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IMPLEMENTATION OF ACTIONS FOR EXTENDED PRODUCER RESPONSIBILITY AS A PROPOSAL TO STREAMLINE POST-CONSUMER PACKAGING MANAGEMENT SYSTEMS IN POLAND

The transposition of new regulations into national legal systems, including updated goals and requirements for the management of packaging placed on the market and packaging waste, provides a number of opportunities for the operation of post-consumer waste management systems. This publication focuses on the essence and characteristics of the system of extended producer responsibility in selected European countries. This paper identifies, on the basis of an analysis taking into account the scopes of legal, economic, physical, and informational liability, key areas of the extended producer responsibility system requiring improvements. It develops recommendations regarding the possibility of introducing changes to the functioning of the EPR system in Poland. The implementation of the improvement proposals for the EPR can significantly contribute to achieving the existing EU waste targets, as well as the ambitious new targets included in the EU Circular Economy.

Keywords: extended producer responsibility, post-consumer packaging management system, packaging waste.

1. INTRODUCTION

Concept of Extended Producer Responsibility (EPR) emerged in the 1980s, when European countries were reporting a rapid increase in the volume of packaging waste for the first time. In response to these issues, the European Community adopted the Directive on Packaging and Packaging Waste in 1994. The latter was incorporated into national packaging waste regulations and directly contributed to setting up polish packaging

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recovery organisations (e.g. Rekopol, Eko-Punkt, Biosystem), which were created with the main aim of expanding producer responsibility into action. The essence of the concept in question is to build and finance a waste collection and recycling system ensuring the circulation of waste in the economy and making sure that waste is valorised as a zero-burden resource and is not misused. Nowadays, EPR is perceived even in a broader sense and is understood as the tool making it possible to put the some assumptions of circular economy into practice. Hence, so much importance is attached to establishing detailed rules for the functioning of packaging waste management systems. The article aims to analyze the functioning of EPR systems in Poland. The article uses methods of observation and analysis of texts and documents. Based on the conducted research, develop guidelines for the proper implementation of EPR in Poland.

2. MULTIFACETED VIEW ON EPR SYSTEM: FINDINGS FROM AN IN-DEPTH REVIEW OF THE LITERATURE

The EPR concept was introduced for the first time in the specialised literature by Thomas Lindhqvist (1992). He defined it as an environmental protection strategy to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product responsible for the entire life-cycle of the product and especially for the take-back, recycling and final disposal of the product. The Extended Producer Responsibility is implemented through administrative, economic and informative instruments. The composition of these instruments determines the precise form of the Extended Producer Responsibility. According to Lindhqvist (2000), such can be achieved by making product manufacturers both aware of and responsible for the environmental impacts and benefits associated with the end-of-life scenarios their products can be addressed to. Those scenarios are so in charge of the producers, and include take-back, recycling and final disposal of the product. A similar view on EPR was put forward by Nash and Bosso (2013), who considered it to be an environmental protection policy that is oriented to:

- Minimising the effects of external production and consumption processes;
- Allocating responsibility for the entire life cycle a product to its manufacturer.

EPR is also described as a concept aimed at devising management systems for certain types of post-consumer waste, which includes not only packaging waste, used electrical and electronic equipment and used batteries and accumulators, but also end-of-life vehicles (Patorska, Karbowska, 2016). On the other hand, Piontek (2018) defined EPR as the readiness or need to take positive and negative consequences ensuing from internal and external effects. Simultaneously, EPR is treated as an attempt to materialise the paradigm of the key importance of natural resources and their rational utilisation for the proper growth of the economy (Piontek, 2018). Whereas, concerning to the legal aspects of EPR, those were the focus of attention of several scholars, such as Karpus (2014) and Korzeniowski (2015). In their publications, the authors expounded on how model elements worked out as part of the EPR concept could translate into the language of legal norms. Furthermore, they presented the extent and manner of incorporating them in to the concept the EU and Polish waste law.

An analysis conducted to find out how EPR is understood and perceived in the literature, also taking into account the aspects of such perception, reveals that authors put different interpretations on how the prescriptive, legal, economic, financial, physical or informational

dimension is identified and seen by them. Therefore, one may say that EPR is a research issue that needs an interdisciplinary approach. Given the fact that the EPR concept, seen both as one of the main waste management methods and as an instrument of a policy designed to support the implementation of the European waste hierarchy, is multifaceted, it requires a holistic view necessary to identify area-specific actions enhancing the manner in which the very concept is applied (Milios et al., 2018).

