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NARODOWA STRATEGIA SPÓJNOŚCI



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National Waste Prevention Programme

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TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION	5
1.1 Document structure and methodology	7
CHAPTER 2. STATE DIAGNOSIS.....	10
2.1 Summary of the diagnosis.....	16
CHAPTER 3. USEFULLNESS OF EXAMPLE MEASURES INDICATED IN ANNEX IV TO WASTE FRAMEWORK DIRECTIVE	20
CHAPTER 4. EXISTING METHODS OF WASTE PREVENTION	28
CHAPTER 5. GOOD WASTE PREVENTION PRACTICES FOR KEY WASTE STREAMS	29
CHAPTER 6. GOOD WASTE PREVENTION PRACTICES BROKEN DOWN INTO AREAS.....	36
CHAPTER 7. STRATEGIC OBJECTIVES.....	39
CHAPTER 8. ACTIONS AIMED AT ACHIEVING STRATEGIC OBJECTIVES.....	41
8.1 Material and financial schedule	53
CHAPTER 9. MONITORING	57
CHAPTER 10. EVALUATION OF THE EFFECTS OF SUGGESTED MEASURES	58
CHAPTER 11. CONSULTATIONS OF DRAFT NWPP	61
ANNEXES.....	62
ANNEX I. STATE DIAGNOSIS WITH RESPECT TO INDIVIDUAL WASTE STREAMS.....	62
I.1 Municipal waste	62
<i>I.1.1. Municipal waste generation – sources, types, amounts</i>	<i>62</i>
<i>I.1.2. General municipal waste prevention methods.....</i>	<i>71</i>
I.2. Biodegradable waste	72
I.3. Packaging waste	75
I.4 Waste from selected industry branches.....	77
<i>I.4.1. Waste generated at the stage of exploration, production, physical and chemical processing of ores and other minerals (group 01)</i>	<i>78</i>
<i>I.4.2. Waste from the production, preparation, trade and use of the products of inorganic chemistry (group 06).....</i>	<i>80</i>
<i>I.4.3. Waste from thermal processes (group 10).....</i>	<i>81</i>
I.5. Waste from the construction, renovation and demolition of buildings and road infrastructure	83
I.6. Hazardous waste from business operations	84
<i>I.6.1. Waste oil</i>	<i>84</i>
<i>I.6.2. Medical and veterinary waste</i>	<i>84</i>
<i>I.6.3. Waste batteries and accumulators.....</i>	<i>84</i>

<i>I.6.4. Waste Electrical and Electronic Equipment (WEEE)</i>	85
<i>I.6.5. End-of-life vehicles</i>	87
<i>I.6.6. Plant protection products past best before date</i>	88
I.7. Other waste	89
<i>I.7.1. Waste tires</i>	89
<i>I.7.2. Urban waste water sludges</i>	89
ANNEX II. Familiarity with waste management issues in the society and related awareness-raising campaigns.....	91
ANNEX III. National plans, programmes, strategies on WP.....	93
<i>Legal regulations</i>	93
<i>National policies and strategies</i>	94
<i>Regional plans and programmes</i>	95
<i>Programmes financing WP actions</i>	98
<i>Projection of waste prevention tendencies</i>	99
ANNEX IV. Networks of reuse and repair centres	100
ANNEX V. Areas of synergy between NWPP and the objectives of strategic documents.....	107
ANNEX VI. Guidelines for outlays estimation	111
LITERATURE.....	114
LIST OF TABLES	116
LIST OF FIGURES	117

List of used terms and abbreviations

- **BAT** – Best Available Techniques
- **BDO** – database dedicated to products, packaging and waste management
- **CSR** – Corporate Social Responsibility
- **Eco-design** – specific approach to product designing with particular attention to the environmental impact of the product throughout its life cycle
- **EMAS** – Eco-Management and Audit Scheme
- **GUS** – Central Statistical Office
- **ISO 14001** – International standard specifying the processes of control and improvement of an organisation's environmental management
- **EC** – European Commission
- **NWMP 2014** – National Waste Management Plan 2014, adopted by the Ordinance No. 217 of the Council of Ministers of 24 December 2010 (M.P., No. 101, item 1183)
- **NWPP** – National Waste Prevention Programme
- **P** – person
- **LCA** – Life Cycle Assessment – advanced methods and tools for analysing environmental impact throughout product life cycle. Life Cycle Assessment is an international standard methodology of assessing the product- (goods- and services-) related environmental impact and resources consumption
- **GDP** – Gross Domestic Product
- **OPI&E** – Operational Programme Infrastructure and Environment 2014–2020
- **EPL** – Act: Environmental Protection Law (Journal of Laws of 2013, item 1232, as amended).
- **PSZOK** – separate municipal waste collection facility
- **Responsible Care** – an international programme known in Poland as "Odpowiedzialność i Troska", which plays an important part in shaping ecological awareness and co-responsibility for the condition of the environment among entrepreneurs and favours addressing environmental issues by means of a partner dialogue and cooperation between public institutions and business
- **VWMP** – Viovodeship Waste Management Plan
- **EC Guidance** – European Commission: „Preparing a Waste Prevention Programme” Guidance document; 2012
- **WP** – waste prevention

CHAPTER 1. INTRODUCTION

According to the Waste Framework Directive (*Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives*¹), which is a key act of Community law in the field of waste management, the EU strives to create a "recycling society", "seeking to avoid waste generation and to use waste as a resource".

Article 29 of the Directive forms grounds for the development of waste prevention programmes, whose aim will be to break the link between economic growth and the environmental impacts associated with the generation of waste. Member States are required to establish waste prevention programmes by 12 December 2013. The programmes shall set out waste prevention objectives, describe the existing prevention measures and evaluate the usefulness of the example measures indicated in Annex IV to the Waste Framework Directive or other appropriate measures, as well as determine appropriate specific qualitative or quantitative benchmarks for adopted waste prevention measures, in order to monitor and assess their progress.

Waste prevention issues are closely related to the implementation of the most important EU development strategy – Europe 2020 – Resource Efficient Europe² and are reflected in its executive acts.

In order to help EU Member States to use numerous waste prevention and resource efficiency opportunities and to indicate the set of best practices in this respect, the European Commission developed a guidance document concerning the preparation of waste prevention programmes³. The guidelines provided in the document have been used to prepare the present Programme.

General national waste prevention framework was adopted by Resolution No. 217 of the Council of Ministers of 24 December 2010. National Waste Management Plan 2014 (M.P. No. 101, item 1183). NWPP is to detail in a single document waste prevention measures both at the national and regional (voivodeship) level.

Article 17 of the Act of 14 December 2012 on waste (Journal of Laws of 2013, item 21, as amended), which transposes the provisions of the Waste Framework Directive, sets the following waste management hierarchy:

- 1) waste prevention;
- 2) preparing for reuse;
- 3) recycling;
- 4) other recovery;
- 5) disposal.

Pursuant to Article 3 (1)(33) of the Act of 14 December 2012 on waste, waste prevention shall be understood as *measures applied with regard to a product, material or substance before they become waste that decrease:*

- a) *the amount of waste, also by means of reuse or extending the operational use of a product,*
- b) *the negative impact of generated waste on human health and the environment,*

¹ (OJ UE. L312 of 22.11.2008, p. 3, as amended) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:en:PDF>

² Roadmap to Resource Efficient Europe

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0571:FIN:PL:PDF>

³ European Commission, Directorate-General Environment, Preparing Waste Prevention Programme, Guidance document, October 2012

<http://ec.europa.eu/environment/waste/prevention/pdf/Waste%20prevention%20guidelines.pdf>

c) the content of harmful substances in products and materials.

Figure 1 below presents the stages of waste prevention.

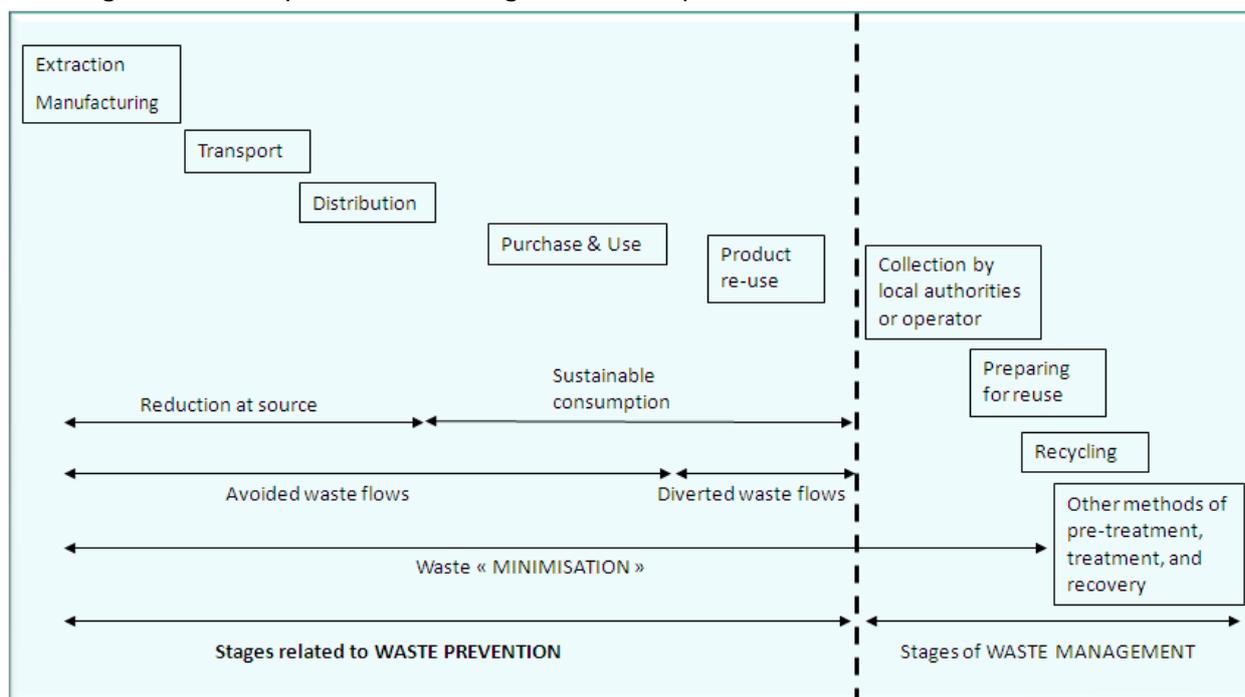


Figure 1. Illustration of the waste prevention definition [Source: European Commission, Directorate-General Environment, Preparing Waste Prevention Programme, Guidance document, October 2012, quoted by ADEME 2008]

Waste prevention is determined by numerous factors that have no direct connection with waste management, but are related to economic growth, the progress in BAT implementation by entrepreneurs, as well as society affluence. The amount of generated waste is also influenced by consumption patterns and environmental awareness.

Waste prevention should be implemented already at the stage of product designing (eco-design), as well as at the stage of its manufacturing, distribution and consumption. It should concern manufacturing processes, as well as other processes, depending on the characteristics of a given activity, e.g. services.

According to the data of the Central Statistical Office (GUS), the amount of waste generated in the country has remained relatively constant (ca. 130 million Mg/year) since 2000. Since the beginning of the 1990s, ca. 15% decrease in the amount of generated waste has been observed. The average amount of waste per person, per year according to the data of Eurostat (statistics concerning total waste generated in all NACE activities and in households) was in 2010 – 4.2 Mg, which was a lower quantity than the EU average of 5.0 Mg.

Taking into consideration the aim of the waste prevention programme to break the link between economic growth and waste generation, it needs to be noticed that in Poland in 2000–2011 GDP increased by 52.8% in constant prices from 2000, while the amount of waste remained unchanged, which indicates a lack of direct correlation between these two indicators.

Resource productivity⁴ (according to the data of Eurostat for 2005) is very low in Poland (0.4 EUR/kg of raw materials), while the average for the EU is four times higher (1.3 EUR/kg).

To conclude, waste generation in Poland is characterised by a relatively low indicator of waste generation per person and a very low resource productivity indicator.

1.1 Document structure and methodology

NWPP was developed with the use of a study prepared by ATMOTERM® S.A. commissioned by the General Director for Environmental Protection, as a part of activities of environmental bodies and institutions managing EU funds "Partnerstwo: Środowisko dla Rozwoju, ze środków Programu Operacyjnego Pomoc Techniczna 2007-2013" [Partnership: Environment for Development from the funds of the Technical Assistance Operational Programme 2007-2013].

The document is divided into 11 chapters.

Chapter 1 presents the context of NWPP development and the description of the document layout and applied methodology.

Chapter 2 assesses the current situation with respect to waste management in Poland in relation to the EU. The conclusion of the diagnosis includes priority waste streams for the implementation of the present NWPP.

Chapter 3 assesses the usefulness of example measures indicated in the Waste Framework Directive in domestic conditions.

Chapter 4 includes a list of existing waste prevention methods according to the provisions of the Waste Framework Directive that are currently applied in the adopted documents and objectives at the national and regional level.

Chapter 5 presents good practices and areas of operation with regard to the prevention of priority waste streams.

Chapter 6 contains a description of good waste prevention practices broken down into areas.

Chapter 7 formulates main goals of NWPP, including with regard to priority waste streams.

Chapter 8 presents the general material and financial schedule with the indication of implementing institutions, time frames, estimated outlays and possible funding sources.

Chapter 9 presents a description of the means of monitoring NWPP progress, including a set of monitoring indicators.

Chapter 10 presents the evaluation of consequences of the proposed measures.

Chapter 11 contains synthetic information on the consultations of draft NWPP.

Annexes hereto constitute an integral part of NWPP. Annex I presents the current state diagnosis with respect to individual waste streams and indicates methods to prevent their generation.

⁴ Resource productivity is a measure of the total amount of materials used directly by the economy (measured as domestic material consumption – DMC) in relation to business activity (usually expressed as GDP). Resource productivity (GDP / DMC) is one of the indicators of sustainable development used in the European Union (EU).

It is followed by a description of the current state of social awareness concerning waste prevention (Annex II) and a review of national plans, programmes, strategies and initiatives related to WP (Annex III).

Annex IV includes guidelines for the establishment of repair and reuse networks, which contain suggestions of terms and model of operation of a repair and reuse network in connection with separate municipal waste collection facilities (PSZOKs).

Annex V indicates areas of synergy between NWPP and the objectives of strategic documents, and Annex VI – guidelines for the estimation of outlays presented in the roadmap.

NWPP adopts a general approach to waste prevention in relation to such waste streams as:

- 1) municipal waste;
- 2) biodegradable waste;
- 3) packaging waste;
- 4) certain industrial waste;
- 5) construction waste;
- 6) hazardous waste;
- 7) other.

The breakdown is generally consistent with the breakdown adopted in NWMP 2014.

Programme development was preceded by a detailed analysis of NWMP 2014 provisions in the context of Directive 2008/98/EC, a revision of EC Guidance on waste prevention programmes preparation and EU strategic documents related to WP. Also existing programmes, plans, strategies and initiatives with regard to waste management, sustainable development, information and promotion policy concerning environmental protection were analysed. The present document contains the most important conclusions resulting from these works.

The stages of NWPP preparation are presented in Figure 2.

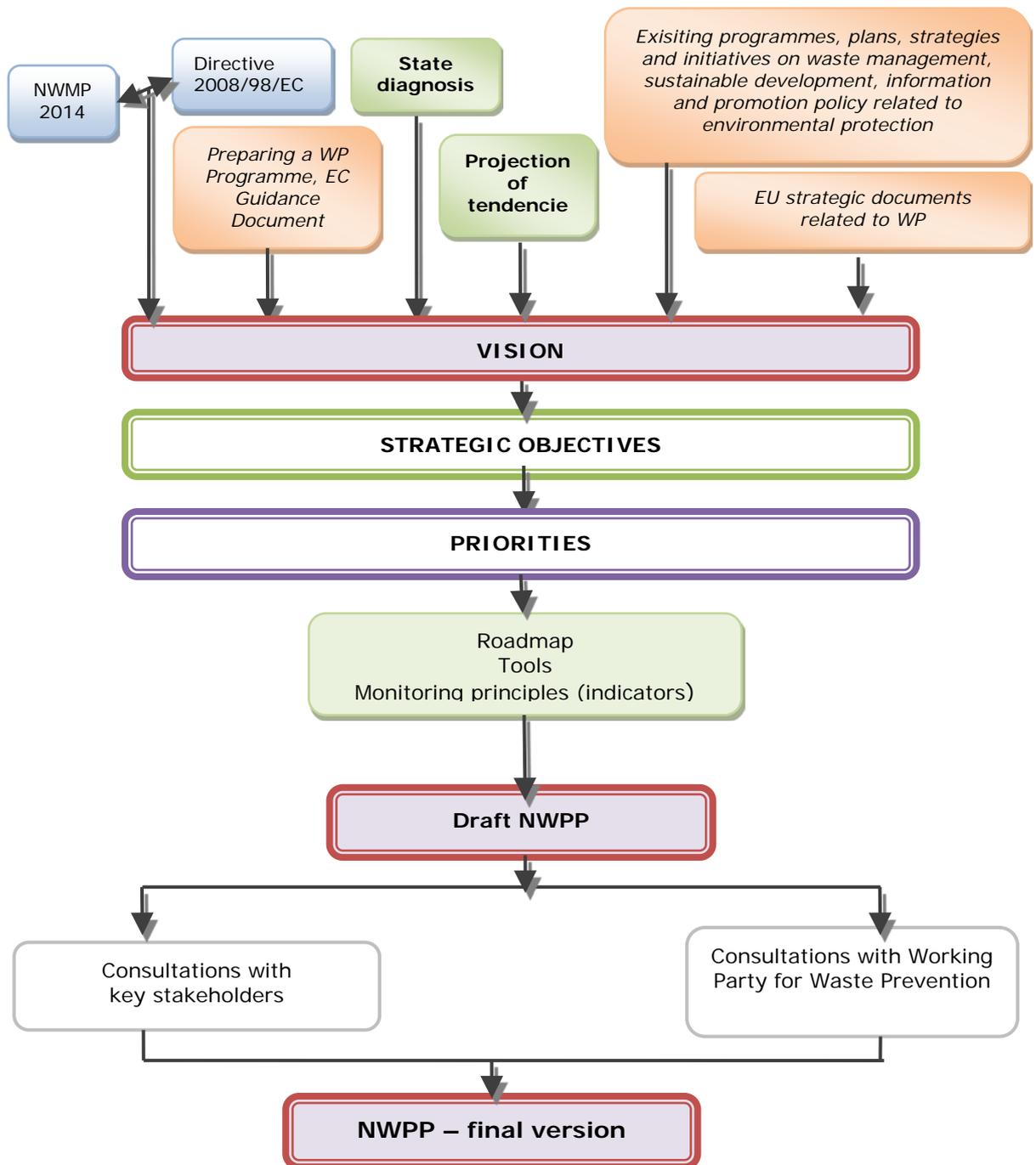


Figure 2. Stages of NWPP preparation (source: own work)

The study was also prepared with the help of draft Programme consultations, including consultations with the Waste Management Working Party acting at the national level within the network: "Partnership: Environment for Development" and consultations with key stakeholders.

CHAPTER 2. STATE DIAGNOSIS

According to the data of the Central Statistical Office (GUS), the amount of waste generated in Poland has remained relatively constant (ca. 130 million Mg/year) since 2000. Since the beginning of the 1990s, ca. 15% decrease in the amount of generated waste has been observed, which is illustrated in Figure 3.

Quantity of waste generated in Poland (million Mg/year)

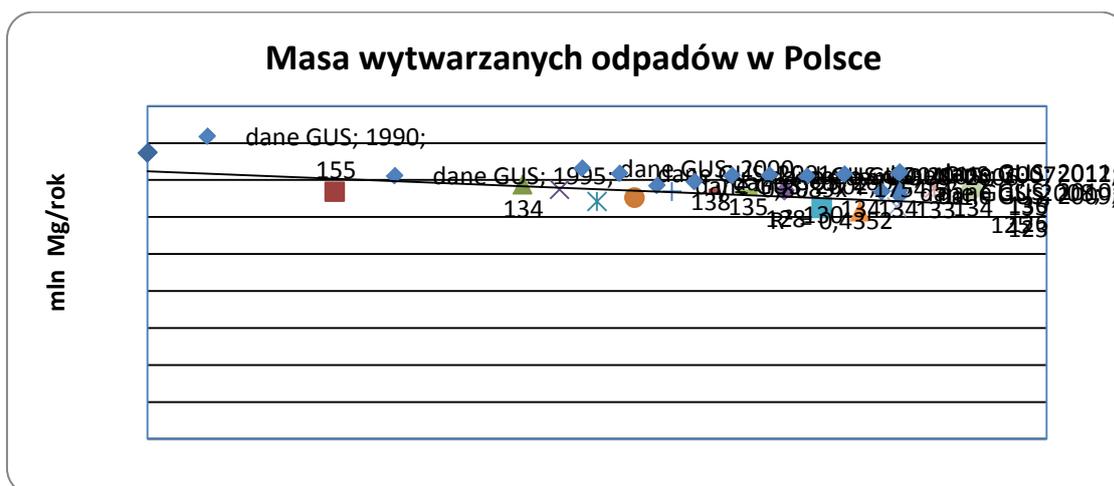
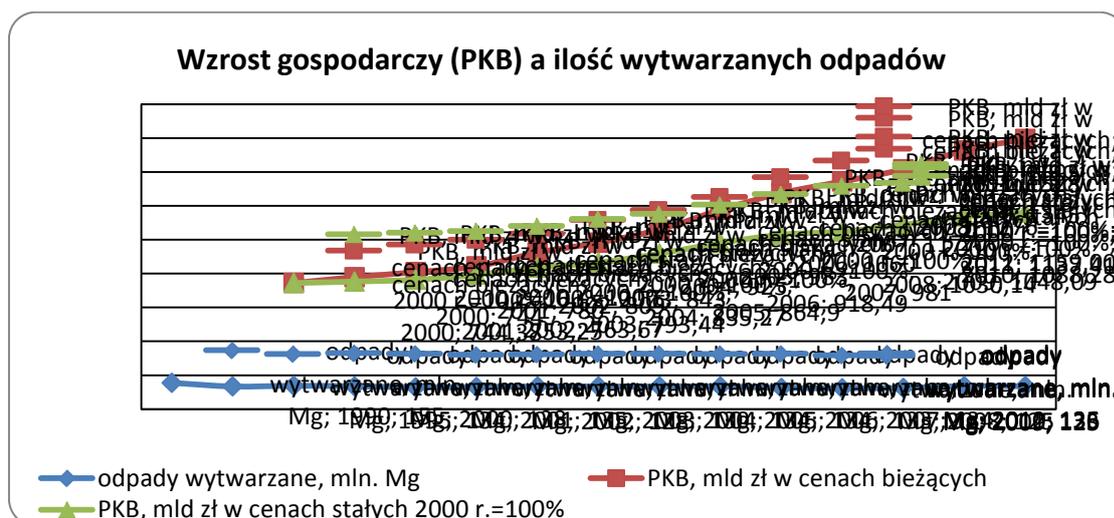


Figure 3. Waste generated in Poland in a year (source: according to GUS data: Environmental protection 2005–2013)⁵

In 2000–2012 in Poland, GDP increased by 55.7% in constant prices from 2000, while the amount of waste remained unchanged, which indicates a lack of direct correlation between these two indicators (Figure 4).

Economic growth (GDP) in relation to the amount of generated waste



Generated waste, million Mg

GDP, PLN billion in current prices

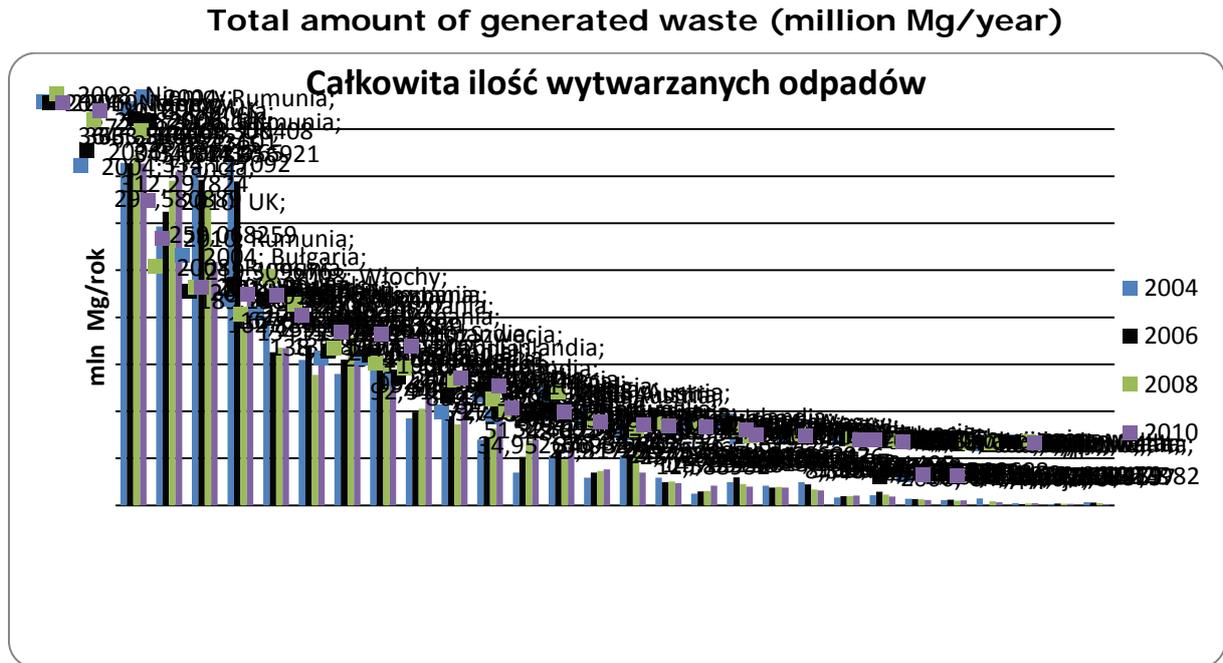
⁵The quantity of generated waste according to the data collected by GUS does not include all sources of waste, GUS survey based on the OS-6 form covers major waste generators in the country, namely entities that generate over 1,000 tonnes of waste or have 1 million tonnes or more of accumulated waste.

GDP, PLN billion in constant prices from 2000 = 100%

Figure 4. Comparison between the GDP growth rate (in current and constant prices) in Poland and the amount of generated waste (source: GUS data)

Poland in comparison to other Member States

Figure 5 presents total amounts of waste generated in individual countries of the European Union. With regard to the total mass of generated waste, in 2010 Poland was sixth. We are also the sixth country in the EU in terms of the number of inhabitants.



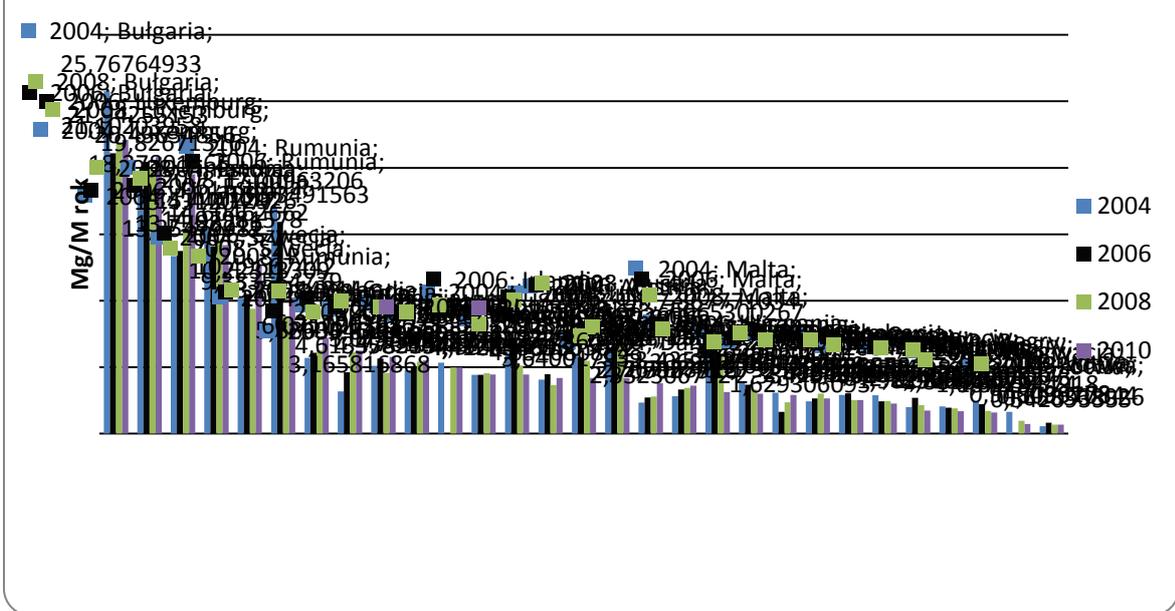
From left to right: Germany, France, UK, Romania, Bulgaria, Poland, Italy, Spain, Netherlands, Sweden, Finland, Greece, Belgium, Portugal, Austria, Czech Republic, Denmark, Ireland, Estonia, Hungary, Luxembourg, Slovakia, Lithuania, Slovenia, Croatia, Cyprus, Latvia, Malta

Figure 5. Total amounts of waste generated in the countries of the European Union (source: Eurostat)

Indicators of waste generation per person are presented in Figure 6.

Amount of generated waste per person (million Mg/year)

Ilość wytwarzanych odpadów na mieszkańca



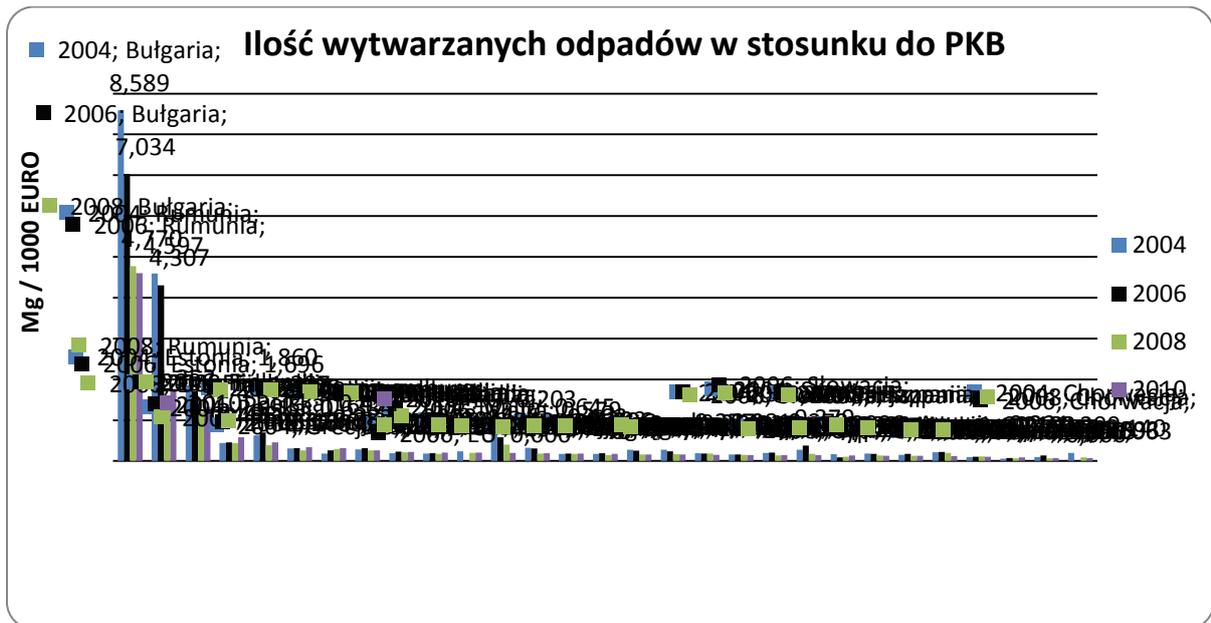
From left to right: Bulgaria, Luxembourg, Finland, Estonia, Sweden, Romania, Netherlands, Greece, Belgium, France, EU, Germany, Ireland, Poland, UK, Austria, Denmark, Portugal, Malta, Spain, Cyprus, Italy, Slovenia, Czech Republic, Slovakia, Lithuania, Hungary, Croatia, Latvia

Figure 6. Amount of generated waste per person (source: Eurostat)

In 2010 in the EU, there was on average ca. 5.0 Mg of waste per year per person. This indicator covers total waste generated in the industry, services and in households (all NACE codes, according to Eurostat data). Poland has a medium waste generation indicator (4.2 Mg/P per year); lower than the EU 28 average.

Figure 7 presents the amount of generated waste in relation to gross domestic product. It is one of the indicators illustrating the efficiency and structure of the economy.

Amount of generated waste in relation to GDP (million Mg/year)



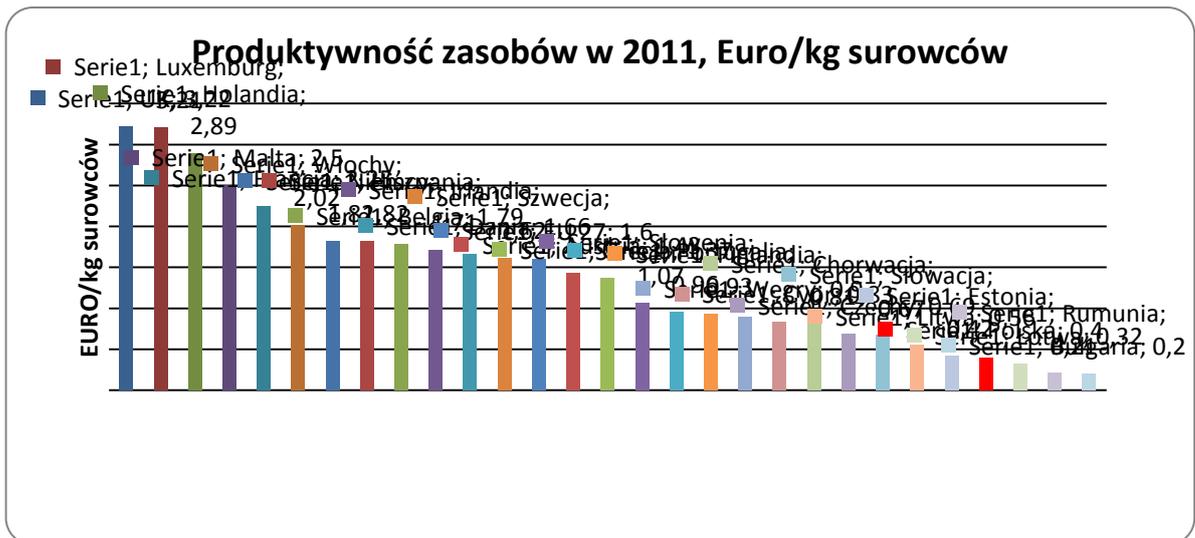
From left to right: Bulgaria, Romania, Estonia, Finland, Poland, Sweden, Greece, Luxembourg, Portugal, Netherlands, EU, Malta, Lithuania, France, Belgium, Italy, Czech Republic, UK, Germany, Slovenia, Slovakia, Cyprus, Spain, Ireland, Austria, Italy, Denmark, Latvia, Croatia

Figure 7. Waste generation intensity in relation to GDP (source: Eurostat)

A high indicator of waste generation per GDP unit is also related to high materials consumption of the economy. Economy's materials consumption is shown by means of the so-called resource productivity, expressed with the relation of GDP to the quantity of consumed raw materials. In 2011 in Poland, EUR 0.4 of GDP was produced per 1 kg of consumed raw materials (Figure 8). It represents a four times lower productivity in comparison with the average for 27 EU Member States – EUR 1.6 per kg and eight time lower productivity that the productivity in the UK. The indicator is lower in countries with a higher share of industry in the GDP structure. In Poland, the share of industry in the national gross value added in 2011 was 25.6%, the share of construction – 8%, the share of services – 64.4%, and the share of agriculture – 4.0%⁶. The share of industry in the GDP structure in the UK was, in turn, 21%, and in the Netherlands – 24% (Eurostat).

