4,53	3,95	3,94	3,66	3,35	4,91	4,76	4,42	3,88
Packaging Waste Quantities											
Paper and cardboard	tons	127 496	128 673	129 856	131 046	132 242	133 445	134 654	135 870	137 209	138 557
Plastics	tons	107 481	108 473	109 470	110 473	111 482	112 496	113 515	114 540	115 668	116 805
Glass	tons	86 743	86 250	85 757	85 263	84 770	84 277	83 784	83 291	82 869	82 446
Metals	tons	21 873	22 075	22 278	22 482	22 687	22 893	23 101	23 309	23 539	23 771
Wood	tons	9 145	9 230	9 315	9 400	9 486	9 572	9 659	9 746	9 842	9 939
TOTAL:	**tons**	**352 738**	**354 700**	**356 676**	**358 665**	**360 668**	**362 684**	**364 713**	**366 755**	**369 127**	**371 518**
Planned increase of collection rate by type of material											
Paper and cardboard	%	3,00	3,00	4,00	4,00	5,00	4,00	3,00	3,00	1,50	1,50
Plastics	%	15,00	20,00	30,00	35,00	40,00	35,00	30,00	25,00	10,00	5,00
Glass	%	15,00	15,00	20,00	22,50	25,00	20,00	15,00	12,50	7,50	5,00
Metals	%	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	1,50	1,50
Wood	%		10,00	10,00	10,00	15,00	20,00	15,00	10,00	5,00	5,00
Collection targets by type of material (in %)											
Paper and cardboard	%	53,49	55,10	57,30	59,59	62,57	65,07	67,03	69,04	70,07	71,12
Plastics	%	3,27	3,92	5,10	6,89	9,64	13,01	16,92	21,15	23,26	24,43
Glass	%	15,73	18,09	21,71	26,59	33,24	39,89	45,87	51,60	55,48	58,25
Metals	%	52,76	54,35	55,98	57,66	59,39	61,17	63,00	64,89	65,87	66,86
Wood	%		15,00	16,50	18,15	20,87	25,05	28,80	31,68	33,27	34,93
Collection targets by type of material (quantities)											

Parameter	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Paper and cardboard	tons	68 198	70 892	74 406	78 091	82 744	86 837	90 252	93 799	96 144	98 546
Plastics	tons	3 514	4 256	5 584	7 607	10 747	14 641	19 206	24 224	26 909	28 532
Glass	tons	13 645	15 602	18 616	22 673	28 178	33 616	38 433	42 982	45 972	48 024
Metals	tons	11 541	11 997	12 471	12 963	13 473	14 004	14 555	15 126	15 505	15 892
Wood	tons		1 384	1 537	1 706	1 980	2 398	2 782	3 088	3 274	3 472
TOTAL:	**tons**	**96 898**	**104 132**	**112 613**	**123 040**	**137 123**	**151 495**	**165 227**	**179 219**	**187 804**	**194 465**
Waste quantities collected through the existing system of collection points and/or directly delivered to recyclers											
Paper and cardboard	tons	68 198	68 997	70 482	69 967	65 922	65 066	63 206	63 464	63 530	63 530
Plastics	tons	3 514	3 620	3 728	3 840	3 955	4 074	4 196	4 322	4 452	4 585
Glass	tons	13 645	14 516	16 400	18 152	18 955	21 857	24 039	27 078	29 125	30 204
Metals	tons	11 541	11 741	11 939	11 862	11 195	11 055	10 891	11 018	11 087	11 149
Wood	tons	0	1 384	1 537	1 706	1 980	2 398	2 782	3 088	3 274	3 472
TOTAL:	tons	96 898	100 258	104 086	105 527	102 007	104 450	105 115	108 970	111 469	112 941
Polupaltion comprised in the systems for separate collection which will be organized by the municipalities	thous. inhabitants		300	600	1200	2400	3000	3600	3900	4050	4200
Percentage of total population	%		3,9	7,8	15,7	31,5	39,7	47,9	52,2	54,5	56,8
Collection rate for the population covered by the systems for separate collection organized by the municipalities											
Paper and cardboard	%		38	39	40	40	41	42	43	44	45
Plastics	%		25	26	26	27	27	28	28	29	29
Glass	%		33	33	34	34	35	36	37	37	38
Metals	%		30	31	31	32	32	33	34	34	35
Wood											
Waste quantities collected by the municipalities through the newly established systems for separate collection of packaging waste											
Paper and cardboard	tons		1895	3924	8125	16823	21771	27047	30335	32614	35016
Plastics	tons		1051	2176	4506	9330	12074	15001	16824	18088	19420
Glass	tons		1086	2216	4521	9223	11759	14393	15904	16847	17820
Metals	tons		257	531	1100	2278	2949	3663	4109	4417	4743
TOTAL:	tons		4289	8848	18252	37654	48553	60104	67172	71966	76998
Total amounts of waste collected (for recycling)											
Paper and cardboard	tons	68198	70892	74406	78091	82744	86837	90252	93799	96144	98546
Plastics	tons	3514	4671	5904	8346	13285	16148	19197	21146	22540	24006
Glass	tons	13645	15602	18616	22673	28178	33616	38433	42982	45972	48024
Metals	tons	11541	11997	12471	12963	13473	14004	14555	15126	15505	15892

Parameter	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Wood	tons	0	1384	1537	1706	1980	2398	2782	3088	3274	3472
TOTAL:	**tons**	**96898**	**103163**	**111397**	**122073**	**137681**	**150605**	**162436**	**173054**	**180160**	**186467**
Achieved recycling targets											
Paper and cardboard	%	54,0	55,6	57,8	60,1	63,1	65,7	67,6	69,7	70,8	71,8
Plastics	%	3,3	4,3	5,4	7,6	12,0	14,5	17,1	18,6	19,7	20,8
Glass	%	15,6	18,0	21,6	26,4	33,0	39,7	45,6	51,3	55,2	58,0
Metals	%	53,3	54,8	56,5	58,2	59,9	61,7	63,6	65,5	66,5	67,5
Wood	%	0,0	15,0	16,5	18,2	20,9	25,0	28,8	31,7	33,3	34,9
TOTAL:	%	**27,6**	**29,2**	**31,4**	**34,2**	**38,4**	**41,8**	**44,8**	**47,4**	**49,1**	**50,5**
Packaging waste quantities recovered as source of energy											
Wooden packaging	tons		1384	1537	1706	1980	2398	2782	3088	3274	3472
Achieved recovery targets, including recycling	**%**	**27,6**	**29,6**	**31,8**	**34,7**	**38,9**	**42,4**	**45,6**	**48,3**	**50,0**	**51,5**

4.3.1.3. Relationship between the Recovery Organization and the municipalities

- The organization assists the implementation of separate collection and recycling of packaging waste, and for that purpose it concludes the respective contracts with the interested municipalities. The assistance includes:

    - Granting of funds to the municipalities, proportional to a ton of separately collected and sorted packaging waste, which will compensate the costs related to these activities;
    - Provide guarantees for baying back of the waste separately collected by the municipalities and for processing of the waste, if they correspond to the technical specifications, by the recycling companies;
    - Participation in the financing of public campaigns;
    - Provision of technical assistance during the management of pilot projects;
    - The Recovery Organization could cover also the transport costs for the delivery of the packaging waste from the municipalities to the recyclers and processing companies.

- It is envisaged in the contracts between the Recovery Organization and the Municipalities to be stated:

    - The general condition and the obligations of both parties;
    - The details of the municipality's project for introduction of separate collection, recycling or recovery of the waste, as well as from their waste management program;
    - The requirements towards the quality of the collected packaging waste;
    - The conditions and the terms of payment of the additional costs to the municipalities by the organization.

- The selection of a system for collection and subsequent treatment of the packaging will be a subject of negotiations between the Recovery Organization and each municipality, whereas the municipalities are responsible for taking the final decision.

4.3.1.4. Relationship between the Recovery Organization and the recyclers and processing companies

- In order to guarantee the reception of the waste, collected by the municipalities, the Recovery Organization will conclude contracts with the major waste processing companies or their organizations in the country. In the cases when such are non-existent, or do not have sufficient capacity, the contracts can be concluded with companies, which

trade with waste or their organizations, and in this way will be guaranteed the export of waste destined for recovery. These contracts should cover separately the different types of packaging materials.

- In the contracts between the Recovery Organization and the processing companies there will be specified the conditions for reception and the prices of the waste sorted and delivered by the municipalities. The processing companies will undertake the financial and logistic obligations to receive the materials sorted by the municipalities at guaranteed minimum price.

- The guarantee for reception covers only the packaging waste, which corresponds to the minimum technical specifications for quality of sorted materials.

4.3.1.5. Relationship between the "Recovery organization" and the state authorities

- The activities of the Recovery Organization are subject to permission by the competent state authorities and specifically by the Ministry of Environment and Water.

- The Recovery Organization is obliged each year to publish and present for approval to the competent authorities, which has issued the permit, a report for the previous calendar year, including detailed description of:

    - Financial status (income and expenditures);
    - Information on the consumption of packaging by the members of the organization and the quantities of packaging waste, which has been recovered and recycled through the organization;
    - Implementation of the contracts with the members, the municipal administrations and the processing companies;
    - Progress and the results from the activities;
    - Campaigns organized for raising the public awareness, including education campaigns for the children;
    - Financial parameters of the system;
    - Technical solutions adopted;
    - Research activities.

4.3.2. Costs of organizing the separate collection by the municipalities

The assessment made is based on determining of the costs for introduction of separate collection, sorting and transportation to the final processing company for a populated area (region) with 150 000 inhabitants, whereas the obtained results have been multiplied in accordance with the objectives for population covered in the period till year 2012.

In order to assess the costs there were used 2 variants for organization of separate collection with subsequent separation and processing of waste:

Variant 1	Collection using containers for the different packaging materials
Variant 2	Collection through free delivery of waste in plastic bags at the point of their generation

Variant 1 envisages the collection of all waste to be done in containers, located near the point of generation. The assessment is based on the use of 3 different types of containers for glass, for paper and cardboard and for other waste (plastic, metal, composite).

Under **Variant 2** is envisaged the collection of the waste from paper and cardboard, plastics and metals to be done in bags at the point of generation and installing of containers for separate collection of the glass waste. Under both variants the collected waste is transported to a municipal site for further sorting and treatment, equipped with installation for sorting and baling of waste, equipment for grinding of the glass and separation of the metal ingredients, storage areas for the incoming and processed waste, transport vehicles and loading equipment.

As regards the quantities of the waste, during the assessment were used the forecast values for the packaging consumption for the period till year 2012.

The values used for the prices of buying back of the sorted waste by the final processing company, by year 2004 correspond to the prices valid at the moment for preparation of the program. An assumption was made that the total revenue from the selling out of the sorted waste will decrease with 2% every year.

For each of the variants a model was prepared for the assessment of the necessary investments, the expenditures and the income, while using the prices valid by year 2002. In the calculation of the annual investment costs was not used a discount factor. The summarized parameters for the implementation of the presented variants are shown in Tables 5 and 6. The breakdowns of costs for the both variants, together with the adopted technical solutions, are presented in Annex 3. The selection of specific variant for the organization of separate collection and the associated costs will vary considerably between the different settlements (municipalities), depending on the adopted technical solutions by the municipalities, the population serviced, the distance to the final waste processing companies, achieved collection levels, etc.

The necessary investments for the introduction of separate collection system for a populated area or region with 150 000 inhabitants, amount to 2 567 000 BGN (1 314 000 EUR) for Variant 1, and respectively to 2 210 000 BGN (1 131 000 EUR) – for Variant 2.