3. OPERATION OF EPR SYSTEM IN SELECTED EUROPEAN COUNTRIES

EPR is treated in EU acts as one of the fundamental legal institutions allowing to attain new objectives of waste law or, in a broader sense, as an environmental protection policy shaped in line with the sustainable development principle (Ezroj, 2009; Ezroj, 2010). Due to the fact that sustainable development is tackled differently in individual countries, the EPR-system advancement also varies from one state to another. There are two models of the EPR system which prevail in the European Union. As regards the first model, organisational and financial responsibility rests with producers, like done in Germany, Austria or Poland. Whereas in the case of the second model, it is delegated to communes, and producers only share collection costs. This is a common practice in European countries like France and Norway. Apart from differences in how the EPR-system models were put into practice, there are also marked discrepancies in the operation of organisations that discharge product manufacturers' duties arising from extended producer responsibility. For instance, in Romania, Austria, and Slovakia, recovery organisations compete with each other, whereas in Germany and France practices were based on monopolistic systems, which used to function in the past, covering only unit packaging (Gupt, Sahay, 2015).

Irrespective of which EPR model is preferred in a given country, the cornerstone of the subject on EPR is the concept of the responsibility for waste and, in wider terms, for products, which will become a wastes in future. From a model perspective, there exist different types of responsibility that can be distinguished as follows (Ezroj, 2009):

- Legal responsibility, understood as legal responsibility for the environmental damage caused by a product which is in various phases of its life cycle, including when that has become waste;
- Economic responsibility, that is the obligation of incurring the costs of collection, recovery and final disposal of post-use commodities that have become waste to be treated;
- Physical responsibility, which means the obligation to carry out waste management operations independently by a manufacturer of a product;
- Informative responsibility, which refers to a manufacturer's duty to inform on the properties of a product manufactured and on a manufacturer's actions aimed at addressing environmental risks.

It is worth mentioning that the aforesaid obligations setting out the substantive scope of the EPR concept model may be perceived by the EU legislator and Member States' lawmakers differently, depending on targets set by them.

In Poland, the EPR system covering packaging and packaging waste has been in effect since 1 January 2002 (PPW, 2001) and is based on Union requirements laid down in the 1994 Directive (Directive 94/62/EC), which were transposed into the Polish law. Poland implemented these provisions relatively late, especially in comparison with the states of the former EU-15, namely the Netherlands (1991), Germany (1991) and Belgium (1992), which

were the first ones to do so. A huge advantage of this situation is that Poland could draw on the experiences of other Member States and try to avoid the past mistakes they made (e.g. incorrect methods of packaging classification). What must be seen as a disadvantage, however, is the fact that the Polish EPR falls far behind the corresponding systems that work in the other countries. It will be a huge problem for Poland severely, as there is a pressing need for streamlining EPR mechanisms to ensure compliance with the provisions of the 2018 Directive (Directive (EU) 2018/851), and specifically, Article 8a, which lays down minimum requirements for extended producer responsibility systems (Żakowska, 2019).

Under this perspective, critical analysis of the EPR system currently adopted in Poland was carried out by this team of authors with key aim of contributing to enhancing the specialised literature and knowledge. Starting from reviewing and building upon the scopes of the legal, economic, physical and informative types of responsibility, the authors could highlight the key areas that require improvements:

- The operation of the packaging waste management system;
- The shadow economy practices in the Polish waste industry;
- Placing on the market of packaging which after being used is unsuitable for recycling or hinders the process considerably;
- Raising the ecological awareness of society as regards packaging placed on the market and packaging waste being generated.

3.1. Financing of Packaging Waste Management System

Entities that place packaged products on the Polish market are required by law (MPPW, 2013) to make sure that packaging materials are sent to recycling after use. The foregoing obligation must be discharged by entities alone or through dedicated external entities – packaging recovery organisations. Based on a polish public register, which is an integral part of the Product and Packaging and Waste Management Data Base (a so-called "BDO"), it follows that in Poland, there were 25 packaging recovery organisations in 2021, which discharged legal obligations relating to extended producer responsibility on behalf of economic operators. Considering that only 42% of the plastic packaging waste generated in the EU is recycled, it is necessary to opt for additional solutions that enable increase increasing that share, chief among those solutions is the use of the depository system collection and recycling (Kutyna-Baklarska, Kulczycka, Dziobek, 2021). This is due to fact that, in 2020, more than 6.3 million tonne packages were used in the Polish market, which means a marked increase compared to previous years. This is not only caused by the continuous growth of the packaging industry, but also results from the fact that e-commerce has become very popular (Report, 2021).