Resource productivity [EUR GDP/kg of resources]

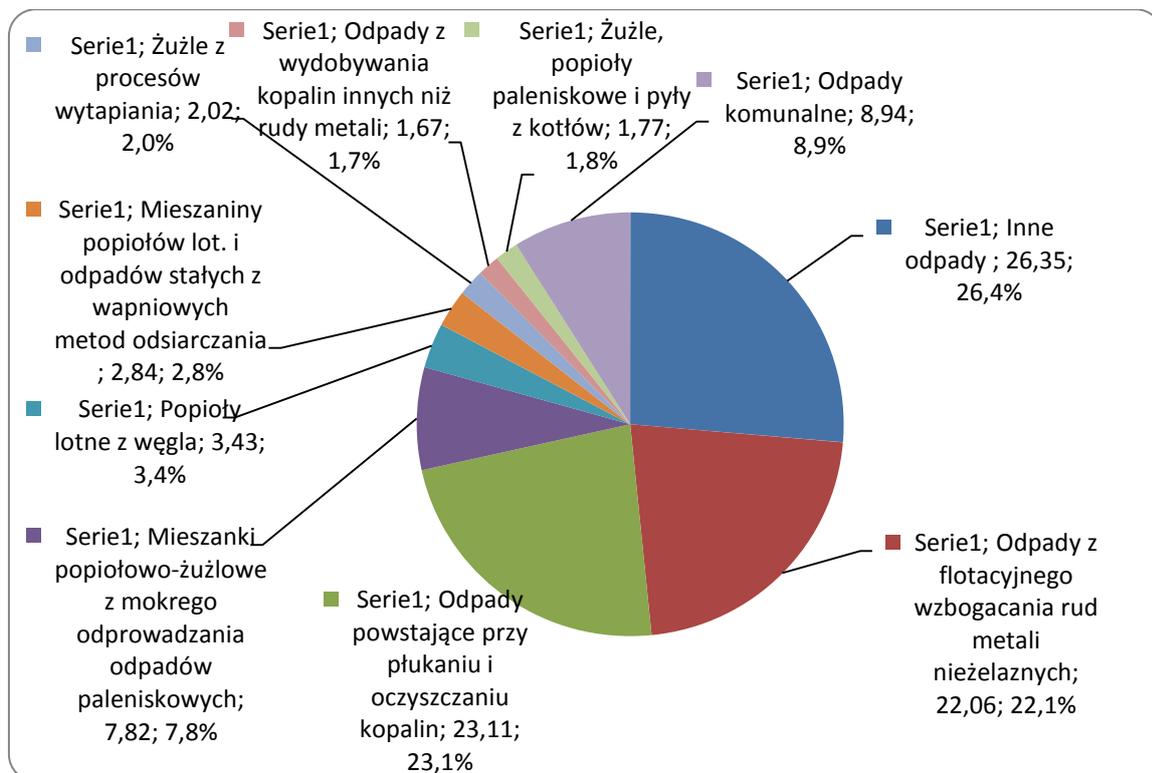
⁶ Gross Domestic Product. Regional accounts in 2011 Central Statistical Office, Statistical Office in Katowice, Katowice 2012



From left to right: UK, Luxembourg, Netherlands, Malta, France, Italy, Germany, Spain, Belgium, Ireland, Denmark, Sweden, EU 27, Austria, Greece, Slovenia, Portugal, Finland, Hungary, Cyprus, Croatia, Czech Republic, Slovakia, Lithuania, Estonia, Poland, Latvia, Romania, Bulgaria

Figure 8. Resource productivity [EUR GDP/kg of resources], (source: Eurostat)

The composition of waste generated in Poland is presented in Figure 9. Industrial waste consists above all of the mining industry waste, which represents over 46% of the total quantity of generated waste. Municipal waste constituted in 2012 ca. 8.9% of the total quantity of generated waste.



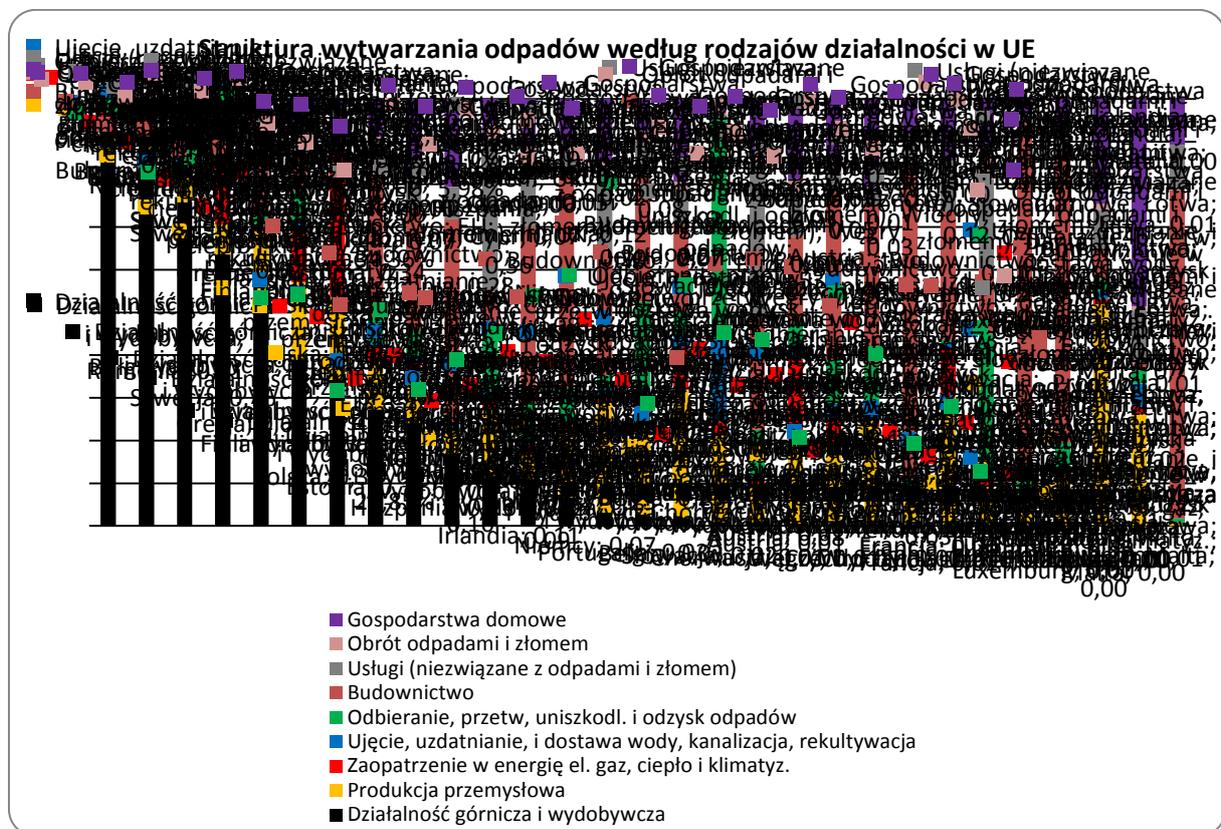
Other waste – 26.4%
Waste from the flotation of non-ferrous metal ores – 22.1%
Waste generated at the stage of rinsing and cleaning minerals – 23.1%
Ash and slag mixture from wet discharge of combustion waste – 7.8%

- Fly ash from coal – 3.4%
- Mixture of fly ash and solid waste from lime desulphurisation methods – 2.8%
- Slag from smelting processes – 2.0%
- Waste from the production of minerals other than metal ores – 1.7%
- Slag, combustion ash and bottom ash – 1.8%
- Municipal waste – 8.9%

Figure 9. Composition of waste generated in Poland in 2012 (source: GUS, Environmental protection 2013)

The structure of waste broken down into the types of operation of waste generators in Poland in comparison with other EU countries is presented in Figure 10. Poland is among the countries with a relatively high share of waste from the mining industry. The total quantity of waste generated in Poland is characterised by a low share of waste from households and waste from the construction industry (5.6% and 13.0% respectively).

Structure of waste generation in the EU broken down into types of business operation



From left to right: Bulgaria, Romania, Sweden, Greece, Finland, Poland, Estonia, EU, Spain, Cyprus, Ireland, UK, Germany, Portugal, Belgium, Slovakia, Croatia, Austria, Hungary, Czech Republic, Italy, France, Slovenia, Denmark, Luxembourg, Netherlands, Lithuania, Latvia, Malta

From top to bottom:

- Households
- Trade in waste and scrap
- Services (unrelated to waste and scrap)
- Construction industry
- Waste collection, processing, treatment and recovery
- Water intake, treatment and supply, sewage, reclamation
- Supply with electric power, gas, heat and air conditioning
- Industrial production

Figure 10. Structure of waste generation in EU Member States in 2010 broken down into basic nature of activity (source: Eurostat)

Annex I presents a detailed state diagnosis with respect to individual waste streams.

2.1 Summary of the diagnosis

On the basis of a detailed analysis of the current situation with respect to waste generation in individual streams, the state of society awareness and implemented waste prevention methods in Poland (Annex I), the following conclusions can be drawn:

- 1) the total amount of waste generated in Poland (municipal and industrial waste) has remained at a similar level for over 10 years (according to GUS data);
- 2) the average amount of waste per inhabitant was in 2010: 4.2 Mg per person per year (according to Eurostat data), which was lower than the EU average;
- 3) in 2000–2012 in Poland, GDP increased by 55.7% in constant prices from 2000, while the amount of waste remained unchanged, which indicates a lack of direct correlation between these two indicators;
- 4) due to a higher share of industry in the GDP structure, the resource productivity indicator is very low in Poland (EUR 0.4/kg of raw materials), while the average for the EU is four times higher (EUR 1.6/kg), and in certain countries even ten times higher;
- 5) waste generation in Poland is characterised by a relatively low indicator of waste generation per person and a very low resource productivity indicator. This results to a large extent from the use of coal as an energy source – substantive quantity of the raw material with a low waste generation indicator;
- 6) Poland is among the countries with a relatively high share of waste from the mining industry – the share of such waste in 2012 (according to GUS data) was over 53% of the quantity of total generated waste. A low share of household waste (ca. 8.9%) is noticeable;
- 7) variation in terms of the amount, morphological structure (with regard to municipal waste) and the share of individual waste streams in the total amount of generated waste, depending on the region, can be observed.

Areas differing in terms of waste generation

The following areas can be identified with respect to the differences in waste generation:

- 1) industrial areas – with developed mining, power and metallurgic industries. These include Górny Śląsk and Zagłębie Lubelskie, where black coal is produced, as well as Wielkopolska and Podkarpacie, where natural gas is produced. Major power plants are located in the following voivodeships: Śląskie (Rybnik, Jaworzno, Łaziska), Opolskie (Opole), Łódzkie (Bełchatów), Świętokrzyskie (Połaniec), Małopolskie (Skawina), Mazowieckie (Kozienice), Dolnośląskie (Turów), Wielkopolskie (Pątnów) and Zachodniopomorskie (Dolna Odra). Metallurgy is prominent in the Dolnośląskie, Małopolskie, Śląskie and Świętokrzyskie Voivodeships. Chemical raw materials (rock salt) are produced in Zagłębie Kłodawskie and Kłodawskie, while sulphur is produced in Osiek; in the Górzycza, Barnówko-Mostno-Buszew, Cychry and Zielin deposits sulphur is acquired by means of desulphurising natural gas and crude oil. Industrial areas generate

substantive amounts of industrial waste related to the activity of individual sectors. Major part is played by the production and processing of mineral resources;

- 2) agricultural areas – agricultural farms in Poland are very fragmented. Plant production in Poland predominates in Kujawsko-Pomorskie, Wielkopolskie, Warmińsko-Mazurskie, Lubelskie, Mazowieckie, Świętokrzyskie, Opolskie and Małopolskie Voivodeships. Animal and mixed production prevails in the areas of Wielkopolska, northern part of Mazowsze and a major part of Podlasie⁷. Areas with intense agricultural activity generate substantive quantities of waste from orcharding and plant growing, as well as waste related to cattle breeding. It needs to be noticed, however, that pursuant to Article 2 (6) of the Act on waste, the Act is not applicable to biomass in the form of:
 - (a) manure subject to Regulation (EC) No. 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation) OJ L 300 of 14.11.2009, p. 1, as amended) hereinafter referred to as "Regulation (EC) No. 1069/2009",
 - (b) straw,
 - (c) other natural substances from agricultural or forestry production that are not hazardous,
 - (d) used in agriculture, forestry or for power generation from such biomass with the use of processes or methods that are not harmful to the environment and do not pose a threat to human life and health;
- 3) tourist areas – areas dominated by tourism are located above all at the seaside and in the south, where intensified inflow of people can be observed in particular in holiday seasons, and the Warmińsko-Mazurskie Voivodeship. Seaside, mountain areas and historic cities are visited by the largest groups of tourist in the summer time. In winter, large groups of tourists travel to the Małopolskie Voivodeship, where winter sports can be practiced, as well as to the Dolnośląskie and Śląskie Voivodeships. Municipalities in which the amount of generated waste is determined by the number of visitors should have a waste management system adjusted to seasonal variations in tourism. At the time of intensified tourist traffic, the amount of generated municipal waste increases;
- 4) urban areas – municipal waste from urban areas is composed predominantly of kitchen and garden waste (ca. 29%), paper, cardboard (19%) and plastic (15%), which is related to the amount of products purchased in packaging and the generation of food waste that cannot be managed in house compost boxes in a quantity characteristic of rural areas. The mineral fraction represents a minor share of waste generated in urban areas;
- 5) rural areas – waste from rural areas is characterised by a high share (higher than in urban areas) of kitchen and garden waste (33%) and the mineral fraction (17%), which results from growing plants on the premises and feeding home boilers with solid fuels (coal, coal dust, coke), which generate ash and combustion slag. Packaging and clothing waste is generated in smaller quantities.

Priority waste streams

⁷ Source: Atlas Rolnictwa Polski, J. Bański, Stanisław Leszczycki Institute of Geography and Spatial Organization, Polish Academy of Sciences, Warsaw 2010

On the basis of the diagnosis presented above, waste streams were identified which should be addressed first in order to reduce their generation. Key waste streams were selected according to the following criteria:

- 1) considerable share in the total quantity of generated waste:
 - a) **waste from the mining industry and the physical and chemical processing of ores and other minerals,**
 - b) **waste from thermal processes (power industry);**
- 2) considerable share of hazardous waste:
 - a) **waste from the chemical industry,**
 - b) **waste chemical agents;**
- 3) identified options to prevent waste generation exist:
 - a) **municipal waste,**
 - b) **packaging waste** – due to its significant share in municipal waste, in particular in urban areas, institutions and enterprises,
 - c) **food waste** – due to the option of better food management to the benefit of people in need,
 - d) **WEEE** – due to the significant environmental impact during the production of electrical and electronic equipment, growing consumption and constantly shortening operational use of these devices, as well as possibly negative environmental impact at the stage of waste management.

The Programme further focuses on the key waste streams indicated above.

Waste prevention in documents and programmes

- 1) a review of national legislation makes it possible to state that legal regulations prioritise waste prevention and ensure the option to implement basic measures in this regard (Act on waste, Act on mining waste, Act on packaging and packaging waste management, Act on economic operators' obligations in the scope of managing certain types of waste and on product fees, Act – Environmental Protection Law);
- 2) the key objectives, priorities and directions specified in national strategic documents that support waste prevention include:
 - a) securing economically valuable mineral deposits and increasing the use of recyclable raw materials,
 - b) rational resources management,
 - c) supporting the transition into a low-carbon economy in all sectors and environmental protection,
 - d) rational waste management, including its use for power generation;
- 3) issues related to waste prevention are included in Voivodeship Waste Management Plans (VWMPs). All plans specify strategic objectives and priorities in this regard, and only a few describe specific measures within a material and financial schedule;
- 4) existing waste prevention methods are diversified and depend on the waste stream;

- 5) WP measures can be financed from the National and Voivodeship Funds for Environmental Protection and Water Management (NFOŚiGW, WFOŚiGWs), EU funds (Life +, financing under the Operational Programme Infrastructure and Environment, Regional Operational Programmes), private funds and mixed ones (Public-Private Partnership).

CHAPTER 3. USEFULNESS OF EXAMPLE MEASURES INDICATED IN ANNEX IV TO WASTE FRAMEWORK DIRECTIVE

With due consideration to the adopted general WP objectives – qualitative and quantitative objectives and specific objectives (targets) – in relation to key waste streams, existing measures that can be used to achieve them were evaluated. The measures were analysed with respect to the example measures indicated in Annex No. 5 to the Act of 14 December 2012 on waste (the annex is a transposition of Annex IV to the Waste Framework Directive).

The aforementioned measures were divided into three groups:

- 1) measures that can affect the framework conditions related to the generation of waste;
- 2) measures that can affect the design, production and distribution phase;
- 3) measures that can affect the consumption and use phase.

These measures were associated with specific objectives and assessed in terms of their usefulness. The results of analyses are presented in Table 1.

Table 1. Analysis of waste prevention measures indicated in Annex No. 5 to the Act on waste in the context on NWPP objectives (source: own work)

Group of measures	Kinds of measures (according to Annex No. 5 to the Act on waste)	Assessment of usefulness Y/N	Activities undertaken as part of the measure	Possible additional activities undertaken as part of the measure
1	2	3	4	5
Measures that can affect the framework conditions related to the generation of waste	1. The use of planning measures, or other economic instruments promoting the efficient use of resources	Yes	1. The "polluter pays" principle is implemented; extended producer responsibility for certain products, WP included in NWMP 2014 and VWMPs	1. Covering a larger number of products with extended producer responsibility, increasing the share of returnable packaging; developing cooperation for WP between stakeholders: Ministry of the Environment, industry and consumer organisations, local governments
	2. The promotion of research and development into the area of achieving cleaner and less wasteful products and technologies and the dissemination and use of the results of such research and development.	Yes	2. The measure has been implemented under general industry restructuring since the 1990s; International projects are carried out, e.g. ZeroWIN (on industrial symbioses), CERREC (Central Europe Repair & Re-use Centres and Networks), TRANSWASTE (under which a ReUse Corner was established next to the Separate Municipal Waste Collection Facility in Poznań), FoRWaRD, "Don't waste food, think green" (reducing and preventing the generation of food waste)	2. Carrying out research and demonstration projects in the field of WP technologies and disseminating research outcomes; developing a national information platform focusing on WP containing data, studies and guidelines on WP implementation for local governments, institutions and entrepreneurs; the measures may be supplemented with the establishment of a national network of institutions collaborating for the prevention of food waste generation

Group of measures	Kinds of measures (according to Annex No. 5 to the Act on waste)	Assessment of usefulness Y/N	Activities undertaken as part of the measure	Possible additional activities undertaken as part of the measure
1	2	3	4	5
	3. The development of effective and meaningful indicators of the environmental pressures associated with the generation of waste aimed at contributing to the prevention of waste generation at all levels, from product comparisons at Community level through action by local authorities to national measures.	Yes	3. General monitoring indicators were developed under NWMP 2010, NWMP 2014 and VWMPs; there is a group monitoring the implementation of NWMP 2014	3. The need to develop NWPP monitoring indicators enabling the evaluation of WP effectiveness and comparison within individual industry branches; the need to develop a reliable database dedicated to products, packaging and waste management (BDO) enabling WP implementation monitoring; extending the scope of works of the NWMP monitoring party with the monitoring of NWPP implementation; establishing/determining an implementing institution for WP supporting industry in order to identify the possible scope of cooperation within industrial symbioses
Measures that can affect the design, production and distribution phase.	4. The promotion of eco-design (systematic integration of environmental aspects into product design with the aim to improve the environmental performance of the product throughout its life cycle).	Yes	4. Research projects on eco-design are carried out; Implementation of specific WP solutions in relation to individual waste streams	4. Intense eco-design promotion; development of tools to assess environmental impact throughout the life cycle for the purpose of eco-design in selected industry branches; Improved efficiency in the exploitation of natural deposits, implementation of new extraction technologies; Continuation and intensification of measures aimed at implementing specific solutions with regard to individual priority waste streams
	5. The provision of information on waste prevention techniques with a view to facilitating the implementation of best available techniques by industry.	Yes	5. Training on BAT for environmental protection, the methods of their implementation as well as on the options to acquire funds for green investments	5. Supporting small and medium enterprises with regard to WP implementation

Group of measures	Kinds of measures (according to Annex No. 5 to the Act on waste)	Assessment of usefulness Y/N	Activities undertaken as part of the measure	Possible additional activities undertaken as part of the measure
1	2	3	4	5
	6. The organisation of training for competent authorities as regards the introduction of waste prevention requirements in permits granted pursuant to the Act on waste and the Act – Environmental Protection Law	Yes	6. Organisation of general training on the Act on waste (transposing the provisions of the Waste Framework Directive), including the waste management hierarchy resulting from the Act	6. Organising training for marshal offices, poviats offices and Regional Directorates for Environmental Protection (for restricted areas) in the field of introducing WP requirements to waste generation permits (integrated permits) – good practices
	7. The inclusion of measures to prevent waste production at installations not falling under integrated permits. Where appropriate, such measures could include waste prevention assessments or plans.	Yes	7. Appropriate provisions exist in the Act on waste and the Environmental Protection Law, namely the marshal, starost, Regional Directorate for Environmental Protection (for restricted areas); pursuant to Article 184 and 188 of the Environmental Protection Law – the request and permit for waste generation specify "means of preventing waste generation or reducing the quantity of waste and its negative environmental impact"	
	8. The use of awareness-raising campaigns or the provision of financial, decision making or other support to businesses. Such measures are likely to be particularly effective where they are aimed at, and adapted to, small and medium sized enterprises and work through established business networks.	Yes	8. Information, financial and decision-making support for businesses, including small and medium sized enterprises, is provided under the Innovative Economy Programme, financed by the European Regional Development Fund and the state budget.	8. Including in the NFOŚiGW/WFOŚiGW priorities in the 2014–2020 perspective the option to support SMEs in relation to: replacing old technologies with low-waste, innovative technologies (like in energy efficiency programmes),_creating new forms of activity related to waste prevention, supplementary outsourcing services;

Group of measures	Kinds of measures (according to Annex No. 5 to the Act on waste)	Assessment of usefulness Y/N	Activities undertaken as part of the measure	Possible additional activities undertaken as part of the measure
1	2	3	4	5
	9. The use of voluntary agreements, consumer/producer panels or sectoral negotiations in order for relevant businesses or industrial sectors to set their own waste prevention plans or objectives or improve wasteful products or packaging.	Yes		9. Developing industrial symbioses and business collaboration networks for rational resource management; Waste prevention (e.g. prevention of construction, demolition and industrial waste generation) by obliging materials' suppliers to accept returns of surplus materials within a specified period at the price of purchase; Verification of trade practices: e.g. product tying (as an incentive to increased consumption; overpromotion of big portions – e.g. in cinema multiplexes – favours greater consumption and food wasting), in justified cases charging for disposable products;
	10. The promotion of credible environmental management systems, including EMAS and ISO 14001.	Yes	10. Training presenting the principles of developing environmental management systems (ISO 14001, EMAS); Consultancy for businesses with regard to the implementation of environmental management systems	10. Promoting environmental audits of manufacturing processes aimed at taking stock and balancing the flow of raw materials, products, services and waste and at identifying cause and effect relationships determining waste generation; Implementing environmental management systems and clean technologies programmes that enable reducing waste generation or reducing its toxicity; Implementing environmental management systems (EMAS) in public institutions
Measures that can affect the consumption and use phase	11. Economic instruments such as incentives for clean purchases or the institution of an obligatory payment by consumers for a given article or element of packaging that would otherwise be provided free of charge	Yes	11. Deposits for returnable bottles, fees for disposable bags	

Group of measures	Kinds of measures (according to Annex No. 5 to the Act on waste)	Assessment of usefulness Y/N	Activities undertaken as part of the measure	Possible additional activities undertaken as part of the measure
1	2	3	4	5
	12. The use of awareness-raising campaigns and information provision directed at the general public or a specific set of consumers.	Yes	12. National information portals run by the Ministry of the Environment dedicated to sustainable lifestyle: http://ekoszyk.mos.gov.pl/ http://naszesmieci.mos.gov.pl/ The introduced new legal regulations emphasise the need to carry out awareness-raising campaigns on waste management, including WP. Moreover, the Ministry of Economy acts to popularise sustainable production and consumption patterns, e.g. as part of the Sustainable Consumption Working Party.	12. Supplementing awareness-raising actions with promotion and incentives: Campaigns promoting the meaning of the waste management hierarchy (including: encouraging less consumptive lifestyle) among consumers; Developing and implementing a web platform for WP developed partially on the national level, implemented locally; Initiating and promoting initiatives, competitions for "zero-waste" municipalities and cities in constant periodical multiannual programmes by regional administration; Joint actions at all levels of administration under the European Week for Waste Prevention; Collecting and publishing teaching aids on WP for schools and universities
	13. The promotion of creditable ecolabels.	Yes	13. Since 2005, Poland has issued ecolabel certificates (Eko-znak, Ecolabel), as well as regional and local products' certificates; Alternatively other European environmental labelling programmes exist	13. Campaigns promoting products with a decreased potential to generate waste and a decreased content of harmful substances by means of recognisable labelling schemes

Group of measures	Kinds of measures (according to Annex No. 5 to the Act on waste)	Assessment of usefulness Y/N	Activities undertaken as part of the measure	Possible additional activities undertaken as part of the measure
1	2	3	4	5
	<p>14. Agreements with the industry, e.g. on the use of product panels such as those carried out within the framework of Integrated Product Policies or with retailers on the availability of waste prevention information and products with a lower environmental impact.</p>	<p>Yes</p>	<p>14. The new Act on packaging and packaging waste management contains provisions that enable establishing agreements between the minister competent for the environment and entrepreneurs introducing products in unit reusable packaging on the establishment and maintenance of trade in such packaging. The Act envisages the option to conclude agreements between an economic self-governing organisation that represents entrepreneurs introducing products in multi-material packaging or hazardous agents in packaging (including plant protection products) and the marshal of a voivodeship on the establishment and maintenance of a scheme for the management of such packaging waste.</p>	<p>14. Establishing a network of institutions collaborating for waste prevention.</p>

Group of measures	Kinds of measures (according to Annex No. 5 to the Act on waste)	Assessment of usefulness Y/N	Activities undertaken as part of the measure	Possible additional activities undertaken as part of the measure
1	2	3	4	5
	<p>15. In the context of public and corporate procurement, the integration of environmental and waste prevention criteria into calls for tenders, in line with the second edition of the Handbook entitled: "Green purchases! A handbook on green public procurement" published by the Commission on 25 October 2011 (Polish version of the handbook is available at: http://ec.europa.eu/environment/gpp/pdf/handbook_pl.pdf).</p>	Yes	<p>15. Continuing the dissemination of knowledge on the implementation of green public procurement. Teaching aids have been developed in the form of handbooks on the use of green public procurement, e.g. the handbook of the Ministry of Regional Development for the Beneficiaries of European Funds, the handbook of the Public Procurement Office, etc. Procurements have been carried out that have taken into account other criteria than just the price, e.g. in the tender procedures for the construction of a waste incineration plant, passive houses, choice of lighting method, etc.</p>	<p>15. WP educational campaigns for public institutions resulting in the introduction of specific WP actions and inclusion of environmental protection criteria (also WP-related ones) to public procurement.</p>
	<p>16. The promotion of the reuse and/or repair of appropriate discarded products or of their components, notably through the use of educational, economic, logistic or other measures such as support to or establishment of accredited repair and reuse centres and networks especially in densely populated regions.</p>	Yes	<p>16. Isolated cases of facilities receiving products for reuse exist, and web portals operate that sell, sell for a symbolic price or enable free exchange of used, unwanted products, mainly clothes, but also furniture, household appliances and other items</p>	<p>16. Establishing networks of reuse and repair centres; Supporting the development of market for second-hand products</p>

CHAPTER 4. EXISTING METHODS OF WASTE PREVENTION

Below, we present the waste prevention methods that are currently applied at the national and regional level.

- 1) as regards the use of planning actions, or other economic instruments promoting the efficient use of resources, the "polluter pays" principle is implemented, as well as extended producer responsibility for certain products; WP was included in NWMP 2014 and VWMPs;
- 2) as regards the promotion of research and development into the area of achieving cleaner and less wasteful products and technologies and the dissemination and use of the results of such research and development, measures within the framework of general industry restructuring have been carried out since the 1990s; international projects are carried out, e.g. ZeroWIN (on industrial symbioses), CERREC (Central Europe Repair & Re-use Centres and Networks), TRANSWASTE (under which a ReUse Corner was established next to the Separate Municipal Waste Collection Facility in Poznań), FoRWaRD, "Don't waste food, think green" (reducing and preventing the generation of food waste);
- 3) indicators of the environmental pressures associated with the generation of waste aimed at contributing to the prevention of waste generation have been developed through action taken by local authorities as well as national measures; general monitoring indicators were developed as part of NWMP 2010, NWMP 2014 and VWMPs; a monitoring party monitors the implementation of NWMP 2014;
- 4) promotion of eco-design (systematic integration of environmental aspects into product design with the aim to improve the environmental performance of the product throughout its life cycle through the implementation of research projects in the field of eco-design) is carried out; specific WP measures are implemented in relation to individual waste streams;
- 5) information on waste prevention techniques with a view to facilitating the implementation of best available techniques by industry is provided by means of training on BATs for environmental protection, the methods of their implementation as well as on the options to acquire funds for green investments,
- 6) training is organised for competent authorities as regards the introduction of waste prevention requirements in permits granted pursuant to the Act on waste and the Act – Environmental Protection Law, as well as general training on the Act on waste (transposing the provisions of the Waste Framework Directive), including the waste management hierarchy resulting from the Act;
- 7) measures to prevent waste generation at installations not falling under integrated permits have been introduced; appropriate provisions exist in the Act on waste and the Environmental Protection Law (pursuant to Article 184 and 188 of the Environmental Protection Law – the request and permit for waste generation specify "means of preventing waste generation or reducing the quantity of waste and its negative environmental impact");
- 8) information campaigns are used and financial support is provided for businesses; information, financial and decision-making support for businesses, including small and medium sized enterprises, is provided under the Innovative Economy

- Programme, financed by the European Regional Development Fund and the state budget;
- 9) environmental management systems are promoted, including EMAS, ISO 14001 and Responsible Care – Training familiarises entrepreneurs with the principles of developing environmental management systems (ISO 14001, EMAS, Responsible Care); consulting for businesses is provided in relation to the implementation of environmental management systems;
 - 10) financial instruments such as incentives to clean purchases or the institution of an obligatory payment by consumers for a given article or element of packaging that would otherwise be provided free of charge are used, e.g. a deposit for returnable bottles or a fee for disposable bags;
 - 11) awareness-raising campaigns and information provision addressed to the general public or a specific set of consumers are used; a national information portal on sustainable lifestyle is run by the Ministry of the Environment www.ekoszyk.mos.gov.pl; introduced new legal regulations emphasise the need to carry out awareness-raising campaigns on waste management, including WP;
 - 12) preventing the generation of food waste through the operation of food banks by means of providing charity organisations with good quality food by shops, restaurants, producers, etc. in order to deliver it to people in need; this way production surpluses, batches with short best before date or recalled from trade e.g. due to incomplete labelling can be managed;
 - 13) since 1996, Clean Production Programme has been implemented aimed at preventing pollution generation and minimising the consumption of natural resources, while reducing costs for enterprises.

CHAPTER 5. GOOD WASTE PREVENTION PRACTICES FOR KEY WASTE STREAMS

Below, we present a detailed description of WP measures in relation to key waste streams.

1. Mining waste.

Good practices aimed at reducing the amount of generated mining waste:

- 1) using, where possible, extractive methods instead of open-pit mining, enabling the reduction of output at source;
- 2) reducing, depending on the nature of the mineral, the exploitation of seams considerably contaminated by gangue;
- 3) planning and designing extraction works in a way that ensures optimal use of resources and obtaining a top-quality product;
- 4) reducing, if possible, the exploitation of "thin" seams with old mining technologies resulting in inefficient deposit management; using deposits with higher concentrations;
- 5) matching powered supports exactly to the parameters of the planned longwall panel, namely using correctly adjusted parameters of powered wall supports and shearers minimising the need to rip the surrounding rocks while exploiting seams (walls);
- 6) gluing roof rocks on a broad scale in order to eliminate dropped rocks in walls and gangways, which leads to waste generation;

- 7) increasing the control of wall formation by services specified in the technical documentation of walls;
- 8) on-going inspections of the technical condition of machines and equipment in order to decrease the wear of machines as well as the oils used in them;
- 9) while purchasing new machines, choosing higher quality equipment with longer periods of safe use.

Additionally, raising the awareness and qualifications of employees in the field of waste prevention should serve as a supportive action that would be effective in long term.