The assessment shows that under both considered variants, the revenues from selling out of sorted materials do not cover the costs for collection and sorting of packaging waste, and that the separate collection cannot be implemented without considerable external financing. Under the assumptions made, the size of the additional financing for Variant 1, in the period 2003 – 2012, is estimated at 303 – 311 BGN (155 – 159 EUR) per ton of collected and sorted waste, or 4,1 – 4,9 BGN per capita covered population. For Variant 2 these parameters are 250 – 264 BGN (127 – 135 EUR) per ton of collected and sorted waste, or 3,4 – 4,2 BGN per capita.

The programme envisages the additional financing to be ensured and provided to the municipalities entirely from private sources through the Recovery Organization(s). The use of municipal resources is limited only to the allocation and providing municipality owned land, suitable for the establishment of sorting centers.

Table 5. **General parameters for a separate collection system with containers for a settlement/region with 150,000 inhabitants (Variant 1)**

Parameter	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Quantity of waste per capita											
Paper and cardboard	kg./capita/year	16,38	16,62	16,87	17,13	17,38	17,64	17,91	18,18	18,45	18,73
Plastics	kg./capita/year	13,81	14,01	14,22	14,44	14,65	14,87	15,10	15,32	15,55	15,79
Glass	kg./capita/year	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14
Metals	kg./capita/year	2,81	2,85	2,89	2,94	2,98	3,03	3,07	3,12	3,16	3,21
TOTAL:	kg./capita/year	44,13	44,63	45,13	45,64	46,16	46,68	47,22	47,76	48,31	48,87
Collection rate (for the covered popullation)											
Paper and cardboard	%		38	39	40	40	41	42	43	44	45
Plastics	%		25	26	26	27	27	28	28	29	29
Glass	%		33	33	34	34	35	36	37	37	38
Metals	%		30	31	31	32	32	33	34	34	35
Amounts waste collected (150,000 inhabitants)											
Paper and cardboard	tons		919	937	956	975	995	1 015	1 035	1 056	1 077
Plastics	tons		473	482	492	502	512	522	533	543	554
Glass	tons		527	537	548	559	570	582	593	605	617
Metals	tons		115	118	120	123	125	128	130	133	135
TOTAL:	tons		2 034	2 075	2 117	2 159	2 202	2 246	2 291	2 337	2 384
Inhabitants		150000	150000	150000	150000	150000	150000	150000	150000	150000	150000
Investments											
Buildings, infrastructure		1192620									
Installations, facilities		380000									
Transport vehicles, loading-unloading equipment		400000								400000	
Equipment		594100					594100				
Total investments		**2566720**	**0**	**0**	**0**	**0**	**594100**	**0**	**0**	**400000**	**0**

Parameter	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Investments per tonne waste collected (installed capacity)	BGN/ton	**1261,667**									
Investments per unit population covered	BGN/ per capita	**17,11147**									
Annual investment costs			**293096**	**293096**	**293096**	**293096**	**293096**	**293096**	**293096**	**293096**	**293096**
Operational costs											
Transport costs - paper waste	BGN/year		11 904	12 142	12 385	12 633	12 886	13 143	13 406	13 674	13 948
Transport costs- glass	BGN/year		5 942	6 061	6 182	6 306	6 432	6 561	6 692	6 826	6 962
Transport costs -other waste	BGN/year		8 941	9 120	9 303	9 489	9 678	9 872	10 069	10 271	10 476
Operational costs (sorting, processing)	BGN/year		482 043	491 684	501 518	511 548	521 779	532 215	542 859	553 716	564 790
Транспорт до краен преработвател	BGN/year		28 783	29 359	29 946	30 545	31 156	31 779	32 415	33 063	33 724
Transport to the final consumer	BGN/year		2 942	3 001	3 061	3 122	3 185	3 248	3 313	3 379	3 447
Total operational costs			540 556	551 367	562 395	573 643	585 116	596 818	608 754	620 929	633 348
TOTAL ANNUAL COSTS	**BGN/year**		**833 652**	**844 464**	**855 491**	**866 739**	**878 212**	**889 914**	**901 850**	**914 025**	**926 444**
Annual costs per tonne waste collected			410	407	404	401	399	396	394	391	389
Annual costs per unit population covered			5,56	5,63	5,70	5,78	5,85	5,93	6,01	6,09	6,18
Income from selling of sorted materials	BGN/year		218100	213738,2	209463,4	205274,2	201168,7	197145,3	193202,4	189338,3	185551,6
Difference (additional financing required)	BGN/year		-615552	-630725	-646027	-661465	-677043	-692769	-708648	-724687	-740892
Difference (additional financing required) per tonne waste collected	BGN/ton		-303	-304	-305	-306	-307	-308	-309	-310	-311
Difference (additional financing required) per unit population covered	BGN/ per capita		-4,10	-4,20	-4,31	-4,41	-4,51	-4,62	-4,72	-4,83	-4,94

Table 6. **General parameters for a separate collection system with plastic bags for a settlement/region with 150,000 inhabitants (Variant 2)**

Parameter	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Waste quantity per capita											
Paper and cardboard	kg./capita/year	16,38	16,62	16,87	17,13	17,38	17,64	17,91	18,18	18,45	18,73
Plastics	kg./capita/year	13,81	14,01	14,22	14,44	14,65	14,87	15,10	15,32	15,55	15,79
Glass	kg./capita/year	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14	11,14
Metals	kg./capita/year	2,81	2,85	2,89	2,94	2,98	3,03	3,07	3,12	3,16	3,21
Total	kg./capita/year	44,13	44,63	45,13	45,64	46,16	46,68	47,22	47,76	48,31	48,87
Collection rate (for the involved popullation)											
Paper and cardboard	%		38	39	40	40	41	42	43	44	45
Plastics	%		25	26	26	27	27	28	28	29	29
Glass	%		33	33	34	34	35	36	37	37	38
Metals	%		30	31	31	32	32	33	34	34	35
Total											
Amounts waste collected (150,000 inhabitants)											
Paper and cardboard	tons		919	937	956	975	995	1 015	1 035	1 056	1 077
Plastics	tons		473	482	492	502	512	522	533	543	554
Glass	tons		527	537	548	559	570	582	593	605	617
Metals	tons		115	118	120	123	125	128	130	133	135
Total	tons		2 034	2 075	2 117	2 159	2 202	2 246	2 291	2 337	2 384
Inhabitants	number	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000
Investments											
Buildings, infrastructure	BGN	1192620									
Installations, facilities	BGN	380000									
Transport vehicles, loading-unloading equipment	BGN	380000								380000	
Equipment	BGN	258100					258100				
Total investments	BGN	**2210720**	**0**	**0**	**0**	**0**	**258100**	**0**	**0**	**380000**	**0**
Investments per tonne waste collected (installed capacity)	BGN/ton	**1086,676**									
Investments per unit population covered	BGN/capita	**14,73813**									
Annual investment costs	BGN		**216426**	**216426**	**216426**	**216426**	**216426**	**216426**	**216426**	**216426**	**216426**

Parameter	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Operational costs											
Transport costs - paper waste	BGN/year		12 556	12 807	13 063	13 324	13 591	13 862	14 140	14 423	14 711
Transport costs- glass	BGN/year		5 942	6 061	6 182	6 306	6 432	6 561	6 692	6 826	6 962
Transport costs -other waste	BGN/year		8 039	8 200	8 364	8 531	8 701	8 876	9 053	9 234	9 419
Operational costs (sorting, processing)	BGN/year		451 547	460 578	469 790	479 185	488 769	498 544	508 515	518 686	529 059
Transport to the final recycling facility	BGN/year		28 783	29 359	29 946	30 545	31 156	31 779	32 415	33 063	33 724
Disposal of residues	BGN/year		2 942	3 001	3 061	3 122	3 185	3 248	3 313	3 379	3 447
Total operational costs			509 809	520 005	530 405	541 014	551 834	562 870	574 128	585 610	597 323
TOTAL ANNUAL COSTS	**BGN/year**		**726 235**	**736 431**	**746 832**	**757 440**	**768 260**	**779 297**	**790 554**	**802 037**	**813 749**
Annual costs per tonne waste collected	BGN/ton		357	355	353	351	349	347	345	343	341
Annual costs per unit population covered	BGN/capita		4,84	4,91	4,98	5,05	5,12	5,20	5,27	5,35	5,42
Income from selling of sorted materials	BGN/year		218100	213738,2	209463,4	205274,2	201168,7	197145,3	193202,4	189338,3	185551,6
Difference (additional financing required)	BGN/year		-508135	-522693	-537368	-552165	-567091	-582151	-597352	-612698	-628197
Difference (additional financing required) per tonne waste collected	BGN/ton		-250	-252	-254	-256	-258	-259	-261	-262	-264
Difference (additional financing required) per unit population covered	BGN/capita		-3,39	-3,48	-3,58	-3,68	-3,78	-3,88	-3,98	-4,08	-4,19

4.4. EXISTING COLLECTION SYSTEMS

Within the framework of the program was made an assumption that the existing collection points (bringing centers) for buying recyclable waste will continue to operate on a commercial basis and meanwhile the generated income will cover the relevant expenditures. Nevertheless, the existing buildings and equipment at the collection points have to be gradually replaced, which will require additional expenditures.

The breakdown of costs for the construction of a new collection point is presented in Table 3-10, Annex 3 under the assumption that the facility will process 200 tons packaging waste per year.

The total additional expenditures related to the construction of new and/or reconstruction of existing collection points, for every year are calculated through multiplying the specific investment costs per unit collected waste (16 BGN) by the total amount of collected paper and cardboard waste for the respective year.

The waste collected through the existing collection schemes include the waste quantities, delivered directly by the producer s(generators) to the processing plants. These include the glass packaging waste, generated at the fillers, as well as the packaging waste generated at the large industrial enterprises and trade centers. In general these waste are in high amounts and have homogenous composition.

The same collection scheme is accepted also for wooden packaging.

4.5. CAPACITY FOR RECYCLING AND RECOVERY

The program considers the recycling of the waste as the only applicable form of recovery. The document takes into consideration the fact that the existing recycling facilities have considerably greater capacity than the quantities of the collected packaging waste in the country. Nevertheless, the presence of sufficient capacity by itself, does not guarantee the achievement of the quantitative targets, because of the fluctuations in the operation of the recycling industry (some of the plants do not receive waste during the whole year; the prices of sorted materials vary significantly; there are continuous breakdowns of operations for some enterprises, etc.). In this respect, efforts will be needed for the extension of market of recycled materials.

While taking into consideration that the construction of a specific recycling installation is entirely a commercial decision defined by the market conditions, the program does not envisage the allocation of public financing for the construction of new recycling capacities for those materials, where existing facilities are already available in the country.

Meanwhile, the setting of increased quantitative recycling targets and the providing of additional financing for the collection and the sorting of the packaging waste will result in increased market supply of waste and consequently will lead to decrease of the prices paid by the recycling companies. This is expected to be an impetus for the recycling industry to provide on their own the necessary investments for reconstruction, modernization and extension of the existing facilities.

Based on the above, the program does not include specific measures for construction of new recycling and/or recovery facilities. The document considers the building of such facilities as a

decision, which has to be taken entirely by the industry, with the view of achieving the recovery targets, while taking into account the economic effectiveness and the technical feasibility.

The programme considers the recycling as only applicable method for achievement of the quantitative recovery targets for packaging waste. This not applies only for wooden packaging waste where the energy recovery shall play the same role as recycling, for the achievement of the recovery targets.

4.6. COSTS FOR IMPLEMENTATION

The program's implementation costs include the investments for the introduction of separate collection and sorting of packaging waste by the municipalities, and the costs, related to the construction of new and reconstruction of existing collection points.