Even though relevant legal regulations have been in force for nearly twenty years, the Polish EPR system still fails to attain to its purpose. Such should be attributed mainly to the fact that all needed operations of post-use package collection and processing severely lack funds. One of the facts showing the scale of irregularities is that economic operators placing packed products on the Polish market bear EPR-related expenses which are estimated to be approximately PLN 40 million, annually. Whilst, the actual cost of the management of the generated packaging waste totals around PLN 1.4 billion per year (Moskwik, Krupa, Lachowicz, Roszkowski, 2020). Consequently, when it comes to recycling waste into secondary raw materials that are processed into value-added commodities, a substantial investment gap can be observed in Poland, which is the principal reason why the actual

capacity of domestic waste processing facilities is substantially reduced. Table 1 demonstrates the scope of investment necessary for selected waste management projects in Poland.

Table 1. Summary of capital expenditures on selected types of waste

Type of waste	Type of project	Required expenditures for developing waste management systems [PLN billion]	
		Years 2020–2028	Years 2029–2034
Glass waste	New glass cullet treatment plants for processing of glass cullet before it goes for recycling	0.225	0.075
Paper and cardboard waste	New material recycling plants	1.700	2.600
Plastic waste	New material recycling plants	3.440	0.860
Non-ferrous metal waste	Provision of non-ferrous metal separators to existing plants	0.110	0.010

Source: Personal elaboration from (Moskwik et al., 2020).

Based upon Table 1, it can be asserted that most of waste is generated on the domestic scale. Therefore, the expenditures shown in Table 1 must be deemed necessary if Poland intends to properly comply with EU requirements concerning extended producer responsibility. The scope of investment for projects related to certain secondary raw materials, to be carried out in Poland, has been tentatively determined. For instance, for glass cullet, three – four treatment plants must be erected by 2034, each having the treatment capacity of 150,000 Mg per year, which requires financial expenditures of approx. PLN 300 million. Whereas, as regards non-ferrous metals, existing waste sorting plants must be principally provided with 250-300 separators along with necessary equipment by 2028, which will require an estimated amount of PLN 100–120 million (Moskwik et al., 2020). Irrespective of individual investment decisions, it should be emphasised that the Polish waste management system is seriously underfunded, and this is valid also for the packaging waste.

Furthermore, it must be stressed that funds obtained for EPR must be considerably increased. The EU legislation (Directive (EU) 2018/851) specifies very clearly (Article 8a(4)(a)) the type of costs which must be covered by economic operators which place packaged products on the market. The most important of them include the cost arising from the separate collection of packaging waste and its subsequent transport and processing, which should be further reduced by revenue from the reuse of packaging, sale of secondary raw materials and unclaimed deposit fees. It is extremely difficult to assess the actual level of that cost, as it should be determined separately for each significant group of used packaging, whilst taking into account its unique properties, including particularly its durability, repairability, re-usability, recyclability and the presence of hazardous substances (Directive (EU) 2018/851). Furthermore, another difficulty that economic operators have to face is that expenses incurred by them must include revenue from the sale of secondary raw materials, whose value varies over time and depends on multiple factors, of which the

most important is their quality understood in terms of cleanliness, uniformity and degree of sorting. In consideration of the Polish market, it is claimed that, only with respect to aluminium fraction (beverage cans) and PET plastic (beverage bottles), the revenue from raw material sale is higher than the costs relating to the management of that waste incurred at the earlier stage (Deloitte, 2021). There are, however, other products, like composite packaging and some polymers (e.g. PVC or EPS), that are not suitable for recycling and are often treated for energy production or conventionally disposed of in landfills. This is mainly to be attributed to the fact that those types of packages are made out of multiple materials that are assembled in a way separation is not technically or economically feasible.

Apart from the aforesaid cost of separate collection, transport and processing of packaging waste, entities that place packed products on the market are further required to spend specific funds on ecological education and the maintenance of administrative systems used for data gathering and reporting (Directive (EU) 2018/851). However, in this case, it is much easier to assess the level of expenses to be borne by economic operators, which may include both flat charges and charges which depend on the value of packaging placed on the market or the amount of revenue earned.

To determine the amount of costs incurred in Poland for EPR, it is necessary, in the first instance, to ensure that a polish public register of packaging placed on the market along with products contains all relevant details. To this end, packaging is to be classified, as required by law (Directive (EU) 2018/851), into household packaging and other types packaging, like those used for transport (e.g. wooden pallets or stretch film). This is because, financial expenditures on its collection, separation and further management differ considerably depending on packaging category. As a consequence of such a distinction, higher rates of charge would be fixed for economic operators that place inner packaging on the market (poorer quality of secondary raw materials and the need for preliminary processes, such as sorting and additional cleaning). Lower rates would apply whereas to transport packaging, which has higher quality of secondary raw materials and readiness for recycling process.