In the case of open-pit mining, waste prevention consists in correct exploitation, which should encompass:

- 1) using such methods of exploration, appraisal, extraction, processing and storage of minerals that would prevent the generation of mining waste or allow to keep its amount at the lowest possible level, as well as reduce the negative environmental impact or hazard to human life and health, taking BATs into account;
- 2) maximum use (management) of karst deposits in the form of clay and sanded silt with weathered limestone in the company's technological process as a corrective raw material;
- 3) eliminating the formation of the so-called rock overhangs related to the conducted shooting, by means of carrying out these works in line with the applicable regulations; preserving the parameters of the drilling grid, the inclination angle of boreholes and straight line of face;
- 4) preserving the height of the exploitation wall in the dry floor, so that it does not exceed the maximum range of work of the mining machine in a given mining technique;
- 5) carrying out regular controls of the condition of slopes by geological services in the spring and autumn season;
- 6) controlling the condition of exploitation slopes by the operator of the mining machine before exploitation; additionally such control should also be carried out after heavy downpours;
- 7) carrying out on-going chemical analyses of exploitation walls in terms of the quality parameters of the material to be used in a technological process (drawing samples from bore holes and submitting them to a laboratory, then to the mining inspection);
- 8) leaving veins and interlayers of gangue that are not envisaged in the geological documentation and included in the deposit resources using the adopted exploitation technique and taking into account the existing geological and mining conditions;
- 9) correct shooting with the use of appropriate explosives.

When applying the exemption provided in the Act on tailing in relation to rock or landmasses, it is possible to prevent waste by using it e.g. to construct parts of infrastructure in the open cast. And by using the exemptions provided in the Act on tailing in relation to overlay, it is possible to use them to rehabilitate e.g. open casts.

Moreover, it needs to be noticed that the option to use the provisions allowing for considering a substance or an object a by-product has a positive impact on rational

resource management and on reducing the amount of generated waste. These provisions may be applied to this group, and such by-products can be effectively used e.g. in the construction and road industry.

2. Waste from thermal processes.

- 1) improving energy efficiency of installations;
- 2) applying modern combustion technologies that meet basic conditions, such as:
 - a) full fuel combustion with minimum excess air factor,
 - b) small and easily removable slagging of furnace and the heating surface,
 - c) selecting most favourable heat exchange conditions,
 - d) high reliability,
 - e) low pollution emission,
 - f) the option to quickly regulate load within broad limits,
 - g) using good-quality coal, which ensures good thermal performance of the combustion process,
 - h) combustion in a fluidised bed, which enhances combustion process efficiency, heat exchange and the recovery of waste products,
 - i) applying wet flue gas desulphurisation process, in which a slurry of lime (so-called lime method) or limestone (limestone method) is used as a sorbent, and calcium sulphate is the end product. An additional oxidation stage produces gypsum, which can be used as a commercial product,
 - j) minimising the number of boiler start-ups per year;
- 3) replacing solid mineral fuels with other types of fuel, including the exploration and production of shale gas;
- 4) increasing the share of renewable energy in the energy balance.

Moreover, the amount of generated waste can also be reduced by means of "optimising" the generation of the so-called combustion by-products in order to meet the criteria for by-products and use them in the construction industry;

3. Hazardous waste.

Implementing the principles of eco-design by means of:

- 1) reducing the use of harmful substances at the manufacturing stage;
- 2) implementing clean low-waste manufacturing processes;
- 3) implementing quality and environmental management systems in industrial plants;
- 4) implementing procedures for the registration, evaluation and authorisation of chemicals (REACH);
- 5) introducing ecolabelling for products that meet specific criteria.

Using household chemicals, plant protection products, paints, etc.:

- 1) education in the field of ecolabelling and reduced use of particularly hazardous substances;
- 2) education in the field of conscious purchases of amounts possible to use before the best before date;
- 3) education in the field of storage and separate collection that prevents the contamination of other products.

4. Municipal waste.

Table 2 below presents a review of good communal practices in the field of municipal waste prevention.

Table 2. Examples of quantitative effects of waste prevention (source: 11, 12, 13, 14, 15, 16, 17, 18, and own calculations based on the enumerated sources)

Practice		Method	Possible prevention effect
1		2	3
"NO" sticker on a post box (to avoid junk mail and advertising materials)		educating inhabitants	9.2 kg as separately collected paper and 3.2 kg of paper in mixed waste, in total: 12.4 kg/P per year ⁸
Intense public campaign on WP		educating inhabitants	3% of mixed waste and 2% of paper waste, in total: 5% ⁸
Promotion of individual composting (or possibly subsidies to the purchase of compost boxes) ⁹		educating and motivating inhabitants	10–30 kg/P per year (other sources up to 60 kg/P per year)
Promoting reuse by popularising repair, hire services and the use of second-hand items		educating inhabitants	8.1 kg/P per year
Green public procurement	Reusable materials	educating and motivating offices	0.5 kg/P per year ⁸
	Using double-sided printouts	educating and motivating offices	0.26 kg as separately collected paper and 0.5 kg of mixed waste, in total: 0.76 kg/P per year ⁸
	Reusable towels	educating and motivating offices	0.2 kg/P per year ⁸
Reuse corners. Designating a zone in separate municipal waste collection facilities where people can donate used things for reuse		educating and changing the procedure of classification of delivered items	In Göteborg in Sweden: 8.5 kg/P in 2010 The first such initiative in Poland – in the Waste Management Facility in Poznań, as part of the "TransWaste" project ¹⁰
Promoting reuse and repair		educating inhabitants and enterprises	4 kg/P in 2010 (result of the national network of repair and reuse centres in Flanders)
Operation of food banks; providing charity organisations with good-quality food with approaching best before date by shops, restaurants, producers, etc. in order to deliver it to people in need. Food is provided as wholesome		encouraging collaboration between enterprises and charity organisations	In 2012 food banks of the European Federation of Foodbanks delivered over 65,000 Mg of food to people in need, of which donations with short expiry dates from enterprises constituted 7,500 Mg

⁸ The amounts were estimated for Vienna in 2000, where 280 kg per year of mixed waste and 201 kg per year of sorted waste per person was collected on average.

⁹ This does not fit the definition of "prevention", but is often mentioned as an action that enables managing generated organic waste at source.

¹⁰ www.transwaste.eu

Practice	Method	Possible prevention effect
1	2	3
in the form of donations. With the above in mind, production surpluses can be managed, as well as batches with short best before date or recalled from trade e.g. due to incomplete labelling.		
Food waste. Promoting effective use of food in households	educating inhabitants	Effects of food losses in 2 million British households: value of wasted food: 230 EUR/household in 2008; total quantity of wasted food: ca. 70,000 Mg/year

⁸ The amounts were estimated for Vienna in 2000, where 280 kg per year of mixed waste and 201 kg per year of sorted waste per person was collected on average.

⁹ This does not fit the definition of "prevention", but is often mentioned as an action that enables managing generated organic waste at source.

5. Waste from institutions (offices, banks, schools).

- 1) implementing quality and environmental management systems (EMAS) in offices;
- 2) introducing an objective to decrease paper consumption per person in offices and other institutions;
- 3) eliminating the use of paper for invoices, receipt acknowledgments, order forms, financial reports and documents related to people costs wherever possible and legally acceptable;
- 4) reusing envelopes for in-house communication;
- 5) resigning from the use of the CFC cooling agent or similar gases that deplete the ozone layer;
- 6) green public procurements that take into consideration e.g. the requirements regarding the minimum operational use of purchased products, the possibility of repairing them, the requirement to supply reusable products, etc.

6. Packaging waste.

Implementing the principles of eco-design: Material selection – promoting materials with considerably lower environmental pressure assessed on the basis of a full LCA (including biomaterials that comply with compostability criteria specified in EN 13432 and EN 14995:2006¹¹ and materials containing recyclates).

Implementing the principles of eco-design: Reducing the mass of packaging per mass of product by means of:

- 1) replacing heavy packaging with lighter one to reduce environmental pressure;
- 2) promoting the use of concentrated products, e.g. household chemicals, cosmetics;
- 3) using thinner, but durable materials (e.g. thin foils) – improving materials in this respect;
- 4) using flexible packaging that adjusts to the shape of the packaged item;

¹¹Standard EN 13432: Proof of compostability of plastic products; EN 14995:2006 Plastics. Evaluation of Compostability.

- 5) using only crucial packaging components – avoiding overuse of internal packaging;
- 6) optimal geometry of packaging that enables best possible placement of products on pallets;
- 7) eliminating unnecessary packaging components.

Implementing the principles of eco-design: Packaging functionality:

- 1) using packaging that enables closing – this allows for storing products in the same packaging and reducing the waste from additional packaging;
- 2) varying the size of unit packaging of hazardous substances, which enables the consumer to choose a suitable portion of a product;
- 3) smart labels informing about product freshness will allow for optimal product use;
- 4) developing more concentrated versions of products.

Using reusable packaging (if it is ecologically justified, economic and socially acceptable):

- 1) developing unit reusable packaging, e.g. cleaning agents and cosmetics in reusable packaging;
- 2) promoting the use of refill packs for some food products and household chemicals;
- 3) packaging that can be used for other purposes – e.g. perfume bottles that can be used as vases;
- 4) returnable collective packaging for the catering industry – e.g. returnable 30–50 l aluminium kegs as beer packaging;
- 5) returnable transport packaging, e.g. jumbos, barrels and other – returned to the supplier;
- 6) transport pallets (pallet logistics – EUR-pallets, EUR-pallets' repair) – pallet hire services;
- 7) transport containers – hire;
- 8) enabling shop customers to use transport packaging for own purchases instead of buying disposable bags.

7. Food waste.

Food waste prevention at individual stages of life cycle:

Production:

- 1) WP methods applied in agriculture as the supplier of substrates for food production are detailed in chapter 6;
- 2) using local agricultural products (reducing waste generation in transport);
- 3) implementing modern food processing and production technologies;
- 4) implementing quality management systems in manufacturing plants.

Distribution and trade:

- 1) promoting products with close best before date;
- 2) providing food banks with products with close best before date;
- 3) smart solutions monitoring the sales dynamics that enable adjusting offers to consumers;
- 4) promoting products with visual defects of packaging (e.g. indentations, ripped labels, scratches) that do not influence food quality;

- 5) decreasing the time of product warehousing and storing by means of direct on-line order placement;
- 6) educating in the field of proper food storage to avoid premature rotting;
- 7) varying the size of packaging to enable adjusting the portion to the size of household;
- 8) counteracting product tying, which may contribute to food losses;
- 9) trading in regional products (allows for reducing food transport and decreasing food losses, hence also the amount of generated waste).

Catering industry (including at workplace, schools and hospitals):

- 1) educating in the field of food waste prevention principles;
- 2) introducing varied portion sizes;
- 3) monitoring the amount of generated waste in order to improve the structure of purchases;
- 4) promoting local and seasonal products;
- 5) early menu selection in the case of groups;
- 6) providing people in need with unconsumed good-quality food.

Households:

- 1) implementing unambiguous labelling, informing about the best before date;
- 2) educational campaigns dedicated to food waste prevention.

8. Waste Electrical and Electronic Equipment (WEEE).

Implementing the principles of eco-design: Material selection:

- 1) promoting materials with considerably lower environmental pressure assessed on the basis of a full LCA;
- 2) reducing the amount of harmful substances, where feasible.

Implementing the principles of eco-design: Functionality at the stage of operational use:

- 1) standardisation enabling the use of sub-assemblies from waste equipment;
- 2) designing for durability;
- 3) designing for easy disassembly and repair;
- 4) counteracting practices related to planned product aging.

Influencing consumers:

- 1) educating for conscious choices (e.g. the meaning of labels);
- 2) promoting durable products (e.g. devices with long guarantee period);
- 3) counteracting practices that cause shorter use of operational products (e.g. using the products only until the expiry of the guarantee contract).

Prolonging the life cycle of equipment by means of:

- 1) establishing networks for the exchange of electrical and electronic equipment for reuse;
- 2) establishing networks for WEEE collection in order to prepare it for reuse;
- 3) establishing networks for electrical and electronic equipment repair and preparation for reuse (Annex II contains guidelines for network implementation);
- 4) promoting reuse by means of green public procurement and creating other marketing channels;
- 5) developing appropriate procedures.

CHAPTER 6. GOOD WASTE PREVENTION PRACTICES BROKEN DOWN INTO AREAS

The following areas were identified with respect to the differences in waste generation:

- 1) industrial areas;
- 2) agricultural areas;
- 3) tourist areas;
- 4) urban areas;
- 5) rural areas.

For each of these areas a group of waste prevention methods can be suggested that seem to be particularly effective. These are presented below.

1. Industrial areas.

- 1) developing and promoting clean, low-emission technologies, including carbon technologies;
- 2) implementing cleaner production principles;
- 3) promoting energy efficiency;
- 4) prolonging product life cycle;
- 5) initiating the cooperation between different industry branches in order to create industrial symbioses based on the exchange of raw materials, infrastructure, services, etc.;
- 6) promoting environmental management systems, such as EMAS, ISO 14001, Responsible Care;
- 7) introducing ecolabels;
- 8) establishing an institution for the support of industry, in particular small and medium sized enterprises, in the field of waste prevention and modern technologies based on rational resource management;
- 9) consultancy with regard to green public procurement;
- 10) promoting eco-design and applying Life Cycle Assessments of goods and services;
- 11) promoting the reuse of devices and equipment.

Moreover, consultancy in the field of procedures related to obtaining a permit for manufacturing by-products may influence the quantity of generated waste.

2. Agricultural areas.

WP strategies for plant growing farms

Education and information in the field of:

- 1) effective use of plant protection products, natural pest control methods (e.g. using other organisms for pest control, using stimuli, such as attractants, repellents and antifeedants) and plant disease control methods (reducing the amount of used chemicals);
- 2) alternative methods of pest and plant disease control;
- 3) rational use of fertilisers (decreasing the amount of used fertilisers) through periodic examination of nutritious substances' content in soil, using fertilisers only at specific times of year (spring, summer) depending on the sowing schedule, effective application to soil, using own manure;
- 4) rational trade in and management of plant protection products and fertilisers in order to reduce waste generation;

- 5) reduced wasting of agricultural foil through its reuse and the promotion of the use of foils that can be composted directly on the field if their use is beneficial throughout their life cycle;
- 6) modern warehousing and packaging methods in order to eliminate product losses (preserve freshness).

Other instruments:

- 1) promoting rational agricultural WP practices on a national web portal;
- 2) separate collection of waste products supporting plant protection and other hazardous waste (decreasing the amount of hazardous waste in relation to other waste);
- 3) promoting returnable packaging, in particular collective and transport packaging;
- 4) promoting collaboration between farms consisting in shared use of tools, machinery and infrastructure (optimising life cycles in particular with regard to rarely used equipment, effective use of resources);
- 5) introducing agricultural products and production quality management systems, monitoring the size of losses;
- 6) counteracting food wasting through the use of worse-quality products as animal fodder;
- 7) effective management of residues from agriculture and forestry, by-products from agri-food processing and forest biomass processing in order to use it for power generation or agricultural purposes in a way that is safe for human health and the environment.

WP strategies for animal breeding farms

Education in the field of:

- 1) optimising the production of animal fodder (e.g. the times of harvest to obtain maximum nutritional values, means of conservation ensuring minimum losses of nutritive substances and counteracting losses; protection against rodents and birds);
- 2) optimising fodder administration depending on nutritional needs in order to minimise losses;
- 3) counteracting animal diseases and rational use of antibiotics and other livestock health protection products in order to decrease the overuse of drugs and consequent contamination of agricultural residues, especially those used as fertilisers;
- 4) purchasing and storing medicine in order to decrease losses, e.g. due to its expiry.

Other instruments:

General WP strategies for agriculture

- 1) promoting services provided for farmers: performing ploughing, sowing, harvesting, ripping, spraying, which favours rational use of agricultural machinery;
- 2) prolonging the life cycle of agricultural machinery, e.g. by means of promoting its repair, as well as sale and distribution of spare parts on second-hand market.

3. Tourist areas.

- 1) promoting the use of reusable products (such as dishes, cups, towels), if it is feasible and in line with hygiene principles and does not cause greater pressure throughout their life cycle;
- 2) promoting the use of items with a minimum negative impact on the environment throughout their life cycle;
- 3) educating institutions organising public events in the field of green public procurement that includes WP issues;
- 4) educating in the field of conscious purchases of food, means of subsistence (e.g. household chemicals) and materials needed by the owners of hotels, boarding houses, restaurants and others providing tourism-related services;
- 5) reducing the use of unit packaging for small portions of products (e.g. for breakfast products, such as jams, cheese, butter, yoghurt); using alternative collective vessels if it is feasible and ensures proper hygiene;
- 6) packaging waste prevention through the use of dispensers, which makes it possible to fill cleaning agents from collective packaging;
- 7) food waste prevention through varying the size of portions, using regional products;
- 8) promoting tourist equipment hire services and promoting the repair of tourist equipment;
- 9) implementing quality management systems in hotels, tourist centres, restaurants, etc.

4. Urban areas.

- 1) promoting less consumptive lifestyle among the inhabitants;
- 2) developing a local website dedicated to waste prevention options available to inhabitants;
- 3) promoting the use of reusable products, such as packaging, bags, dishes, if it is feasible and in line with hygiene principles and does not cause greater pressure throughout their life cycle;
- 4) promoting the hire of rarely used tools and devices;
- 5) promoting products with ecolabels;
- 6) creating reuse corners next to separate municipal waste collection facilities in order to enable inhabitants to deliver objects for reuse;
- 7) establishing networks for the repair and reuse of electrical and electronic equipment, furniture, toys, etc.;
- 8) educational campaigns for public institutions focusing on waste prevention by means of e.g. double-sided printing, using equipment with longer operational use, leasing/hire of equipment instead of buying it, green public procurement;
- 9) organising exchanges of second-hand equipment, clothes, furniture, etc.;
- 10) developing web portals for the exchange or sale of products for reuse;
- 11) reducing the generation of food waste by promoting the operation of food banks and other charity organisations;
- 12) supporting collaboration between various institutions in terms of reuse.

5. Rural areas.

Similar actions as in the cities, yet due to the smaller amount of generated packaging waste, clothes and food, it is suggested to focus on:

- 1) promoting reuse through the establishment of networks of repair and reuse centres, organising exchange and sale of second-hand equipment, running relevant websites;
- 2) preventing hazardous waste generation due to a higher use of chemical products, such as plant protection products, paints, lacquers and preparations used in agricultural farms, e.g. through education and promotion of products with ecolabels;
- 3) depending on the type of municipality, promoting WP actions in agriculture or tourism.

CHAPTER 7. STRATEGIC OBJECTIVES

The main strategic objective for Poland until 2020 is to develop a sustainable economy based on efficient use of resources, respect for the environment and achieving higher competitiveness owing to the use of technologies with a lower demand for raw materials and energy and enabling the use of recyclable raw materials and renewable energy sources.

Additional, social objective should be to develop a conscious and responsible society for sustainable development through ecological education based on the popularisation of non-material actions, e.g. promoting investments in competence development, science, tourism and culture popularisation instead of promoting material goods, reducing unnecessary consumption, teaching conscious decision-making and supporting good practices and civil society initiatives.

Waste prevention should be viewed as an important issue in the implementation of the strategic objective, while preserving the freedom of economic activity and choices under applicable legal regulations. Waste prevention should result from actions dedicated to a complex efficiency improvement with due consideration to ecological, economic and social effects.

Below, we present the set qualitative and quantitative targets and objectives to be achieved by 2022, which are a supplement to the present NWMP 2014 and Voivodeship Waste Management Plans in connection with the development of the present Programme.

These objectives relate to waste prevention, and the actions aimed at achieving them are undertaken at the level of products, materials and substances.

Quantitative objectives in relation to the total quantity of generated waste:

- 1) preserving economic growth with the total quantity of generated waste at a constant level,

indicator: quantity of waste generated in Poland according to GUS data;

- 2) reduced burden to GDP attributable to waste,

indicator: quantity of waste generated in Poland in relation to GDP [kg/EUR GDP].

Quantitative objectives in relation to key waste streams:

Mining waste generated at the stage of exploration, production, physical and chemical processing of ores and other minerals

objective: reduced quantity of waste in relation to the production volume

indicator: ratio of waste generated in the mining industry to the production volume (black coal, brown coal, copper and rock raw materials in total) [Mg/Mg], *data source:* GUS and Polish Geological Institute – National Research Institute

Waste from thermal processes generated during the production of electric power and heat by means of combusting solid fuels in power plants and combined heat and power plants, so-called combustion waste and products of flue gases desulphurisation.

objective: reduced quantity of waste in relation to the amount of generated energy

indicator: ratio of waste generated in the power industry to the amount of produced energy [Mg/GWh], *data source:* GUS and Energy Regulatory Office

Hazardous waste (characterised by a high content of substances harmful to human and the environment; it is generated at the stage of production and use of chemicals and other products containing hazardous substances)

objective: reduced environmental pressure through an increase in the amount of goods produced in Poland covered by ecolabelling

indicator: number of issued ecolabelling certificates in Poland

(ecolabels are most commonly applied to materials that can possibly contain hazardous substances, e.g. paints, cleaning agents, lacquers, electrical and electronic equipment). In Poland, it is possible to obtain one of two ecolabels: „Ecolabel” or „Eko-znak”¹². EU Ecolabel on products indicates that they are less harmful to the environment throughout their life cycle than similar products because they meet published environmental criteria agreed by EU Member States after consultations with stakeholders (including the representatives of the industry, consumers, environmental organisations, trade and public authorities). Life Cycle Assessment methodology is applied.

data source: data of the certifying institutions (Polskie Centrum Badań i Certyfikacji S.A)

Municipal waste

objective: reduced amount of mixed municipal waste

indicator: amount of mixed municipal waste per person [kg/P per year]: *data source:* Central Statistical Office

Packaging waste

objective: reduced quantity of packaging waste in relation to the volume of products

indicator: quantity of packaging waste in relation to GDP in constant prices from 2000 [thousand Mg/billion GDP per year]; *data source:* report of the Minister of the Environment – Report of the Republic of Poland on the amount of packaging waste generated and recovered or incinerated with heat recovery in combustion plants, GUS data for GDP.

¹² The current technical criteria developed and adopted by the European Ecolabelling Committee cover thirty categories of goods, among others: paints, soil improvers, tissue paper, copying paper, laundry detergents, light sources, textile products, bed mattresses, personal computers, notebook computers, all-purpose cleaners and sanitary cleaners, hand dishwashing detergents, detergents for dishwashers, televisions, hard coverings, tourist accommodation services. Pursuant to the decision of the Committee for Eko-znak and Ecolabel, of 20 June 2005, the current system of granting ecolabels in Poland is based on the same criteria for goods and services that are provided in Commission decisions that establish ecological criteria for the EU Ecolabel, which is to promote the products with limited environmental impact throughout their life cycle. Owing to this decision, applicants may obtain both labels at the same time on favourable financial terms.

indicators for comparisons in individual industries:

- 1) share of reusable packaging in packaging placed on the market [%],
- 2) mass of the packaging in relation to the mass of the product placed on the market [kg/kg].

Food waste

objective: less food wasted

indicator: quantity of food delivered to Food Banks (the indicator should be regarded as auxiliary since it does not reflect the complexity of the problem of food waste generation); *data source:* Food Banks

Waste Electrical and Electronic Equipment (WEEE) – due to the significant environmental impact during the production of electrical and electronic equipment, growing consumption and constantly shortening operational use of these devices, as well as possibly negative environmental impact at the stage of waste management.

objective: increased reuse, e.g. by means of networks for the exchange and repair of electrical and electronic equipment, as well as collecting and preparing WEEE for reuse

indicator: share of the mass of totally reused waste equipment in the total mass of waste equipment collected in a given year [%]; *data source:* Reports of the Chief Inspector for Environmental Protection on the operation of the waste electrical and electronic equipment management system

Qualitative objectives

In relation to products and production: reduced environmental impact at the stage of extraction of raw materials and consumption logistics, with particular attention to limiting the use of harmful substances.

CHAPTER 8. ACTIONS AIMED AT ACHIEVING STRATEGIC OBJECTIVES

This chapter details recommended priority actions related to the achievement of strategic objectives. Due to their nature, they are divided into formal and legal, organisational and financial, and technical and technological actions. They cover actions related to awareness-raising, promotion and necessary regulations.

Area 1: Horizontal actions:

Action 1. Developing and implementing a database dedicated to products, packaging and waste management (BDO) that will enable WP monitoring

A. Action description:

Collecting reliable data on the amount of generated waste – at national and regional level – forms the grounds for the monitoring of progress in WP implementation with regard to the set targets. Pursuant to the Act of 14 December 2012 on waste, a database dedicated to products, packaging and waste management (BDO) will be established. Article 79 paragraph 1 of the Act on waste specifies the scope of data that will be collected in BDO, encompassing e.g. data on the packaging and packaged products introduced on the territory of Poland broken down into individual types of packaging and resulting waste; introduced waste electrical and electronic equipment, batteries and accumulators and resulting waste; achieved levels of recovery and recycling of waste

from packaging and products, the amount of collected municipal waste broken down into sorted and mixed waste with separated biodegradable municipal waste. Pursuant to the Act on waste, the minister competent for the environment will specify by means of an ordinance the detailed scope of the information that should be provided to BDO. BDO is desirable for the monitoring of the effects of the suggested WP actions. At the stage of detailing the scope of data collected in BDO, the scope of data needed for WP monitoring should be taken into account.

BDO development and implementation achieves the objective in the form of monitoring of the effects of suggested WP actions and future planning.

B. Nature:

formal and legal, organisational and financial

C. Level:

central, regional

D. Implementing authority:

Minister of the Environment

E. Recipients:

Minister of the Environment, GIOŚ, GDOŚ, NFOŚiGW, regional and local administration and others pursuant to the Act of 14 December 2012 on waste

F. Tools:

legal, financial and technical

G. Notes:

Required collaboration and information exchange between the Minister of the Environment and local governments.

Action 2. National information platform dedicated to WP containing data, studies and guidelines on WP implementation for local governments, institutions and entrepreneurs

A. Action description:

National information platform dedicated to WP containing data, studies and guidelines on WP implementation for local governments, institutions and entrepreneurs. Developing guidelines and examples of good practices for individual groups performing WP-related duties: 1) local governments; 2) public institutions; 3) entrepreneurs, including small and medium sized enterprises. Separate guidelines should encompass suggestions of practical actions that can be carried out in: 1) a municipality, 2) a public institution, 3) an enterprise, 4) an agricultural holding, with examples and quantitative evaluation of expected outcomes, if possible. The action should be implemented at a national level in order to develop a consistent national strategy.

Additionally, it is suggested to develop a central web platform containing data, studies, publications and examples of good WP practices. The platform should include methodological guidelines for lower-level public administration, local governments, institutions, the economic sector and the inhabitants, specifying a consistent WP strategy. The platform should be administered by the Minister of the Environment and enable interactive communication. The platform should contain the outcomes of conducted research and demonstration projects referred to in action 4.

Action 2 achieves objectives aimed at: reducing the quantity of mining waste in relation to the production volume, reducing the quantity of waste in relation to the amount of produced energy, reducing environmental pressure of waste through increasing the amount of products manufactured in Poland with ecolabels, decreasing the amount of collected mixed municipal waste, reducing the quantity of packaging waste in relation to the quantity of products and reducing the amount of wasted food.

B. Nature:

organisational and financial, technical and technological

C. Level:

central

D. Implementing authority:

Minister of the Environment

E. Recipients:

bodies of local administration, local governments, institutions, enterprises, inhabitants

F. Tools:

handbooks of recommended practices, information platform, studies, methodological guidelines, examples of good practices.

Action 3. Developing collaboration for WP between stakeholders: Ministry of the Environment, Ministry of Economy, industry and consumer organisations, local and regional administration

A. Action description:

The development of efficient waste prevention strategies requires collaboration and exchange of experiences between industries and sectors. The development of methods, their verification and improvement should take the form of a dialogue and take the interests of individual groups into account. A series of workshops should be launched aimed at presenting various WP strategies and concepts in individual sectors (e.g. as part of the "Good waste management practices" forum initiated by the Minister of the Environment and the National Fund for Environmental Protection and Water Management, aimed at creating a platform for the exchange of ideas, views and experiences of key actors on the waste management market). The outcomes of analyses and strategic documents, as well as their interpretation should take into account the suggestions of the representatives of the industry and be subject to industry and social consultations. The Ministry of the Environment should appoint a team responsible for WP implementation, which should involve members of the Working Party for the monitoring of the National Waste Management Plan implementation.

Action 3 should achieve objectives aimed at: reducing the quantity of mining waste in relation to the production volume, reducing the quantity of waste in relation to the amount of produced energy, decreasing the amount of collected mixed municipal waste, reducing the quantity of packaging waste in relation to the quantity of products and reducing the amount of wasted food.

B. Nature:

organisational and financial

C. Level:

central

D. Implementing authority:

Minister of the Environment/Minister of Economy

E. Recipients:

local governments, institutions, inhabitants

F. Tools:

thematic workshops and discussions

Action 4. Carrying out research and demonstration projects in the field of WP technologies and disseminating research outcomes

A. Action description:

Carrying out research projects aimed at developing new technologies dedicated to effective use of resources and reducing waste generation and associated environmental pressure. Thematic scope of projects:

- material innovations: researching the option to implement new materials for the production of packaging and other products, e.g. materials from renewable and biodegradable raw materials compliant with EN 13432, as well as materials based on recyclable raw materials, replacing materials with harmful environmental impact;
- process innovations: improving manufacturing technologies (e.g. reducing the consumption of exploitation materials and energy);
- product innovations: developing new products based on eco-design principles, product miniaturisation, multi-functional products;
- priority thematic scope of projects:
 - 1) project counteracting food wasting: Food constitutes a significant part of municipal waste, yet there are no credible data on the WP potential in this respect. It is suggested to prepare methodology and substantive scope of a national campaign against food wasting based on the past experiences of food collections organised by the Federation of Polish Food Banks. Experiences of the EU and the "FUSIONS" project can also be used to develop national action framework.
 - 2) reuse, developing networks for the repair of electrical and electronic equipment, furniture, toys, bicycles, etc.
 - 3) research and development focusing on modern construction materials with the use of recyclable materials,
 - 4) modern manufacturing technologies that eliminate waste generation;
- pilot/demonstration projects to promote developed technologies, trial implementations to evaluate economic effects, the possibility of achieving desired effects, social consequences and possible weaknesses. Pilot projects should be implemented in cooperation between research institutions and entrepreneurs or local governments;
- developing product comparison methodology, developing product rankings in terms of WP for the purpose of promotional actions;
- developing methodology, guidelines and criteria of labelling for local products, durable and low-waste products for the purpose of a consistent educational campaign;
- developing WP procedures;
- developing IT tools to support WP;

- market analysis for WP and other projects important for WP.

The action that consists in the implementation of the above research projects will contribute to achieving the following objectives: reducing the quantity of mining waste in relation to the production volume and the amount of produced energy, reducing the amount of wasted food and increasing the reuse of electrical and electronic equipment, as well as collecting and preparing WEEE for reuse.

B. Nature:

technical and technological

C. Level:

central and regional

D. Implementing authority:

Minister of Science and Higher Education / National Centre for Research and Development, DG Research and Innovation, implementation: research institutes, universities, enterprises

E. Recipients:

inhabitants, enterprises, local and regional administration

F. Tools:

research and demonstrative (implementation) projects

Action 5. Including in the NFOŚiGW/WFOŚiGW priorities in the 2014–2020 perspective the option to support SMEs in relation to: replacing old technologies with low-waste, innovative technologies (like in energy efficiency programmes), creating new forms of activity related to waste prevention

A. Action description:

Using the experience and outcomes of the programmes and implementation of objectives related to the promotion of energy efficiency actions for SMEs and transferring good practices to analogous forms of waste prevention programmes in a given domain.

Action 5 is aimed at reducing the quantity of generated mining waste in relation to the volume of production and generated energy.

B. Nature:

technical and technological, organisational and financial

C. Level:

central and regional

D. Implementing authority:

NFOŚiGW/WFOŚiGW,

E. Recipients:

enterprises

F. Tools:

awareness-raising campaigns, economic campaigns.

Area 2. Production and products:

Section 2.1. Waste prevention in product design, Eco-design

Action 6. Eco-design promotion

A. Action description:

The promotion of eco-design – systematic integration of environmental aspects into product design with the aim to improve the environmental performance of the product throughout its life cycle.

The main objectives of this action include: reducing environmental pressure associated with waste through an increase in the number of products manufactured in Poland with ecolabels and reducing the quantity of packaging waste in relation to the quantity of products.

B. Nature:

formal and legal

C. Level:

regional

D. Implementing authority:

Minister of the Environment/Minister of Economy

E. Recipients:

enterprises

F. Tools:

informative.

Section 2.2. Waste prevention at the stage of production

Action 7. Promoting environmental audits of manufacturing processes aimed at taking stock and balancing the flow of raw materials, products, services and waste and at identifying cause and effect relationships determining waste generation

A. Action description:

Developing guidelines for sectoral environmental audits aimed at optimising production processes in terms of raw materials and waste.

The action consisting in the promotion of environmental audits of manufacturing processes and the identification of cause and effect relationships determining waste generation will contribute to achieving the objectives aimed at: reducing the quantity of generated mining waste in relation to the production volume and produced energy and reducing the amount of wasted food.

The action can be implemented together with the central level, e.g. within the framework of the Working Party for Sustainable Consumption, which operates under the Ministry of Economy.

B. Nature:

organisational and financial

C. Level:

central

D. Implementing authority:

Minister of the Environment/Minister of Economy

E. Recipients:

enterprises

F. Tools:

environmental audits, announcements and information, guidelines

Area 3: Consumption, use and actions at the local level:

Section 3.1 Supporting consumer decisions taking into consideration WP principles

Action 8. Campaigns promoting the meaning of the waste management hierarchy (including less consumptive lifestyle)

A. Action description:

A campaign promoting the meaning of the waste management hierarchy (including less consumptive lifestyle). Actions promoting behaviours that support conscious consumption of goods and services, reduce overconsumption and promote investments in education, culture, entertainment and sport that are not related to the purchase of material goods. Promoting a less consumptive lifestyle through the implementation of the concept of "buying a service instead of a product", promoting non-material presents for children and adults, investing in education and culture, including impact through economic instruments: fees for disposable bags, disposable dishes, etc. Promotion should take the form of awareness-raising campaigns addressed to children and youth. Local governments should support the development of interests of children and teenagers – cultural centres, hobby groups, creating educational offers and co-financing educational courses for various age groups, organising sports competitions, cultural and entertainment events, concerts, shows for broad audience, tourism, etc.

Additionally, non-material forms of presents should be promoted, such as tickets to the cinema or to events, instead of material presents, which requires creating a database with such offers.

Action 8 should achieve objectives aimed at: decreasing the amount of collected mixed municipal waste, reducing the quantity of packaging waste in relation to the quantity of products and reducing the amount of wasted food.