The assessment of total costs and the necessary investments for the implementation of the proposed two variants for the organization of separate collection are presented in Table 7. The respective costs and investments were determined in BGN according to the prices valid by the end of 2002 and have been calculated in EUR at a rate of 1,954 BGN for 1,00 EUR.

The amount of the necessary investments for application of separate collection and sorting of packaging waste in the period 2003 – 2012 is estimated at 74 – 79 million BGN (38 – 41 million EUR). The program does not envisage the use of external sources of financing of the investments.

The total costs for application of the program amount to 121 - 148 million BGN (72 – 76 million EUR) and by the year 2012 the annual costs are estimated at 23 – 27 million BGN. It was assumed that the producers and the importers of packed goods would secure the necessary income mainly through installments to the Recovery organization.

The presented values do not include the necessary investments for reconstruction of the existing and/or construction of new facilities for waste treatment.

It was assumed that the administrative costs, related to the employment of additional personnel in the state administration, functioning of the information system for packaging and packaging waste, the adoption of national standards, etc., will be secured through the national budget and by the Enterprise for Management of Environmental Activities, in accordance with the Action Plan in Paragraph 6 of the program.

Table 7. **Prognozis for the financing of systems for separate collection and sorting during the period 2003 - 2012**

Parameter	**Unit**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total for period**
Population	number	7785091	7740829	7696568	7652307	7608045	7563784	7519522	7475261	7437373	7399484	
GDP	mln BGN	35 287	38 431	41 797	44 848	48 211	51 827	55 714	59 893	63 486	67 295	
GDP growth	%	4,72	5,41	5,26	4,30	4,50	4,50	4,50	4,50	3,50	3,50	
Variant 1												
TOTAL INVESTMENTS	thous. BGN		**5 133**	**5 133**	**10 267**	**20 534**	**10 267**	**10 267**	**5 133**	**3 367**	**3 367**	**73 468**
	thous. Euro		**2 627**	**2 627**	**5 254**	**10 509**	**5 254**	**5 254**	**2 627**	**1 723**	**1 723**	**37 599**
Percentage of GDP	%		0,013	0,012	0,023	0,043	0,020	0,018	0,009	0,005	0,005	
Costs												
Annual investment costs	thous. BGN		586	1 172	2 345	4 690	5 862	7 034	7 620	7 914	8 207	45 430
	thous. Euro		300	600	1200	2400	3000	3600	3900	4050	4200	23250
Annual operating costs	thous. BGN		1 081	2 205	4 499	9 178	11 702	14 324	15 828	16 765	17 734	93 316
	thous. Euro		553	1129	2303	4697	5989	7330	8100	8580	9076	47757
Costs for reconstruction/comissioning of waste collection points	thous. BGN	1 117	1 130	1 142	1 121	1 028	998	965	967	966	964	10 398
	thous. Euro	571	578	585	574	526	511	494	495	494	493	5322
TOTAL COSTS	**thous. BGN**		**2 797**	**4 520**	**7 965**	**14 896**	**18 563**	**22 323**	**24 415**	**25 645**	**26 905**	**148 028**
	thous. Euro		**1431**	**2313**	**4076**	**7623**	**9500**	**11424**	**12495**	**13124**	**13769**	**75756**
Revenues												
Revenues from realization of materials			436	855	1 676	3 284	4 023	4 731	5 023	5 112	5 195	30 337
	thous. Euro		223	438	858	1681	2059	2421	2571	2616	2659	15526
Membership fee for recovery organization	**thous. BGN**		2 361	3 665	6 289	11 612	14 539	17 592	19 392	20 533	21 709	117 691
	thous. Euro		1208	1876	3219	5942	7441	9003	9924	10508	11110	60231
TOTAL REVENUES			**2 797**	**4 520**	**7 965**	**14 896**	**18 563**	**22 323**	**24 415**	**25 645**	**26 905**	**148 028**
	thous. Euro		**1431**	**2313**	**4076**	**7623**	**9500**	**11424**	**12495**	**13124**	**13769**	**75756**

Parameter	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total for period
Population	number	7785091	7740829	7696568	7652307	7608045	7563784	7519522	7475261	7437373	7399484	
GDP	mln BGN	35 287	38 431	41 797	44 848	48 211	51 827	55 714	59 893	63 486	67 295	
GDP growth	%	4,72	5,41	5,26	4,30	4,50	4,50	4,50	4,50	3,50	3,50	
Variant 2												
TOTAL INVESTMENTS	**thous. BGN**		**4 421**	**4 421**	**8 843**	**17 686**	**8 843**	**8 843**	**4 421**	**2 971**	**2 971**	**79 172**
	thous. Euro		**2263**	**2263**	**4526**	**9051**	**4526**	**4526**	**2263**	**1520**	**1520**	**40518**
Percentage of GDP	%		0,012	0,011	0,020	0,037	0,017	0,016	0,007	0,005	0,004	
Costs												
Annual investment costs	thous. BGN		433	866	1 731	3 463	4 329	5 194	5 627	5 844	6 060	33 546
	thous. Euro		222	443	886	1772	2215	2658	2880	2991	3101	17168
Annual operational costs	thous. BGN		1 020	2 080	4 243	8 656	11 037	13 509	14 927	15 811	16 725	88 009
	thous. Euro		522	1064	2172	4430	5648	6913	7639	8092	8559	45040
Costs for reconstruction/comissioning of waste collection points	thous. BGN	1 117	1 130	1 142	1 121	1 028	998	965	967	966	964	10 398
	thous. Euro	571	578	585	574	526	511	494	495	494	493	5322
TOTAL COSTS	**thous. BGN**		**1 452**	**2 946**	**5 975**	**12 119**	**15 365**	**18 703**	**20 554**	**21 655**	**22 785**	**121 555**
	thous. Euro		**743**	**1508**	**3058**	**6202**	**7863**	**9572**	**10519**	**11082**	**11661**	**62208**
Revenues												
Revenues from realization of materials	thous. BGN		436	855	1 676	3 284	4 023	4 731	5 023	5 112	5 195	30 337
	thous. Euro		223	438	858	1681	2059	2421	2571	2616	2659	15526
Incomes from membership fees for recovery organization	thous. BGN		1 016	2 091	4 299	8 835	11 342	13 972	15 531	16 543	17 590	91 218
	thous. Euro		520	1070	2200	4521	5804	7150	7948	8466	9002	46683
TOTAL REVENUES	**thous. BGN**		**1 452**	**2 946**	**5 975**	**12 119**	**15 365**	**18 703**	**20 554**	**21 655**	**22 785**	**121 555**
	thous. Euro		**743**	**1508**	**3058**	**6202**	**7863**	**9572**	**10519**	**11082**	**11661**	**62208**

5. STRATEGY FOR IMPLEMENTATION

The implementation of the program is based on the principles described below:

- Responsibility by the producers and importers of packaging and packaging goods for the packaging released at the market by them;
- Joint responsibility of the municipalities for the organization of the separate collection of packaging waste on their territory;
- Application of the hierarchy of the methods for waste management:
  - Encouraging the prevention of packaging waste generation including decrease of the content of hazardous substances in the packaging;
  - Achieving higher levels of packaging waste recovery and giving a priority to the recycling in front of the other forms of recovery;
- Equality and opportunity for volunteer collective implementation of the obligations arising by the legislations for all affected economic operators;
- Encouraging the participation of the public;
- Dialog with the industry and the public sector;
- Effectiveness of the proposed decisions for packaging waste collection and recovery;
- Access to information for all interested parties;
- Adequate, proportional to the violation and withholding sanctions for the economic units violating the legislative requirements, including incompliance with the defined quantitative targets;
- Preventing the limitations over the industry and the free movement of goods corresponding to the legislation in force;

The major priorities, including legislative, administrative, organizational, technical and financial measures ensuring of the program implementation are described below.

5.1. LEGISLATIVE MEASURES

5.1.1. Harmonization of the national and the local legislation

The harmonization of the national legislation with the requirements of Directive 94/62/EC shall be provided with the adoption of the new *Waste Management Act* and the consequent adoption of the *Regulation on the requirements for decreasing, recovery and recycling the packaging waste*. The subsequent update of the municipal budgets and the waste management programs would allow the local implementation of the harmonized legislation.

The adoption of the national standards corresponding to the harmonized European standards (CEN)[8] is a must and it could support the Bulgarian producers of packaging and packaging materials for implementing the requirements of Directive 94/62/EC.

[8] prEN13427 and the related standards are in process of preparation and approval by the European Committee for Standardization

5.2. ADMINISTRATIVE AND ORGANIZATIONAL MEASURES

5.2.1. Strengthening the administrative capacity

The effective control on the implementation of the legislative requirements on the behalf of the state and municipal administrations requires ensuring the relevant human resources and equipment. For the implementation of the program the establishment of a proper administrative structure is envisaged, which includes:

- Establishment of Commission for packaging;
- Appointment of additional personnel in MOEW, EEA, RIEW and the rest of the state institutions involved with the packaging and packaging waste;
- Appointment of additional personnel in the municipalities in accordance with the needs and the possibilities of the relevant municipal administrations;
- Preparation of a training program for the state administration and the municipalities regarding the requirements of the legislation and their implementation.

5.2.2. Information and Reporting

Ensuring sufficient and reliable data for the packaging should serve as a basis for the control for achieving the quantitative targets for recovery and recycling as well as for the assessment of the consumption tendencies regarding the packaging in the country. The last but no the least the information systems shall provide the necessary data for reporting to the European Commission after the accession of Republic of Bulgaria to EU. For the reporting to the EC in accordance with the requirements of the Directive for packaging and packaging waste, Republic of Bulgaria should undertake the following measures:

- Introduction of information systems for packaging and packaging waste till 1.01.2004;
- Establishment of requirements and procedures for monitoring of re-used packaging and corresponding enlargement of information system for packaging and packaging waste till 1.01.2005 г.

Additionally the program envisages the realization of investigations for quantity and contents of the generated municipal solid waste and the amount of the packaging waste and obtaining of reliable data for the settlements with more than 10 000 inhabitants.

5.2.3. Work with the public

Keeping the public informed and making the activities for separate waste collection popular are the key elements for the implementation of the national policy in the field of packaging waste. The following activities are envisaged:

- Publishing and distribution of information materials;
- Information campaign for separate collection and recovery of packaging waste;
- Development and implementation of training program for waste recycling directed towards the schools;
- Information campaign for attracting the public for participation in the systems for separate collection and deposit;

- Information campaign for the producers of packaging and packaging materials regarding the requirements of the Directive.

5.3. TECHNICAL MEASURES FOR COMPLIANCE WITH THE REQUIREMENTS OF DIRECTIVE 94/62/EC

5.3.1. OVERALL MEASURES

For implementation of the requirements of Directive 94/62/EC the following activities are envisaged:

- Establishment and registration of Recovery Organization;
- Obtaining of permission for the activities of the Recovery Organization;
- Preparation of guidelines for negotiations between the Recovery Organization and the municipalities (including example contract between the Recovery Organization and the municipalities);
- Defining the requirements for quality of sorted packaging waste in accordance with the conditions in the manufacturing enterprises;
- Implementation of pilot projects for introducing systems for separate waste collection;
- Staged implementation of separate collection in correspondence with the targets of the program and the permit for the activity of Recovery Organization;
- Compliance of the existing facilities with the environmental legislation requirements Integrated Prevention Pollution Control (IPPC), Waste Management Act (WMA), Clean Air Act (CAA), Water Act (WA));
- Investigation of the possibilities for packaging waste recovery in the existing industry enterprises;
- Defining the requirements towards the packaging waste incinerated with energy recovery;
- Construction of additional facilities for recovery.

