

MANUELA INGALDI*

MANAGEMENT OF PACKAGING WASTE

GOSPODAROWANIE ODPADAMI OPAKOWANIOWYMI

Abstract

Most of the products available on the market are sold together with different types of packaging. Information about the product, manufacturers etc., is placed on these packages but their main function is to protect the product during transport. After the product is removed, the packaging becomes waste which, according to Polish law, should be managed in an appropriate way. Recycling and recovery of the material are the most important issues. Basic statistics on recycling of packaging waste showed that paper, cardboard and aluminum packaging are recycled to the greatest extent in Poland. In the article, definitions of packaging and packaging waste according to Polish law are presented, together with legal acts on waste management. The main statistics connected with the management of packaging waste are also presented.

Keywords: waste, packaging waste, waste management

Streszczenie

Większość wyrobów dostępnych na rynku sprzedawana jest łącznie z opakowaniami. Na opakowaniach tych umieszczone są informacje o produkcie, producencie itd., ale główną ich funkcją jest ochrona wyrobu w trakcie transportu. Po wyjęciu produktu opakowania stają się odpadem opakowaniowym, z którym – według polskiego prawa – powinno się postępować w odpowiedni sposób. Najważniejszy jest odzysk materiałów. Podstawowe statystyki dotyczące recyklingu odpadów opakowaniowych pokazują, że opakowania papierowe, kartony oraz opakowania aluminiowe są odzyskiwane w największym stopniu w Polsce. W artykule przedstawiono definicje opakowań oraz odpadów opakowaniowych według polskiego prawa oraz podstawowe akty prawne związane z gospodarowaniem odpadami opakowaniowymi. Pokazano również podstawowe statystyki związane z gospodarowaniem odpadami opakowaniowymi.

Słowa kluczowe: odpady, odpady opakowaniowe, gospodarowanie odpadami

DOI: 10.4467/2353737XCT.16.229.5978

* Ph.D. Eng. Manuela Ingaldi, Institute of Production Engineering, Faculty of Management, Czestochowa University of Technology.

1. Introduction

During everyday purchases customers acquire both products and packaging in which these products are supplied. Information about the producer, composition of the product or expiration date is placed on the packaging which is designed to protect products from damage and facilitate their transport.

Unfortunately, after unpacking the product, the packaging becomes unnecessary and useless. It can be used by the customer for a chosen purpose, but in most cases it becomes waste.

In Poland and European Union there are many acts which regulate the management of packaging and packaging waste. The main problem of waste packaging management is recycling of such type of waste. Limited access to raw materials and a large amount of such type of waste create the need for waste recycling. At the beginning, a suitable segregation of packaging waste is required. People's attitudes to separate packaging waste is also slowly changing. Variety of advertising campaigns, frequent publications, packaging collection actions lead people to change their behavior for the better [1, 2].

The purpose of this article is to define packaging and packaging waste according to Polish law and to present the main acts which describe the management of packaging waste. The main statistics connected with the management of packaging waste are also presented.

2. Definition of packaging and packaging waste

Packaging and packaging waste are defined in the available literature, but the most important definitions were included in the legislation. At the beginning, packaging should be defined. According to the Act on packaging and packaging waste, packagings are "products placed on the market, made of any materials, intended for the storage, protection, transport, delivery or presentation of any product, from raw materials to already processed goods" [3]. Packaging in the understanding of this Act includes [3]:

- packaging units, for transmitting the product to the user in the place of purchase, including also consumption product, such as disposable dishes;
- multipacks containing multiple unit packages of products, regardless of whether they are transmitted to users or to selling points, which can be removed from the product without compromising its features;
- transport packagings, used to transport products in packaging units or multipacks in order to prevent damage, with the exception of containers for transport by road, rail, water or air.

The aim of product packaging is to encourage potential customer to buy the product. It contains information about the name of the product, its composition, producer and expiration date. It protects the product from damage and helps the customer to transport this product home. Due to the need to protect the environment, and thus the need to use recycled materials, also product packaging should be recycled and reused [4].

Packaging, like other products, must meet many requirements. Only then can they be treated as fully valuable products and used for its planned purpose. The packaging

quality was defined in the standard ISO 8402, where quality packaging is defined as a “set of characteristics, parameters characterizing the packaging associated with its ability to meet the needs of buyers and users” [5].

Materials like glass, paper and board, plastics, wood and metals such as aluminium and steel are mainly used for packaging. Some types of packaging can be used repeatedly, such as glass bottles and wooden pallets. However, it should be remembered that, according to the Act on packaging and packaging waste, the packaging or product shall be presumed placed on the market only once [3]. Additionally, no matter what material was used for the production of packaging, over time it becomes packaging waste.

The definition of packaging waste was included in the Act on packaging management and packaging waste, where it can be understood as “all packaging including reusable packaging withdrawn from the re-use, constitute waste within the meaning of the waste legislation, with the exception of waste generated in the production of packaging” [3].