The above classification of packaging will make it possible to take another step towards streamlining the EPR system, namely to gather real data on the actual costs of the management of individual types of packaging waste. For that purpose, it is necessary to create an additional module operating as part of the BDO system (a so-called “financial reporting module”). That module could be used for gathering data and information on costs relating to the collection, transport and processing of packaging waste and revenue from the sale of secondary raw materials. Financial flows, which had not been subjected to environmental reporting activities before, should be indeed available for inspection by administrative authorities who are in charge of monitoring and controlling waste management operations. Therefore, the EPR system regulator (e.g. The Institute of Environmental Protection – National Research Institute) should compile every year, based on data gathered in the “financial reporting module”, a publicly available report containing information on the costs of packaging waste management incurred by respective packaging recovery organisations whilst discharging statutory obligations assumed from economic operators placing packed products on the domestic market. In fact, without that knowledge, neither the effectiveness of the EPR system operation could be enhanced, nor the rates of charges to be paid by entities placing packed products on the market could be determined in such an amount that would be sufficient to cover all costs, without imposing undue burden on economic operators of the small and medium size enterprises (SMEs). Complete

data would be available exclusively to the EPR system regulator and would be used for optimising processes and for verifying the accuracy of information entered into the waste management system. Reports generated for packaging recovery organisations would also not present unit costs incurred separately by each of the organisations' business partners (e.g. companies, which are collecting and recycling individual types of packaging waste). Data gathered in the "financial reporting module" would, hence, be utilised for the actual eco-modulation of the rates of charges and to ensure that each type of packaging material is settled separately. Such would imply taking into account the monetary costs collection and recycling of waste, and the revenue from sale of the secondary raw material obtained, without the possibility of subsidising material of one type by another one. Furthermore, obtaining accurate financial data would provide a valuable basis for further optimisation of the EPR system, e.g. through the application of lower charges to reusable packaging or packaging containing a specified percentage of recycled material.

3.2. Irregularities in Packaging Waste Management Operations

The value of shadow market in waste in Poland is estimated to be close to PLN 2 billion, 37.5% of which is what it is lost every year by the Polish government due to VAT and income tax (Global Compact Network Poland, 2019). In 2018, a fire broke out at waste collection points in Poland 243 times (GUS, 2020), mainly due to warehoused or stored packaging waste, which in the overwhelming majority of cases was unsuitable for material recycling. So, it is urgently needed that efforts are made to avoid that those incidents are repeated in the future, as they heavily threaten the quality of the natural ecosystem, the health of humans, and the solidity of the economy.

Nevertheless, from the EPR point of view, the most serious problem is the fact that inaccurate or even false documents confirming the recycling of packaging waste are issued (so-called DPR and EDPR documents). Such documents concern waste that either does not exist at all or has never been waste from used packaging, which also precludes packaging recovery organisations from discharging their statutory obligations properly. It is estimated that for glass, paper, cardboard and plastic packaging waste, irregularities may concern approximately 30% of the documents in question, resulting in a loss of around PLN 252.7 million (Moskwik et al., 2020).

In this regard, the authors of this paper believe the way out is not to raise the rates of charges to be paid by economic operators placing packaged products on the market. This is mainly because Polish sectors of package manufacturing and after-use management as a waste need to be thoroughly streamlined in many operational aspects. This is particularly relevant in the context of diverse wealth level of the Polish people (the minimum salary is EUR 610), which is two and a half times lower than in Germany, and in view of the fact that EPR-related financial burden imposed on the business sector will be certainly passed to consumers purchasing packaged products at points of sale. Hence, a crucial improvement measure would be that of changing the role of packaging recovery organisations into entities engaged in the collection and management of waste or playing an intermediary role in the waste trade. Such a solution would definitely address the Polish problem of false documents being issued to confirm the recycling of packaging waste (Moskwik et al., 2020). Those actions would provide signing agreements directly with the packaging waste holders, under which waste collection and proper management would be ensured. On the other hand, under other specific agreements, packaging recovery organisations should be provided by packaging-waste processing operators in Poland and abroad, reliable information on the

quantity of on the quality-standard-fulfilling secondary raw materials that are obtained. Such agreements would translate into proper cash flows, which could be utilised by packaging recovery organisations to make payments for purchasing packaging waste, carrying out preliminary operations (sorting, additional cleaning, etc.) and, in the case of certain types of waste, also to make payments for the processing of them. In this way, those organisations would not deprive Polish municipalities of control over municipal packaging waste originating, but would only ensure that reliable documents on actually-recycled packaging waste are issued and has been actually delivered to a waste facility. This scenario will result in the distribution of the vast majority of funds directly from packaging recovery organisations to entities purchasing and recycling packaging waste from the market (mainly generated by households). Doing so will make it possible to reach required waste collection and recycling targets and ensure the maintenance of the highest standards and proper control at each operational stage. Only in this manner, packaging recovery organisations can bear full responsibility for their actions, and consequently, also for the proper discharge of statutory obligations assumed from entrepreneurs.