5.3.2. SPECIFIC MEASURES RELATED TO IMPLEMTATION OF THE DIRECTIVE

5.3.2.1. Compliance of the packaging released at the market with the legislative requirements

The implementation program envisages the accomplishment of compliance with the requirements for limiting concentration of heavy metals in the packaging as per Art. 11 from the Directive 94/62/EC and the introduction of practices for their adequate monitoring within the following deadlines:

- 600 ppm as per 01.01.2005;
- 250 ppm as per 01.01.2006;
- 100 ppm as per 01.01.2007;

5.3.2.2. Prevention and re-use

Preventing the packaging waste generation is main priority of the national policy in the field. The program envisages keeping the quantities generated packaging waste per capita in the lower limits of this indicator for the EU countries as per 2010. The accomplishment of the target should be

achieved in the context of the planning increase of the quantities of generated packaging waste as a result of the expected industrial and services economic growth as well as a result of the increase of the population income.

The state administration shall continue to encourage the implementation of measures in the field of prevention and reuse and special attention will be paid to:

- Enlarging the scope of the voluntary deposit schemes for glass packaging;
- Enlarging the market of packaging for multiple use;
- Inclusion of the re-used packaging in the information system and development of quantitative indicators for preventing the usage of packaging.

5.3.2.3. Recovery and recycling

The main target in the field of recovery and recycling of packaging waste is the achievement of the pointed in Art. 6 of the Directive 94/62/EC targets in 2012 as follows:

- Recovery of 50% as a minimum by weight of the total amount of packaging waste;
- Recycling of 25% as a minimum by weight of the total amount of packaging waste and with a minimum 15% by weight of every packaging material will be recycled.

In addition to the main target the following intermediate targets are set:

Year	**Recovery** [% by weight]	**Recycling** [% by weight]
2004	20	20
2005	25	25
2006	30	30
2007	35	30
2008	40	35
2009	44	40
2010	46	43
2011	50	48
2012	51	49

Nevertheless of defined quantitative targets for recovery and recycling the program introduces the following targets for the number of population that should be involved in the organized systems for separate collection of packaging waste generated by the household:

Year	Population Included [*thous. inhabitants*]
2003	-
2004	300
2005	600
2006	1200
2007	2400
2008	3000
2009	3600
2010	3900
2011	4050
2012	4200

5.3.2.4. Individual systems for compliance (take-back obligation)

The producers and the importers of packed goods performing independently their obligations for recycling and recovery shall be obliged to arrange the conversely acceptance of the packaging released by them on the market. This obligation shall be also valid for their distributors including the petty traders.

Every distributor of packed goods should provide the buyers of these goods with the opportunity to return back the packaging after the relevant usage at the place of purchasing or very close to it. The consumers, despite whether they are final consumers or distributors for consequent selling, could return the used packaging to the seller or the supplier from whom they have purchased the packed good without paying any charges or other compensations.

5.3.2.5. Deposit systems

The producers and distributors of packed goods could independently or together with other producers and distributors organize systems for depositing of packaging released at the market by them.

The economic operators in accordance with the economic effectiveness and the expediency are free to determine the provisions, the packaging type for which the deposit system is applicable and the prices for depositing packaging, while the consumers should be informed about them.

The state has the right to support, the performance of the necessary investigations and the distribution of the results from them regarding the economic effectiveness, expediency and effect on the environment as a result of the implementation of the deposit systems for certain types of packaging, including by envisaging the relevant financing through *Enterprise for management of the environmental activities*.

5.4. FINANCIAL MEASURES

The assessment made shows that the implementation of the requirements of the Directive would require significant investments and ensuring additional financing for organizing the separate collection and the sorting of the packaging waste by the municipalities. The program envisages that this additional financing shall be entirely provided by the industry through the producers and the importers of the packed goods.

In this sense the readiness of the industry to organize and to finance the activities of one or more collective systems for compliance (Recovery Organizations) that would cover the biggest possible proportion of the packaging put on the market, shall have the decisive importance for the successful implementation of the program.

The increase of the municipal expenditures for disposal of mixed municipal waste as a result of the implementation of contemporary technical standards shall also support the waste recycling together with the other measures described in the program.

The introduction of product charges for packaging as a whole or for certain types of packaging should be considered as an alternative for implementation of the Directive and for encouraging the recycling in the country, in case that the quantitative targets are not accomplished.

5.5. EXPECTED RESULTS

As a result of the execution of implementation program for packaging and packaging waste are expected the following results:

- Establishment of systems for separate collection, sorting and treatment of packaging waste;
- Considerable increase of the quantities of recycled and recovered packaging waste and achieving of the envisaged into the legislation quantitative targets;
- Limitation of the risks for human health and environment, including stopping of no regulated collection of packaging waste from containers and landfills for municipal solid waste;
- Increase of public awareness and public participation in the proposed schemes for separate waste collection of packaging waste. Gradual movement from the practice of collection of packaging waste for payment to unpaid delivering of waste;
- Compliance of the Bulgarian legislative base with the requirements of European legislation in the field of packaging and packaging waste and reduction of the deadlines for the requested transitional period and ensuring of conditions for easier adaptation of national measures in relation to future amendments of European legislation;
- Compliance of the packaging distributed on the national market with the requirements of Directive 94/62/EC on packaging and packaging waste
- Improvement of the information quality for packaging consumption and packaging waste recovery.

5.6. TRANSITIONAL PERIODS

The necessary time for the organization and execution of the technical measures into the program and ensuring of the expenses for implementation confirm the need from the requested transitional period for achieving of the quantitative targets under art.6 (1).

The major motives supporting the requested transitional period are as follows:

- The low level of packaging waste consumption into the country and related with this difficulties for achieving of higher level for collection of different packaging materials and high unit costs for waste collection;
- The time necessary for the producers and importers of packaging goods for the establishment Recovery Organization (s);
- The period of several years necessary for the Recovery Organization (s) to cover representative share of the packaging put on Bulgarian market and to ensure the necessary funds for organization and implementation of separate collection of packaging waste;
- The time necessary for establishment of entirely new infrastructure for collection and sorting of packaging waste originated from municipal solid waste stream in order to comprise sufficient number of population;
- The high additional expenses for collection and sorting of waste;
- Defined quantitative recovery targets under art. 6 (1)(a) have to be achieved entirely through recycling of packaging waste, because of the lack of appropriate installations and methods in period for which the program is designed;
- The lack of experience in the implementation of systems for separate collection of packaging waste originated from households;
- The lack of public interest regarding participation in systems for separate waste collection in case that recyclables are delivered without payment.

The requested transitional period for the achievement of the recovery and recycling targets is formulated, as follows:

- Two years transitional period till 31.12.2008, for the achievement of minimum recycling target of 15% by weight for the plastic packaging waste, according to Article 6(1),(b) of Directive 94/62/EC;
- Four years transitional period till 31.12.2010, for the achievement of the general recovery target of 50% by weight of the total amount of packaging waste, according to Article 6(1),(a) of Directive 94/62/EC.

	6. ACTION PLAN				
No	**Measure/Activity**	**Deadline (impl. period)**	**Responsible institutions and organizations**	**Assessment of expenditures**	**Source of Financing**
				Thousands leva	
I.	**PREVENTION AND REUSE**				
1.1.	Inclusion of the packaging for reuse within the information system for packaging and packaging waste	1.01.2004	EEA, NSI	50	EMEPA
1.2.	Development of indicators for preventing the packaging waste	30.06.2004	MOEW	10	EMEPA
1.3.	Preparation of analysis for the possibilities to increase the prevention and reuse of packaging waste	30.06.2005	MOEW, BAPE	40	Business
II.	**RECYCLING AND RECOVERY**				
2.1	Establishment and registration of Recovery Organization (RO)	30.09.2003	Industry, BAPE	-	-
2.2.	Investigation of the quantity and the content of the generated municipal solid waste and the proportion of the packaging within them (the scope of the investigations is representative for the settlements with population of more than 10 000 inhabitants)	30.06.2004	Municipalities, Industry	50	Business
2.3.	Obtaining of permission for the activities of the Recovery Organization	31.12.2003	MOEW, Industry BAPE	-	-
2.4.	Preparation of guidelines for contracting between the RO and the municipalities (including example contract between the RO and the municipalities)	30.06.2004	Municipalities, RO	-	-
2.5.	Negotiating the requirements for quality of sorted waste	30.06.2004	Commission for packaging; RO, Manufacturers, Municipalities	-	-

	6. ACTION PLAN				
No	**Measure/Activity**	**Deadline (impl. period)**	**Responsible institutions and organizations**	**Assessment of expenditures**	**Source of Financing**
2.6.	Updating of municipal waste management programs for waste in regard with the introduction of the requirements for management of packaging waste from the **Waste Management Act and the Regulation on the requirements for prevention, recovery and recycling of packaging waste**	30.06.2004	Municipalities	-	-
	▪ For municipalities with population over 10 000 inhabitants	30.06.2004	Municipalities	-	-
	▪ For the rest of the municipalities	30.06.2005	Municipalities	-	-
2.7.	Implementation of pilot projects for introducing systems for separate collection including not less than 300 000 inhabitants (in accordance with the permit for activity of RO)	31.12.2004	RO, pilot municipalities	10000	Business
2.8.	Defining of recommendable requirements towards the centers for collection and buying up of packaging waste	31.12.2004	MOEW	10	EMEPA
2.9.	Staged implementation of separate collection in correspondence with the targets of the program and the permit for the activity of RO	01.01.2005 – 31.12.2010	RO, business, municipalities	In accordance with investment plan	RO, business, municipalities
2.10.	Compliance of the existing facilities with the environmental legislation requirements (IPPC, Waste Management Act (WMA), Clean Air Act (CAA), Water Act (WA))	31.12.2006	Operators of recycling facilities	In accordance with the programs for compliance approved by MOEW	Waste manufacturers
2.11.	Construction of additional facilities for recovery	31.12.2010	Recyclers, producers of packaging and	In accordance with the contracts with	Manufacturers, producers of packaging and

	6. ACTION PLAN				
No	**Measure/Activity**	**Deadline (impl. period)**	**Responsible institutions and organizations**	**Assessment of expenditures**	**Source of Financing**
			packaging materials	contracts with RO	packaging and packaging materials
2.12.	Investigation of the possibilities for recovering the packaging waste in the existing industrial enterprises	31.12.2004	RO, Cement industry	50	Business
2.13.	Defining the requirements towards the packaging waste incinerated with energy recovery	31.12.2005	Enterprises, Commission for Recovery	-	-
III.	**COMPLIANCE OF THE PACKAGING PUT ON THE MARKET WITH THE LEGAL REQUIREMENTS**				
3.1.	Information campaign for the producers of packaging and packaging materials regarding the requirements of the Directive	31.12.2003	MOEW, BCC, BIA	100	EMEPA
3.2.	Adoption of the standardized methods for determination of the content of heavy metals within the packaging	01.01.2005	SASM	30	EMEPA
3.3.	Suspending the production of packaging which does not comply with the requirements for admissible content of heavy metals	01.01.2005	Producers of packaging and packaging materials	In accordance with companies' programs	Business
3.4.	Adoption of national standards in the fields of packaging and packaging waste identical with the operative harmonized European standards.	30.06.2003 – 1.01.2005	SASM, MOEW	80	EMEPA
IV.	**INFORMATION AND CONTROL**				
4.1.	Implementation of computing system for processing of the data for packaging and packaging waste within EEA	1.01.2004	EEA	10	External financing