The same Act defines the activities that help in the management of such waste. According to the Act, the manufacturer should remember about a few rules to reduce the impact of packaging on the environment [3]:

- the volume and weight of packaging should be limited to the minimum required to fulfill the functions of the packaging;
- packaging should be designed and executed in a way that allows their re-use and recycling later, and if this is not possible, at least recycling, and if this is not possible, another form of recovery;
- packaging should contain the smallest possible amount of the substance posing threat to the life or health of humans and the environment.

The Act amending the Act on maintaining cleanliness and order in municipalities introduces, together with other acts, the need to segregate the municipal waste, including packaging of products purchased by residents of the municipality [7]. Thanks to this Act, more and more people are separating waste, including packaging waste. It should also be emphasized that the overall waste management is based on the Act of 14 December 2012 on waste and Act of 27 April 2001 in the Environmental Protection Law [8, 9].

In addition to the already mentioned laws in Poland and European Union, other provisions on packaging waste are applied. Current legislation stipulates the following [10]:

- Summary of EU Waste Legislation on Packaging and Packaging Waste (short information on objectives, scope and main elements of the Packaging and Packaging Waste Directive, as well as related acts);
- Directive 94/62/EC on Packaging and Packaging Waste (consolidated version).

Also, some amending acts should be followed. These are [10]:

- Directive 2004/12/EC amending Directive 94/62/EC on packaging and packaging waste;
- Directive 2005/20/EC amending Directive 94/62/EC on packaging and packaging waste (extension of deadlines for the attainment of the recycling and recovery targets for the Member States acceding the EU in 2004);
- Regulation (EC) No 219/2009 adapting a number of instruments subject to the procedure referred to in Article 251 of the Treaty to Council Decision 1999/468/EC with regard to the regulatory procedure with scrutiny;

- Commission Directive 2013/2/EU amending Annex I to Directive 94/61/EC on packaging and packaging waste;
- Directive (EU) 2015/720 of the European Parliament and of the Council of 29 April 2015 amending Directive 94/62/EC as regards the consumption of lightweight plastic carrier bags.

The packaging waste is one type of basic groups of waste included in the waste catalogue. The waste catalogue was presented in the Regulation of the Minister of Environment of 27 September 2001 on the waste catalogue. This regulation specifies the catalogue with a list of hazardous waste and stipulates how to classify them. In the catalogue, the types of the waste are divided into 20 groups according to their source (with some exceptions) [11]. According to the waste catalogue, packaging waste should be marked with code 15 01.

3. Main statistics of packaging waste

In 2013, 156.9 kg of packaging waste was generated per inhabitant in the EU-28. This quantity varied between 46.7 kg per inhabitant in Croatia and 210.4 kg per inhabitant in Germany [12]. In Fig. 1 the shares of packaging waste generated by weight by all countries of the UE in 2013 were presented.

According to Eurostat, (Fig. 1) paper and cardboard were the largest group of packaging waste generated in 2013. It should be remembered that cardboards are used as bulk packaging for the products already packaged in other packagings, so this can be the reason of their large percentage of the total amount of packaging waste generated. Cardboards are those packagings which are usually not suitable for re-use, but can be recycled. Paper and cardboards are packagings that can be subjected to the fastest biodegradation.

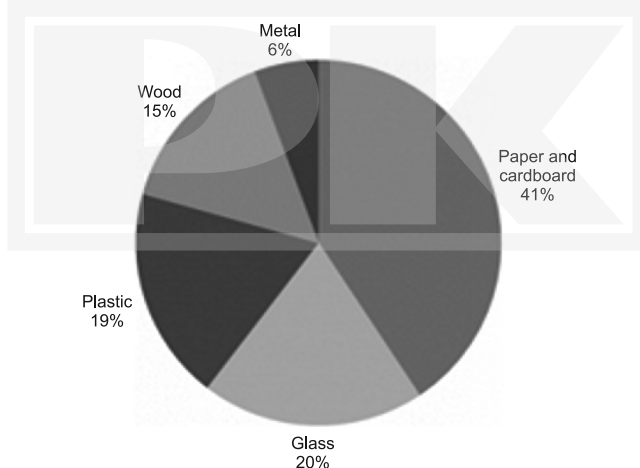


Fig. 1. Shares of packaging waste generated by weight, 2013 [12]

One ton of recycled paper is equal to 17 trees, which results in saving plants that are still able to produce the oxygen needed for life. Recycling of 1 ton of paper saves 2–7 m³ of

landfill space, 26.5 thousand liters of water, 1,476 liters of oil and 4.2 thousand kWh, which is what is needed to heat an average apartment for half a year [13].

Packaging should follow the 3R's hierarchy. The first R stands for „reduce”. Packaging should be reduced prior to the manufacturing stage, by designing and marketing products for the first “R”. This means reducing the number of layers, materials and toxins at source. The second R stands for “reuse”. Packaging should be designed to be reusable, refillable, returnable and durable to the greatest extent possible. The third R stands for “recycle”. Packaging should be designed to be recyclable and/or made with recycled content [14].