B. Nature:

organisational and financial

C. Level:

regional and local

D. Implementing authority:

marshal offices, also through civil society organisations, local administration bodies (municipalities), schools

E. Recipients:

inhabitants and local communities

F. Tools:

awareness-raising campaigns, promoting and co-financing mass events, co-financing education

Action 9. Initiating and promoting initiatives, competitions for "low-waste" municipalities and cities in constant periodical multiannual programmes by regional governments

A. Action description:

It is crucial to document the capacities to implement and to evaluate the developed WP indicators, both in the case of households and the economic sector, and to carry out a comparative analysis in order to identify the best practices in a given field.

The action consisting in initiating and promoting initiatives, competitions for "low-waste" municipalities and cities in constant periodical multiannual programmes by regional governments should reduce the amount of mixed municipal waste and reduce the quantity of wasted food.

B. Nature:

technical and organisational

C. Level:

central and regional

D. Implementing authority:

Minister of the Environment/ marshal offices

E. Recipients:

municipalities

F. Tools:

awareness-raising campaigns.

Action 10. Local web platform for WP developed partially at the national level, implemented in local context

A. Action description:

Developing and implementing a web portal available to general public at a local level (at best linked to the official city, municipality or regional website) dedicated to WP and encompassing the information developed as part of the National Programme (it may take the form of redirection to the national WP platform – e.g. <http://ekoszyk.mos.gov.pl> or <http://naszesmieci.mos.gov.pl>) and presenting products and actions that promote a less consumptive lifestyle. The portal should be addressed to the local community and include information, calendars of events, promote local products, products with limited environmental impact, durable products, information about repair and redistribution (reuse) networks, guidelines for conscious consumer choices, etc.

The portal should be administered by the municipality (e.g. the promotion department) and be regularly updated.

The action should reduce the amount of collected mixed municipal waste.

B. Nature:

organisational and financial

C. Level:

regional and local

D. Implementing authority:

local government (municipality)

E. Recipients:

inhabitants and local communities

F. Tools:

web portal (consistent concept and current information update required)

Action 11. Establishing a network of institutions collaborating for waste prevention, including food waste

A. Action description:

Developing a concept and implementing a network of institutions collaborating for rational food use with due consideration to trade, catering industry, people in need and their organisations. Food represents a substantial part of municipal waste. Various countries, including Poland, carry out research projects aimed at developing food waste prevention strategies¹³. The outcomes of projects should be translated into systemic actions at the national and local level through the promotion of collaboration and the participation of a greater number of stakeholders – including retailers, caterers, consumers and the Federation of Polish Food Banks.

A systemic approach is suggested that encompasses actions reducing food wasting through e.g. life cycle assessment, i.a. promoting the use of food based on regional products in catering establishments (promoting labelled products, promoting regional food and food made of organic products), promoting products with approaching best before date, introducing the requirement to vary the size of meals in catering establishments and delivering left food to Food Banks in order to distribute it to people in need, etc. It is necessary to improve and popularise the existing procedures in this regard, with due consideration to ethics and hygiene principles and in compliance with the applicable legal regulations. This concerns food products that can be donated to those in need by stakeholders and the creation of technical conditions for such actions.

Action 11 should contribute above all to reducing the amount of collected municipal waste and reducing food wasting.

B. Nature:

formal and legal, organisational and financial

C. Level:

national – strategy development and local – implementation

D. Implementing authority:

Federation of Polish Food Banks or other organisation in cooperation with retail organisations, catering organisations, consumer organisations, social aid organisations; collaboration with partner organisations from other EU Member States

E. Recipients:

inhabitants and local communities

¹³ FoRWaRD project and an awareness-raising campaign "Don't waste food – Think green"

F. Tools:

implementing a number of organisational instruments, e.g. expanding regional networks of donor institutions and intermediary institutions distributing food to people in need, acquiring co-financing for the expansion of logistics of food redistribution to people in need, promotional and awareness-raising campaigns, supporting scientific research, standardisation, IT and logistic measures, etc.

Section 3.2 General education, participation of the society and public institutions in WP

Action 12. Collecting and popularising teaching aids focusing on WP for schools and universities

A. Action description:

Teaching content related to waste generation issues and proper waste handling has been included in the new core curriculum in general education at each level, adjusted to the age and educational needs of students. Teachers can freely use such didactic and educational methods as they see fit. It is crucial to provide teachers with the broadest possible catalogue of top-quality teaching resources to deliver the core curriculum. Therefore, it is suggested to collect teaching aids related to ecology on educational portals addressed to teachers and to make them available free of charge. This will enable teachers to make lessons more appealing, and in consequence, to make pupils more interested in ecology, and will contribute to the transfer of good practices as habits beyond the school environment.

Action 12 should contribute above all to reducing the amount of collected municipal waste and reducing food wasting.

B. Nature:

formal and legal

C. Level:

schools and universities

D. Implementing authority:

Minister of National Education, Centre for Education Development

E. Recipients:

children, teenagers, teachers

F. Tools:

Materials collected and made available by the Centre for Education Development

Action 13. Implementing environmental management systems compliant with ISO 14001, Responsible Care and EMAS in enterprises and public institutions

A. Action description:

Implementing an environmental management system compliant with ISO 14001, Responsible Care and EMAS entails an integrated approach to environmental protection in public institutions, as well as in enterprises. The acquisition of a certificate confirming the implementation of the environmental management system proves that the organisation has carried out environmental pressure analysis, including pressure

associated with generated waste, and that it has established targets (which can include generated waste indicators), for which verifiable indicators were determined, and that the progress will be monitored by an external auditor. In general, the implementation of ISO 14001 and EMAS requires ordering the knowledge of generated pressure and specifying improvement indicators that will be monitored. Consequently, in an organisation/institution with an environmental management system it is much easier to monitor the effects of WP actions. Moreover, it is possible to compare the obtained results with other organisations/institutions (benchmarking).

The major objectives to be achieved by this action include: reducing the quantity of mining waste in relation to the production volume, reducing the quantity of waste in relation to the amount of produced energy, decreasing the amount of collected mixed municipal waste, reducing the quantity of packaging waste in relation to the quantity of products

B. Nature:

technical and technological, formal and legal, organisational and financial

C. Level:

local, regional

D. Implementing authority:

public institutions/organisations/enterprises

E. Recipients:

public institutions, enterprises

F. Tools:

environmental management system

Section 3.3 Local initiatives and good practices

Action 14. Promoting and supporting the development of networks of repair and reuse centres

A. Action description:

The action should support the establishment of networks of product repair for reuse or the acquisition and preparation of waste for reuse.

Pursuant to the Act of 14 December 2012 on waste (Article 19 paragraph 1) public administration bodies, according to their competence, take actions to support the reuse and preparation for reuse of waste, in particular:

- 1) encouraging the establishment and supporting the networks of repair and reuse centres;
- 2) creating economic incentives. The action is also aimed at strengthening markets for second-hand products. This can be done through web portals cooperating with repair networks, which provide lists and characteristics of available items. They can be used for mail orders (similar to second-hand markets – *allegro, tablica*) or just to present information about available items and where to buy them or to place announcements about needed products.

It is also desired to develop quality criteria for used products and guarantee-granting procedures for repair networks, which will help them to find market for their goods and services. Such criteria should be developed by producer associations and be implemented at the central level.

Action 14 should contribute to decreasing the amount of collected mixed municipal waste and increasing the reuse of electrical and electronic equipment, as well as collecting and preparing WEEE for reuse.

Investment needs in this respect should be planned by individual voivodeships

B. Nature:

organisational and financial

C. Level:

regional and local

D. Implementing authority:

municipalities, marshal offices in collaboration with entrepreneurs, consultants

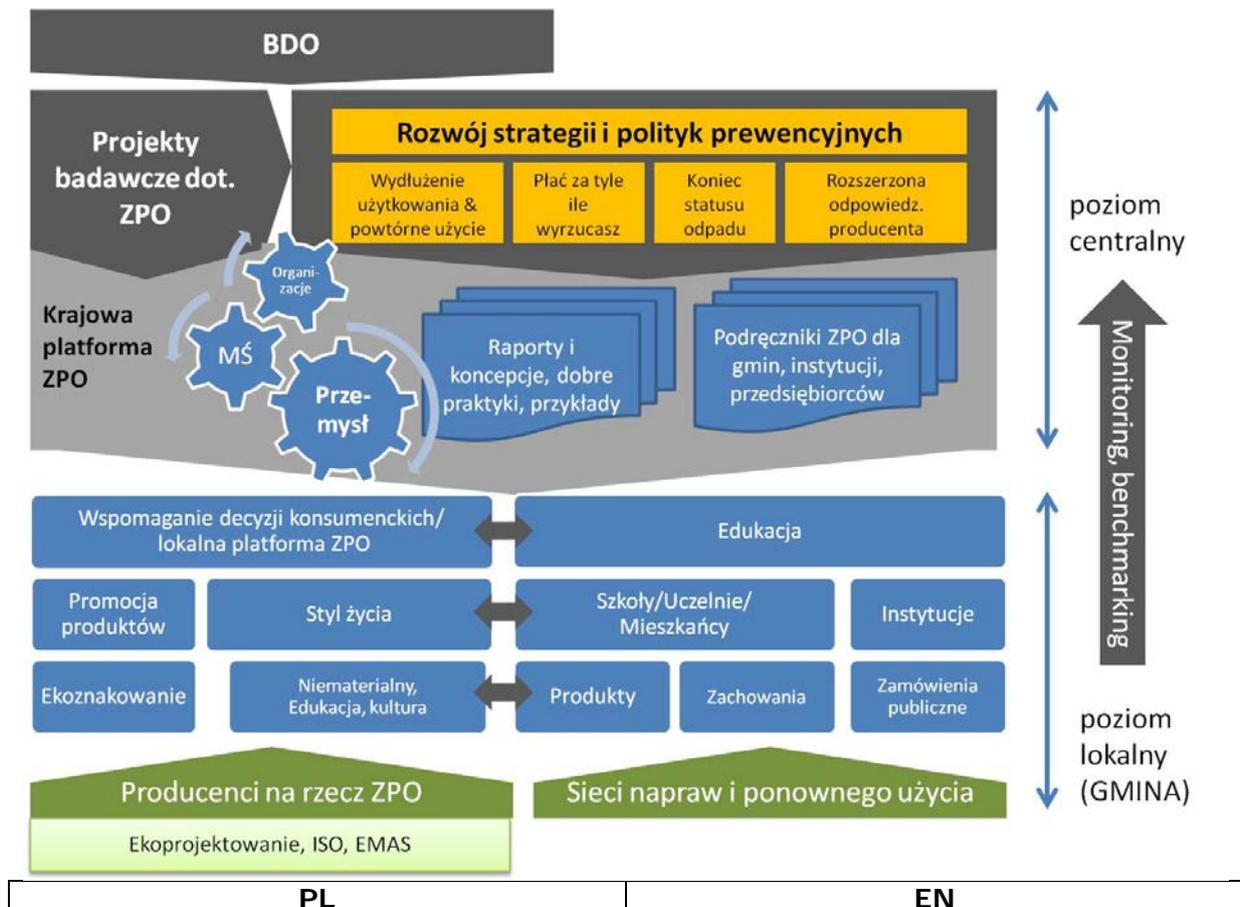
E. Recipients:

entrepreneurs, inhabitants

F. Tools:

financial and organisational support

Figure 11 presents the above measures in correlation.



BDO	BDO
Projekty badawcze dot. ZPO	Research projects on WP
Rozwój strategii i polityk prewencyjnych	Development of preventive policies and strategies
Wydłużenie użytkowania & powtórne użycie	Prolonging use & reuse
Płać za tyle, ile wyrzucasz	Pay exactly for the amount you discard
Koniec status odpadu	End of waste status
Rozszerzona odpowiedzialność Producenta	Extended Producer Responsibility
Krajowa platforma ZPO	National WP platform
Organizacje	Organisations
MŚ	Ministry of the Environment
Przemysł	Industry
Raporty i koncepcje, dobre praktyki, przykłady	Reports and concepts, good practices, examples
Podręczniki ZPO dla gmin, instytucji, przedsiębiorców	WP handbooks for municipalities, institutions, entrepreneurs
Wspomaganie decyzji konsumenckich / lokalna platforma ZPO	Support for consumer decisions / local WP platform
Edukacja	Education
Promocja produktów	Product promotion
Styl życia	Lifestyle
Szkoły / Uczelnie / Mieszkańcy	Schools / Universities / People
Instytucje	Institutions
Ekoznakowanie	Ecolabelling
Niematerialny, Edukacja, kultura	Non-material, Education, Culture
Produkty	Products
Zachowania	Behaviour
Zamówienia publiczne	Public procurement
Producenci na rzecz ZPO	Manufacturers for WP
Sieci napraw i ponownego użycia	Networks of repair and reuse centres
Ekoprojektowanie, ISO, EMAS	Eco-design, ISO, EMAS
Poziom centralny	Central level
Monitoring, benchmarking	Monitoring, benchmarking
Poziom lokalny (GMINA)	Local level (MUNICIPALITY)

Figure 11. Structure of relationships between WP measures (source: own work)

8.1 Material and financial schedule

Below, we present the material and financial schedule of recommended actions with the identification of implementing institutions, time frames, estimated outlays and potential funding sources, as well as monitoring indicators.

Estimated funds presented in the schedule envisaged for individual measures should not exceed the limits of a given administering entity.

Table 3 presents the material and financial schedule of NWPP actions.

Table 3. Material and financial schedule of recommended NWPP actions (source: own work)

Action no.	Action title	Implementing authority	Time frame	Estimated outlay [PLN million] ¹⁾	Possible source of financing ¹⁴	Monitoring indicators
1	2	3	4	5	6	7
1	Developing and implementing a database dedicated to products, packaging and waste management (BDO) that will enable WP monitoring	Minister of the Environment	2014–2016	12.0 (of which ca. 7 million for system development)	NFOŚiGW	<i>Not envisaged, mandatory action</i>
2	National information platform dedicated to WP containing data, studies and guidelines on WP implementation for local governments, institutions and entrepreneurs	Minister of the Environment	implementation from 2015 and maintenance	1.0	NFOŚiGW	Developed and regularly updated information platform dedicated to WP with a forum of collaborating institutions
3	Developing collaboration for WP between stakeholders: Ministry of the Environment, industry and consumer organisations, local and regional administration	Minister of the Environment/Minister of Economy	implementation from 2015 and maintenance	1.0	NFOŚiGW e.g. as part of Good Practices	Number of workshops organised per year Number of collaborating institutions
4	Carrying out research and demonstration projects in the field of WP technologies and disseminating research outcomes	Minister of Science and Higher Education/ National Centre for Research and Development, DG Research and Innovation	2015–2018	5.0 3.0	state budget ^{2)/} NFOŚiGW EU research projects, e.g. Life+, Horizon2020, Central Europe, Baltic Sea Region, etc.	Total amount allocated to WP projects [million/year] and participation in general contributions to waste management projects financed with national funds
5	Including in the NFOŚiGW/WFOŚiGW priorities in the 2014–2020 perspective the option to support SMEs in relation to: replacing old technologies	NFOŚiGW/WFOŚiGW	2015–2020	-	-	Launched NFOŚiGW/WFOŚiGW programmes supporting SMEs to replace technologies with low-waste, innovative ones

¹⁴ In the case of NFOŚiGW these are both national and EU funds, according to the adopted financing principles.

Action no.	Action title	Implementing authority	Time frame	Estimated outlay [PLN million] ¹⁾	Possible source of financing ¹⁴	Monitoring indicators
1	2	3	4	5	6	7
	with low-waste, innovative technologies (like in energy efficiency programmes), creating new forms of activity related to waste prevention					
6	Promotion of eco-design	Minister of the Environment/Minister of Economy	2015–2020	9.6	WFOŚiGW	Planned and carried out promotional campaign
7	Promoting environmental audits of manufacturing processes aimed at taking stock and balancing the flow of raw materials, products, services and waste and at identifying cause and effect relationships determining waste generation	Minister of the Environment/Minister of Economy	2015–2022	0.1	WFOŚiGW	Developing guidelines for sectoral environmental audits aimed at optimising production processes in terms of raw materials and waste
8	Campaigns promoting the meaning of the waste management hierarchy (including less consumptive lifestyle)	marshal offices, through civil society organisations, institutions, schools, offices	2015–2019	8.0	WFOŚiGW	Number of events organised per year
9	Initiating and promoting initiatives, competitions for "low-waste" municipalities and cities in constant periodical multiannual programmes by regional governments	Minister of the Environment/marshal offices	2015–2020	9.6	WFOŚiGW	Number of launched initiatives, organised competitions
10	Local WP web platform	municipalities	2015–2017	8.0	WFOŚiGW	Developed and regularly updated information platform dedicated to WP with a forum of collaborating institutions
11	Establishing a network of institutions collaborating for waste prevention, including food	Federation of Polish Food Banks or other organisation in cooperation with	2015–2022	2.0	NFOŚiGW	Number of collaborating institutions

Action no.	Action title	Implementing authority	Time frame	Estimated outlay [PLN million] ¹⁾	Possible source of financing ¹⁴	Monitoring indicators
1	2	3	4	5	6	7
	waste	retail organisations, catering organisations, consumer organisations, social aid organisations; collaboration with partner organisations from other EU Member States				
12	Collecting and publishing teaching aids focusing on WP for schools and universities	Minister of National Education Centre for Education Development	2014–2016	-	-	not envisaged
13	Implementing environmental management systems compliant with ISO 14001, Responsible Care and EMAS in enterprises and public institutions	organisations as defined in Article 2 (25) of Regulation (EC) No. 1221/2009 entrepreneurs	2014–2022	35	organisations/ WFOŚiGW company budgets	Number of organisations that have implemented environmental management systems compliant with ISO 14001, Responsible Care and EMAS
14	Promoting and supporting the development of networks of repair and reuse centres	municipalities, marshal offices in collaboration with entrepreneurs, consultants	2014–2018	0.5	company budgets/ WFOŚiGW	<i>not envisaged</i>

¹⁾ guidelines for the calculation of estimated outlays are presented in Annex VI.

²⁾ outlays will be financed under expenditure limits planned in the budgets of respective administrating entities in budget acts for subsequent years.

CHAPTER 9. MONITORING

NWPP implementation requires planning and carrying out a number of actions presented in the present document. The implementation of these actions should contribute to reducing negative environmental impact, improving resource efficiency and the general level of environmental education in the society. Waste prevention should constitute a measurable outcome of the actions. In Chapter 7 monitoring indicators were specified for the total quantity of generated waste and key waste streams.

Programme monitoring is closely related to the duties and responsibilities resulting from the current structure of the waste management system and should be the duty of structures that are in charge of supervising this system in Poland.

NWPP supplements NWMP 2014 and VWMPs in terms of waste prevention, by means of specifying waste prevention actions, both at national and regional (voivodeship) level, in a single document. Pursuant to Article 37 paragraph 1 of the Act of 14 December 2012 on waste, waste management plans should be updated at least every six years. Moreover, pursuant to Article 39 paragraph 1 of the Act on waste, reports on the implementation of waste management plans are prepared for periods covering 3 calendar years. NWPP, as a mandatory part of waste management plans, is subject to updating and reporting requirements with the same frequency. For the purpose of NWPP monitoring, quantitative indicators were specified with the indication of information source. Monitoring indicators concerning general NWPP objectives are listed in Table 4, while Table 5 contains monitoring indicators for specific NWPP objectives. The benchmarks provided in the tables represent the current values of monitoring indicators.

Table 4. Monitoring of general quantitative NWPP objectives (source: own work)

Item	Indicator	Unit	Desired tendency	Benchmark value (year)	Data source
1	Amount of generated waste	Mg/year	↘	135 million (2012)	GUS
2	Quantity of waste generated in Poland in relation to GDP in constant prices (year 2000 = 100%)	million Mg/ PLN billion (kg/PLN)	↘	0.12 (2012)	translation on the basis of GUS data

Table 5. Monitoring of specific NWPP objectives (source: own work)

Item	Indicator	Unit	Desired tendency	Benchmark value (year)	Data source
1	Quantity of mining waste: 1) Waste from the flotation of non-ferrous metal ores 2) Waste generated at the stage of rinsing and cleaning minerals in relation to the quantity of the product (black coal, brown coal and copper in total)	Mg/Mg	↘	0.35 (2012)	translation on the basis of GUS data
2	Quantity of waste from the power industry (encompassing: 1) ash and slag mixture from wet discharge of combustion waste; 2) fly ash from coal; 3) mixture of fly ash and	Mg/GWh	↘	87 (2012)	translation on the basis of the data of GUS and the Energy Regulatory Office

Item	Indicator	Unit	Desired tendency	Benchmark value (year)	Data source
	solid waste from lime desulphurisation methods; 4) slag, combustion ash and bottom ash in relation to the amount of produced energy)				
3	Number of issued ecolabelling certificates (Eko-znak and/or Ecolabel) in Poland per year	-	↗	36 including: 12 for chemicals, 23 for electrical and electronic equipment, 1 for furniture (2012)	data of Polish certifying institutions
4	Amount of collected mixed municipal waste per person	kg/P per year	↘	222.5 (2012)	GUS
5	Quantity of packaging waste in relation to GDP in constant prices from 2000	thousand Mg/PLN billion per year	↘	4.05 (2011)	Report of the Republic of Poland on the quantity of generated packaging waste (Eurostat data); GUS – GDP value
6	Quantity of food delivered to Food Banks by entrepreneurs in Poland (excl. food from EU support programmes) (auxiliary indicator)	Mg/year	↗	7,500 Mg (2012)	Data from Food Banks
7	Share of the volume of totally reused waste equipment in the total volume of waste equipment collected in a given year	%	↗	0.4 (2011)	Reports of the Chief Inspector for Environmental Protection on the operation of the waste electrical and electronic equipment management system

It is suggested to monitor the implementation of the present Programme separately on the basis of the specified indicators. Progress in the achievement of the objectives should be evaluated in the report on NWPP implementation covering 3 calendar years.

CHAPTER 10. EVALUATION OF THE EFFECTS OF SUGGESTED MEASURES

The aim of the Programme was to suggest measures that could address the problems related to waste prevention. Research and analyses carried out under NWPP suggested that the main problems in this respect concern high material consumption of the economy (with the so-called resource productivity as the indicator). The resource productivity indicator is very low in Poland (0.4 EUR/kg of raw materials), while the average for the EU is four times higher (1.6 EUR/kg), and in certain countries even ten times higher).

This leads to the conclusion that the actions indicated in NWPP will have a positive effect on rational waste management in Poland – Figure 12.

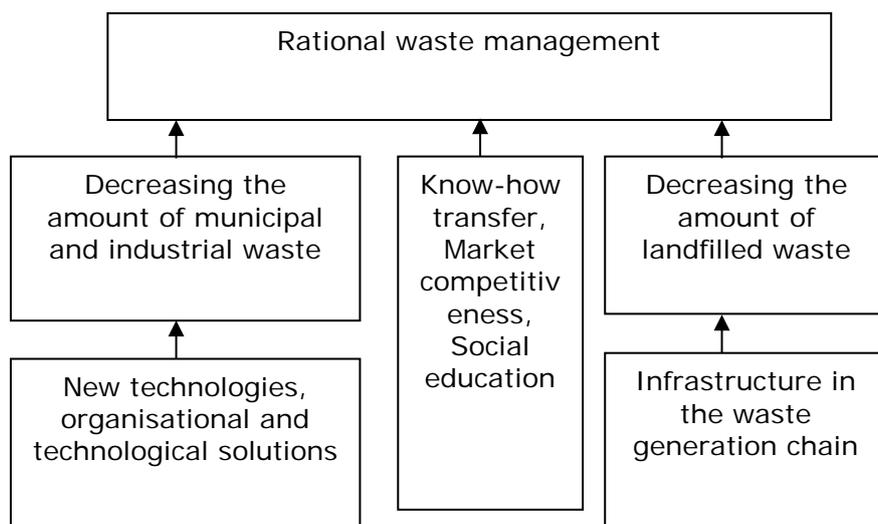


Figure 12. Actions influencing rational waste management.

The effects of suggested measures can be evaluated with regard to various dimensions: legal, financial, social, economic, environmental.

Financial and economic effects.

The estimated impact of the drafted document on the public finances sector, including the state budget and the budgets of local administration entities, as well as on the operation of enterprises is presented in the material and financial schedule of NWPP actions in Table 3.

It is impossible to present detailed financial and economic effects of NWPP, which will depend on the degree of implementation of actions by individual entities.

Moreover, waste prevention will result in a possible decrease in environmental fees related to reduced waste generation and pollution emissions.

General environmental protection requirements, including those concerning waste prevention may lead to enterprises introducing new technologies that are more efficient and environmentally-friendly in order to meet the requirements of the European market. This may also contribute to increasing economy innovativeness and competitiveness.

Environmental effects.

As a result of NWPP implementation, the amount of landfilled waste should be decreased. Landfilled waste may pose a threat to surface and ground water, disturb ambient air and the landscape. Decreasing the amount of biodegradable waste in generated and landfilled waste will reduce pollution emissions to water and air, as well as the emission of landfill gas, the spread of microorganisms, the feeding of birds and rodents and will decrease inconvenience caused by odour. Therefore, gradual elimination of such waste from landfills will contribute to the improvement of water, air and soil environment in the surrounding of landfills.

Health and environmental hazards are also expected to be decreased through the reduction of hazardous waste generation. In the case of hazardous waste, hazards related to the leaching of hazardous substances to the soil and ground water or the spreading of dust and increasing air pollution can be decreased.

Moreover, decreased waste generation will allow for a lower consumption of raw materials used to manufacture the products that generate this type of waste. This will enable more economic resource management. Decreasing the amount of generated waste may also contribute to a reduction in greenhouse gas emissions, mainly methane from landfills and carbon dioxide from combustion

Implementing and supporting low-waste manufacturing technologies will also allow for reducing waste emissions in the manufacturing process. It is crucial to select proven technologies compliant with BAT requirements.

Social effects.

In terms of social effects, NWPP aims at influencing the attitudes and behaviour and raise the awareness of the society through various information campaigns. Through a change in the attitudes and behaviour patterns of the society to more environmentally-friendly ones, it will be possible to implement the suggested measures more effectively, contributing to decreasing the amount of generated waste. The achievement of objectives specified in the present programme should also be facilitated by means of educational activity. Social understanding and acceptance of the fundamental environmental objectives are crucial to achieve them.

In the field of waste management, legislative actions have been practically concluded. The National Waste Management Plan 2014 has also been adopted at the national level, and the present Programme only supplements it.

The actions specified in the Programme may be supported under Priority Axis II of Investment Priority 6.1¹⁵ of OPI&E.

This priority envisages providing support to the following areas:

- 1) absorbing technologies, including innovative technologies, to decrease material consumption of manufacturing processes;
- 2) rationalising waste management, including the management of hazardous waste by entrepreneurs.

Owing to Programme implementation, developmental actions will be stimulated in regions, new business entities may arise, innovative technologies will be absorbed, manufacturing processes will be improved, a knowledge database on low-waste technologies will be developed.

This priority axis envisages support for local administration entities and their associations, as well as organisational units acting on their behalf, entrepreneurs and entities providing public services outsourced by public administration entities that are not entrepreneurs. Such a broad range of beneficiaries enables a comprehensive approach to waste management issues specified in NWPP in all priority areas of the Programme, namely:

- 1) horizontal actions;
- 2) actions related to products and manufacturing;
- 3) consumption, use and actions at the local level.

Consequently, it needs to be expected that the measures specified in the Programme will be properly allocated to individual areas.

¹⁵ OPI&E 2014–2020 has not been accepted by the European Commission yet, and the areas of support may change.

Due to the fact that NWPP covers actions both at the national and voivodeship level, funds for measures related to waste management may be obtained from Regional Operational Programmes (ROP 2014–2020).

CHAPTER 11. CONSULTATIONS OF DRAFT NWPP

Draft NWPP at the stage of its development was subject to consultations with administration bodies (ministers, marshals) and institutions (National Fund for Environmental Protection and Water Management, Central Statistical Office), as well as associations, chambers of commerce, representatives of trade and industry.

Opinions, comments and suggestions regarding the document could be submitted on-line. Additionally, two meetings were held with the Working Party for Waste Management operating under the Network "Partnership: Environment for Development" and one meeting was organised with representatives of institutions and industry dedicated to the discussion of the major issues related to the Programme.

During the consultations, comments in writing were submitted by: the Minister of the Environment, the Minister of Infrastructure and Development, the Minister of Agriculture and Rural Development, the Minister of Science and Higher Education, the Team monitoring the implementation of the National Waste Management Programme, National Fund for Environmental Protection and Water Management, Central Statistical Office, Voivodeship Inspectorate for Environmental Protection in Warsaw, PlasticsEurope Poland Foundation, EKO-PAK Society, Polish Federation of Food Producers, Polish Steel Association, as well as the marshals of the following voivodeships: Kujawsko-Pomorskie, Lubuskie, Mazowieckie, Opolskie, Podlaskie, Podkarpackie, Śląskie, Świętokrzyskie, Warmińsko-Mazurskie, Wielkopolskie and Zachodniopomorskie.

Submitted comments related e.g. to the size of the document, mainly too comprehensive diagnosis, insufficient reference to prevention methods, inconsistent data concerning the amount of generated waste and parameters of duties in the material and financial schedule.

The report on public consultations and assessment is provided in a separate annex.

It needs to be noticed that the draft NWPP was submitted for assessment to the Joint Commission of Central Government and Local Government.

ANNEXES

ANNEX I. STATE DIAGNOSIS WITH RESPECT TO INDIVIDUAL WASTE STREAMS

I.1 Municipal waste

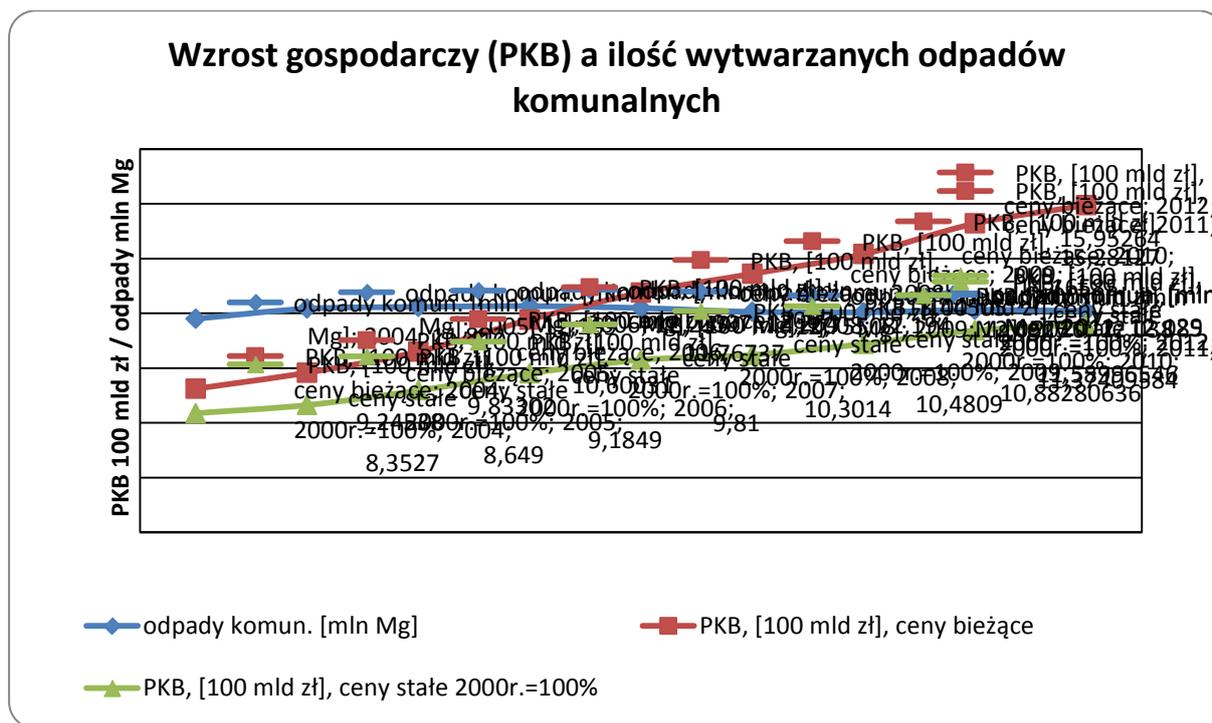
Municipal waste shall be understood as waste generated in households, with the exclusion of end-of-life vehicles, as well as waste that does not contain hazardous waste from other sources, which due to its nature or composition is similar to household waste; mixed municipal waste remains mixed municipal waste even if it has been subject to waste processing operations that have not significantly changed its properties¹⁶.

I.1.1. Municipal waste generation – sources, types, amounts

According to GUS, 12,085,000 Mg of municipal waste was generated in Poland in 2012. The average amount of municipal waste per person generated in 2012 in Poland was 314 kg, while the EU-27 average was 500 kg/P per year.

When compared to the economic growth (GDP) indicator (in current prices), it can be stated that in spite of constant economic growth in 2004–2012, the amount of generated municipal waste did not increase, which is illustrated in Figure AI.1.

Economic growth (GDP) in relation to the amount of generated municipal waste (PLN 100 billion GDP / waste in million Mg)



Municipal waste [million Mg]

GDP [PLN 100 billion], current prices

GDP [PLN 100 billion], constant prices from 2000 = 100%

¹⁶ Source: Act of 14 December 2012 on waste (Journal of Laws of 2013, item 21, as amended)

Figure AI.1. Comparison between the GDP growth rate (in current prices) in Poland and the amount of generated waste (source: GUS, apart from the generation of municipal waste in 2004 – NWMP 2010)

Varying indicators of municipal waste generation in Poland

Data concerning the amount of municipal waste per person reflect significant differences between individual voivodeships (Figure AI.2). In 2012, the amount of municipal waste per person ranged from 180 kg/P per year in the Świętokrzyskie Voivodeship to 364 kg/P per year in the Dolnośląskie Voivodeship.