	6. ACTION PLAN				
No	**Measure/Activity**	**Deadline (impl. period)**	**Responsible institutions and organizations**	**Assessment of expenditures**	**Source of Financing**
4.2.	Control over the implementation of the requirements of the Waste Management Act and the Regulation on the requirements for prevention, recovery and recycling of packaging waste	Permanent	RIEW	-	-
4.3.	Control over the implementation of the conditions of the permit of Recovery Organization	Permanent	RIEW	-	-
V.	**STRENGHTENING THE ADMINISTRATIVE CAPACITY**				
5.1.	Establishment of Commission for packaging	30.06.2003	MOEW, other institutions and organizations	-	-
5.2.	Appointment of additional personnel within MOEW, EEA, RIEW and other state institutions involved with the packaging and packaging waste				
	In 2003 (the pointed expenditures are per year)				
	▪ MOEW – 2 specialists	31.03.2003	MOEW	14	State Budget
	▪ EEA – 1 specialist	31.03.2004	MOEW (EEA)	7	State Budget
	▪ SASM - 1 specialist	31.03.2004	SASm	7	State Budget
	▪ NSI – 1 specialist	31.03.2004	NSI	7	State Budget
	▪ Custom Agency – 1 specialist	31.03.2004	Custom Agency	1	State Budget
	▪ RIEWs – 15 specialists	31.12.2004	MOEW (RIEW)	90	State Budget
	After 2003 – 20 specialists in regard with the necessary control on the implementation	1.01.2005	MOEW, SASM,	120	State Budget

	6. ACTION PLAN				
No	**Measure/Activity**	**Deadline (impl. period)**	**Responsible institutions and organizations**	**Assessment of expenditures**	**Source of Financing**
			Custom Agency		
5.3.	Appointment of additional personnel within the municipalities in accordance with their needs and possibilities of the relevant municipal administrations	1.01.2004	Municipalities	In accordance with the municipal budgets	Municipal budgets
5.4.	Preparation of a training program for the state administration and the municipalities for the implementation of the legal requirements	31.12.2003	MOEW Commission for packaging	10	EMEPA
5.5.	Implementation of the training program (The expenditures refer to an year)	1.01.2004	MOEW, other institutions	25	EMEPA
VI.	**ATTRACTING THE PUBLIC TO PARTICIPATE IN THE PROGRAM SFOR SEPARATE COLLECTION AND INCREASING THE PUBLIC AWARENESS**				
6.1.	Publishing and distribution of information materials	30.06.2003 – 31.12.2010	MOEW, municipalities, industry	5 000	EMEPA, Business, municipal budgets
6.2.	Information campaign for separate collection and recovery of packaging waste, in the media	30.06.2005	MOEW	500	EMEPA
6.3.	Development and implementation of a training program for waste recycling directed towards the schools	1.01.2004-30.06.2007	MOEW, municipalities	1200	EMEPA, Business
6.4.	Information campaign for attracting the public for participation in the systems for separate collection and deposit	1.01.2004 – 31.12.2005	RO, municipalities	As per RO activity permit	Business

7. MONITORING OF THE IMPLEMENTATION OF THE PLAN

It is envisaged that the implementation of the program will be monitored continuously. The following stages for the adoption of the reports for the implementation of the plan are proposed according to the governmental coordination scheme for European integration:

1) Inter-institutional Working Group 22 “Environment”;

2) Leading team for negotiations

3) European Integration Council at the Council of Ministers, chaired by the Prime-Minister.

If it is necessary in the process of reporting on the implementation of the program measures for its update will be taken.

REFERENCES

1. First Interim Report on the Project "Database on packaging and packaging waste", performed by ARGUS –Berlin and URBOPROJECT, *2001*.

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3. Results of PHARE Twining Project BG99/IB/EN01, performed by the German Federal Ministry of Environment, Nature Conservation and Nuclear Safety and Bulgarian Ministry of Environment and Water, *2002*.

4. Data of NSI on the production of packaging in Bulgaria.

5. Data of Customs Agency on the import and export of packaging and packed goods in Bulgaria.

6. Project "Improvement of the system for collection and transportation of municipal solid waste and closure of old polluted sites in the regions of Montana, Pernik, Rousse, Sevlievo, Silistra and Sozopol", performed by BT-Engineering, *2002*.

Annex 1

QUANTITIES OF PRODUCED, IMPORTED AND EXPORTED PACKAGING RELEVANT TO BULGARIA, ACCORDING TO PACKAGING MATERIAL GROUPS

Table 1-1 . **Production of paper and cardboard packaging during the period 1998 – 2001**

NCIP Code	Description	Unit	Production quantity			
			1998	1999	2000	2001
2321.11.00	Corrugated paper and cardboard as rollers and sheets	tons	75,84	61,189		
30.12.2321	Sacks and bags with a base width 40 cm and more, made from cellulose wadding and plates of cellulose fibres	tons	1,424	2,482	2915	2748,000
2321.12.50	Other bags, envelopes, paper bags, including coneshaped: from paper and cardboard, made from cellulose wadding and plates of cellulose fibres	tons	9,767	4,788	1184	1628,000
2321.13.00	Boxes, cardboard boxes, fortifying and compacting materials, from corrugated paper and cardboard	tons	58,595	45,845	44928	48153,00
2321.14.00	Folding boxes and cardboard articles from non-corrugated paper or cardboard	tons	11,653	8,824	7760	7525,000
2321.15.30	Other paper packaging, not otherwise classified	tons	103	56	1478	739,000
2323.12.30.00	Envelopes from paper or cardboard	tons			5	60,000
2325.14.57.00	Formed or pressed articles made of paper mass, including ambalage forms for eggs	tons			323	13,000
2312.23.15.00	Kraft paper for bags, not covered, not bleached, (excluding for writing, printing or other graphic purposes)	tons			16205	231,000
2312.25.10.00	Multi-layered paper and cardboard, not covered, all layers bleached, as rollers or sheets	tons			776	
2312.25.35.00	Multi-layered paper and cardboard, not covered, one external layer is bleached – test-liner, as rollers or sheets	tons			7105	126,000
2312.25.75.00	Other multi-layered paper and cardboard, not covered – testliner, as rollers or sheets	tons			33751	36466,000
2312.30.10.00	Sulphate ambalage paper, non-covered (thin), as rollers or sheets	tons			1166	1953,000
2312.30.60.00	Paper and cardboard for flutting, non-covered, weight not more than 150g/m¤, for rollers and sheets	tons			16969	19629,000
Total packaging production *		tons	157,382	123,184	134565	119271

Table 1-2. **Production of plastic packaging during the period 1998 – 2001**

NCIP (PRODPROM) Code	Description	Data from NSI					Conv. factor	Production quantities (tons)			
		Unit	1998	1999	2000	2001	(kg/pce)	1998	1999	2000	2001
17.40.21.73.00	Ambalage sacks and bags, of polyethylene or polypropylene sheets or similar materials, weight per unit area ≤120 g/m2	P/st				48592	0,100				0,005
17.40.21.75.00	Ambalage sacks and bags, of polyethylene or polypropylene lines, or similar materials, weight per unit area ≥ 120 g/m2	P/st				2000	0,150				0,000
2822.11.00	Sacks and bags of polymers of ethylene (incl. cones)	kg	11,809,259	10,196,693	11492756	15077732		11,809	10,197	11,493	15,078
2822.12.00	Plastic sacks and bags (incl. cones) (excl. of polymers of ethylene)	kg	4,037,270	2,897,430	2327873	2303757		4,037	2,897	2,328	2,304
2822.13.00	Plastic boxes; cases; crates and similar articles for the conveyance or packing of goods	kg	3,153,789	2,508,769	3288854	3440776		3,154	2,509	3,289	3,441
2822.14.50	Plastic carboys; bottles; flasks and similar articles for the conveyance or packing of goods; capacity ≤ 2l	P/st	200,378,710	428,310,774	364677891	648404536	0,035	7,013	14,991	12,764	22,694
2822.14.70	Plastic carboys; bottles; flasks and similar articles for the conveyance or packing of goods; capacity > 2 l	P/st	4,202,208	17,317,505	4424911	21782850	0,055	231,000	952,000	0,243	1,198
2822.15.23	Plastic spools; cops; bobbins and similar supports	P/st	40,896,107	19,777,379			0,100	4,090	1,978	0,000	0,000
2822.15.25	Plastic caps and capsules for bottles	P/st	105325189	93560810	117088202	168766919	0,010	1,053	936,000	1,171	1,688
2822.15.27	Plastic stoppers; lids; caps and other closures (excl. for bottles)	P/st	55632811	128049278	168089720	114525585	0,010	556,000	1,280	1,681	1,145
2822.15.40	Other articles for the conveyance or packing of goods of plastics	P/st	105612969	91212196	178208411	191544113	0,300	31,684	27,364	53,463	57,463
2822.15.88	Other containers of other plastics	P/st	61770000	57060552	86828956	1660778	0,200	12,354	11,412	17,366	0,332
Total production:								75,982	74,516	103,797	105,348

Table 1-3. **Production of glass packaging during the period 1998 – 2001**

NCIP (PRODPROM) Code	Description	Data from NSI					Conv. factor	Production quantities (tons)			
			1998	1999	2000	2001	(kg/piece)	1998	1999	2000	2001
2913.11.10.00	Glass preserving jars; stoppers; lids and other closures	t. p/st	182,889	114,552	89756	133183	0,237	43,345	27,149	21,272	31,564
2913.11.53.00	Bottles for beverages and foodstuffs: non coloured	t. p/st	261,877	160,262	179579	157848	0,384	100,561	61,541	68,958	60,614
2913.11.55.00	Bottles for beverages and foodstuffs: coloured	t. p/st	377,605	151,591	249801	313893	0,384	145,000	58,211	95,924	120,535
26.13.11.57.00	Bottles and containers for beverages or foodstuffs, volume < 0,15l	t. p/st			4780	0	0,040			0,191	0,000
26.13.11.70.00	Vessels for transportation or ambalage, made of glass, for pharmaceutical products, volume <= 0,33 l	t. p/st			34422	21649	0,060			2,065	1,299
	Total production	t. p/st	822,371	426,405				288,906	146,900	188,411	214,012

Table1-4. **Production of metal packaging during the period 1998 – 2001**

NCIP (PRODPROM) Code	Description	Data from NSI					Conv. factor	Production quantities (tons)			
		Unit	1998	1999	2000	2001	(kg/piece)	1998	1999	2000	2001
3371.11.00	Tanks, casks, drums, cans... (excl. for gas) of iron or steel,≥ 50 l, ≤300 l	p/st	282,508	91,347	48499	47992	15,000	4,2	1,4	0,727	0,720
3371.12.00	Tanks, casks, drums... (excl. for gas) of iron or steel, < 50 l	p/st	77,723	9,753	2298	40366	1,000	78,0	10,0	0,002	0,040
3372.11.33	Cans used for preserving food and drink of iron or steel, < 50 l, food cans	p/st	25,898,323	13,478,456	43884647	31812198	0,100	2,6	1,3	4,388	3,181
3372.11.50	Cans other than for preserving food and drink of iron or steel, < 50 l	p/st	11,586,188	10,335,961	12523364	12792166	0,200	2,3	2,1	2,505	2,558
3372.11.55	Cans other than for preserving food and drink of iron or steel, < 50 l, other	p/st	10,022,410	8,012,491		8284770	0,200	2,0	1,6	0,000	1,657
3372.13.70	Base metal closures, stoppers, caps and lids	t. p/st	1,265,232	743,837			0,002	2,5	1,5	0,000	
3372.12.10.00	Flexible tubes for packaging of any material, excluding liquefied gasses and gasses under pressure, volume nor more than 300 l, of aluminum	p/st.			40888577	40610770	0,050			2,044	2,031
3372.13.30.00	Krockencork lids, of non precious metals	t. p/st.			1279715	818887	0,005			6,399	4,094
3372.13.50.00	Capsules for closing or sealing, diameter > 21 mm, of lead or aluminum	t. p/st.			12462	9441	0,030			0,374	0,283
28.72.12.30.00	Solid tubes for packaging of any material, excluding liquefied gasses and gasses under pressure, volume less than 300 l, of aluminum	p/st.				41701200	0,200			0,000	8,340
28.72.12.80.00	Reservoirs, barrels, tubes, boxes and similar vessels for packaging of any material, excluding liquefied gasses and gasses under pressure, volume nor more that 50 l, of aluminum	p/st.				9623767	1,000			0,000	9,624
Total production								13,8	7,9	16,4	32,5