In Table 1, the recycling of packaging waste in 2009–2014 in Poland was shown.

Table 1

Recycling of packaging waste in 2009–2014 in Poland [15]

Specification	Achieved level of recycling					
	2009	2010	2011	2012	2013	2014
Plastic packaging	21.5	20.2	22.6	22.2	20.0	28.6
Aluminium packaging	64.5	60.5	54.2	46.7	34.0	48.1
Steel packaging, of which steel sheet packaging	33.6	39.5	40.4	47.1	34.8	55.5
Paper and cardboard packaging	50.9	57.2	58.7	53.2	49.7	72.9
Household glass packaging excluding ampoules	41.9	45.6	45.1	51.3	43.4	60.2
Packaging made of natural materials (wood and textiles)	23.1	21.0	27.3	28.3	21.9	48.6

In Poland, recycling of the packaging waste was very diverse. The highest percentage of the recycling was noted in case of paper and cardboard packaging and aluminium packaging. In Poland, since 1th July 2013 a new Act amending the Act on maintaining cleanliness and order in municipalities and some other acts has been in force [16]. Under the Act, local governments have taken control of waste, including packaging waste. It is worth noting that Poland has changed the regulations on waste management as one of the two last European Union countries. According to the act, all waste should be divided into paper, plastic, metal and glass. However, a simplified division into dry waste (recyclable), wet waste and glass is also accepted and used in many municipalities. Changes concerning the act which forced residents to change their behavior, could have caused a large decrease in the recovery of various materials in 2013. Residents needed some time to get used to the new rules and new requirements for the segregation of waste.

4. Conclusions

The concept of sustainable development and global environmental regulations have forced also Poland to change legislation in this area. It should be remembered that the success of these changes depends primarily on the attitude of the people and their willingness to

change their behavior. During purchasing a variety of products everyday different types of the packaging waste are produced. Some part of this waste can be easily reused. But in order to do this, their prior segregation is needed. Therefore, adequate awareness of people who produce such type of waste is the most important.

In Poland, a large part of packaging waste is recycled. Some variations in this trend can be noticed, but Poland is still behind in comparison with other European countries when it comes to the packaging waste recycling. However, in the case of paper, cardboard and aluminum packaging, recycling in Poland is quite high. Maybe in 20–30 years, when the present generation of children who are brought up in the spirit of nature grows, they will improve this situation.

References

- [1] Konstanciak A., Brozova S., Pustejovska P., *Wykorzystanie alternatywnych źródeł energii w Polsce i Republice Czeskiej*, Rynek Energii, **107** (4), 2013, 33-36 [in Polish].
- [2] Kardas E., *Analiza jakości wytwarzania opakowań szklanych*, Logistyka, **5**, 2011, 106-110 [in Polish].
- [3] Act of 13th June 2013 on packaging management and packaging waste (Journal of Laws of 2013, item 888) [in Polish].
- [4] Dziuba S.T., Ingaldi M., *Segregation and recycling of packaging waste by individual consumers in Poland*, 15th International Multidisciplinary Scientific GeoConference SGEM 2015, SGEM2015, Conference Proceedings, June 18–24, 2015, Book 5, Vol. 3, 545-552.
- [5] PN-ISO 8402:1996 Zarządzanie jakością i zapewnienie jakości – Terminologia [in Polish].
- [6] Żakowska H., *Recykling odpadów opakowaniowych*, Warszawa 2005 [in Polish].
- [7] Act of 11th July 2011 on maintaining cleanliness and order in municipalities and other acts (OJ 2011, No. 152, item. 897) [in Polish].
- [8] Act of 14th December 2012 on waste (OJ 2013 item. 21) [in Polish].
- [9] Act of 27th April 2001 the Environmental Protection Law (OJ 2001, No. 62 item. 627) [in Polish].
- [10] *Packaging and Packaging Waste*, <http://ec.europa.eu/environment/waste/packaging/legis.htm> [date of acc.: 2016-05-22].
- [11] Regulation of the Minister of the Environment of 27th September 2001 on the waste catalogue (OJ 2001, No. 112, item. 1206) [in Polish].
- [12] Eurostat, <http://appsso.eurostat.ec.europa.eu/nui/show.do> (date of acc.: 2016-05-22).
- [13] *European waste catalogue and hazardous waste list*, Valid from 1 January 2002, Environmental Protection Agency.
- [14] Ingaldi M., *Management of the packaging waste in companies in Poland*, International Multidisciplinary Scientific GeoConference SGEM 2015, SGEM2015 Conference Proceedings, June 18–24, 2015, Book 5, Vol. 3, 385-392.
- [15] <http://stat.gov.pl/obszary-tematyczne/srodowisko-energia/> [date of acc.: 20160522].
- [16] Act of 1st July 2011 on amending the Act on maintaining cleanliness and order in municipalities and some other acts (OJ 2011, No. 152, item. 897) [in Polish].