Generated and collected municipal waste per person in 2012 [kg]

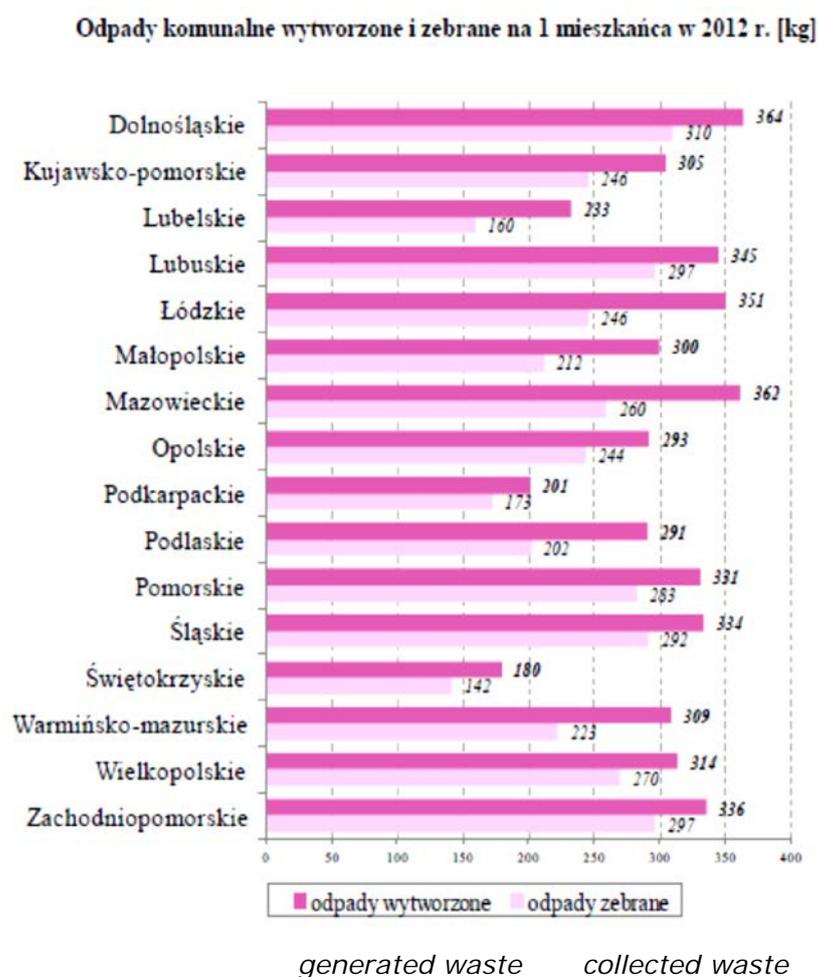


Figure AI.2. Generated and collected municipal waste per person in 2012 (source: GUS, Municipal infrastructure in 2012)

Differences in the amount of generated waste in various urban sectors were recognised in NWMP 2014, where 3 types of developments were identified: rural areas, towns <50,000 inhabitants and cities >50,000 inhabitants, with significantly diverging waste generation indicators (Table AI.1).

Table AI.1. Estimated amount of municipal waste generated in Poland, in 2012 (source: own work on the basis of data from NWMP 2014 and GUS – census data)

Area	Indicator [Mg/P/year 2012]	Population in 2012	Amount of municipal waste [thousand Mg]
cities (>50,000)	0.404	13,065,166	5,281

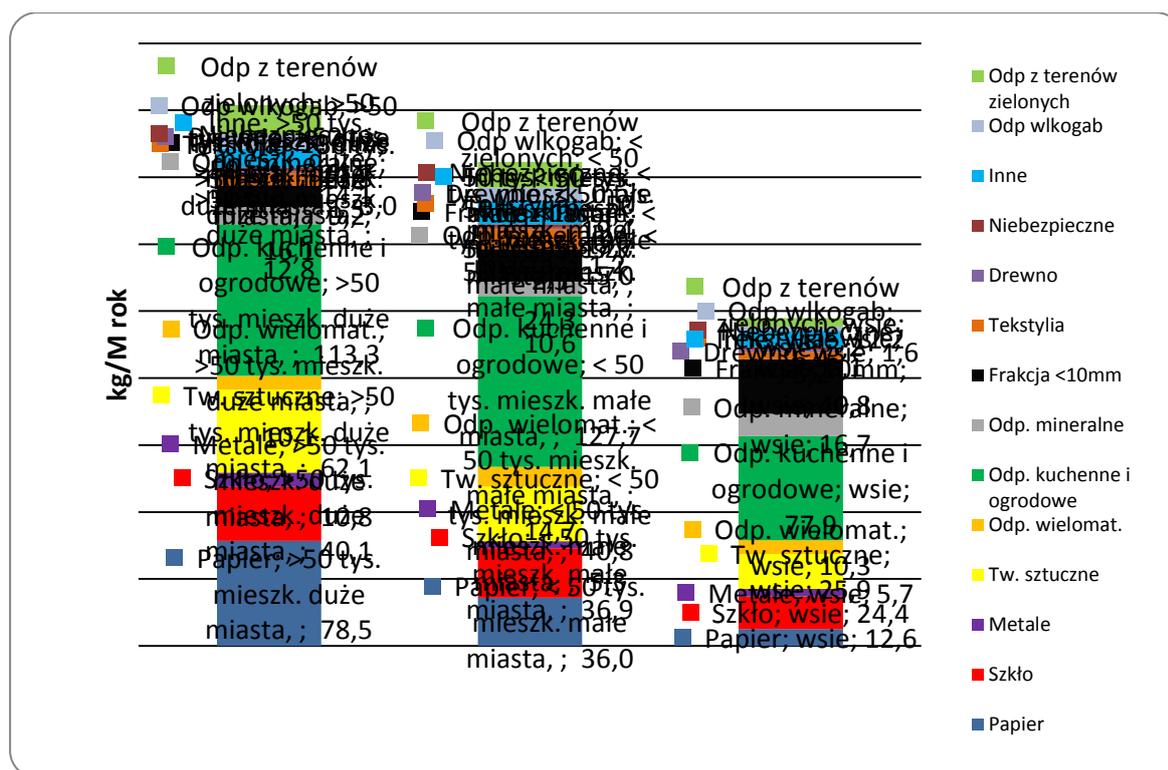
Area	Indicator [Mg/P/year 2012]	Population in 2012	Amount of municipal waste [thousand Mg]
inhabitants)			
towns (<50,000 inhabitants)	0.362	8,665,160	3,134
rural areas	0.245	16,802,973	4,110
Total	-	38,533,299	12,525

Apart from discrepancies in the amount of generated municipal waste, there are also differences in the composition of waste from these areas. This is of significance to the possible waste prevention methods.

According to the morphological composition adopted in NWMP 2014, the following fractions can be identified in the municipal waste stream: biodegradable kitchen waste, green waste, paper and cardboard, multi-material packaging, plastic, glass, metal, clothes, textiles, wood, hazardous waste, bulk waste, urban yard waste, streets and squares cleaning waste and waste from street markets.

Moreover, municipal waste streams may contain: waste electrical and electronic equipment, hazardous waste, such as chemicals, light bulbs, expired medications and renovation and construction waste.

The quantities and morphological composition of municipal waste broken down into urban and rural areas as well and big cities are presented in Figure A1.3.



PL	EN
Kg/M rok	kg/P per year
Duże miasta, > 50 tys. mieszk.	Cities > 50,000 people
Małe miasta < 50 tys. mieszk.	Towns < 50,000 people
wsie	Villages
Odp z terenów zielonych	Urban yard waste
Odp wlkogab	Bulk waste

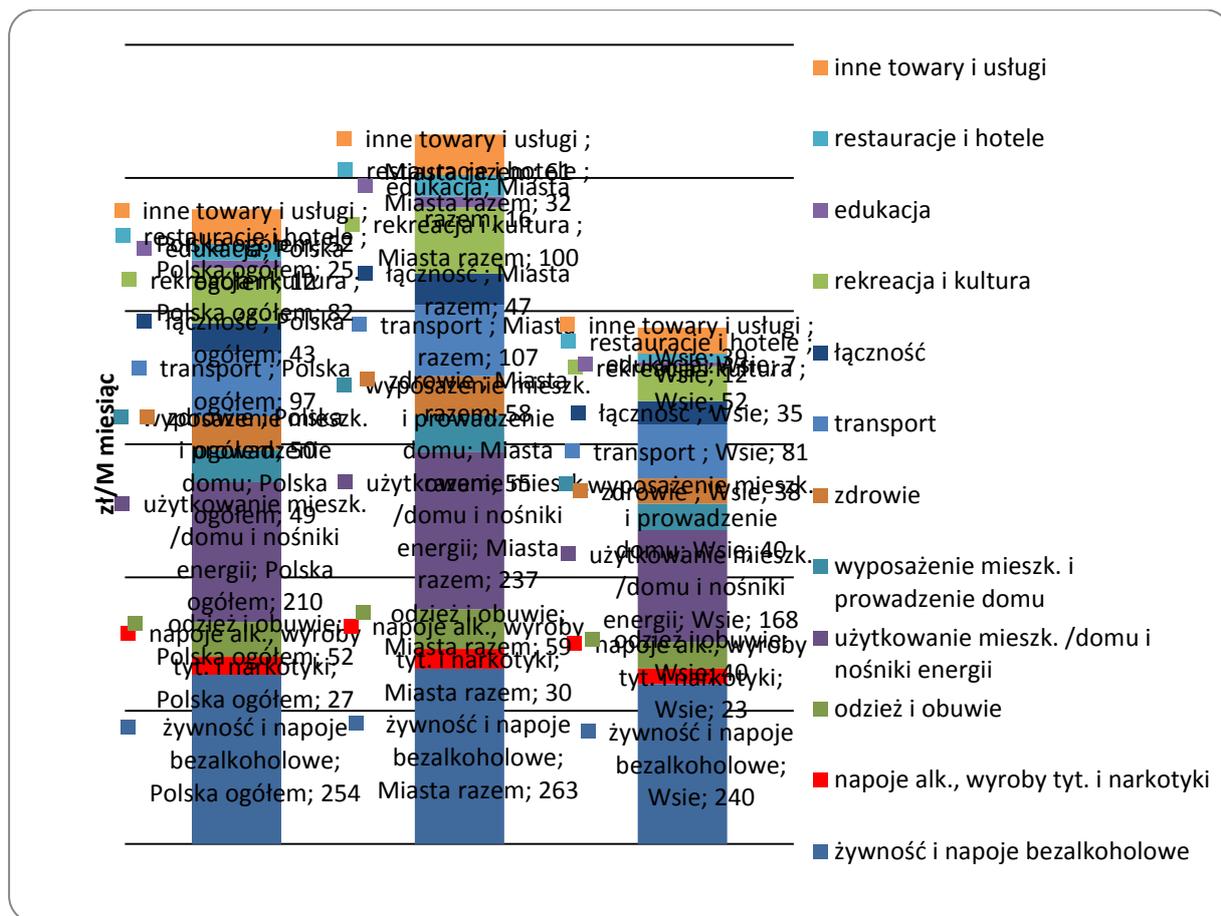
Inne	Other
Niebezpieczne	Hazardous waste
Drewno	Wood
Tekstylia	Textiles
Fracja < 10mm	Fraction < 10 mm
Odp. mineralne	Mineral waste
Odp. kuchenne i ogrodowe	Kitchen and garden waste
Odp. wielomat.	Multi-material waste
Tw. sztuczne	Plastics
Metale	Metals
Szkło	Glass
Papier	Paper

Figure AI.3. Quantities and morphological composition of municipal waste generated in various types of urban structures (source: own work, according to NWMP 2014)

In cities with over 50,000 inhabitants municipal waste consists mostly of kitchen and garden waste (29%), paper and cardboard (19%) and plastic (15%). Total quantity of recyclable raw materials (paper, plastic, glass, metal and multi-material waste) represents ca. 50% of total waste. The share of the aforementioned raw materials in the total waste from towns is ca. 37%, with the highest share of kitchen and garden waste, which amounts to ca. 36%. Waste from rural areas, in turn, has a relatively high content of kitchen and garden waste (33%), as well as the fine fraction <10 mm (17%).

Household waste

Differences in the composition of waste generated in various development structures result from differences in the habits and financial capacities of the inhabitants of individual areas. This is directly related to the structure of consumption expenditures, illustrated in Figure AI.4.



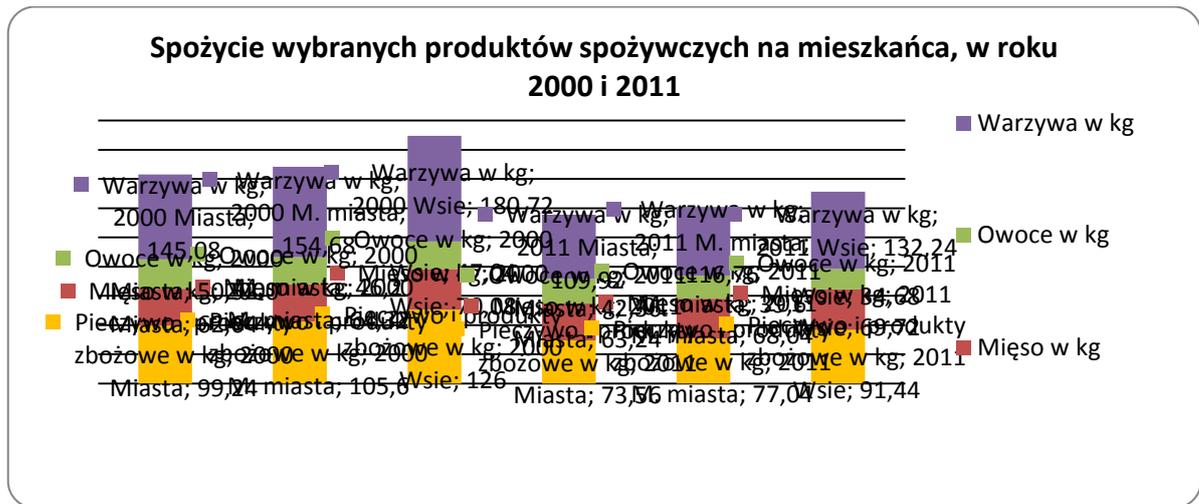
PL	EN
zł/M miesiąc	PLN/P per month
Polska ogółem	Poland in total
Miasta razem	Urban areas in total
Wsie	Rural areas
Inne towary i usługi	Other goods and services
Restauracje i hotele	Restaurants and hotels
Edukacja	Education
Rekreacja i kultura	Active leisure and culture
Łączność	Communication
Transport	Transport
Zdrowie	Health
Wyposażenie mieszk. i prowadzenie domu	House furnishing and household management
Użytkowanie mieszk./domu i nośniki energii	Flat/house use and energy carriers
Odzież i obuwie	Clothing and footwear
Napoje alk. Wyroby tyt. i narkotyki	Alcoholic beverages, tobacco products and drugs
Żywność i napoje bezalkoholowe	Food and non-alcoholic beverages

Figure AI.4. Average monthly expenditures per person in a household in 2011 in cities and in the countryside (in PLN); (source: own work on the basis of: Socio-economic situation of households in 2000–2011, GUS, Warsaw 2013)

In general, it can be concluded that the differences in the expenditures on food and non-alcoholic beverages are not significant. City inhabitants spend considerably more money on clothes and footwear, as well as furnishings, which translates into the amount of generated waste. This concerns textile and multi-material waste as well as bulk waste.

The structure of food consumption also influences waste composition. Also in this regard, there are some differences between social groups in individual urban structures, which is presented in Figures AI.5–AI.7. Unconsumed food scraps (kitchen waste) and its packaging become waste.

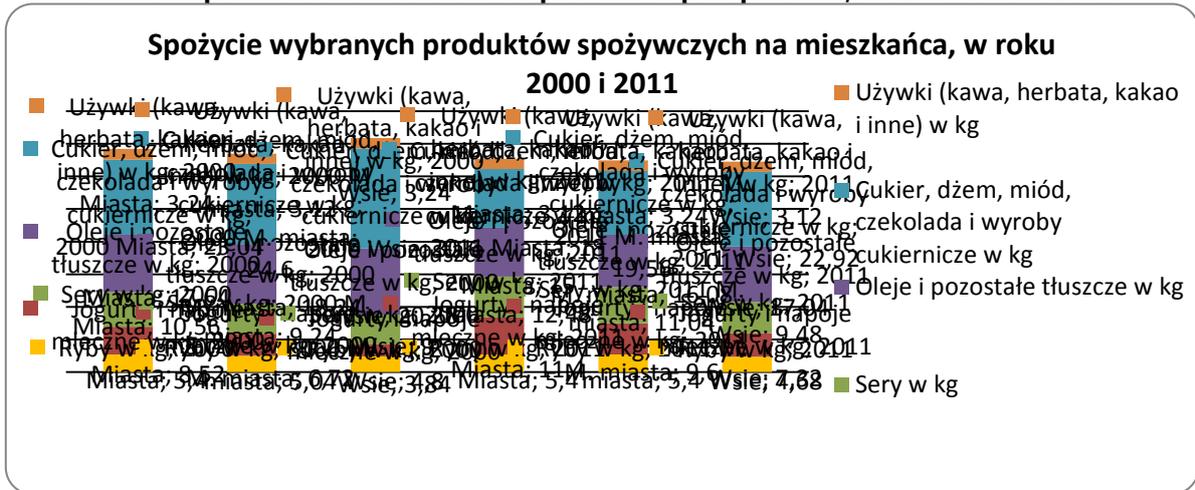
Consumption of selected food products per person, in 2000 and 2001



PL	EN
Miasta	Cities
M. miasta	Towns
Wsie	Villages
Warzywa w kg	Vegetables in kg
Owoce w kg	Fruit in kg
Mięso w kg	Meat in kg
Pieczywo i produkty zbożowe w kg	Bread and grain products in kg

Figure AI.5. Differences in the consumption of selected food products, in various regions of Poland (source: own work on the basis of GUS)

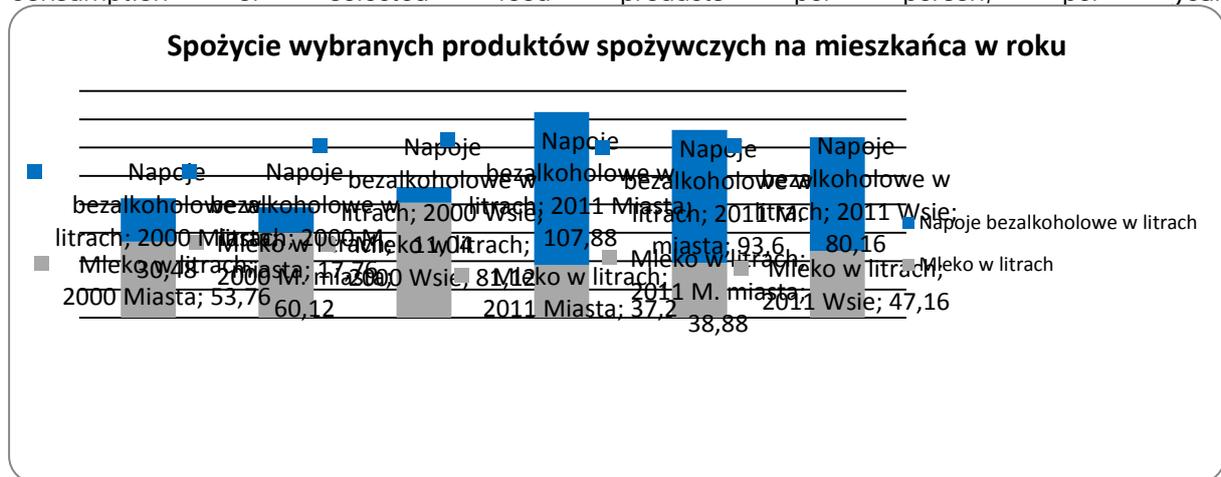
Consumption of selected food products per person, in 2000 and 2001



PL	EN
Miasta	Cities
M. miasta	Towns
Wsie	Villages
Używki (kawa, herbata, kakao i inne) w kg	Stimulants (coffee, tea, cocoa and other) in kg
Cukier, dżem, miód, czekolada i wyroby cukiernicze w kg	Sugar, jam, honey, chocolate and pastries in kg
Oleje i pozostałe tłuszcze w kg	Oils and other fats in kg
Sery w kg	Cheese in kg
Jogurty i napoje mleczne w kg	Yoghurts and milk beverages in kg
Ryby w kg	Fish in kg

Figure AI.6. Differences in the consumption of selected food products in various regions of Poland (source: own work on the basis of GUS)

Consumption of selected food products per person, per year



PL	EN
Miasta	Cities
M. miasta	Towns
Wsie	Villages
Napoje bezalkoholowe w litrach	Non-alcoholic beverages in litres

Figure AI.7. Differences in the consumption of selected food products in various regions of Poland (source: own work on the basis of GUS)

In rural areas, food consists mostly of bread, grain products and vegetables (including a high share of potatoes). Although the total consumption of these products has decreased since 2000, in rural areas it is still higher than in urban areas. In urban areas, in turn, increased consumption of cheese, yoghurt and other milk beverages was observed, which are usually packaged products, in rather small portions, hence with a relatively high ratio of packaging to the mass of the product. Moreover, as shown in Figure AI.7, the consumption of non-alcoholic beverages increased in all regions, with particularly significant increase in beverages consumption in the cities. This also entails a large amount of packaging – glass and plastic bottles, steel cans and multi-material packaging.

The presented analysis of the consumption structure explains quite well the differences in the composition of waste – in particular the higher share of packaging in urban waste than in rural waste. Smaller amounts of waste generated in rural areas result also from the size of floor surface at the disposal of the inhabitants, the size of gardens, etc. In single-family houses, solid fuel heating occurs more often than in cities, which explains the considerable share of ash (fraction < 10 mm) in rural waste. The inhabitants of rural areas usually have more floor surface at their disposal, which favours longer storage of various unused objects, which the residents of small flats are forced to discard. This influences e.g. the amount of generated bulk waste.

Bulk waste

Bulk waste is an irregularly collected waste stream. The collection method (frequency, convenience, distance to the collection point) has a huge impact on the generated amounts of bulk waste. In Warsaw, as part of the aforementioned monitoring, the bulk waste accumulation indicator was recorded at the level of ca. 10 kg/P per year. This waste consists mainly of furniture, toys, bulk devices, including waste electrical and electronic equipment (actually belonging to WEEE). This waste stream can be partially prevented by means of promoting reuse.

Municipal waste and waste from infrastructure

Another factor that influences the amount and composition of waste in rural and urban areas is the density of commercial, administrative, office or workplace infrastructure, i.e. non-residential buildings where municipal waste is generated. These facilities produce huge amounts of raw materials, above all office paper and various packaging. The density of such buildings is much greater in the cities than in rural areas.

On the basis of available data, it is very difficult to identify this stream because it is not registered separately from the dominant waste from households.

Table AI.2 presents estimated amounts of waste from infrastructure per person on the basis of monitoring carried out in Warsaw. In Warsaw, the average annual share of waste from infrastructural facilities in the total volume of municipal waste was ca. 23%.

Table AI.2. Weight indicators of infrastructural waste accumulation per city inhabitant (source: den Boer et al.¹⁷)

¹⁷ Den Boer J., den Boer E., Szpadt R., Górnkowski W. Zmienność składu i właściwości odpadów komunalnych m.st. Warszawy na podstawie wyników monitoringu prowadzonego przez m.st. Warszawa w latach 2000-2008, Kamieniec Wrocławski 2008

	Cemeteries	Street markets	Litter bins	Schools	Offices	Hotels	Restaurants	Urban yard	Manual street cleaning	Machine street cleaning	Total
Season	kg/P/year										
Summer	8.6	9.6	7.9	2.8	15.1	3.8	9.9	37.1	0.0	0.3	95.2
Autumn	22.6	8.1	9.5	7.2	33.8	3.5	9.2	6.2	0.1	0.7	100.8
Winter	15.9	3.3	11.0	7.0	18.4	2.3	9.5	12.2	0.0	0.0	79.6
Spring	10.5	5.9	10.4	9.7	33.8	3.8	18.0	7.2	0.0	0.3	99.7
Annual weighted average	14.4	6.7	9.7	6.6	25.3	3.4	11.7	15.7	0.0	0.4	93.9

Table AI.3 presents example data on the morphological composition of waste from infrastructure, taking seasonal variations into account. Green waste constitutes the largest portion, with 26% of the total quantity of waste from infrastructure on average. Other large waste fractions include: paper and non-packaging cardboard (21% on average) and biodegradable kitchen waste (18% on average). The average shares of other fractions are much lower and do not exceed 10%. The content of green waste in infrastructural waste varies most during the year and may range from 45% in summer to 15% in spring.

The morphological composition of waste from infrastructure varies a lot throughout the year. The share of green waste is greatest in summer. As has been mentioned before, also the content of paper and non-packaging cardboard fluctuates a lot. Lower share of this fraction in summer is related to the holiday season, both at schools and in offices.

Table AI.3. Example morphological composition of infrastructural waste (on the basis of data from Warsaw)

Infrastructure

	Biodegradable kitchen waste	Green waste	Non-packaging paper and cardboard	Paper and cardboard packaging	Multi-material packaging	Non-packaging plastics	Plastic packaging	Textiles	Non-packaging glass	Glass packaging	Steel plate packaging	Aluminium packaging	Metals	Mineral waste > 10 mm	Wood and wood-derived materials	Wooden packaging	Fraction 0–10 mm	Construction waste	Other waste	Total
Season	%																			
Summer	15.8	45.0	13.9	5.4	0.8	1.4	6.3	0.7	1.7	7.0	0.1	0.2	0.1	0.1	0.0	0.3	0.8	0.1	0.5	100
Autumn	16.2	15.6	23.9	4.0	3.3	4.8	9.5	1.0	5.3	8.7	0.3	0.9	0.8	0.2	0.0	0.5	3.2	0.0	1.7	100
Winter	18.0	31.5	20.9	2.8	1.2	1.3	7.7	0.5	2.3	8.0	0.5	0.3	0.4	3.2	0.0	0.1	0.6	0.1	0.7	100
Spring	21.1	14.6	25.1	3.5	3.8	1.4	11.1	1.2	1.7	10.1	0.4	1.0	0.2	0.2	0.0	0.4	3.1	0.3	0.8	100
Annual weighted average	17.8	26.1	21.0	4.0	2.3	2.3	8.7	0.9	2.8	8.05	0.3	0.6	0.4	0.8	0.0	0.3	2.0	0.1	0.9	100

To conclude, it can be said that the amount of generated waste, as well as the content of individual fractions, are closely related to the place of generation (households, infrastructural facilities, other) and the type of area where they are generated (urban or rural). In order to estimate the amount of waste, appropriate waste generation indicators were adopted for the numbers of people inhabiting rural areas, towns and cities. It was also assumed that the generation indicator increases by ca. 1.2% a year in relation to the preceding year. The results of estimations are presented in Table AI.4.

Table AI.4. Estimated amounts of municipal waste in Poland, broken down into fractions (source: own calculations on the basis of data from NWMP 2014)

Item	Waste fractions	Quantity of waste generated in 2012 [Mg]			
		total	cities (>50,000)	towns (<50,000)	villages
1.	Paper and cardboard	1,518,211	1,008,682	304,029	205,499
2.	Glass	1,258,805	528,106	319,701	410,998
3.	Metal	282,962	137,308	47,015	98,640
4.	Plastic	1,565,543	797,440	344,775	423,328
5.	Multi-material waste	421,799	132,026	125,373	164,399
6.	Kitchen and garden waste	4,036,926	1,526,226	1,150,296	1,360,403
7.	Mineral waste	503,354	168,994	87,761	246,599
8.	Fraction < 10 mm	1,129,525	221,805	213,134	694,587
9.	Textiles	333,147	121,464	125,373	86,310
10.	Wood	48,735	10,562	9,403	28,770
11.	Hazardous waste	93,934	42,248	18,806	32,880
12.	Other categories	511,427	168,994	141,044	201,389
13.	Bulk waste	272,230	137,308	81,492	53,430
14.	Urban yard waste	548,765	279,896	166,119	102,749
Total		12,525,361	5,281,060	3,134,322	4,109,980
%		100	42	25	33

The Table above demonstrates that over 12,500,000 Mg of municipal waste was generated in 2012. Ca. 42% of waste was generated in cities, 25% of waste was generated in towns of less than 50,000 inhabitants, and ca. 33% of municipal waste in rural areas.

I.1.2. General municipal waste prevention methods

Municipal waste prevention may be carried out by means of:

- 1) educating and influencing consumer decisions of inhabitants as regards:
 - a) reducing redundant purchases,
 - b) choosing durable products with a lower content of harmful substances;
- 2) educating and promoting waste prevention in institutions by means of:
 - a) popularising green public procurement,
 - b) implementing environment management systems (e.g. EMAS, Responsible Care);
- 3) providing institutional and procedural support and promotion for reuse (e.g. support for repair services, hires, second-hand markets etc.);
- 4) influencing the producers of products and packaging (implementing new technologies and eco-design throughout their life cycle).

The above actions should be stimulated through the use of appropriate financial instruments.

Waste prevention should focus above all on raising environmental awareness of people through an educational campaign defined as training, providing information to consumers on the environmental impact of products (e.g. ecolabels), leaflets, web portals promoting certain products and habits. Awareness-raising campaigns should be

simple, visible and appropriately addressed to all social groups. Suggested behaviour changes should be easy to implement, if required, and explained in detail. The suggested everyday-life municipal waste prevention methods include the following habits, attitudes or ways to avoid waste generation. Such behaviours should be reinforced in the mental framework of the contemporary consumer:

- 1) choosing products without redundant packaging;
- 2) using reusable bags;
- 3) using packaging suitable for a given purpose a number of times;
- 4) using paper rationally by means of using both sides of a sheet;
- 5) refusing to receive junk mail and advertising materials;
- 6) creating facilities – spots for the reuse of newspapers and magazines by readers;
- 7) buying rechargeable batteries (accumulators) instead of disposable ones;
- 8) avoiding disposable cups, plates, cutlery and towels;
- 9) buying drinks, food and chemicals in packaging that can be returned or refilled;
- 10) delivering used clothes, shoes and other unwanted items to other recipients or selling them at web auctions;
- 11) choosing durable products;
- 12) reading product labels and making conscious consumer decisions.

It needs to be remembered, however, that certain types of disposable packaging considerably prolong the best before date of food products even if no preservatives are added, decrease losses at transport and storage, and hence generate smaller amounts of waste.

Systemic waste prevention measures, apart from influencing consumer behaviour, include also those provided in Annex No. 5 to the Act on waste of 14 December 2012:

- 1) the use of planning measures or other financial instruments promoting the efficient use of resources
- 2) the promotion of research and development into the area of achieving cleaner and less wasteful products and technologies and the dissemination and use of the results of such research and development;
- 3) the development of effective and useful indicators of environmental pressure associated with waste generation.

The measures that can affect the design, production and distribution phase include:

- 1) the promotion of eco-design (the systematic integration of environmental aspects into product design with the aim to improve the environmental performance of the product throughout its life cycle);
- 2) the promotion of the reuse and/or repair of discarded products or of their components, notably through the use of educational, economic, logistic or other measures, such as support to or establishment of accredited repair and reuse centres and networks especially in densely populated regions;
- 3) the promotion of creditable ecolabelling.

Chapter 4 presents a review of good communal practices in the field of municipal waste prevention with example quantitative effects.

Due to a high content of biodegradable waste and packaging waste in the municipal waste stream and the significant share of sources other than municipal, these types of waste are discussed separately.

I.2. Biodegradable waste

Biodegradable waste is any waste that is capable of undergoing aerobic or anaerobic decomposition. Biodegradable waste is composed above all of the so-called bio-waste, that is biodegradable garden and park waste, food and kitchen waste from

households, restaurants, caterers and retail premises, as well as comparable waste from food processing plants. Next to bio-waste from households, the municipal waste stream is also composed of green waste – cuttings of plants from urban yard, gardens, parks and cemeteries, as well as street markets, with the exception of streets and squares cleaning waste¹⁸.

In line with NWMP 2014 guidelines, biodegradable municipal waste includes the following waste fractions enumerated according to their morphological content:

- 1) paper and cardboard;
- 2) clothing and textiles made of natural materials (50%);
- 3) urban yard waste;
- 4) kitchen and garden waste;
- 5) wood (50%);
- 6) multi-material waste (40%);
- 7) fine fraction <10 mm (30%).

The estimated quantities of biodegradable municipal waste generated in Poland are presented in Table AI.5 below.

Table AI.5. Amount of biodegradable municipal waste in Poland in 2012 (on the basis of NWMP 2014)

Item	Waste fractions	Quantity of waste generated in 2012 [Mg]			
		total	cities (>50,000)	towns (<50,000)	villages
1.	Paper and cardboard	1,518,211	1,008,682	304,029	205,499
2.	Clothing and textiles made of natural materials (50% of textiles);	166,573	60,732	62,686	43,155
3.	Urban yard waste	548,765	279,896	166,119	102,749
4.	Kitchen and garden waste	4,036,926	1,526,226	1,150,296	1,360,403
5.	Wood (50%)	24,367	5,281	4,701	14,385
6.	Multi-material waste (40%)	168,719	52,811	50,149	65,760
7.	Fraction < 10 mm (30%)	338,857	66,541	63,940	208,376
Total		6,802,419	3,000,170	1,801,921	2,000,327
%		100	44	26	29

The greatest amount of biodegradable waste is generated in cities (44%), and in towns, while in rural areas it constitutes a similar amount (26–29% of total waste generated in Poland). At the national level, biodegradable municipal waste represents 54% of the total municipal waste, and consists predominantly of kitchen and garden waste (59%), paper and cardboard (22%) and urban yard waste (ca. 8%).

Food waste

Food waste, which covers a considerable part of bio-waste, consists of raw or cooked food products. Food is wasted at every stage of the food chain "from the field to the table", starting with the so-called basic production – agriculture, through storage, production and processing, to distribution and consumption. In households, food waste concerns materials produced before, during and after meal preparation, such as vegetable peelings, rotten meat, surplus ingredients or the prepared food itself. Additionally, the source of food waste is taken into account: apart from household waste, waste generated during food production, distribution, trade or catering services is

¹⁸ Source: Act of 14 December 2012 on waste (Journal of Laws of 2013, item 21, as amended)

mentioned (BIO Intelligence Service 2010¹⁹). Figure AI.8 presents the breakdown of food waste according to the possibilities of waste prevention.

Food waste		
Avoidable: Discarded waste that was edible before it was discarded (e.g. bread slices, apples, meat)	Possibly avoidable: Food that is consumed by some people and not by others (e.g. bread crust, potato peels)	Unavoidable: Waste from meal preparation that is not edible (e.g. bones, egg shells, fruit and vegetable peels)

Figure AI.8. Breakdown of food waste (source: own work on the basis of BIO Intelligence Service 2010)

The above breakdown relates primarily to households. The "avoidable food waste" category can be further subdivided into the following categories:

- 1) cooked, processed or served too many times – food and beverages that have been prepared, processed or served at home, and then discarded, in most cases due to the preparation of too much food and beverages, including cases in which food or drinks were damaged during processing (e.g. burnt);
- 2) not consumed by the best before date – food and beverages that were discarded because the best before date provided at the label expired, spoiled food whose appearance, odour and flavour does not meet expectations;
- 3) other – any other waste whose precise reason for disposal cannot be identified.