Table1-5. **Production of wooden packaging in 2000 and 2001**

	Year	**2000**				**2001**			
NCIP (PRODPROM) Code	**Description**	**Amount produced**	**Unit**	**Conv.factor**	**Amount** tons	**Amount produced**	**Unit**	**Conv.factor** (kg/piece)	**Amount** tons
20.40.11.33.00	Wooden pallets	57256	m3	0,6	34353,6	1952378	P/st.	18,00	35142,80
20.40.11.35.00	Box pallets and load boards of wood (excl. flat pallets)	12931	m3	0,6	7758,6	34825	P/st.	18,00	626,85
20.40.12.13.00	Cases, boxes, crates, drums and similar packaging of wood	7849	m3	0,6	4709,4	1665967	kg		1665,97
20.40.12.50.00	Drums, casks, barrels	1302	m3	0,6	781,2				
Total production:					**47602,8**				**37435,62**

Table 1-6. **Import/export of empty packaging made from paper and cardboard in 2000 and 2001**

Sub-position	Title of sub-position	2000			2001		
		Import (net)	Export (net)	Difference (import - export)	Import (net)	Export (net)	Difference (import - export)
		tons	*tons*	*tons*	*tons*	*tons*	*tons*
480530	Sulphate ambalage paper	1 238	57	1 181	837	265	572
481710	Envelopes	363	4	359	458	3	455
481910	Boxes and master boxes made of corrugated paper or cardboard	3 579	2 157	1 422	4115	2241	1 874
481920	Folding boxes and cardboard articles, made of corrugated paper or cardboard	6 322	587	5 734	6405	933	5 472
481930	Sacks, base width 40 cm or more	1 120	24	1 096	884	990	-105
481940	Other sacks, bags, items, including cone shaped	420	534	-113	590	790	-199
481950	Other packaging	92	86	7	95	71	24
482370	Formed or pressed articles, made of paper mass	717	55	662	821	8	813
TOTAL:		**13 851**	**3 504**	**10 347**	**14 205**	**5 300**	**8 906**

Table 1-7. **Import/export of empty plastic packaging in 2000 and 2001**

Sub-position	Title of sub-position	2000			2001		
		Import (net)	Export (net)	Difference (import - export)	Import (net)	Import (net)	Export (net)
		tons	tons	tons	tons	tons	tons
392310	Boxes, cases, grates and similar articles	960	2025	-1064	1188	2000	-812
392330	Glass jars, bottles vessels and similar articles	9 298	819	8 479	6915	1108	5 807
392340	Rolls and other paddings	176	60	116	225	54	171
392350	Stoppers, lids, caps and other closures	1 377	315	1 062	1740	499	1 240
392390	Others	1 264	155	1 110	1494	205	1 289
630532	Flexible packaging for bulk materials	384	3 863	-3 479	365	4049	-3 684
630533	Others made of sheets or other forms of polyethylene or polypropylene	28	121	-93	29	862	-833
TOTAL:		**13 489**	**7 358**	**6 131**	**11 956**	**8 777**	**3 179**

Table 1-8. **Import/export of empty glass packaging in 2000 and 2001**

Sub-position	Title of sub-position	2000			2001		
		Import (net)	Export (net)	Difference (import - export)	Import (net)	Import (net)	Export (net)
		tons	*tons*	*tons*	*tons*	*tons*	*tons*
7010	Plastic carboys, bottles, flasks and other articles for transportation or ambalage, made of glass						
701020	Lids, caps, stoppers and other closures	1	17	-15	23	0	23
701091	Volume exceeding1 L:	415	10 414	-9 999	196	8742	-8 546
701092	Volume exceeding 0,33 L, but not exceeding 1 L:	5 559	52 971	-47 412	5000	87491	-82 491
701093	Volume exceeding 0,15 L, but not exceeding 0,33 L:	655	11 744	-11 089	2863	6557	-3 694
701094	Volume exceeding 0,15 L:	1 287	553	734	1910	460	1 450
TOTAL:		**7 916**	**75 698**	**-67 781**	**9 991**	**103 249**	**-93 258**

Table 1-9. **Import/export of empty wooden packaging in 2000 and 2001**

Sub-position	Title of sub-position	2000			2001		
		Import (net)	Export (net)	Difference (import - export)	Import (net)	Import (net)	Export (net)
		tons	tons	tons	tons	tons	tons
441510	Cases, boxes, crates, drums and similar packaging of wood, (excl. cable drums)	32	2 003	-1 970	134	1558	-1 424
441520	Box pallets and load boards of wood (excl. flat pallets)	1 325	14 994	-13 669	1162	15192	-14 030
441600	Drums, casks, barrels	120	117	3	22	149	-127
450310	Stoppers	176	66	110	269	144	125
450390	Other	30	0	30	16	0	16
Total:		**1 683**	**17 180**	**-15 497**	**1 603**	**17 043**	**-15 441**

Table 1-10. **Import/export of empty metal packaging in 2000 and 2001**

Sub-position	Title of sub-position	2000			2001		
		Import (net)	Export (net)	Difference (import - export)	Import (net)	Import (net)	Export (net)
		tons	*tons*	*tons*	*tons*	*tons*	*tons*
7310	Reservoirs, barrels, tubes, boxes and similar vessels for any material						
731010	Volume of or 50 L or more	1 127	523	604	1174	184	991
731021	Boxes for closing via welding or casing, lining	545	63	482	1124	187	937
731029	Others	234	249	-14	255	359	-104
7607	Aluminum foil, not thicker than 2 mm						
760711	Stretched only	1 226	2 512	-1 287	1551	5126	-3 575
760719	Others	1 337	53	1 284	1242	287	954
760720	Onto paddings (supports)	2 383	228	2 155	2163	252	1 911
761210	Flexible tubes for packaging	563	134	430	306	150	157
761290	Others	791	69	721	818	128	690
TOTAL:		**8 206**	**3 831**	**4 376**	**8 633**	**6 673**	**1 961**

Table 1-11. **Import/export of filled packaging in 2000 and 2001**

Export		Import			
2000	**2001**	**2000**	**2001**	**2000**	**2001**
Difference (gross – net)	Difference (gross – net)	Difference (gross – net)	Difference (gross – net)	Difference (gross – net)	Difference (gross – net)
tons	*tons*	*tons*	*tons*	*tons*	*tons*
429507	**265157**	**132624**	**200071**	**-296882**	**-65086**

Table 1-12. **Assessment of quantities imported/exported filled packaging, according to packaging material groups in 2001**

Material	**Export**		**Import**		**Difference**
	%	*tons*	%	*tons*	*tons*
1. Paper and cardboard packaging	20	53031	25	50017	-3013
2. Plastic packaging	20	53031	25	50017	-3013
3. Glass packaging	20	53031	10	20007	-33024
4. Metal packaging	20	53031	20	40014	-13017
5. Wood packaging	20	53031	20	40014	-13017
TOTAL:	**100**	**265157**	**100**	**200071**	**65086**

Note: The total amount of imported/exported filled packaging is estimated as difference between "gross" and "net" weights of the imported packaging. For the evaluation of packaging consumption is made an assumption that the quantities of exported filled packaging are equally divided into five packaging groups (paper, plastic, metals, glass, wood).
For estimation of the quantities imported filled packaging, following figures are accepted: 25% for paper and plastic packaging, 10% for glass packaging, 20% for metal packaging, 20% for wooden packaging.

ANNEX 2

EXISTING WASTE RECYCLING CAPACITIES IN THE COUNTRY

The existing waste recycling capacities in Bulgaria are presented according to the types of recycled materials[9]. The data on waste recycling capacities, in general, reflect the technical possibilities to recycle, but not actual amount of recycled (accepted) waste. The additional information provided is relevant to present status of the market of recyclable waste.

Paper and cardboard

The recyclers for waste paper and cardboard in the country are grouped depending on types of produced papers and cardboards, as follows:

1. Production of paper for smooth layers (test liner) and for corrugated layers (fluting) needed for production of corrugated paper;
2. Production of multilayered cardboards designated for consumers' and group packaging;
3. Production of ambalage paper;
4. Production of ambalage;
5. Production of papers for bags.

Table 2-1 gives information on the existing recycling capacities for paper and cardboard waste.

Table 2-1. Capacities for recycling of paper and cardboard waste

	Enterprise	**Approximate capacity for waste recycl [thous. tons]**
a)	"Trakia Papir"JSC, Pazardzik	50
b)	"Belovo" JSC, Belovo	30
c)	"Kostenetz HHI" JCS, Kostenetz	12
d)	"Celchart"-JSC, Stamboliyski city	10
e)	ZKMO - Kocherinovo[10]	5
f)	ZMK "Nikopol"JSC, Nikopol	70
g)	"Pirin Hart" JSC, Razlog	30
h)	"Rulon Iskar"JCS, Sofia	22
i)	"Knaug Gypsofaser"	10

The total recovery capacity for paper and cardboard waste is assessed to approximately 200 000 tons. "Rulon Iskar" JSC is excluded from this figure because this company does not possess the required waste treatment permit and the new owner's policy does not include the paper and cardboard production to be restarted in future[11].

The realistic quantity of recycled waste in the country is about 50%[12] of the total capacity.

[9] Data are included from the "Database on packaging and packaging waste in Bulgaria" project
[10] The capacity on pressed boards is not included – it is 18 million pieces per year.
[11] Quantity of waste recycled in 1997 is 19 000 tons.
[12] In 1997 was recycled the maximal waste quantity - 150 000 tons.

Considerable fluctuations in operational activities and production quantities of above quoted companies are observed during the last years. The trend towards decrease in production volumes is obvious.

At present, the major waste paper recyclers are "Trakia Papir" JCS – for waste from corrugated cardboards and "Belovo" JSC – for waste of mixed types of papers. These two enterprises process approximately 90% of the relevant waste in the country at present.

Increase in quantities of recycled waste could be expected as a result of expansion of the economic activities of other quoted waste recycling facilities.
The available recycling capacities at national level could be assessed as sufficient ones. But in spite of that fact, certain risk factors should be taken into consideration because they would influence the quantities of separately collected and recycled waste:

- setting out of higher requirements for recycling in the EC Member States probably will lead to excessive amounts of collected waste paper. The supply costs of such waste could be lower than the costs of waste paper collected in the country, thus the waste collection process in the country will be decreased. This problem exists even at present but due to restricted ship navigation along Danube River, its impact is not considerable. It is possible to expect that prices offered by recyclers would decrease.
- The requirements for achievement of production of papers and cardboards of higher quality could result in significant reduction in waste input for production of 1 ton of tradable product. It should be taken into consideration that the waste input is at higher level currently.
- The price paid by the recyclers for 1 ton of waste paper is dynamic and it is influenced by factors as current status of companies, as well as international market status. Periodical decreases in prices could cause discontinuation of collection process, mainly due to decrease in pay-back price offered to the population.

Plastics

The available plastic waste recycling capacities are given in Table 2-2.

Table 2-2. Major plastic waste recycling facilities[13] in the country

	Recycling facility	**Type of waste recycled**	**Capacity [tons]**
1.	"Himik " JSC, Asenovgrad city	HDPE, LDPE, PVC – soft, PP,PS	12 000
2.	"Phoenix plastic" Ltd, Targoviste city	LDPE, PP	3 000
3.	"Podem plast " JCS, Podem village, Pleven district	LDPE	500
4.	"Europlast" Ltd., Sklave village, Sandanski municipality	LDPE	1 500

[13] From the presented list is excluded an installation for processing of heterogeneous plastics at "Mehaplast" JSC – Sofia because it is non-operational since more than 5 years.
The intention on recycling of PET waste in quantities about 4 000 tons per year and the availability of technical capacities are declared by "Yambolen" JSC – Yambol. Till now the enterprise does not accept waste (probably due to the high requirements towards the waste fractions accepted).

From the above listed firms, “Himik” and “Phoenix plastic” are in operation only. Their total capacity is 400 tons per month and the recycling is mainly directed to foil materials and LDPE. The other companies under discussion have, in general, local importance only.

The list does not include numerous small recycling facilities, which are operating without having the relevant permits.

The following factors have to be taken into consideration:

- The market of secondary granulate and plastic goods, produced by waste plastics, as well as the high prices of plastics waste are limiting factors for the recycling of such waste in the country;
- All recycling companies show fluctuation in their operational activities, including periodical discontinuation of waste acceptance;
- At present, the amounts of recycled plastic waste, collected in the country, is not higher than 200 tons per month and the share of imported waste is considerable[14];
- Achievement of the recycling capacities given in Table 2-2 would demand substantial investments for major maintenance and repairing activities, mounting of new equipment etc., even favorable market for selling of the production exists.;
- In spite that the influence of small-sized undertakings for recycling plastic waste is considered to be insignificant, their impact must not be ignored. It is necessary to underline that these facilities employ professional staff and they compete the major recycling facilities more effectively lately. Unfortunately, the information available about these companies is insufficient because they operate without relevant permits;
- Raised interest at the opportunities for construction of new plastic waste recycling facilities (dominantly for PET, PE and PP) is observed during the last years. The interest is shown by local and international companies.

Glass

The existing glass producers in Bulgaria, which have possibilities for recycling of glass waste are given in Table 2-3.

Table 2-3. Glass producers in Bulgaria

Company	Waste recycled	Capacity[15] [tons]
“Stind” JCS - Sofia	glass packaging - white, brown, gre	15 000
“Drujba” JCS - Plovdiv	glass packaging - white, brown, gre white, flat glass	25 000
“Rubin” JCS – Pleven	glass packaging - white only	5 000
“Kitka” JCS – Novi Pazar	glass packaging	3 500 no interest
“Interior” JCS – Elena		no interest
“Belopal” JCS – Beloslav		no interest

[14] “Himik” JSC treats dominantly imported plastics waste.
[15] The given figures are approximated

Currently, “Stind” JSC is the only company accepting glass waste for recycling. The companies in Pleven and Plovdiv accept waste on a periodical basis also.

The capacities for waste recycling in the other mentioned facilities would depend on their financial status and on the opportunities to continue production activities.

The existing recycling is limited mainly to technological waste glass generated by bottling enterprises.

Independently from the relatively high prices offered (40 – 50 BGN per ton) the collection expenditures exceed potential incomes.

Metals

- *Steel*

The capacities of major recycling plants – “Stomana industry”, Pernik and “Kremikovtzi”, Sofia are appr. 750 000 t/y, therefore limitations for recycling of such waste do not exist.

One enterprise, branch of Combinate of Non-ferrous Metals – Plovdiv, used to operate in past dealing with extraction of tin metal from tin plates (main material input for production of steel packaging). This company is non-operational at present.

- *Aluminum*

In Bulgaria one single company treats aluminum waste to obtain end-user products – “Alkomet” JCS, Shoumen (formerly called “Alumina”).

Typically, the aluminum waste after being sorted, packed and/or recycled through melting (formed as aluminum blocks) is exported.

It could be accepted that the metal waste recycling capacities are not limiting factors due to functioning of international market for such waste.

ANNEX 3

CALCULATION OF THE EXPENDITURES FOR IMPLEMENTATION OF SEPARATE WASTE COLLECTION IN SETTLEMENT /REGIONS WITH 150000 INHABITANTS

Variants 1 and 2

Table 3-1. Collection of glass waste

Parameter		Unit	Value
Total population serviced by the system		inhabitants	150000
Number of inhabitants serviced by one container		inh./container	1000
Container volume		cubic m	1,5
Number of operational containers		pieces	150
Number of reserve containers		pieces	10
Average waste quantity per one containment of a container		kg/container	1700
Average waste quantity		kg/1000 inhabitants	11142
Collection rate		%	33
		kg/1000 inhabitants.y	3621
	total	tons/year	543
Average number of containments/shipments per container		number/year	2
Average period for containment of one container		days	171
Total number of shipments		number/year	320
Costs for transportation to sorting site		BGN/year	**6126**
Costs for transportation of 1 ton glass waste		BGN/ton	**11,28**

Note: The expenditures relevant to staff and investment costs are included in position concerning sorting and Treatment Site. The quoted costs for transportastion of 1t waste include fuel, consumables and spare parts only.

Variant 1

Table 3-2.Collection of paper waste

Parameter		Unit	Value
Total population served by the system		*inh.*	150000
Number of inhabitants served by one container		*inh. /cont*	500
Container volume		*cub. m*	1,1
Number of operational containers		*pieces*	300
Number of reserve containers		*pieces*	20
Average waste quantity per one containment of a container		*kg/cont.*	75
Total quantity of generated paper waste		*t/y*	2493
Collection rate		*%*	38
		t/y	947
Waste quantity per container		*t/y*	3
Average number of containments/shipments per container		*number/y*	42
Average period for containment of one container		*days*	6
Mashine shifts		*number*	126
Costs for transportation to sorting site		*BGN/y*	**12272**
Costs for transportation of 1 ton paper waste		*BGN/t.*	**12,95**

Note: The expenditures relevant to staff and investment costs are included in position concerning Sorting and Treatment Site. The quoted costs for transportastion of 1t waste include fuel, consumables and spare parts only.

Variant 1

Table 3-3. Collection of plastic and metal waste

Parameter	Unit	Value
Total population serviced by the system	inhabitants	150000
Number of inhabitants serviced by one container	inhabitants/container	500
Container volume	cubic m	1,1
Number of operational containers	pieces	300
Number of reserve containers	pieces	20
Average waste quantity per one containment of container	kg/container	65
Total quantity of generated waste, including	t/y	2530
plastics	t/y	2102
metals	t/y	428
Collection rate for plastic waste	%	25
Collection rate for metal waste	%	30
including:	t/y	654
plastics	t/y	525
metals	t/y	128
Average waste quantity per container	t/y	2
Average number of containments/shipments per container	number/y	34
Average period for containment of one container	days	6
Mashine shifts	number	102
Costs for transportation to the sorting site	BGN/y	**9935**
Costs for transportation of 1 ton of other types	BGN/t	**15,20**

Note: The expenditures relevant to staff and investment costs are included in position concerning Sorting and Treatment Site. The quoted costs for transportastion of 1t waste include fuel, consumables and spare parts only.

Variant 1 Separate collection using containers for different packaging materials

Table 3-4. Estimations of costs relevant to sorting and treatment site

Population serviced	Inhabitants		150000
Waste flow towards the Site	Unit		Quantity
Annual waste quantity	t/y		2144,49
including			
paper and cardboard	t/y		947,49
plastics	t/y		525,49
glass	t/y		543,18
metals	t/y		128,33
Average daily quantity	t/day		9,75
including			
paper and cardboard	t/day		4,31
plastics	t/day		2,39
glass	t/day		2,47
metals	t/day		0,58

Title	Unit	Unit price	Quantity	Value
Capital expenditures				
Buildings, infrastructure				
Site*	sq.m.		5000	0
*provided by municipality				
Covered industrial area with separation line	sq.m.	380	1200	456000
and waste storage facility (metal construction)				
Covered industrial area for glass mill	sq.m.	380	400	152000
Open air storage facility - subdivided to sections (H 1,5 m) 5 cells x 60 sq.m.	sq.m.	140	300	42000
Shelter	sq.m.	190	600	114000
Garage with maintenance area	sq.m.	200	200	40000
Office	sq.m.	320	60	19200
Staff rooms	sq.m.	300	60	18000
Energy supply transformer	pieces	25000	1	25000
Concrete for site	sq.m.	80	2500	200000
Hence	m	100	180	18000
Contingencies	%		10	108420
Total investments buildings and infrastructure				1192620
Pay back period	years		20	
Annual investment costs	BGN/y			59631

Installations and machinery				
Press mashine for baling of paper, plastics (incl. conveyor belt transporter)	pieces	1	95000	95000
Glass milling machine, with magnetic separator	pieces	1	110000	110000

Title	Unit	Unit price	Quantity	Value
Separation line	pieces	1	135000	135000
Weighting bridge for vehicles	pieces	1	40000	40000
Total investments installations and devices				380000
Pay back period	years		10	
Annual investment costs	BGN/y			38000

Transport vehicles				
Waste collection vehicle	pieces	1	160000	160000
Truck with hydraulic lifting device	pieces	1	140000	140000
Fork-lift	pieces	2	15000	30000
Loader	pieces	1	70000	70000
Total investments transport vehicles and loading/unloading equipment				400000
Pay back period	years		8	
Annual investment costs	BGN/y			50000

Devices, equipment and furniture				
Weighting device 500 kg	pieces	1	1500	1500
Supply of comminucations	pieces	1	5000	5000
Office furniture	pieces	1	5000	5000
Containers for glass (on site reserve)	pieces	4	400	1600
Containers for glass	pieces	160	1500	240000
Containers for paper	pieces	320	525	168000
Containers for other types of waste	pieces	320	525	168000
Equipment for the maintenace shop	pieces	1	5000	5000
Total investments devices, equipment and furniture				594100
Pay back period	years		5	
Annual investment costs	BGN/y			118820

Total capital investments for site	BGN			**2566720**
Annual investment costs	BGN/y			**293096**
Investmetns for 1 ton treated waste	BGN/t			**1197**

Operational costs				
Salaries and insurances				
Salaries staff				
Manager	Person/shift	1		
	BGN/month	450	12	5400
Book keper	Person/shift	1		
	BGN/month	350	12	4200
Book keeping &human resources	Person/shift	1		
	BGN/month	320	12	3840
Storage facility staff	Person/shift	3		
	Person/shift	300	12	10800

Title	Unit	Unit price	Quantity	Value
Meintenance technicians	Person/shift	2		
	BGN/month	250	12	6000
Equipment workers	Person/shift	5		
	BGN/month	250	12	15000
Drivers	Person/shift	6		
	BGN/month	300	12	21600
Supplier	Person/shift	14		
	BGN/month	200	12	33600
Common workers	Person/shift	2		
	BGN/month	200	12	4800
Social ensurancies	%	30,7		30835
Expenditures related to staff (working clothes, etc.)	%	5		5022
Consumables (electricity, water, fuel, etc.)	BGN/t	5	2144,49	10722
Maintenance of devices, equipment, loading/unloading equipment	BGN/y		1%Inv..	25667
Security	BGN/month	12	1500,00	18000
PR and advertisement expenditures	BGN/y		10%EP	19549
Total operational costs	BGNy			**215035**
Operational costs per unit	BGN/t			**100**
Total costs relevant to site	BGN/y			**508131**
Costs for treatment of 1 t waste at site	BGN/t			**237**