Food waste can also be broken down into two main types of wasted food: losses of edible parts of food – technological losses, and waste related to food trade and consumption (e.g. damaged food, food past the best before date, secondarily contaminated, plate rests).

Table AI.6 presents the classification of food waste according to its source. In Poland, it is estimated that the share of food waste from households is ca. 22%, and catering services are another municipal source (further 5%). Waste from the food industry constitutes the largest part.

Table AI.6. Food waste generated in various sources in the EU and in the UK (source: on the basis of BIO Intelligence Service 2010)

Source	share in the EU	share in the UK	share in Poland
production	39%	23%	70%
wholesale trade	5%	0,04%	4%
retail trade		3%	
catering services	14%		5%
households, of which:	42%	74%	22%
<i>collected at the request of municipalities</i>		70%	
<i>through the sewage system</i>		22%	

¹⁹ BIO Intelligence Service (2010). Preparatory Study on Food Waste Across EU27, final report-2010-54 for the European Commission (DG ENV) Directorate C - Industry, ISBN : 978-92-79-22138-5. BIO Intelligence Service in association with Umweltbundesamt and AEA.

household composting and animal feeding		8%	
TOTAL	100%	100%	100%

Waste prevention

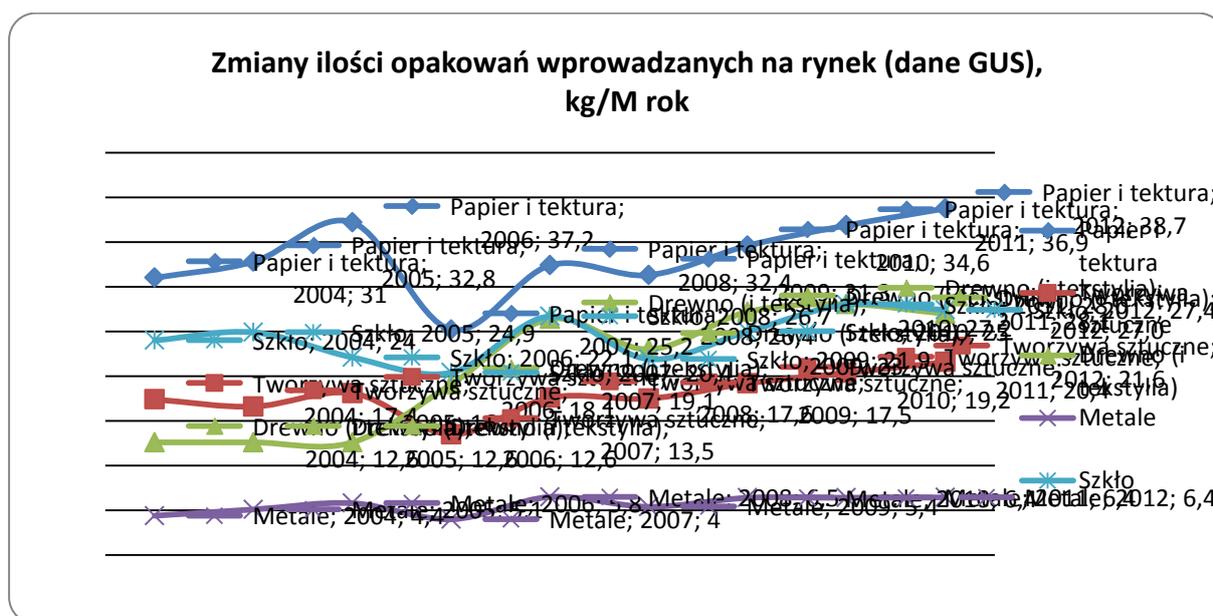
Biodegradable waste generation is prevented through:

- 1) waste prevention at subsequent stages of life cycle of food products (from the agricultural holding to the consumer);
- 2) actions to decrease food wasting and the activity of food banks;
- 3) economic use of paper through electronic document circulation, double-sided printouts and similar actions carried out in institutions.

I.3. Packaging waste

Data concerning the total quantity of packaging placed on the market show that from 2004 to 2012 an increase from 2.89 million Mg to 4.67 million Mg occurred. Figure AI.9 presents changes in the amounts of individual types of packaging placed on the market per person. (GUS, data source: Ministry of the Environment)

**Changes in the amounts of packaging placed on the market (GUS data)
kg/P per year**



PL	EN
Papier i tektura	Paper and cardboard
Tworzywa sztuczne	Plastics
Drewno (i tekstylia)	Wood (and textiles)
Metale	Metals
Szkló	Glass

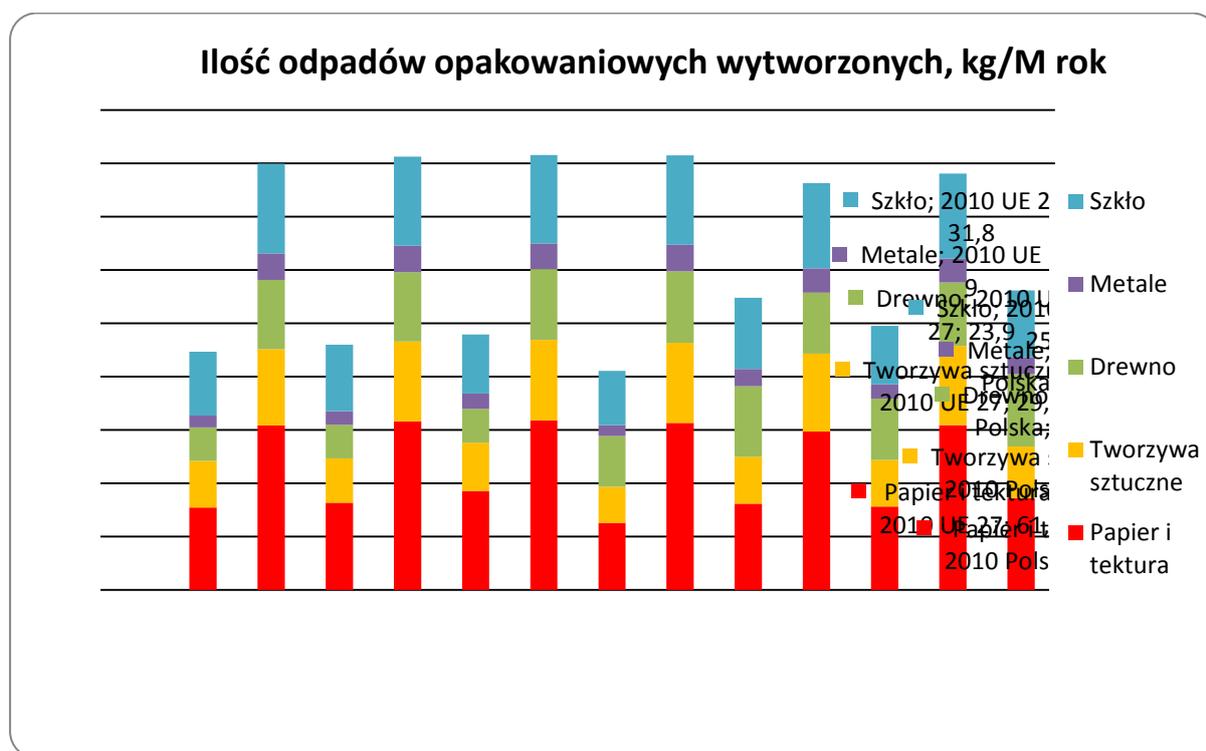
Figure AI.9. Changes in the amounts of packaging waste made of various materials placed on the market from 2004 to 2012 (source: own work on the basis of the data of the Ministry of the Environment published by GUS)

Figure AI. 9 demonstrates that in 2004–2012, a significant increase in the quantity of packaging placed on the market per person was observed. The greatest increase

concerned wood packaging, whose quantity more than doubled. The increase in the quantity of metal packaging placed on the market was also quite significant in the discussed period, and amounted to 31.8%. In the case of packaging made of other materials, a moderate increase in quantity, of 20% for paper and cardboard, 19.4% for plastic and 12.5% for glass, was observed.

Figure AI.10 presents annual amounts of packaging waste per person in the EU and in Poland. According to the data of Eurostat, in 2010 the waste generation indicator for Poland (112 kg/P) amounted to 72% of the average indicator for EU27 (156 kg/P). The average amount of food waste in the European Union (EU27) was in 2004–2010 constant, and in 2004–2010, a slight decrease in the amount of waste per person occurred, which should probably be attributed to the economic crisis in Europe in this period. In Poland at that time, the quantity of packaging waste per person increased by ca. 26%. Having analysed the time-related tendencies in both areas, it can be concluded that the quantity of waste per person in Poland will probably continue to increase in the coming years to approach the average for EU27. However, taking into consideration that Poland is not a rich country, and the average GDP per capita in 2012 did not exceed 67% of the average GDP per capita in EU28, it is wiser to assume that the amount of packaging waste generated in Poland will stabilise at a lower level than the EU average.

Amount of generated packaging waste, kg/P per year



PL	EN
Szkło	Glass
Metale	Metals
Drewno (i tekstylia)	Wood (and textiles)
Tworzywa sztuczne	Plastics
Papier i tektura	Paper and cardboard
UE 27	EU 27
Polska	Poland

Figure AI.10. Packaging waste placed on the market – average for the EU and for Poland, kg/P per year, source: own work (source: Eurostat)

Figure AI. 10 presents the structure of packaging waste generated in Poland against the background of the European Union (EU27). Both in Poland and in EU27, packaging waste made of paper and cardboard prevails, whose share in the total quantity of packaging waste generated in 2010 was 31% and 40%, respectively. In Poland, the second largest packaging waste stream was wood, whose share in the total quantity of waste generated in 2010 was 24% (in EU – 15%). The shares of the remaining types of packaging waste were similar and amounted in the case of glass – to 22% for Poland and to 20% for EU27, in the case of plastic – to 17% for Poland and to 19% for the EU and in the case of metal – to 6% for both areas. The high share of wood packaging may prove a lower level of reuse of such packaging than in EU27.

Packaging introduced to the market already today is subject to prevention requirements (fundamental requirements under Directive 94/62), to which relevant standards are issued.

Since 2001, packaging in Poland has been covered with Extended Producer Responsibility (EPR). In terms of subsequent handling of packaging waste, one of the major duties of the manufacturer of packaging is to design packaging in a way that enables its reuse and subsequent recycling, and if impossible, at least recycling, or as a last resort other form of recovery. A manufacturer that introduced packaged products to the market is obliged e.g. to obtain appropriate levels of recovery and recycling of packaging waste. EPR encourages the manufacturer to analyse the life cycle of his or her product already at the stage of design, through extending his or her responsibility for the product after the end of its use. The effects of EPR are obvious since in the long run, technological progress has occurred related to the production of packaging materials and packaging, consisting in a significant reduction in their mass, as well as due to the requirement to reduce the quantity of waste in goods' packaging systems by entrepreneurs (reduction at source).

The priorities in the development of packaging will be determined by several factors. Above all, by the increasing requirements related to the level of packaging safety. New products will have to be safer, in particular for the environment. Such requirements should be met firstly by the packaging of food, cosmetics and pharmaceutical materials. An increase in the share of packaging made of paper and cardboard, as well as plastic and glass is projected at the cost of decreasing the quantity of generated metal packaging.

Waste prevention

Packaging waste generation is prevented through:

- 1) the elimination of redundant packaging or packaging components;
- 2) a reduction in the quantity of packaging in relation to the quantity of sold products through the introduction of eco-design methods;
- 3) the use of reusable packaging if justified by reduced environmental impact at subsequent stages of life cycle;
- 4) the promotion of local products (the reduction of transport packaging).

I.4 Waste from selected industry branches

The greatest amounts of waste from the industry include: mining waste, steelworks waste, chemical industry waste and waste from the power industry. The said waste should be classified to the following waste streams according to the Ordinance of the Minister of the Environment of 27 September 2001 on the catalogue of waste types (Journal of Laws no. 112, item 1206):

Group 01 – waste generated at the stage of exploration, production, physical and chemical processing of ores and other minerals

Group 06 – waste from the production, preparation, trade and use of the products of inorganic chemistry,

Group 10 – waste from thermal processes.

I.4.1. Waste generated at the stage of exploration, production, physical and chemical processing of ores and other minerals (group 01)

The main source of waste from group 01 is mining and processing of black coal, as well as the processing of metal ores (copper, zinc, lead). This type of waste is also generated in brown coal mining and in smaller amounts by companies that explore, appraise and produce crude oil and natural gas, and as a result of the extraction and processing of: chemical raw materials (sulphur, rock salt) and rock raw materials (construction, cement and limestone industry).

The amount of waste generated in the mining of energy resources correlates linearly with the volume of extraction.

Figure AI.11 presents the amounts of generated waste from group 01 in 2004–2012. The data are based on a GUS survey covering the major waste generators in Poland, i.e. entities that generate over 1,000 Mg of waste per year or have 1 Mg and more of accumulated waste. This note refers also to subsequent Figures AI.12–14.

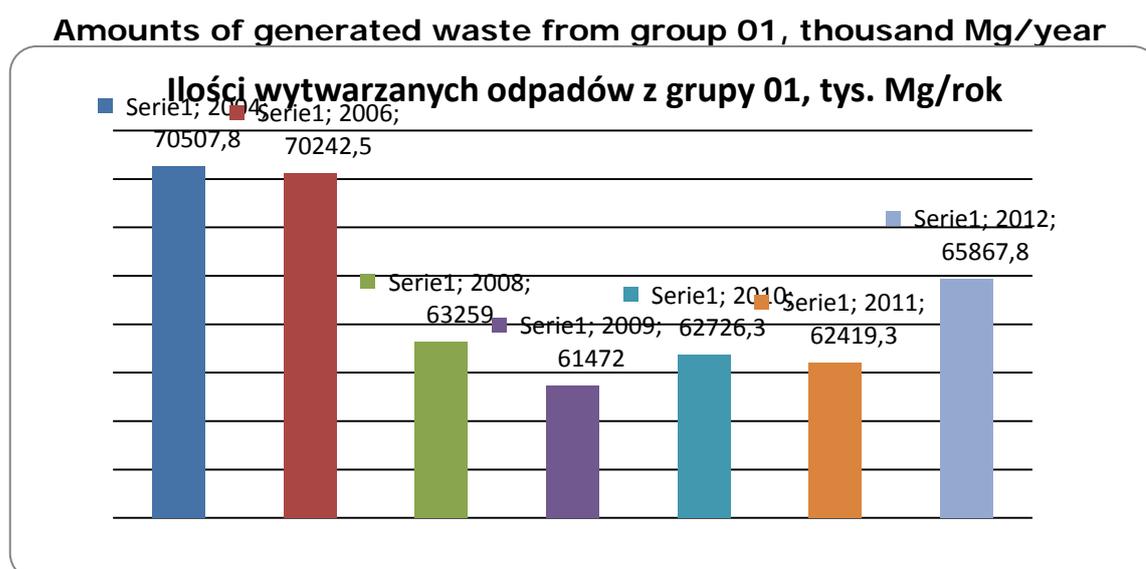


Figure AI.11. Amounts of waste from group 01 generated in 2004–2012 (source: GUS)

In 2004–2006, the quantity of generated waste was relatively constant and fluctuated around 70 million Mg/year. In the next years, the quantity of generated waste decreased, and in 2012 slightly increased.

The main contributor to the generation of mining waste is the mining of energy resources (black and brown coal), where the quantity of generated waste in the said period also decreased. In the mining of metal ores and the remaining types of mining, a decrease in the quantity of generated waste has occurred since 2002.

Taking into consideration the good economic situation of copper on global markets, the generation of waste from the flotation of copper ores in the coming years is projected to remain relatively constant. Less favourable projections concern the production of black

coal. Its decrease is envisaged due to increasingly difficult mining conditions, increasing costs of production and the import of cheaper coal.

The projection of black and brown coal consumption by the power industry, included in the annex to Poland's Energy Policy until 2030, envisages decreasing the use of these energy resources and replacing them with renewable energy sources, while preserving the demand for energy for the industry and at the constant level from 2006. Due to the above, a gradual decrease in the quantity of waste from group 01 until 2022 is to be expected.

The large amount of generated mining waste is due to the following factors²⁰:

- 1) the minerals, during the extraction of which mining waste is generated, rarely have the properties that would enable their direct use. They need to be treated at all stages of their industrial use (deposit exploitation, concentration during processing, transformation into a specific raw material). During mineral production and processing, a part of rock material that is eligible for further processing (or direct use) is separated from parts that cannot be used – waste. Yet a lack of demand at the place of manufacturing in relation to the prices of the raw material related to the cost of material treatment make the transport of the raw material uneconomic due to its considerable mass and volume;
- 2) large scale of minerals exploitation (even considering the introduction of modern mining and processing technologies and rational use of raw materials) leads to generating significant amounts of waste.

Waste prevention

Good practices aimed at reducing the amount of generated mining waste:

- 1) reducing, depending on the nature of the mineral, the exploitation of seams considerably contaminated by gangue;
- 2) planning and designing extraction works in a way that ensures optimal use of resources and obtaining a top-quality product;
- 3) reducing, if possible, the exploitation of "thin" seams with old mining technologies resulting in inefficient deposit management;
- 4) using deposits with higher concentrations;
- 5) matching powered supports exactly with the parameters of the planned longwall panel, namely using correctly adjusted parameters of powered wall supports and shearers minimising the need to rip the surrounding rocks while exploiting seams (walls);
- 6) increasing the control of wall formation by services specified in the technical documentation of walls;
- 7) while purchasing new machines, choosing higher quality equipment with longer periods of safe use.

Additionally, raising the awareness and qualifications of employees in the field of waste prevention should serve as a supportive action that would be effective in long term.

In the case of open-pit mining, waste prevention consists in correct exploitation, which should encompass:

- 1) using such methods of exploration, appraisal, extraction, processing and storage of minerals that would prevent the generation of mining waste or allow to keep its

²⁰ <http://geoportal.pgi.gov.pl/odpady/wytwarzanie>

- amount at the lowest possible level, as well as reduce the negative environmental impact or hazard to human life and health, taking BATs into account;
- 2) maximum use (management) of karst deposits in the form of clay and sanded silt with weathered limestone in the company's technological process as a corrective raw material;
 - 3) eliminating the formation of the so-called rock overhangs related to the conducted shooting, by carrying out these works in line with the applicable regulations; preserving the parameters of the drilling grid, the inclination angle of boreholes and straight line of face;
 - 4) preserving the height of the exploitation wall in the dry floor, so that it does not exceed the maximum range of work of the mining machine in a given mining technique;
 - 5) carrying out regular controls of the condition of slopes by geological services in the spring and autumn season;
 - 6) controlling the condition of exploitation slopes by the operator of the mining machine before exploitation; additionally such control should also be carried out after heavy downpours;
 - 7) carrying out on-going chemical analyses of exploitation walls in terms of their use in a technological process (drawing samples from bore holes and submitting them to a laboratory, then to the mining inspection);
 - 8) leaving veins and interlayers of gangue that are not envisaged in the geological documentation and included in the deposit resources using the adopted exploitation technique and taking into account the existing geological and mining conditions;
 - 9) decreasing the dispersion of rock pieces by optimising the shooting parameters with the use of state-of-the-art explosives.

Additionally, the provisions concerning regarding a substance or a product as a by-product may be applied to this group, and such by-products can be effectively used e.g. in the construction and road industry.

I.4.2. Waste from the production, preparation, trade and use of the products of inorganic chemistry (group 06)

The products of inorganic chemistry are manufactured mainly from natural raw materials that are often contaminated and need to be purified, which leads to the generation of waste in the manufacturing process. Depending on their intended use they are either by-products or waste.

By-products contain mainly inert material from the streams of raw materials, contaminations of raw materials used to manufacture titanium white, waste generated during the neutralisation of process streams, insoluble salts precipitated in the process of production of extractive orthophosphoric acid.

This group includes:

- 1) phosphogypsum from the production of extractive orthophosphoric acid;
- 2) soda ash from the production of soda (sodium carbonate)
- 3) iron (II) sulphate from titanium white (titanium dioxide) installations.

The greatest source of inorganic waste – phosphogypsum is the production of extractive orthophosphoric acid. That is why phosphogypsum mixed with slag and ash (code 06 09 81) has the highest share in the total amount of waste in group 06.

Figure AI.12 presents the amounts of generated waste from group 06 in 2004–2012.

Amounts of generated waste from group 06, thousand Mg/year

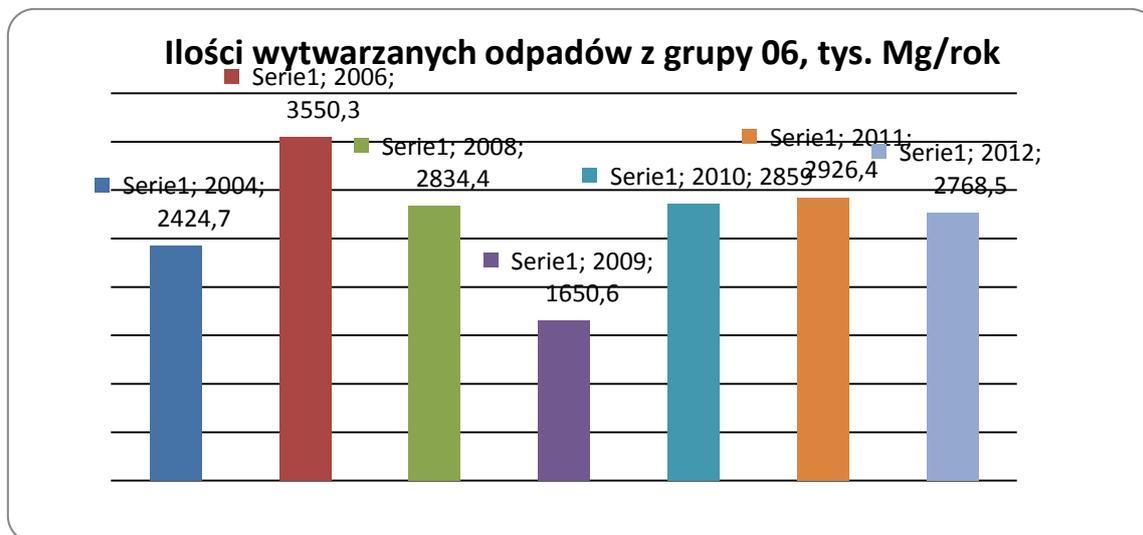


Figure AI.12. Amounts of waste from group 06 generated in 2004–2012 (source: GUS)

After a decrease in the amount of waste from group 06 generated in 2009, since 2009 its quantity has remained relatively constant.

Phosphogypsum, mostly from the production of phosphorous fertilisers, predominates in the generated waste. Tendencies²¹ indicate an increase in the consumption of fertilisers in the coming years.

Waste prevention

Due to the fact that phosphogypsum is the major problem in this group of waste, the phosphorous raw material can also be decomposed by mineral acids other than the sulphuric acid. The use of nitric acid allows for avoiding the production of waste phosphogypsum, e.g. the Odda process. This method is useful for inert phosphor raw materials that do not require deep grinding.

Research²² has shown that it is possible to use phosphogypsum in mixtures with fly ashes in road construction.

I.4.3. Waste from thermal processes (group 10)

Waste from this group is generated mostly in the power industry and in the iron and steel industry. Waste from the power industry generated during the production of electricity and heat from the combustion of such solid fuels as black and brown coal (so-called combustion waste and products of flue gas desulphurisation); these include: ash and slag mixtures from wet discharge of combustion waste, solid waste from flue gas lime desulphurisation methods, including residue gypsum, products of desulphurisation with a semi-dry method, products of desulphurisation with a dry method, and mixtures of fly ashes and solid waste from the lime methods of desulphurisation of waste gases – according to dry or semi-dry methods of flue gas desulphurisation and combustion in a fluidised bed.

²¹ According to the Prognoza rozwoju przemysłu chemicznego w Europie ze szczególnym uwzględnieniem przemysłu nieorganicznego i nawozowego, Wojciech Lubiewa-Wieleżyński, Jerzy Majchrzak, Warsaw 2010

²² Special research project (financed by the Minister of Science and Higher Education) entitled: "Use of phosphogypsum waste for road construction" carried out by the Fertilisers Research Institute, Inorganic Chemistry Division "IChN" in Gliwice in cooperation with the Road and Bridge Research Institute in Warsaw.

The waste generated in metallurgy can be divided into two groups:

- 1) waste generated as a result of the applied manufacturing technology (e.g. metallurgical slag or sulphuric acid produced as a by-product in the copper industry);
- 2) waste generated as a result of actions for environmental protection, generated as a result of cleaning of waste gas streams, slurry and ashes from dedusting systems, waste from flue gas cleaning installations, slurry after the treatment of acidic waste water.

Figure AI.13 presents the amounts of generated waste from group 10 in 2004–2012.

Amounts of generated waste from group 10, thousand Mg/year

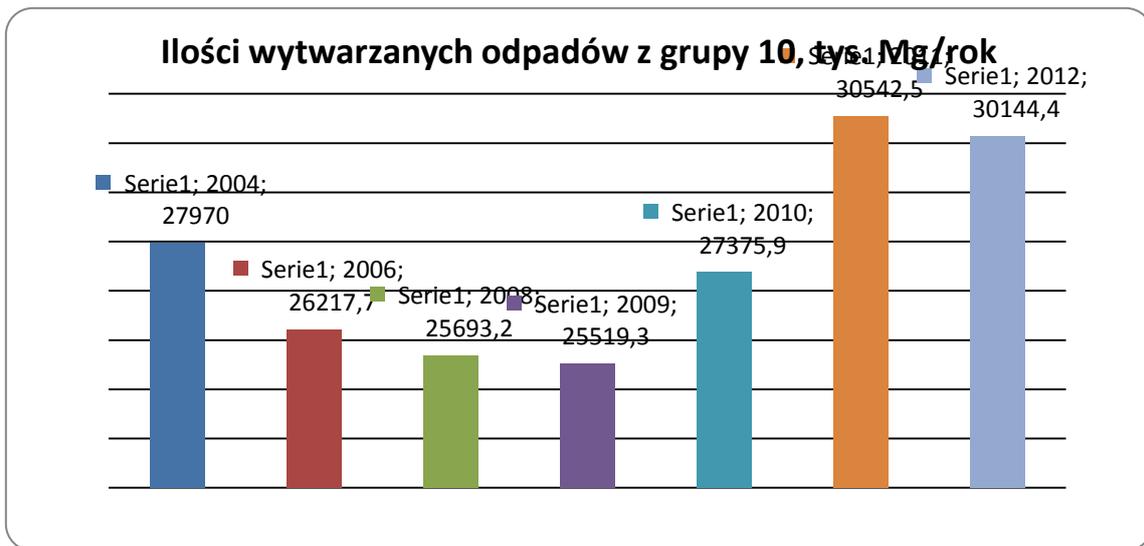


Figure AI.13. Amounts of waste from group 10 generated in 2004–2012 (source: GUS)

Since 2004, a gradual decrease in the quantity of generated waste from group 10 was observed, followed by a considerable increase in subsequent years.

The projection of black and brown coal consumption by the power industry, included in the annex to Poland's Energy Policy until 2030, envisages decreasing the use of these energy resources and replacing them with renewable energy sources, while preserving the demand for energy in the sectors with the greatest energy consumption, i.e. the industry and households at a constant level. Due to the above, a gradual decrease in the quantity of waste from group 10 until 2022 is to be expected.

It also needs to be noticed that the Act of 14 December 2012 on waste (Journal of Laws of 2013, item 21, as amended) defines the by-product, which is of significance to the power industry due to the combustion by-products generated in this industry. These include ashes, slag, ash and slag mixtures and products of fluidised bed combustion generated as a result of black and brown coal combustion in power boilers. Combustion by-products may be considered a by-product if they meet certain criteria.

Waste prevention

The generation of waste from group 10 is prevented through:

- 1) improving energy efficiency;
- 2) using modern combustion technologies;
- 3) replacing solid mineral fuels with other types of fuel, including the exploration and production of shale gas;
- 4) increasing the share of renewable energy in the energy balance.

Moreover, the amounts of generated waste can be reduced by means of considering combustion products by-products and using them in the construction industry.

I.5. Waste from the construction, renovation and demolition of buildings and road infrastructure

Waste from the construction, renovation and demolition of buildings and road infrastructure is generated in residential housing and industrial construction industry, as well as in the rail and road industry. This type of waste is generated at the stage of construction, renovation and demolition works.

The above waste should be assigned to group 17 – waste from the construction, renovation and demolition of buildings and road infrastructure (including the soil and earth from polluted areas).

Figure AI.14 presents the amounts of generated waste from group 17 in 2004–2012.

Amounts of generated waste from group 17, thousand Mg/year

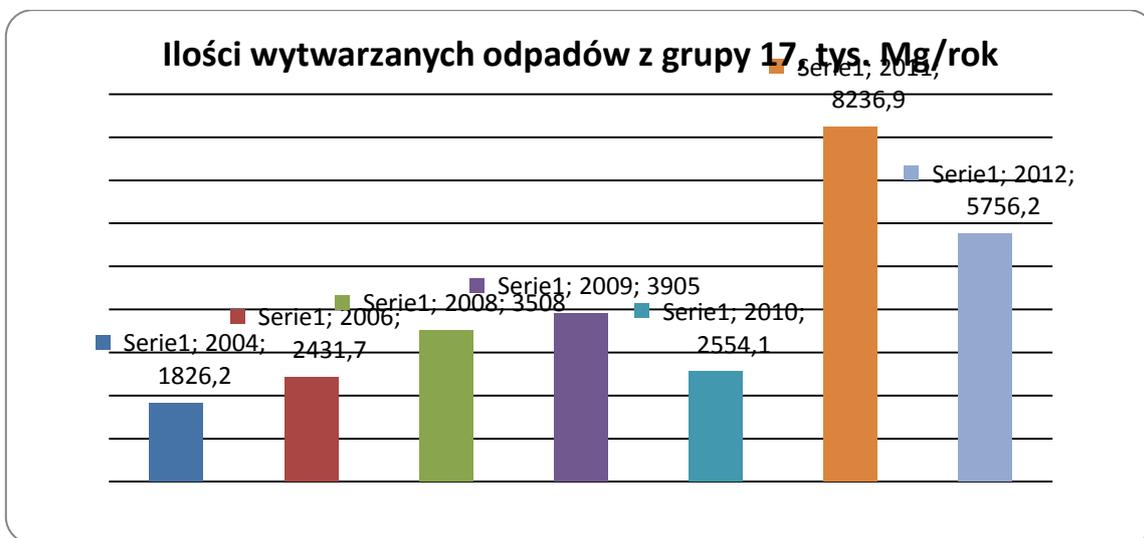


Figure AI.14. Amounts of waste from group 17 generated in 2004–2012 (source: GUS)

After the period of crisis and stagnation, an improvement in the economic situation of the construction industry is projected, which entails a rising trend in the generation of group 17 waste. The projection included in NWMP 2014 provides for an increase to 5,600,000 Mg by the year 2022.

Waste prevention

Due to the fact that this type of waste is generated at different stages of renovation and construction works, its prevention capacities are closely related to the applied technology. During renovation and construction works, the following principles need to be adhered to:

- 1) the optimisation of use of construction materials;
- 2) the use of modern devices and machinery that apply zero-waste or low-waste technologies;
- 3) the observance of parameters of technological processes;
- 4) the analysis and verification of applied technologies and standards of material wear and tear in terms of waste reduction.

I.6. Hazardous waste from business operations

Upon becoming waste, materials considered hazardous (containing substances that pose a threat to human health and the environment or with such physical or chemical properties as inflammability, toxicity, explosiveness, etc.) usually become hazardous waste, too. Also waste from materials that are not considered hazardous may be classified as hazardous.

The most significant share of hazardous waste is generated in the chemical industry. According to the GUS data, 1,491,800 Mg of hazardous waste was generated in total in 2012, of which chemical waste constituted 281,700 Mg, acidic, basic or salt waste – 191,800 Mg; waste oils – 119,600 Mg; slurries of industrial waste water – 84,300 Mg; medical and biological waste – 46,200 Mg; waste batteries and accumulators – 15,300 Mg; waste solvents 5,900 Mg; slurries and liquid waste from waste processing – 3,500 Mg.

I.6.1. Waste oil

Waste oils are generated as a result of exchange of used oils, breakdowns of systems and devices, and as a result of removing them from end-of-life vehicles.

The total amount of lubricants (according to GUS, source: data of the Ministry of the Environment) in 2009–2012 was 146,400 Mg, 139,800 Mg, 145,100 Mg, 146,900 Mg, respectively.

While comparing data from 2009–2012 it can be noticed that the amounts of oil introduced to the market remain constant.

Waste prevention

The generation of waste oil is prevented through the use of oils with prolonged period of use if it is economically and environmentally justifiable.

I.6.2. Medical and veterinary waste

Medical waste is waste generated in connection with the provision of health services and the conduct of research and scientific experiments in medicine. Veterinary waste, in turn, is waste related to the examination and treatment of animals or the provision of veterinary services, also in connection with scientific research and tests on animals.

The total amount of medical waste generated in 2011 was 66,150,700 Mg (source: Central Waste System)

The projection presented in NWMP 2014 envisages the generation of medical waste at the level of 28,000 – 29,500 Mg and veterinary waste at the level of ca. 2,800 – 3,000 Mg a year. The maintenance of a constant level of generation is expected in the coming years.

Waste prevention

The methods preventing the generation of this type of waste are limited due to the fact that the use of disposable equipment in the case of waste that has contact with human or animal tissue is necessary. Moreover, correct sorting of medical waste may decrease the amount of generated infectious waste.

I.6.3. Waste batteries and accumulators

Batteries and accumulators are sources of electricity generated by means of direct processing of chemical energy, consisting of one or several primary battery cells (that cannot be recharged) or one or several secondary battery cells (rechargeable). Due to

their content of harmful substances (including lead, cadmium and mercury) after use they become waste that poses a threat to human life and the environment.

Batteries and accumulators can be applied both in the business sector and in households. They can be divided into the following groups:

- 1) zinc-carbon, zinc-manganese and zinc-air;
- 2) nickel-cadmium;
- 3) lead;
- 4) button (without mercury);
- 5) button with mercury;
- 6) other.

Pursuant to the Act of 24 April 2009 on batteries and accumulators (Journal of Laws no. 79, item 666, as amended), the division of batteries and accumulators relates above all to their use, which is why batteries and accumulators are divided into the following groups: portable, industrial and car batteries. With regard to the processing and recycling of used batteries and accumulators and the requirement to achieve relevant recycling efficiency by processing plants, batteries and accumulators are divided into: lead-acid, nickel-cadmium and other.

In 2011, 480,847.67 Mg of car batteries and accumulators, 32,943.56 Mg of industrial batteries and accumulators and 9,932.07 Mg of portable batteries and accumulators were introduced to the market, of which 3397.25 and 774.84 Mg of used portable batteries and accumulators were collected (report of the General Inspectorate for Environmental Protection – GIOŚ for 2011).

Due to the improved quality of manufactured batteries and accumulators and their prolonged effective use, only an insignificant increase in the generation of this type of waste is envisaged in subsequent years.

Waste prevention

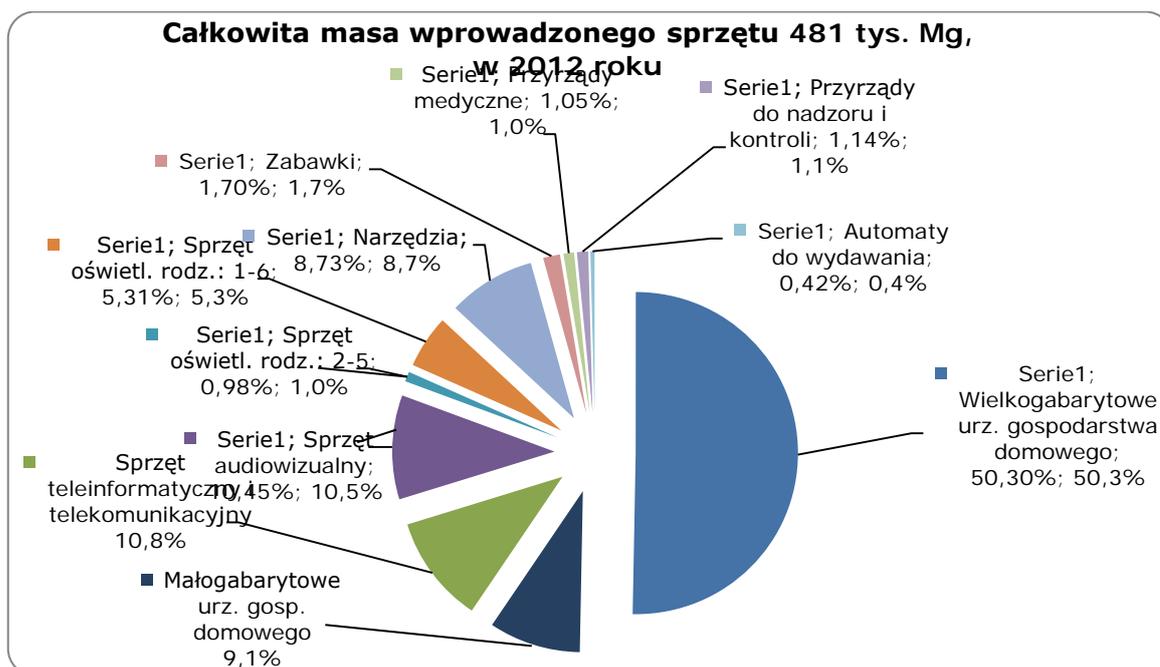
The prevention of waste batteries and accumulators' generation consists in using batteries and accumulators with prolonged lifetime, as well as in using rechargeable batteries. Moreover, proper handling of these products results in their prolonged operational use, which also prevents waste generation.

I.6.4. Waste Electrical and Electronic Equipment (WEEE)

Waste electrical and electronic equipment consists of devices whose correct operation depends on power supply or the presence of electromagnetic fields and devices that can serve to generate, transmit or measure power or electromagnetic field and are designed to be used with voltage not exceeding 1000 V for alternating current and 1500 V for direct current, which are waste as defined by the Act of 14 December 2012 on waste. Waste electrical and electronic devices are generated in households, businesses, infrastructural facilities and in the industry. The types of electrical and electronic equipment are specified in Annex No. 1 to the Act of 29 July 2005 on waste electrical and electronic equipment (Journal of Laws of 2013, item 1155) and include e.g.: coolers, washing machines, electrical heaters, vacuum cleaners, computers, telephones, fluorescent lamps, etc.

According to the current GIOŚ report, in 2012, ca. 481,000 Mg of electrical and electronic equipment was introduced to the market, of which group 1 – bulk household appliances had the largest quantitative share (50.30%). This group was followed in terms of tonnage by ICT and telecommunications equipment (10.79%) and audiovisual equipment (10.45%). Data on the share of other categories of devices are provided in Figure AI.15.

Total quantity of equipment placed on the market: 481,000 Mg, in 2012



Bulk household appliances – 50.3%
Small household appliances – 9.1%
ICT and telecommunications equipment – 10.8%
Audiovisual equipment – 10.5%
Lighting equipment types 2–5 – 1.0%
Lighting equipment types 1–6 – 5.3%
Toys – 1.7%
Medical instruments – 1.0%
Supervision and control instruments – 1.1%
Dispensers – 0.4%

Figure AI.15. Quantity of electrical and electronic equipment introduced to the market in Poland in 2012 (according to the GIOŚ report)

According to the GIOŚ report, in 2010 the quantity of waste electrical equipment amounted to 112,200 Mg, in 2011 to 143,300 Mg and in 2012 to 157,200 Mg.

The prognosis presented in NWMP 2014 envisaged that the amount of waste electrical and electronic equipment will be higher than it is in fact (on the basis of data for 2010 and 2011). The amount of separately collected WEEE gradually increases. It seems that the tendency of moderate increase in the generation of this type of waste will be preserved.

Waste prevention

Prolonging the period of use of electrical and electronic equipment is a very important action. This is possible through the promotion of durable products, the promotion of repair and reuse, and through appropriate care of the technical condition of devices. In the case of rarely used electrical and electronic tools, hire services should be promoted. The generation of the analysed waste is also prevented through green public procurements, under which public entities include the criteria and/or environmental requirements to the procurement process (the process of granting public procurements) and strive for solutions that would minimise the negative impact of goods/services on the

environment e.g. through making some components of devices from waste and considering the entire life cycle of products, and influence the development and popularisation of environmental technologies, including low-waste technologies. The generation of this type of waste can also be prevented by means of preferring the manufacture of devices that allow for easy repairs, disassembly and reuse of whole devices or their parts.

Another element of waste prevention consists in awareness-raising actions aimed at shaping conscious consumer attitudes in the field of:

- 1) choosing more durable devices;
- 2) understanding product labels;
- 3) familiarity with the principles of proper equipment operation;
- 4) using repair services;
- 5) delivering used equipment to the designated collection facilities.

I.6.5. End-of-life vehicles

According to the guidelines of NWMP 2014, ca. 6% of operated vehicles should be disassembled each year.

The projection of NWMP 2014 on the amounts of end-of-life cars in subsequent years was as follows:

- 1) 2010 – 1,005,000 Mg;
- 2) 2014 – 1,222,000 Mg;
- 3) 2018 – 1,485,000 Mg.

The above projections were, however, not reflected in statistical data. Table AI.7 shows the number of end-of-life vehicles delivered to the Disassembly Station in 2010–2011.

Table AI.7. Handling end-of-use vehicles (source: according to the data of the Ministry of the Environment²³)

Specification	2010		2011	
	number	quantity, Mg	number	quantity, Mg
End-of-life vehicles delivered to the disassembly station	259,576	217,636	295,152	284,307
Elements of furnishing and parts intended for reuse		23,058 (10.6%)		25,559 (9.0%)

Ca. 10.6% and 9.0% of the quantity of vehicles delivered to the Disassembly Station were reused in the form of elements of furnishing and parts in 2010 and 2011, respectively.

The table below presents the number of motor vehicles registered in Poland and the volume of import of used passenger cars.

Table AI.8. Number of cars registered in Poland and the volume of import of passenger cars in 2005–2011 (source: data of the Polish Automotive Industry Association published by GUS)

Specification	2005	2006	2007	2008	2009	2010	2011
	thousand						

²³ Ministry of the Environment, Reports of the Republic of Poland on the achieved levels of reuse and recovery as well as reuse and recycling of end-of-life vehicles for the period from 1 January 2011 to 31 December 2011 and for the period from 1 January 2010 to 31 December 2010.

Specification	2005	2006	2007	2008	2009	2010	2011
	thousand						
Motor vehicles	16,815.9	18,035	19,471.8	21,336.9	22,024.7	23,037.1	23,852.5
Import of used passenger cars	870.8	816.8	994.6	1104	693.3	718.3	655.3

According to the estimates of the European Automobile Manufacturers' Association (ACEA), in April 2012 the number of newly registered passenger cars increased in annual terms by 6.7%²⁴. Taking the above data into consideration, a growth trend can be observed concerning the number of vehicles in the country, which may translate into an increase in the number of end-of-life vehicles.

Waste prevention

The generation of waste in this stream may be prevented by means of increasing the stream of elements of furnishing and parts intended for reuse. Major part may be played by manufacturers who, at the stage of designing, should follow the rules of eco-design in order to reduce the generation of waste at all stages of vehicle's life cycle. One of the methods to prevent the generation of waste vehicles is to decrease the need to purchase vehicles by private users. People can use public transport as an alternative. Actions aimed at developing and promoting mass transport may reduce the generation of end-of-life vehicles. Other solution is to share vehicles among several users, which is currently infrequent.

I.6.6. Plant protection products past best before date

The current sale of plant protection products in 2011 amounted to 21,779 Mg and in 2012 to 21,886 Mg of active substance (GUS, Environmental protection 2012 and 2013).

Plant protection products are purchased and used on an on-going basis, which explains why they rarely exceed their best before date. However, packaging waste related to plant protection products is generated. The packaging of plant protection products that are hazardous substances should be returned to the seller of hazardous substances that are plant protection products.

Waste prevention

The methods of waste prevention concerning plant protection products past their best before date consist primarily in shaping conscious consumer behaviour, so that consumers would buy such amounts of plant protection products that they would not exceed their best before date. One of the methods is also to promote general principles of integrated plant protection or organic farming, where the use of plant protection products is limited.

In relation to packaging waste prevention, it is crucial to ensure efficient operation of the system of returning such packaging and shaping consumer behaviour, so that the consumers would conform to the requirement to return the packaging of hazardous preparations to the seller.

Pursuant to the published announcement of the Minister of Agriculture and Rural Development of 6 May 2013: National action plan to reduce the risks associated with the use of plant protection products for 2013–2017 (M.P. item 536), good practices in the field of waste prevention or their proper handling are a crucial part of training for people

²⁴ Source: web portal <http://biznes.pl/>

that use plant protection products in agriculture and forestry. Shaping the awareness in this field among the users of plant protection products requires also carrying out control actions by competent services.

I.7. Other waste

I.7.1. Waste tires

Waste tires originate from the use of motor vehicles and are generated primarily at service points, in companies operating vehicles and at stations disassembling end-of-life vehicles. The amount of generated waste tires depends on the season and increases in particular at the time of autumn-winter and spring tire replacement.

In 2009–2011, the amount of tires introduced to the market increased from 165,800 Mg to 222,900 Mg. In 2012, in turn, an insignificant decrease in the amount of tires introduced to the market to 218,900 Mg occurred. (GUS, Environmental Protection 2012 and 2013, data source: Ministry of the Environment).

Since 2001, tires have been covered with Extended Producer Responsibility (EPR). It is forbidden to landfill waste tires, with the exception of bicycle tires and tires with external diameter exceeding 1400 mm.

Actions aimed at tire reuse are carried out. According to GUS, in 2010 – 5,848 Mg, in 2011 – 5,495 Mg and in 2012 – 7,006 Mg of waste tires were introduced to the market, which are subject to recovery and recycling (GUS, Environmental protection 2012 and 2013, data source: Ministry of the Environment).

The amount of waste tires is directly related to the amount of used and end-of-life vehicles. It is estimated that the increase in the amount of waste tires in subsequent years will be proportional to the increase in the number of vehicles.

Waste prevention

The methods of prevention concerning this type of waste are determined by the traffic safety requirements, yet shaping proper attitudes – i.e. decreasing the use of cars in favour of public transport also contributes to reducing the generation of this type of waste. Moreover, the implementation of new technologies of tire production (using abrasion resistant materials) improves their durability and prolongs their economic lifetime. It is also possible to revive waste tires by means of re-treading, which allows for their rehabilitation. It is estimated that in 2010, from among all tires introduced to the market (according to GUS – 195,000 Mg), re-treaded tires represented ca. 2%, i.e. 5,600 Mg.

I.7.2. Urban waste water sludges

Waste in the form of urban waste water sludges is generated in the process of urban waste water treatment in treatment plants. It belongs to group 19 as waste with code 19 08 05 – sludges from treatment of urban waste water. The volume of this waste increases with the expansion of the sewage network and the increase in the number of treatment plants, both in urban and in rural areas.

The total amount of generated urban waste water sludges in 2009, 2010, 2011 and 2012 was (according to GUS) 563,000 Mg; 526,000 Mg, 519,000 Mg, 533,000 Mg of dry mass, respectively. The amount of waste water sludges generated at that time decreased in spite of an increase in the number of people using treatment plants.

Subject to the Update of the National Programme for Municipal Waste Water Treatment (NPMWWT) 2010, the deadline for the implementation of investment projects in 126 cities covered by the programme was postponed from 2010 to subsequent years. For 62 urban areas the deadline for investment completion was prolonged until 2015,

which affects the rate of generation of urban waste water sludges in subsequent years in relation to the projections presented in NWMP 2014.

Waste prevention

The waste prevention methods concerning this type of waste are very limited. When more advanced technologies are applied, it is possible to reduce the amount of sludges by means of decreasing water content. The dehydration level should, however, always be adjusted to further methods of sludge handling.

Since the generation of urban waste water sludges depends on the amount of collected municipal waste water, the focus should be on properly conducted technological treatment process in order to minimise the possibility of negative environmental impact. In the waste water treatment process it is crucial to:

- 1) analyse the quality of in-flowing waste water in terms of carried load; pollutants influencing the future quality of sludges;
- 2) stabilise – waste water sludges are not chemically and biologically inert and may have an unpleasant odour due to their putrefaction capacity;
- 3) optimise the water content and volume of waste water sludges with view to managing them in the future;
- 4) reduce the amount of pathogenic microorganisms if people, animals or plants come into contact with waste water sludges;
- 5) recover phosphorus, nitrogen and cariogenic organic matter for agriculture, e.g. through the manufacture of products that improve soil quality by composting, and
- 6) use the energy capacity, if financially feasible.

ANNEX II. FAMILIARITY WITH WASTE MANAGEMENT ISSUES IN THE SOCIETY AND RELATED AWARENESS-RAISING CAMPAIGNS

Awareness campaigns are an integral part of legal and organisational changes introduced to the society in every topic. Since the time of entry into force of the Act of 1 July 2011 on the change of the Act on maintaining cleanliness and order in municipalities and certain other acts (Journal of Laws no. 152, item 879) and in connection with a change in the waste management system, it has been necessary to organise various awareness-raising campaigns dedicated to municipal waste management. It needs to be noticed that such campaigns should be organised all the time to keep raising social awareness. Pursuant to the aforementioned act, the municipality is obliged to: carry out awareness-raising actions in the field of correct municipal waste management, in particular its separate collection; publish on the municipality's website information concerning waste collection operators and places of waste management, separate waste collection facilities and means of services provision by these facilities, operators collecting waste electrical and electronic equipment; publish information on the levels achieved by the municipality and operators collecting municipal waste from property owners that do not operate under an agreement with the municipality, in a given calendar year, on the required levels of recycling, preparing for reuse and recovery with other methods and reducing the quantity of landfilled biodegradable municipal waste.

Educational actions taken in different areas of Poland may be broken down into:

- 1) municipal;
- 2) regional;
- 3) voivodeship;
- 4) national.

Environmental campaigns in Poland are carried out by:

- 1) educational institutions;
- 2) central and local government units;
- 3) municipal associations;
- 4) enterprises;
- 5) civil society organisations.

Often the said entities cooperate for the efficient use of obtained funds and own resources, e.g. staff. Environmental campaigns in Poland dedicated to waste sorting education are diversified and often astound with their creativity.

To evaluate the level of familiarity with waste management issues in the society, related educational campaigns carried out last year should be taken into account. At the national level, they are carried out in each voivodeship, but it is difficult to estimate the number of participants and the level of their involvement. This is due to the fact that a major part of campaigns is run on-line in digital form.

In 2013, a PBS Report was prepared at the request of the Minister of the Environment in order to examine the ecological awareness and behaviours of people in Poland. The report demonstrated that due to the implementation of changes to the Act on maintaining cleanliness and order in municipalities and related awareness-raising campaigns, regular waste sorting has become popular in the households of respondents. Owing to the transfer of responsibility for waste management to local governments, some inhabitants gained access to waste sorting containers. In the view of respondents, the lack of appropriate infrastructure ceased to be the major hindrance. The significance of other reasons, however, increased, such as: lack of space at home for sorting or no willingness to do so.

The main reason why respondents do not sort waste or do it rarely is lack of space at home. In relation to the measurement in 2012, the percentage of people that explain their current method of waste management this way more than doubled.

Another reason why the respondents fail to regularly sort waste is the lack of appropriate containers near their place of living. In the current edition of the survey, the share of people indicating this reason significantly decreased, which may be due to the transfer of responsibility for waste management to local governments and providing groups of inhabitants with containers for individual waste categories.

Lack of willingness to regularly sort waste was the third most frequently given answer.

The conclusions presented in the report show, however, that the number of people who sporadically sort waste decrease, and represent now 15% of all respondents. It was also noticed that people with higher education stand out favourably against the background of others.

Legal regulations

A review of national legislation proves that the regulations raise waste prevention issues and make it possible to implement fundamental actions in this respect.

The most important legal acts related to waste prevention include:

- 1) Act of 13 September 1996 on maintaining cleanliness and order in municipalities (Journal of Laws of 2013, item 1399);
- 2) Act of 27 April 2001 – Environmental Protection Law (Journal of Laws of 2013, item 1232, as amended);
- 3) Act of 11 May 2001 on packaging and packaging waste (Journal of Laws no. 63, item 638, as amended), replaced on 1 January 2014 by the Act of 13 June 2013 on packaging and packaging waste management (Journal of Laws item 888);
- 4) Act of 11 May 2001 on economic operators' obligations in the scope of managing certain types of waste and on product fees (Journal of Laws of 2007, No. 90, item 607, as amended);
- 5) Act of 20 January 2005 on the recycling of end-of-use vehicles (Journal of Laws of 2013, item 1162);
- 6) Act of 29 July 2005 on waste electrical and electronic equipment (Journal of Laws of 2013, item 1155);
- 7) Act of 10 July 2008 on mining waste (Journal of Laws of 2013, item 1136);
- 8) Act of 24 April 2009 on batteries and accumulators (Journal of Laws no. 79, item 666, as amended);
- 9) Act of 14 December 2012 on waste (Journal of Laws of 2013, item 21, as amended)

and executive acts issued subject to authorisations provided in respective acts.

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives was transposed to the national legislation in its major part by the Act of 14 December 2012 on waste. Pursuant to this Act, while conducting activities leading to waste generation, this generation needs to be prevented or the amount and negative impact of waste on human life and health and the environment should be reduced in the first place. The Act also specifies waste prevention measures.

The Act – Environmental Protection Law regulates the issue of environmental permits and indicates the necessity to apply waste prevention methods or to reduce the negative environmental impact of waste.

The Act on maintaining cleanliness and order in municipalities specifies the duties of municipalities and property owners with respect to maintaining cleanliness and order. It also specifies the terms of operation in the field of collecting municipal waste from property owners and managing this waste in line with the waste management hierarchy indicated in the Act on waste.

Waste prevention issues are also raised in the Act on packaging and packaging waste management. More specifically, the Act specifies the requirements to be met by packaging introduced to the market, the principles of handling packaging and packaging waste, as well as the principles of setting and collecting product fees. These requirements are aimed at decreasing the amount and harmfulness of materials and substances contained in packaging and packaging waste to the environment and the amount and harmfulness of packaging and packaging waste at all stages of manufacturing processes, introduction to the market, distribution and processing.

The Act on economic operators' obligations in the scope of managing certain types of waste and on product fees specifies legal and financial instruments aimed at motivating entrepreneurs to search for and use such packaging that is environmentally-friendly and profitable.

Also the Act on mining waste is worth noticing since it aims at preventing waste in the mining industry and reducing its negative environmental impact. The regulations require that entrepreneurs use such methods of exploration, appraisal, extraction, processing and storage that would prevent the generation of mining waste or allow for keeping its amount at the lowest possible level, as well as reduce the negative environmental impact or hazard to human life and health, taking BATs into account.

Other mentioned legal acts raise waste prevention issues to a lesser extent, providing guidelines aimed at supporting the achievement of targets specified in the Waste Framework Directive.

National policies and strategies

Strategic documents at the national level generally result from waste prevention targets, priorities and actions specified in EU strategic documents.

The basic nine strategies of Poland include:

- 1) Strategy for Innovation and Efficiency of the Economy;
- 2) Human Capital Development Strategy;
- 3) Transport Development Strategy;
- 4) Energy Security and Environment Strategy;
- 5) Efficient State;
- 6) Social Capital Development Strategy;
- 7) National Regional Development Strategy;
- 8) Strategy of Development of the National Security System of the Republic of Poland 2022;
- 9) Strategy for Sustainable Development of Rural Areas and Agriculture.

The developed long-term strategic documents provide frameworks, objectives and actions required to implement state strategies. The most important are:

- 1) Long-Term National Development Strategy, Poland 2030. Third wave of modernity;
- 2) National Spatial Development Concept 2030;
- 3) National Development Strategy 2020, Active society, Competitive economy, Efficient state;
- 4) Programming financial perspective 2014–2020 – Partnership Agreement;
- 5) Energy Security and Environment Strategy, 2020 Perspective

The key objectives, priorities and directions specified in the strategic documents that support waste prevention include:

- 1) creating incentives accelerating the development of a green economy;
- 2) decreasing environmental pressure caused by the emission of pollution to water, air and soil;
- 3) securing economically valuable mineral deposits and increasing the use of recyclable materials;
- 4) rational resources management;
- 5) supporting the transition into a low-carbon economy in all sectors and environmental protection;
- 6) rational waste management, including its use for power generation.

Having analysed the provisions included in individual strategic documents, it can be stated that the fundamental objectives, priorities and actions specified in national

documents comply with those specified in EU documents. Nevertheless, waste prevention issues are not sufficiently emphasised in national documents.

Regional plans and programmes

Issues related to waste prevention at regional level are provided for in:

- 1) Voivodeship Waste Management Plans (VWMPs);
- 2) the Corporate Social Responsibility Concept (CSR);
- 3) other voluntary supporting initiatives.

Voivodeship Waste Management Plans

Prepared and adopted Voivodeship Waste Management Plans do include waste prevention issues, yet to an insufficient extent.

The WP measures specified in the plans include:

- 1) "green procurements", e.g.: providing for the purchases of goods containing recycled materials or substances in the Terms of Reference; including environmental protection and waste prevention criteria in the public procurement procedures;
- 2) promotional and educational actions, e.g. environmental education including familiarising people with the new municipal waste management system and promoting proper handling of municipal waste;
- 3) designing new processes and goods in a way that would ensure the least possible environmental impact at the stage of production, use and after their use.

Corporate Social Responsibility – CSR

CSR consists in voluntary consideration of social and environmental issues in the commercial activity of businesses and in their relations with interested parties that goes beyond the minimum legal requirements. The basic assumption behind CSR is responsible and ethical conduct of business towards the social groups it interacts with, with the greatest possible respect for the natural environment.

The actions taken under CSR are not required by law or may not be directly related to the current business operations. CSR requires going beyond these standards and imposing on oneself higher ethical standards.

The substance of CSR is illustrated best in the social responsibility standard ISO 26000 published in November 2010 by the International Standardisation Organisation, (ISO). In ISO 26000, social responsibility is defined as the organisation's commitment to integrate social and environmental aspects into the decision-making process and to take responsibility for the impact of made decisions and activity on the society and the environment.

As regards waste management, CSR refers to decreasing the volume of generated waste and considering environmental guidelines at the stage of product design (eco-design, Life Cycle Assessment – LCA/LCM).

As regards waste prevention, it may take various forms. The most interesting solutions applied in Poland in relation to waste prevention are as follows: PET bottles were exchanged for seedlings of trees and bushes; low-waste packaging technology is applied in the production of yoghurts; own advertising banners are used for the production of reusable bags; used mobile phones are collected and purchased at the stores of mobile operators; education and recycling.

Integrated Product Policy (IPP) is an initiative of the European Commission aimed at linking broadly defined product policy with environmental protection through reference to product life cycle. To date, the greatest dynamics has been observed in the

development of so-called **green public procurement** (GPP) consisting in integrating environmental criteria and requirements to tender procedures and search for solutions that minimize the negative environmental impact of goods and services throughout their life time.

High resource consumption may be a hindrance to the development of a modern and competitive economy; therefore, the **National Reform Programme** specifies a number of actions that are in line with the sustainable development priority of the "Europe 2020" strategy. They include investments in environmental protection, power and transport infrastructure, as well as in the development and implementation of green technologies. Investments in modern and more efficient transmission grids, support for the use of renewable energy sources, new regulations in the field of water and sewage management and waste management are to decrease the energy consumption and the resources consumption of the Polish economy. Transport investments are also planned to decrease the negative environmental impact of transport.

The programme of the Minister of the Environment "Leader of Polish Ecology" rewards companies that help to protect the environment and try to develop in a sustainable way. The aim of the programme is to reward examples of commercial success achieved in an environmentally-friendly way.

The **"Clean Business"** programme of the Polish Environmental Partnership Foundation showcases small and medium sized enterprises that try to protect the environment and implement innovative solutions in order to achieve that.

The **"Fair Play Enterprise"** programme of the Polish Chamber of Commerce promotes companies that follow the principles of Corporate Social Responsibility.

Businesses that plan to acquire an ecolabel under the Operational Programme Infrastructure and Environment may obtain financial support.

The "Environmental Compliance Assistance Programme" (ECAP) aims to:

- 1) reduce the administrative burden on SMEs;
- 2) promote the implementation of tailor-made environmental management systems;
- 3) finance sustainable production in SMEs;
- 4) develop competencies and improve communication, including access to information.

The Minister of the Environment runs the **"Work Clean" campaign**, which aims to:

- 1) involve employees and management of companies and offices in carrying out internal educational campaigns that promote environmentally-friendly behaviour;
- 2) reward the best educational campaigns dedicated to environmental protection in companies and offices.

The mission of the National Cleaner Production Centre is to promote environmental management systems, both formal (ISO 14001, EU Eco-Management and Audit Scheme – EMAS) and informal (Cleaner Production), as well as relevant educational activities.

Other initiatives

At the regional level, initiatives are undertaken to serve waste prevention, such as the point of unpaid item collection "SKLEPOWISKO" in Wrocław and the Separate Municipal Waste Collection Facility in Poznań. Both initiatives support the concept of reuse, contributing to the reduction of waste generation, by granting waste "second life".

Educational campaigns

Examples of environmental education campaigns and projects launched in Poland are presented below:

- 1) "Education and information in the field of waste management – campaign aimed at improving the efficiency of separate waste collection systems" financed by the National Fund for Environmental Protection and Water Management and run at <http://www.edukacjaodpadowa.pl>. "Zielona Akcja" Environmental Foundation has for years run educational programmes for school children and youth, as well as ecology education workshops for school and pre-school teachers;
- 2) the "Waste Academy" project – comprehensive education aimed at changing behaviour patterns and raising environmental awareness in the field of correct waste management. The project uses such educational instruments as: training conducted with activating methods, e-learning courses and an educational web portal with interactive tools;
- 3) regional and national campaigns organised by civil society organisations;
- 4) in the recent years, Liga Ochrony Przyrody [League for Nature Conservation] carried out the following projects²⁵: „Śmieć i My” [Litter and We], „Zielone Karpaty=Czyste Karpaty” [Green Carpathians = Clean Carpathians], „Osobiście Segreguję” [I sort waste in person];
- 5) for more than ten years, RECAL – Foundation for Recovery of Aluminium Beverage Cans has organised a number of actions to increase the amount of recovered aluminium beverage cans. The following holiday recycling campaigns are particularly worth highlighting: "Clean Mountains", "Clean Bieszczady Mountains", "Clean Mazury", "Clean Beaches" and "Clean Sudety Mountains";
- 6) national campaigns organised by the Ministry of the Environment: "Don't litter your consciousness" – the concept of "environmental sin" was used, defined as incinerating waste in individual household furnaces and depositing waste at so-called "wild" landfills.

Report published by TNS Polska²⁶

Consumption of products with eco-labels

Ecolabelling of products allows consumers to choose products or services that create relatively smaller pressure on the environment, as long as it is cost-effective for the consumer.

Ecolabels are an environmentally-friendly instrument that should inform the consumer about the possible impact of a packaging or a product (e.g. batteries, plastic products, electrical and electronic equipment, etc.) on the environment and the means of handling it. Labels are primarily informative (they provide data on the amount of consumed energy, materials, water, and emitted noise during product operation, as well as the determined criteria and standards of a given product), but also bear significance for quality and trade.

Ecolabelling programmes are voluntary. They are run by state agencies, civil society organisations or private companies, including national, regional and international ones. In order for a product to obtain an ecolabel, it has to be a so-called "environmental leader", which means that it cannot cause a negative environmental impact at any stage of its life cycle.²⁷

Each group of goods is governed by different criteria of granting ecolabels. In Europe, according to the guidelines developed by OECD (Organisation for Economic Cooperation and Development), an ecolabel is granted by a relevant public or private

²⁵ Source: „Kampanie edukacyjne w Polsce. Przykłady edukacji ekologicznej w zakresie segregacji odpadów.” Piotr Kutiak

²⁶ Source: "The study of ecological awareness and behaviour of Polish citizens. Report by TNS Polska", Ministry of the Environment, Warsaw 2012

²⁷ Source: „Analiza możliwości skutecznej promocji oznakowań ekologicznych”, R. Janikowski, Warsaw–Katowice 2008

organisation (e.g. European Commission – Ecolabel). In Poland the criteria for granting ecolabels are established by the Polish Centre for Research and Certification.

In the EU, a voluntary Ecolabel system has been used for over 20 years, owing to which people are able to make conscious purchases, selecting products that comply with a number of environmental impact criteria. The number of goods and services that have been granted EU ecolabels increases every year. Currently, EU ecolabels can be found on over 17,000 products. The greatest number of Ecolabels have been granted in Italy: 9067, France: 3839 and in the UK: 1616.

Polish producers acquired first Ecolabel certificates in 2005. To date, 138 certificates have been granted. Additionally, a Polish ecolabel – Ekoznak is granted (42 certificates have been issued) – see Table AI.9.

Table AI.9. Number of ecolabelling certificates granted in Poland (source: Polish Centre for Research and Certification)

Certificates	Number of issued certificates	Example products
Ekoznak	42	offset paper, cleaning agents, cosmetics, knits, magazines, printouts
Ecolabel	138	electronic equipment, paper, paint and lacquers, detergents, soil improvement products

Currently in Poland, ecolabelling is not a criterion of purchase. The awareness of it is still low and support for ecolabelling is needed. At the same time, regional and local products should be promoted.

Programmes financing WP actions

The need to implement certain waste management actions requires an efficient financing scheme. The scheme of financing environmental protection, including waste management, is constantly being developed and enhanced.

The fundamental sources of financing environmental investment projects in municipalities, among them those related to waste management, include:

- 1) public funds:
 - a) own resources of local governments,
 - b) national and voivodeship funds and foundations, e.g. National Fund for Environmental Protection and Water Management (NFOŚiGW), Voivodeship Funds for Environmental Protection and Water Management, the "European Fund for the Development of Polish Countryside", the Foundation for Polish-German Cooperation, the Global Environment Facility Small Grants Programme, the option to establish state aid programmes for SMEs by the Minister of Economy,
 - c) EU funds, e.g. Life + financed under Operational Programme Infrastructure and Environment, Smart Growth Operational Programme, Rural Development Operational Programme, Regional Operational Programmes;
- 2) private funds:
 - a) financial institutions, e.g. commercial banks granting loans, municipal bonds,
 - b) own resources of enterprises supported by public funds and bank loans.
- 3) mixed:
 - public-private partnerships

Financing actions resulting from voivodeship waste management plans requires support from external financing sources.

Projection of waste prevention tendencies

Projections of WP tendencies may be based on the evaluation of European tendencies in this area.

The following priority actions are noticeable in WP programmes and strategies of EU countries that are highly advanced in the field of waste management:

- 1) attention to the issue of waste prevention in households;
- 2) emphasis on "soft" actions, such as promotion and education;
- 3) considering a broad use of environmental management systems in business as a mechanism to support WP;
- 4) introducing eco-design principles and LCA as an important component of WP at the stage of product preparation.

Changes in the attitudes towards WP in Poland should follow the same paths. Experience and good practices of such countries as Germany, Ireland, Austria or the United Kingdom can be drawn upon. Naturally, their implementation should take into account national and regional characteristics. The following possible projects and undertakings can be enumerated as examples:

- 1) the creation of a national know-how transfer network for local governments dedicated to waste prevention in order to support the initiatives of local business and local communities;
- 2) an educational project offering advice and guidance on decreasing the amount of food waste in households;
- 3) regional waste prevention competitions for schools, hotels and restaurants;
- 4) agreements between retail companies to reduce the amount of generated waste;
- 5) financial support for specialist companies that prepare products for reuse;
- 6) the promotion of product service systems, creating conditions for the development of such services;
- 7) support for applied research and implementations in the field of Life Cycle Assessment and eco-design.

Many countries of the European Union have their own networks of repair and reuse centres connected with separate municipal waste collection facilities (PSZOK) that receive products which are not waste for reuse or waste that is prepared for reuse. Owing to the requirement to create such facilities in municipalities, an opportunity arises to connect their operation with subsequent components of repair and reuse networks also in Poland. A correctly operating network should consist of 3 stages/steps: collection and sorting, preparing for reuse and sale. The conditions and model of operation of such networks are suggested below.

Reuse in Poland²⁸

Reuse is a priority action that enables prolonging product life cycle and hence reducing its environmental impact. Reuse concerns items that have never become waste – e.g. as a result of sale on a web portal or donating second-hand items to people in need. Reuse can also be an effect of preparing waste considered items for reuse. Preparing for reuse is the second level of waste management hierarchy.