Non-recyclable residues		
Materials	%	t/y
paper and cardboard	3	28,4
plastics	10	52,5
glass	3	16,3
metals	10	12,8
Total	5,1	110,1

Costs for disposal of residues				
Title	**Unit**	**Unit price**	**Quantity**	**Value**
transport to landfill	BGN/y	10	110,1	1101
landfilling	BGN/y	15	110,1	1652
Total costs associated to residues	BGN/y			**2753**

Quantities of sorted materials		
paper and cardboard	t/y	919,1
plastics	t/y	472,9
glass	t/y	526,9
metals	t/y	115,5
TOTAL	t/y	**2034,4**

Variants 1 and 2

Table 3-5. Estimations of revenues and expenditures for transportation to final treatment facility and realization

	Unit	Unit price	Quantity	Value
Transportation of waste to final treatment facility and realization				
paper and cardboard	BGN/t	15	919,06	13786
plastics		15	472,94	7094
glass		15	526,89	7903
metals		0	115,50	0
Total transportation costs to final treatment faci	BGN/y			**28783**

Revenues from realization to final treatment facility				
paper and cardboard	BGN/t	130	919	119478
plastics	BGN/t	150	473	70941
glass*	BGN/t	35	527	18441
metals	BGN/t	80	115	9240
Total revenues from realizatoin	BGN			**218100**

Revenues from municipality	BGN/t	0	2034	0

Variants 1 and 2

Table 3-6. Calculation of costs for glass collection vehicle with hydraulic lifting device

Mashine shifts	220	number/y
Number of transportation routes driven fo	3	number
Number of containers serviced per one tra	2	number
Average length of one transportation route	16	km

	Title	Parameter		Costs	
		Unit	Value		
	Delivery price	**BGN/piece**	**140 000**		
1	Fuel and materials			71	BGN/ mashine shift
	Fuel	l/100km	40	24	BGN/ mashine shift
		l/transport route	12	45	BGN/ mashine shift
	Fuel price	*BGN/l*	*1,25*		
	Lubricants	%, of fuel	10	2	BGN/ mashine shift
2	Maintenance			8 000	BGN/y
	Maintenance and spare parts	%, of cost	4	5 600	BGN/y
	Tyres			2 400	BGN/y
	number	*pieces*	*6*		
	price per tyre	*BGN/piece*	*400*		
3	Fees and insurances			1 600	BGN/y
4	Staff			0	BGN/ mashine shift
	Driver	persons/shift	1		BGN/y
	Salary of driver	*BGN/month*	*300*		
	Social ensurances	%	30,7		BGN/y
	TOTAL costs			**25 308**	**BGN/y**
				115	**BGN/mashine shift**

Note: The above costs for machine shift include costs for fuel, maintenance, consumables and spare parts only.The costs for staff and the investment costs are included in position concerning Sorting and Treatment Site.

Variant 1

Table 3-7. Calculation of costs for waste collection vehicle 16 m3

Mashine shifts	250	number/y
Number of transportation routes driven for mashi	4	number
Number of containers serviced per one transport	25	number
Average length of one transportation route	16	km

	Title	Parameter		Costs	
		Unit	Value		
	Delivery price	**BGN/piece**	**160 000**		
1	Fuel and materials			56	BGN/ mashine shift
	Fuel	l/100km	35	28	BGN/ mashine shift
		l/transport route	5	25	BGN/ mashine shift
	Fuel price	*BGN/l*	*1,25*		
	Lubricants	%, of fuel	10	3	BGN/ mashine shift
2	Maintenance			8 800	BGN/y
	Maintenance and spare parts	%, of cost	4	6 400	BGN/y
	Tyres			2 400	BGN/y
	number	*number*	*6*		
	price per tyre	*BGN/piece*	*400*		
3	Fees and insurance			1 600	BGN/y
4	Staff				BGN/ mashine shift
	Driver	person/shift	1		BGN/y
	Salary of driv	*BGN/month*	*300*		
	Waste collection worker	person/shift	3		BGN/y
	Salary of was	*BGN/month*	*200*		
	Social ensurances	%	30,7		BGN/y
	TOTAL_costs				**24350BGN/y**
				97	**BGN/ mashine shift**

Note: The above costs for machine shift include costs for fuel, maintenance, consumables and spare parts only.The costs for staff and the investment costs are included in position concerning Sorting and Treatment Site.

Variant 2. Curb-side separate collection in plastic bags

Table 3-8. Estimations of costs relevant to sorting and treatment site

Population serviced	Inhabitants		150000

Waste amounts	Unit		Quantity
Annual waste quantity	t/y		2144,49
including			
paper and cardboard	t/y		947,49
plastics	t/y		525,49
glass	t/y		543,18
metals	t/y		128,33
Average daily quantity	t/day		9,75
including			
paper and cardboard	t/day		4,31
plastics	t/day		2,39
glass	t/day		2,47
metals	t/day		0,58

waste quantity per bags	kg per piece		4,00
Quantity of the necessary bags	pieses		400326

Title	Unit	Unit price	Quantity	Value
Capital expenditures				
Buildings, infrastructure				
Site*	sq.m.		5000	0
*provided by municipality				
Covered industrial area with separation line	sq.m.	380	1200	456000
and waste storage facility (metal construction)				
Covered industrial area for glass mill	sq.m.	380	400	152000
Open air storage facility - subdivided to sections (H 1,5 m) 5 cells x 60 sq.m.	sq.m.	140	300	42000
Shelter	sq.m.	190	600	114000
Garage with maintenance area	sq.m.	200	200	40000
Office	sq.m.	320	60	19200
Staff rooms	sq.m.	300	60	18000
Energy supply transformer	pieces	25000	1	25000
Concrete for site	sq.m.	80	2500	200000
Hence	m	100	180	18000
Contingencies	%		10	108420
Total investments buildings and infrastructure				1192620
Pay back period	years		20	
Annual investment costs	BGN/y			59631

Title	Unit	Unit price	Quantity	Value
Installations and machinery				
Press mashine for baling of paper, plastics (incl. conveyor belt transporter)	pieces	1	95000	95000
Device for glass milling, with magnetic separator	pieces	1	110000	110000
Separation line	pieces	1	135000	135000
Electron weighting bridge for vehicles	pieces	1	40000	40000
Total investments installations and devices				380000
Pay back period	years		10	
Annual investment costs	BGN/y			38000
Transport vehicles				
Waste collection vehicle	pieces	1	140000	140000
Truck with hydraulic lifting device	pieces	1	140000	140000
Fork-lift	pieces	2	15000	30000
Loader	pieces	1	70000	70000
Total investments transport vehicles and loading/unloading equipment				380000
Pay back period	years		8	
Annual investment costs	BGN/y			47500
Devices, equipment and furniture				
Weighting device 500 kg	pieces	1	1500	1500
Supply of comminucations	pieces	1	5000	5000
Office furniture	pieces	1	5000	5000
Containers for glass (on site reserve)	pieces	4	400	1600
Containers for glass	pieces	160	1500	240000
Equipment for the maintenace shop	pieces	1	5000	5000
Total investments devices, equipment and furniture				258100
Pay back period	years		5	
Annual investment costs	BGN/y			51620
Total capital investments for site	BGN			**2210720**
Amortization	BGN/y			**216426**
Investmetns for 1 ton treated waste	BGN/t			**1031**
Operational costs				
Salaries and ensurances				
Salaries staff				
Manager	Person/shift	1		
	BGN/month	450	12	5400
Book keper	Person/shift	1		
	BGN/month	350	12	4200
Book keeping &human resources	Person/shift	1		
	BGN/month	320	12	3840
Storage facility staff	Person/shift	3		

Title	Unit	Unit price	Quantity	Value
	Person/shift	300	12	10800
Meintenance technicians	Person/shift	2		
	BGN/month	250	12	6000
Equipment workers	Person/shift	5		
	BGN/month	250	12	15000
Drivers	Person/shift	6		
	BGN/month	300	12	21600
Common worker	Person/shift	14		
	BGN/month	200	12	33600
Common worker - collection	Person/shift	2		
	BGN/month	200	12	4800
Social ensurances	%	30,7		30835
Expenditures related to staff (working clothes, etc.)	%	5		5022
Consumables (electricity, water, fuel, etc.)	BGN/t	5	2144,49	10722
Plastic bags	BGN	0,11	400326	44036
Maintenance of devices, equipment, loading/unloading equipment	BGN/y		1%Инв.	22107
Security of the site	BGN/month	12	1500,00	18000
PR and advertisement expenditures	BGN/y		10%ЕР-ди	23596
Total operational costs	BGN/y			**259559**
Operational costs per unit	BGN/t			**121**
Total costs relevant to site	BGN/y			**475985**
Costs for treatment of 1 t waste at site	BGN/t			**222**

Non-recyclable residues			
Materials	%	тона/год.	
paper and cardboard	3	28,4	
plastics	10	52,5	
glass	3	16,3	
metals	10	12,8	
Total	5,1		110,1

Costs for disposal of residues				
Title	Unit	Unit price	Quantity	Value
transport to landfill	BGN/y	10	110,1	1101
landfilling	BGN/y	15	110,1	1652
Total costs associated to residues	BGN/y			**2753**

Quantities of sorted materials		
paper and cardboard	t/y	919,1
plastics	t/y	472,9
glass	t/y	526,9
metals	t/y	115,5
TOTAL	t/y	**2034,4**

Variant 2

Table 3-9 Calculation of costs for waste collection vehicle 16 m3

Mashine shifts	220	number/y
Number of transportation routes driven for mashi	4	number
Number of containers serviced per one transport	2,5	t/transportation route
Average length of one transportation route	16	km

	Title	Parameter		Costs
		Unit	Value	
	Delivery price	**BGN/piece**	**0**	
1	Fuel and materials			56 BGN/ mashine shift
	Fuel	l/100km	35	28 BGN/ mashine shift
		l/transport route	5	25 BGN/ mashine shift
	Fuel price	*BGN/l*	*1,25*	
	Lubricants	%, of fuel	10	3 BGN/ mashine shift
2	Maintenance			2 400 BGN/y
	Maintenance and spare parts	%, of cost	4	0 BGN/y
	Tyres			2 400 BGN/y
	number	*number*	*6*	
	price per tyre	*BGN/piece*	*400*	
3	Fees and insurances			1 600 BGN/y
	TOTAL costs			**16 276 BGN/y**
				74 BGN/ mashine shift
				10 BGN/t

Note: The above costs for machine shift include costs for fuel, maintenance, consumables and spare parts only.The costs for staff and the investment costs are included in position concerning Sorting and Treatment Site.

Table 3-10. Estimations for investments and expenditures for commissioning of collection point

Estimated quantity of waste collected at the collecttion point	t/y	200		
Title	Unit	Unit price	Quantity	Value
Investments				
Buildings and infrastructure				
Site *provided by the municipality	sq.m.		400	
Acceptance facility	sq.m.	300	20	6000
Hygiene room	sq.m.	400	4	1600
Waste storage facility (metal construction)	sq.m.	150	100	15000
Shelter	sq.m.	120	60	7200
Asphalt/ concrete cover of the site	sq.m.	65	250	16250
Hence	m.	100	50	5000
Total Investments Buildings and Infrastructure				51050
Pay back period	years		20	
Annual investment costs	BGN/y			2553
Devices and Upholster				
Weighting device 500 kg	pieces	1	1500	1500
Weighting device 50 kg	pieces	1	110	110
Power supply and communications	pieces	1	1000	1000
Office furniture	pieces	1	1000	1000
Total Investments Devices and Upholster				3610
Amortization	years		5	
Amortization	lv/y			722
Total Investments				54660
Total annual investment costs	BGN/point.y			3275
	BGN/t			16