Already today, there are many forms of reuse available in Poland. Under the CERREC project concerning national terms of reuse introduction, it was estimated that the amount of second-hand items sold at street markets is ca. 6 kg/P per year. These items often originate from separate municipal waste collection facilities (PSZOK) in Germany and other countries. Other examples of reuse existing in Poland, in decreasing order of importance:

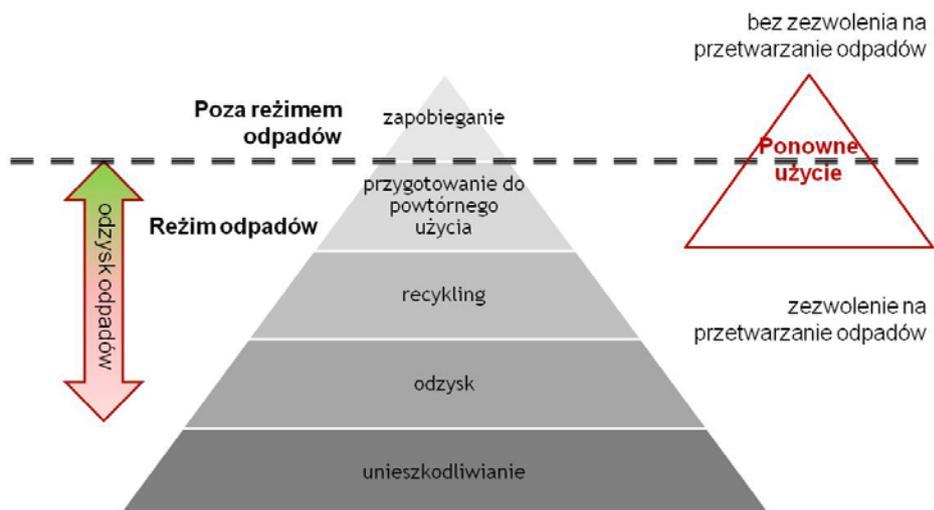
- 1) web portals acting as intermediaries in the sale of second-hand items (Allegro, tablica.pl and Gumtree);
- 2) donating items to friends;
- 3) web portals acting as intermediaries in exchange / donations (e.g. gratyzchaty);
- 4) second-hand stores selling more valuable items and antiques;
- 5) announcements in local press (sale and donations);
- 6) second-hand boutiques;
- 7) reuse thrift stores (Emmaus, Sue Ryder Foundation);
- 8) donations through churches and other intermediary charity organisations;
- 9) reuse of WEEE (reported amounts);
- 10) reuse of parts of end-of-life vehicles.

Most of the enumerated forms of reuse are not registered in any way; therefore, they are not considered in the statistics concerning the levels of reuse (apart from the reuse of WEEE and car parts).

As mentioned before, reuse can be broken down into two groups of actions:

- 1) reuse of second-hand items that have not become waste;
- 2) preparing for reuse. In this case used items become waste, and after processing (e.g. repair, verification or cleaning) they cease to be waste and are reused as in the first case – Figure AI.16.

²⁸ CERREC Europejskie sieci i centra napraw i ponownego wykorzystania Krajowe warunki tworzenia centrów i sieci napraw i ponownego wykorzystania, Monika Żurańska-Skalny, Jan den Boer, Wameco S.C., Emilia den Boer Wrocław University of Technology, at the request of the Marshal Office of the Kujawsko-Pomorskie Voivodeship, Project co-financed by the European Regional Development Fund, May 2012



PL	EN
Poza reżimem odpadów	Outside the waste management system
Reżim odpadów	Waste management system
Odzysk odpadów	Waste recovery
Zapobieganie	Prevention
Przygotowanie do powtórnego użycia	Preparing for Reuse
Recykling	Recycling
Odzysk	Other Recovery
Unieszkodliwianie	Disposal
Bez zezwolenie na przetwarzanie odpadów	Without a waste processing permit
Ponowne użycie	Reuse
Zezwolenie na przetwarzanie odpadów	Waste processing permit

Figure AI.16. Reuse in the waste management hierarchy

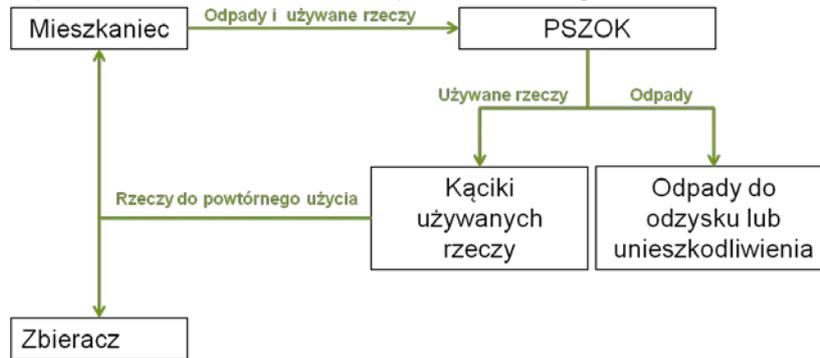
Forms of reuse and preparing for reuse that are not broadly implemented in Poland are presented below:

- 1) reuse corners, which can be considered an easy first step for municipalities;
- 2) networks of reuse and repair centres.

Reuse corner

Municipalities are required to establish and run separate municipal waste collection facilities (PSZOKs), where people will be able to deliver problematic waste, including e.g. bulk waste. The operation of a reuse corner as a separate part of PSZOK is a simple solution, known in other countries, which allows for a practical implementation of bulk waste prevention. The creation of a reuse corner during the organisation of PSZOK increases the investment cost only insignificantly.

The principles of operation of reuse corners are presented in Figure AI.17.



PL	EN
Mieszkaniec	Inhabitant
Odpady i używane rzeczy	Waste and used items
PSZOK	PSZOK (separate municipal waste collection facility)
Używane rzeczy	Second-hand items
Odpady	Waste
Kąciki używanych rzeczy	Reuse corners
Odpady do odzysku lub unieszkodliwienia	Waste for recovery or disposal
Rzeczy to powtórnego użycia	Items for reuse
Zbieracz	Collector

Figure AI.17. General diagram of a reuse corner (source: own work)

The corner is a place that collects items and passes them to subsequent users on certain occasions as a part of a campaign or all year round. The users may include inhabitants or "collectors", who introduce these items to the market, e.g. through their sale at street markets. Items may be taken against a fee, but also free of charge, according to the principle "leave or take a thing". Due to organisational reasons, collection may be limited to the inhabitants of e.g. a town or a municipality who collect items only for their own purposes.

The organisation of reuse corners is a simple solution, which, however, raises a number of questions and doubts, in particular concerning the practical aspects of their organisation. There are many examples of solutions and forms, yet if we take into consideration the municipal government responsible for waste management, it is most beneficial to run such a corner under the established PSZOKs. It is profitable to introduce a small fee for collected items to ensure that they are really needed and will not become waste. The items would be priced by the facility manager and the profit would cover the costs of its operation. Doubts and discussions are related to the thin line between a used item and waste, which results from the definition of waste ("waste" – each substance or item that its owner discards, intends to discard or is obliged to discard). Pursuant to the Act of 14 December 2012 on waste, "reuse" is an action consisting in the use of products or parts of products that are not waste once again for the same purpose for which they were intended. Hence all actions related to the organisation of reuse corners should be considered beyond the waste management system. An item that fails to find a buyer will become waste upon its transfer to the waste management system.

A reuse corner next to the PSZOK in the Waste Management Facility in Poznań was created in 2012 as part of the "Transwaste" project, which can be considered the first example of good practices in this field in Poland.

Networks of reuse and repair centres

Pursuant to Article 19 paragraph 1 of the Act of 14 December 2012 on waste, public administration bodies, according to their competence, take actions to support the reuse and preparation for reuse of waste, in particular:

- 1) encouraging establishing and supporting the networks of repair and reuse centres;
- 2) creating economic incentives.

The consolidation of the reuse sector in the waste management segment so that it achieves the objectives of the EU environmental policy is a challenge. This type of activity is not very profitable, or even has to be subsidised, which nevertheless translates into specific social and environmental benefits.

The organisation of such networks is possible in cooperation with bodies of municipalities, civil society organisations and waste management entities.

In order to create rational grounds for the operation of networks of repair and reuse centres it is necessary to ensure cooperation between:

- 1) PSZOK, as a facility that collects second-hand items and waste that can be prepared for reuse; items collected in PSZOK may be divided into two streams: items for reuse and waste for processing (preparing for reuse);
- 2) social enterprises whose aim is to integrate socially and professionally excluded people and people at risk of exclusion: unemployed, disabled, after rehabilitation in connection with substance abuse, discharged from penitential facilities, etc.; from the perspective of local governments it is also important to e.g. ensure inexpensive and good health care, education, culture, local development, ecology, etc. The database www.ekonomiaspoleczna.pl includes examples of such initiatives operated by civil society enterprises in Poland;
- 3) second-hand stores providing market for second-hand items; currently trade in second-hand items from donations is rare in Poland; examples of good practices include Emaus and Sue Ryder stores, whose activity also encompasses the objective of social and professional integration of excluded people and people at risk of exclusion;
- 4) entrepreneurs who collect WEEE and bulk waste and WEEE recovery organisations, which may be integrated in the scheme as additional source of WEEE to be prepared for reuse (Waste Considered Products, WCP) and as the recipients of WEEE which in spite of preparing for reuse has not found a buyer;
- 5) repair centres; entrepreneurs who repair household appliances and audio & video devices and furniture still operate in municipalities; however, the repair in the networks of repair and reuse centres concerns in principle other form of repair: not at the request of a client, but as a repair of waste considered products; nevertheless, these types of activity can be connected, and the knowledge and experience of these entities may be beneficial to the development of networks of repair and reuse centres.

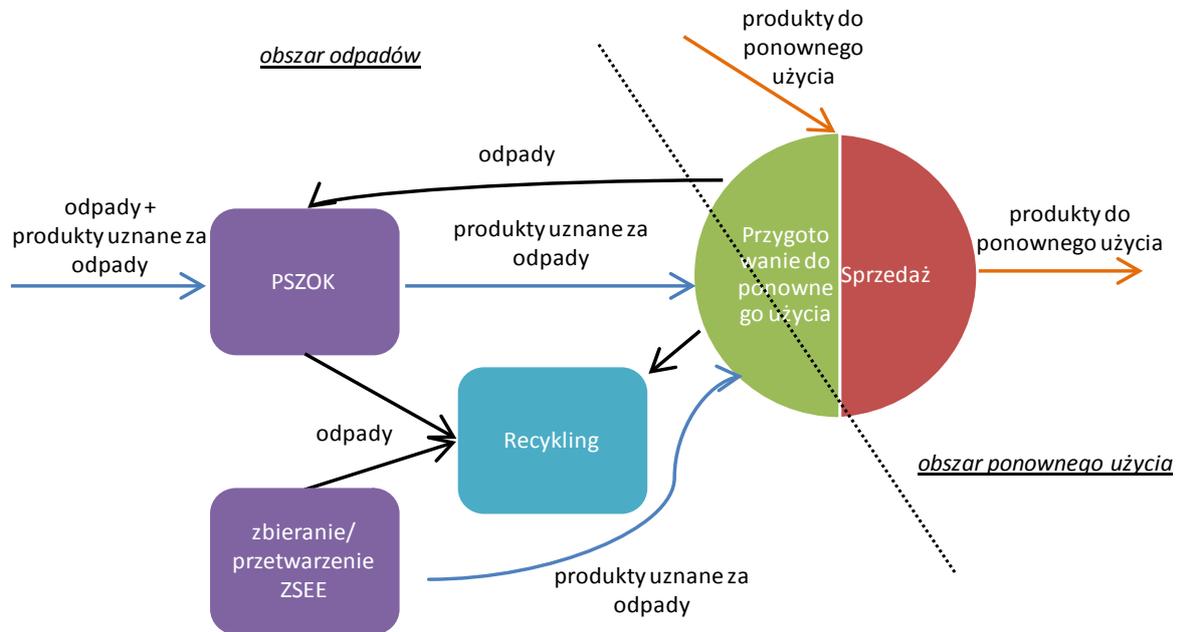
The reuse of waste considered products may occur as a result of the following actions:

- 1) separating waste considered products (whose market value justifies preparing them for reuse) from the waste stream intended for recycling or other type of recovery;
- 2) preparing for reuse: verifying and sorting, repair and quality assurance;

3) sale.

In practice, these steps may be implemented at a single location, but it is also possible to separate the collection, preparing for reuse and sale (with the latter e.g. in the city centre).

Figure AI.18 presents the diagram of operation of reuse and repair networks.



PL	EN
<u>Obszar odpadów</u>	Area of waste
Odpady	Waste
Odpady + produkty uznane za odpady	Waste + waste considered products
PSZOK	PSZOK (separate municipal waste collection facility)
Produkty uznane za odpady	waste considered products
Recykling	Recycling
Zbieranie / przetwarzanie ZSEE	WEE collection / processing
<u>Obszar ponownego użycia</u>	Area of reuse
Produkty do ponownego użycia	Products for reuse
Przygotowanie do ponownego użycia	Preparing for reuse
Sprzedaż	Sale

Figure AI.18. Reuse Network with highlighted areas of operation related to waste management and product reuse

General basic competencies required to establish a network of repair and reuse centres are as follows:

- 1) professional qualifications (in the field of transport, sorting, repair, removal of harmful substances, sale, marketing, legal expertise),
- 2) education (staff training);
- 3) establishment of specialised repair centres;
- 4) acquisition of items for reuse, in particular through cooperation with waste management institutions;
- 5) network management;

- 6) information management;
- 7) promotion, stimulation of products' supply and demand;
- 8) cooperation between two working environments: the waste management sector and the social sector;
- 9) broad integration of existing institutions;
- 10) recovery logistics;
- 11) quality assurance (quality standards and criteria for the reuse of products and repair networks);
- 12) marketing, public relations (PR), awareness raising (in particular raising popular awareness to acquire items for reuse from households and to sell repaired items);
- 13) retail sale.

Reuse items may be divided into the following "product categories":

- 1) electrical/electronic equipment classified pursuant to the Act of 29 July 2005 on waste electrical and electronic equipment (Journal of Laws of 2013, item 1155) to one of the following categories:
 - a) bulk household appliances,
 - b) small household appliances,
 - c) ICT and telecommunications equipment,
 - d) audiovisual equipment,
 - e) electrical and electronic tools (with the exception of bulk stationary industrial tools),
 - f) toys, recreation and sports equipment;
- 2) non-electrical household appliances;
- 3) furniture;
- 4) non-electrical toys / sports equipment / leisure equipment;
- 5) clothing items and fabrics;
- 6) renovation and construction equipment;
- 7) other.

Municipalities should act as the initiators of repair and reuse networks. The operation of such networks may be beneficial to municipalities also for reasons other than waste prevention (along with the registration of the amounts of waste submitted for reuse):

- 1) job creation for people with different qualifications;
- 2) the option to educate and prepare for employment on the labour market;
- 3) environmentally-friendly image;
- 4) decreased costs of waste management;
- 5) decreased consumption of natural resources;
- 6) access to cheap items for people in need.

More information on the networks of repair and reuse centres is available in the reports of the CERREC project, in which Poland is represented by the Kujawsko-Pomorskie Voivodeship (www.cerrec.eu) as well as Transwaste (www.transwaste.eu) and

ZeroWIN projects (www.zerowin.eu) and in German-language documents listed in footnotes²⁹.

²⁹ Neitsch M., Spitzbart M., Hammerl B. and Schleich, B. (2010) Umsetzungskonzept zur Implementierung des Gebotes der „Wiederverwendung“ gemäß ARL2008 in Österreich. Für Lebensministerium. Verein Repanet - Reparaturnetzwerk Österreich, Wien.
Spitzbart M., Thaler A. and Stachura M. (2009) Leidfaden für die Wiederverwendung von Elektroaltgeräten in Österreich. Im Auftrag des Lebensministeriums, KERP.
Recyclingboerse (2012) Project: 'Lokale Nachhaltige Kreislaufwirtschaft'. Available at: <http://www.recyclingboerse.org/lonak/>

ANNEX V. AREAS OF SYNERGY BETWEEN NWPP AND THE OBJECTIVES OF STRATEGIC DOCUMENTS

Table AI.10. Areas of synergy between NWPP and the objectives of strategic documents (source: own work)

Item	Document	Objectives/priorities/directions related to waste prevention	Actions	Areas of synergy between NWPP and the objectives of strategic documents
1	2	3	4	5
1	<p>Long-Term National Development Strategy, Poland 2030. Third wave of modernity. Ministry of Administration and Digitization, January 2013</p> <p>https://mac.gov.pl/wp-content/uploads/2013/02/Strategia-DSRK-PL2030-RM.pdf</p>	<p>Creating incentives accelerating the development of a green economy</p>	<p>1) more efficient use of natural resources, 2) implementation of integrated environmental management (promoting waste recycling, energy efficiency, efficient use of natural resources, spatial planning taking into consideration the management of areas of high natural value and water resources protection). Indicators: non-recycled waste indicator (2009–85%, 2030–25%)</p>	<p>The objectives were taken into consideration in all three priority areas</p>
2	<p>National Spatial Development Concept 2030</p> <p>http://www.mrr.gov.pl/rozwój_regionalny/Polityka_przestrzenna/KPZK/Aktualnosci/Documents/KPZK2030.pdf</p>	<p>Decreasing environmental pressure caused by the emission of pollution to water, air and soil</p> <p>Securing economically valuable mineral deposits and increasing the use of recyclable materials</p>	<p>1) while locating investment projects, the energy policy of municipalities should be taken into account, e.g. whether they use biomass from waste or apply waste thermal treatment, 2) the problems with municipal and industrial waste collection, including hazardous waste, and its further management, will be solved by means of improving the waste management system, 3) the areas with infrastructure for technological waste management and their designated zones of limited use, due to their scale of impact will be supervised in terms of compliance with environmental protection criteria.</p> <p>1) it is necessary to develop policy guidelines with the aim to create conditions to significantly increase the use of recyclable materials in the economy. No performance indicators</p>	<p>The objectives are included mainly in area 2, section 2.2. Waste prevention at the stage of raw materials extraction</p>
3	<p>National Development Strategy 2020, Active society, Competitive economy, Efficient state, September 2012</p>	<p>Rational resources management</p>	<p>1) the actions will be carried out under a comprehensive, integrated approach to the issue of efficient use of resources. They will concern all key areas (including e.g. raw materials policy, waste management policy),</p>	<p>The objectives were taken into consideration in all three priority areas</p>

Item	Document	Objectives/priorities/ directions related to waste prevention	Actions	Areas of synergy between NWPP and the objectives of strategic documents
1	2	3	4	5
	http://www.mrr.gov.pl/rozwoj_regionalny/Polityka_rozwoju/SRK_2020/Documents/SRK_2020_112012_1.pdf		<p>2) actions aimed at reducing energy consumption and raw materials consumption of the economy will be supported,</p> <p>3) in the event of limited access to natural resources, it is particularly important to use recyclable raw materials,</p> <p>4) comprehensive information on the size and quality of resources should form the foundations of rational resources management,</p> <p>5) one of the instruments of correct resources management is to integrate the principles of sustainable development into spatial planning processes,</p> <p>6) it will be necessary to complete the development of an effective waste management system (until 2015), including in particular the management of municipal and hazardous waste,</p> <p>7) the primary aim of a waste management policy should be to prevent waste generation "at source" and to maximise the recovery of raw materials and/or energy contained in them. The actions will include the introduction and implementation of the "3R" principle (Reduce, Reuse, Recycle³⁰) and closed-loop management. They include e.g.: introducing a system of separate waste collection, constructing a facility for recovery (including recycling) and treatment of waste, closing and reclaiming municipal waste landfills that do not comply with legal standards or create pressure on the environment, eliminating "wild" landfills, reducing the amount of landfilled waste, e.g. by means of their recovery.</p> <p>8) necessary legislative changes will be introduced to eliminate the hindrances to priority investments in the field of modern waste management.</p> <p>9) sustainable production, consumption and industrial policies will be promoted.</p> <p>Indicators: The level of reduction of the quantity of landfilled biodegradable municipal waste in relation to the quantity of this type of waste generated in 1995 (2009 – 85%, 2020 – 35%)</p>	
4	Programming financial perspective 2014–2020 – Partnership	Objective: supporting the transition into a low-carbon	<p>The following actions will be supported:</p> <p>1) actions aimed at improving social awareness of sustainable</p>	The objectives were taken into consideration in all

³⁰ Own interpretation – according to the binding definitions, it should be "recover"

Item	Document	Objectives/priorities/directions related to waste prevention	Actions	Areas of synergy between NWPP and the objectives of strategic documents
1	2	3	4	5
	Agreement – document adopted by the Council of Ministers on 8 January 2014 http://www.mir.gov.pl/fundusze/Fundusze_Europejskie_2014_2020/Programowanie_2014_2020/Umowa_partnerstwa/Documents/UPRM.pdf	economy in all sectors, protecting the environment and supporting efficient use of resources	consumption patterns, in order to break the link between economic growth and environmental pressure, 2) investments related to waste management, in particular resulting from the Waste Framework Directive and the Landfill Directive and related to municipal waste management (with particular attention to biodegradable and hazardous waste), in line with the waste management hierarchy (waste prevention, preparing for reuse, recycling, energy recovery), 3) relating to particular types of waste (e.g. hazardous waste, including asbestos), 4) educational campaigns dedicated to handling waste and shaping sustainable consumer attitudes, 5) emissions reduction and efficient use of resources by enterprises, e.g. through the use of eco-innovative technologies (e.g. processes and services with low resources consumption), 6) adjustment of existing installations to the requirements of best available practices (BATs), 7) implementation of environmental management systems, registration in EMAS and acquisition of certified ecolabels. No waste indicators.	three priority areas
5	State's environmental policy in 2009–2012 with 2016 perspective, Warsaw 2008 http://www.mos.gov.pl/g2/big/2009_11/8183a2c86f4d7e2cdf8c3572bdba0bc6.pdf	No clearly specified strategic objective in the document. Major issues raised in the document are specified, such as: - priority systemic actions, - protection of natural resources, - improved quality of the environment and ecological safety.	Middle-term objectives until 2016 in the field of waste management include: - maintaining the trend to break the link between the amount of generated waste and the economic growth of the country (less waste per product unit, less packaging, longer product life cycles) No indicators in the document.	The objectives were taken into consideration in all three priority areas
6	Strategy Energy Security and Environment Perspective until 2020 - document adopted by the Council of Ministers on 15 April 2014	Rational waste management, including its use for power generation	1) ensuring the operation of the separate municipal waste collection system, by means of: - intensifying ecological education, - shaping proper consumption patterns, - constructing separate municipal waste collection infrastructure, - full implementation of a new waste management system;	The objectives are included mainly in area 2, section 2.2. Waste prevention at the stage of raw materials extraction

Item	Document	Objectives/priorities/ directions related to waste prevention	Actions	Areas of synergy between NWPP and the objectives of strategic documents
1	2	3	4	5
	http://www.mg.gov.pl/files/upload/20531/2014-04-15_BEiS_%20przyjety_przez_RM.pdf		<p>2) reducing the number of ineffective local landfills, by means of:</p> <ul style="list-style-type: none"> - increasing the rates for the landfilling of mixed waste, - controls to check compliance with the requirements of Directive 1999/31/EC of 26 April 1999 on landfills; <p>3) implementing and supporting low-waste manufacturing technologies and cost-effective and eco-effective waste recovery and disposal technologies, including waste incineration, by means of:</p> <ul style="list-style-type: none"> - introducing legal norms and carrying out promotional actions favouring eco-efficiency in the manufacturing process, - popularising Life Cycle Assessment (LCA) in the industry and the principles of closed loop production, - supporting bottom-up business initiatives for sustainable development (including as part of CSR), - ensuring financing from EU and national funds, investment projects, - constructing installations for waste recovery (including recycling), thermal processing with energy recovery and waste treatment, - increasing the use of biogas from municipal landfills for power generation, - increasing the use of agricultural waste for the production of biogas in agricultural biogas plants. <p>Indicators: 1) Level of recycling and preparation for reuse of selected waste fractions: paper, metals, plastic and glass (in terms of their mass) – 2020 – 50%, 2) Level of recycling and preparation for reuse with other methods of construction and demolition waste other than hazardous (in terms of their mass) – 2020 – 70%, 3) Level of reduction of landfilled biodegradable municipal waste in relation to waste generated in 1995 (2010 – 85%, 2020 – 35%).</p>	

ANNEX VI. GUIDELINES FOR OUTLAYS ESTIMATION

Table AI.11. Guidelines for outlays estimation (source: own work)

Action no.	Action title	Implementing authority	Time frame	Estimated outlay [PLN million] ¹⁾	Possible source of financing ³¹	Guideline for outlays estimation
1	2	3	4	5	6	7
1	Developing and implementing a database dedicated to products, packaging and waste management (BDO) that will enable WP monitoring	Minister of the Environment	2014–2016	12.0 (of which ca. 7 million for system development)	NFOŚiGW	according to average market prices for database systems of this scale PLN 5,000,000
2	National information platform dedicated to WP containing data, studies and guidelines on WP implementation for local governments, institutions and entrepreneurs	Minister of the Environment	implementation from 2015 and maintenance	1.0	NFOŚiGW	according to the average market prices for this type of web platforms and their maintenance for 10 years PLN 1,000,000
3	Developing collaboration for WP between stakeholders: Ministry of the Environment, industry and consumer organisations, local and regional administration	Minister of the Environment	implementation from 2015 and maintenance	1.0	NFOŚiGW e.g. as part of Good Practices	cost of the tool + (number of organised workshops * average cost of a workshop) + organisation- and coordination-related costs PLN 100,000 + (12 * PLN 50,000) + PLN 300,000
4	Carrying out research and demonstration projects in the field of WP technologies and disseminating research outcomes	Minister of Science and Higher Education/ National Centre for Research and Development, DG Research and Innovation	2015–2018	5.0 3.0	state budget ^{2)/} NFOŚiGW EU research projects, e.g. Life+, Horizon2020, Central Europe, Baltic Sea Region, etc.	analogous to the total funds allocated to waste management projects of similar scale financed with national means
5	Including in the NFOŚiGW/WFOŚiGW priorities	NFOŚiGW/WFOŚiGW	2015–2020	-	-	launched NFOŚiGW/WFOŚiGW

³¹ In the case of NFOŚiGW these are both national and EU funds, according to the adopted financing principles.

Action no.	Action title	Implementing authority	Time frame	Estimated outlay [PLN million] ¹⁾	Possible source of financing ³¹	Guideline for outlays estimation
1	2	3	4	5	6	7
	in the 2014–2020 perspective the option to support SMEs in relation to: replacing old technologies with low-waste, innovative technologies (like in energy efficiency programmes), creating new forms of activity related to waste prevention					programmes supporting SMEs to replace technologies with low-waste, innovative ones
6	Promoting eco-design	Minister of the Environment/Minister of Economy	2015–2020	9.6	WFOŚiGW	number of offices * average cost of a campaign * number of repetitions in years (16 * PLN 100,000 * 6)
7	Promoting environmental audits of manufacturing processes aimed at taking stock and balancing the flow of raw materials, products, services and waste and at identifying cause and effect relationships determining waste generation	Minister of the Environment/ Minister of Economy	2015–2022	0.1	WFOŚiGW	average market price for supporting methodological documents PLN 100,000
8	Campaigns promoting the meaning of the waste management hierarchy (including less consumptive lifestyle)	marshal offices, through civil society organisations, institutions, schools, offices	2015–2019	8.0	WFOŚiGW	average cost of an event * number of offices * number of repetitions in years (PLN 100,000 * 16 * 5)
9	Initiating and promoting initiatives, competitions for "low-waste" municipalities and cities in constant periodical multiannual programmes by regional governments	Minister of the Environment/ marshal offices	2015–2020	9.6	WFOŚiGW	average cost of an event * number of offices * number of repetitions in years (PLN 100,000 * 16 * 6)
10	Local WP web platform	municipalities	2015–2017	8.0	WFOŚiGW	according to the average market prices for this type of web platforms * number

Action no.	Action title	Implementing authority	Time frame	Estimated outlay [PLN million] ¹⁾	Possible source of financing ³¹	Guideline for outlays estimation
1	2	3	4	5	6	7
						of maintained platforms (PLN 50,000 * 160)
11	Establishing a network of institutions collaborating for waste prevention, including food waste	Federation of Polish Food Banks or other organisation in cooperation with retail organisations, catering organisations, consumer organisations, social aid organisations; collaboration with partner organisations from other EU Member States	2015–2022	2.0	NFOŚiGW	cost of the tool + (number of organised workshops * average cost of a workshop) + organisation- and coordination-related costs PLN 200,000 + (12 * PLN 50,000) + PLN 450,000
12	Collecting and publishing teaching aids focusing on WP for schools and universities	Minister of National Education, Centre for Education Development	2014–2016	-	- 2)	not envisaged
13	Implementing environmental management systems compliant with ISO 14001, Responsible Care and EMAS in enterprises and public institutions	organisations (as defined in Article 2 (25) of Regulation (EC) No 1221/2009)	2014–2022	35	organisations/ WFOŚiGW/ company budgets	number of organisations * average cost of system implementation (350 * PLN 100,000)
14	Promoting and supporting the development of networks of repair and reuse centres	municipalities, marshal of voivodeship in collaboration with entrepreneurs, consultants	2014–2018	0.5	company budgets/ WFOŚiGW	average cost of an event * number of repetitions in years (PLN 20,000 * 25)

¹⁾ outlays made under expenditure limits planned in the budgets of respective administrating entities in budget acts for subsequent years.

²⁾ outlays will be financed under expenditure limits planned in the budgets of respective administrating entities in budget acts for subsequent years.

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LIST OF TABLES

Table 1. Analysis of waste prevention measures indicated in Annex No. 5 to the Act on waste in the context on NWPP objectives (source: own work)	21
Table 2. Examples of quantitative effects of waste prevention (source: 11, 12, 13, 14, 15, 16, 17, 18, and own calculations based on the enumerated sources).....	32
Table 3. Material and financial schedule of recommended NWPP actions (source: own work).....	54
Table 4. Monitoring of general quantitative NWPP objectives (source: own work)	57
Table 5. Monitoring of specific NWPP objectives (source: own work)	57
ANNEX	
Table AI.1. Estimated amount of municipal waste generated in Poland, in 2012 (source: own work on the basis of data from NWMP 2014 and GUS – census data)	63
Table AI.2. Weight indicators of infrastructural waste accumulation per city inhabitant (source: den Boer et al.)	69
Table AI.3. Example morphological composition of infrastructural waste (on the basis of data from Warsaw)	70
Table AI.4. Estimated amounts of municipal waste in Poland, broken down into fractions (source: own calculations on the basis of data from NWMP 2014)	71
Table AI.5. Amount of biodegradable municipal waste in Poland in 2012 (on the basis of NWMP 2014).....	73
Table AI.6. Food waste generated in various sources in the EU and in the UK (source: on the basis of BIO Intelligence Service 2010).....	74
Table AI.7. Handling end-of-use vehicles (source: according to the data of the Ministry of the Environment)	87
Table AI.8. Number of cars registered in Poland and the volume of import of passenger cars in 2005–2011 (source: data of the Polish Automotive Industry Association published by GUS)	87
Table AI.9. Number of ecolabelling certificates granted in Poland (source: Polish Centre for Research and Certification)	98
Table AI.10. Areas of synergy between NWPP and the objectives of strategic documents (source: own work)	107
Table AI.11. Guidelines for outlays estimation (source: own work)	111

LIST OF FIGURES

Figure 1. Illustration of the waste prevention definition [Source: European Commission, Directorate-General Environment, Preparing Waste Prevention Programme, Guidance document, October 2012, quoted by ADEME 2008]	6
Figure 2. Stages of NWPP preparation (source: own work).....	9
Figure 3. Waste generated in Poland in a year (source: according to GUS data: Environmental protection 2005–2013)	10
Figure 4. Comparison between the GDP growth rate (in current and constant prices) in Poland and the amount of generated waste (source: GUS data)	11
Figure 5. Total amounts of waste generated in the countries of the European Union (source: Eurostat)	11
Figure 6. Amount of generated waste per person (source: Eurostat)	12
Figure 7. Waste generation intensity in relation to GDP (source: Eurostat).....	13
Figure 8. Resource productivity [EUR GDP/kg of resources], (source: Eurostat).....	14
Figure 9. Composition of waste generated in Poland in 2012 (source: GUS, Environmental protection 2013)	15
Figure 10. Structure of waste generation in EU Member States in 2010 broken down into basic nature of activity (source: Eurostat)	16
Figure 11. Structure of relationships between WP measures (source: own work)	53
Figure 12. Actions influencing rational waste management.	59
ANNEX	
Figure AI.1. Comparison between the GDP growth rate (in current prices) in Poland and the amount of generated waste (source: GUS, apart from the generation of municipal waste in 2004 – NWMP 2010)	63
Figure AI.2. Generated and collected municipal waste per person in 2012 (source: GUS, Municipal infrastructure in 2012)	63
Figure AI.3. Quantities and morphological composition of municipal waste generated in various types of urban structures (source: own work, according to NWMP 2014)	65
Figure AI.4. Average monthly expenditures per person in a household in 2011 in cities and in the countryside (in PLN); (source: own work on the basis of: Socio-economic situation of households in 2000–2011, GUS, Warsaw 2013).....	67
Figure AI.5. Differences in the consumption of selected food products in various regions of Poland (source: own work on the basis of GUS)	67
Figure AI.6. Differences in the consumption of selected food products in various regions of Poland (source: own work on the basis of GUS)	68

Figure AI.7. Differences in the consumption of selected food products in various regions of Poland (source: own work on the basis of GUS)	69
Figure AI.8. Breakdown of food waste (source: own work on the basis of BIO Intelligence Service 2010)	74
Figure AI.9. Changes in the amounts of packaging waste made of various materials placed on the market from 2004 to 2012 (source: own work on the basis of the data of the Ministry of the Environment published by GUS)	75
Figure AI.10. Packaging waste placed on the market – average for the EU and for Poland, kg/P per year, source: own work (source: Eurostat)	77
Figure AI.11. Amounts of waste from group 01 generated in 2004–2012 (source: GUS) 78	
Figure AI.12. Amounts of waste from group 06 generated in 2004–2012 (source: GUS) 81	
Figure AI.13. Amounts of waste from group 10 generated in 2004–2012 (source: GUS) 82	
Figure AI.14. Amounts of waste from group 17 generated in 2004–2012 (source: GUS) 83	
Figure AI.15. Quantity of electrical and electronic equipment introduced to the market in Poland in 2012 (according to the GIOŚ report)	86
Figure AI.16. Reuse in the waste management hierarchy	101
Figure AI.17. General diagram of a reuse corner (source: own work)	102
Figure AI.18. Reuse Network with highlighted areas of operation related to waste management and product reuse	104