Furthermore, separate EPR systems for composite packaging and packaging used for hazardous agents must be no longer established and maintained. Realization of these systems currently takes place in Poland on a voluntary basis under agreements made between self-regulatory organisations and voivodship marshals. All packaging that is available on the market should be included in a general packaging waste management system and be subjected to the requirements of discharging statutory obligations only as part of a co-operation with packaging recovery organisations, which are dedicated and specialised entities ensuring the proper discharge of legal obligations.

To maintain the highest standards in this regard, it is necessary to introduce additional statutory requirements for packaging recovery organisations:

- Obligation to obtain licence to conduct operations;
- Obligation to increase the share capital to at least PLN 5 million;
- Requirement to carry out external audits designed to verify whether they operate correctly or not.

State authorities, on the other hand, are expected to appoint a Polish regulator of the EPR system, which could be either the Institute of Environmental Protection - National Research Institute or the Chief Environmental Protection Inspector, as both of them have relevant expertise and knowledge. The regulator's duties would include as follows: to draw up reports containing data gathered in the "financial reporting module", to verify reporting of all the stakeholders of the EPR system; to control financial flows in packaging waste management; to oversee DPR and EDPR documents and issue licences to packaging recovery organisations.

3.3. Placing on Market of Packaging Which After Being Used Is Unsuitable for Recycling or Hinders That Process Considerably

Union legislation defines EPR as a set of measures taken by Member States, which require manufacturers of products to bear either financial or financial and organisational responsibility for the management of their products when they become a waste (Directive (EU) 2018/851). However, that definition seems to be incomplete, as it contains a reference only to the product's end-of-life, overlooking very important actions, such as eco-design or education and shaping proper consumer attitudes.

Eco-design is essentially based upon the incorporation of environmental aspects into the design and development of a product, whilst making sure it fulfils the required quality standards (ISO/TR 14062:2002). In the light of this, eco-design might be considered as a response to the problem of using packages that, due to their material composition, are not suitable for recycling and so can only be disposed of conventionally (Van Doorsselaer, 2021; Yeang, Woo, 2010). From the practical point of view, eco-design might be use for developing a refined version of packaging with smaller environmental impact, but whose performance and role and function in supply chains is not altered (Karwowska, Żakowska, 2020). Therefore, according to this paper's authors' team, it would be necessary to introduce the packaging eco-design process to the Polish EPR system permanently. Such could be done not only through good business practices, but also very specific legal requirements that ban or limit the use of certain types of packaging materials (Zeng, Ertz, Durif, 2017). Such packaging range includes, for instance, plastics, whose combination in packaging material is very often the reason why used packaging is not suitable for material recycling, and consequently, is not in line with the circular economy. Combinations of various types of polymers in packaging has been prepared by the French Plastic Packaging Recycling Committee and presented in Table 2. According to the their own accepted methodology, these combinations may be acceptable (designated as 1), acceptable to a limited extent (designated as 2) and unacceptable (designated as 3).

Table 2. Assessment of various plastic type combinations in packaging materials

Material of Packaging		Additional Material							
		PE-HD	**PE-LD**	**PP**	**PVC**	**PS**	**PET**	**EVOH**	**PA**
Prevailing Material	**PE-HD**	1	1	2	3	3	3	2	3
	PE-LD	1	1	2	3	3	3	2	3
	PP	2	2	1	3	3	2	2	3
	PVC	2	2	2	1	2	3	2	3
	PS	2	2	2	2	1	3	3	3
	PET	2	2	2	3	3	1	2	2
	PA	3	3	2	3	3	3	3	2
	PC	3	3	3	3	3	1	3	2

Source: Personal elaboration from (Karwowska and Żakowska, 2020).

A very popular polish example of an unacceptable combination of two types of plastics is, for instance, a PET bottle with a shrinking film label made from PVC attached to it, which is unsuitable for recycling due to similar density of both polymers, and consequently, plastic separation by floatation is not possible. Such combinations are eliminated during the packaging eco-design process, for which mono-material structures are preferred in the first place – as they can be easily separated by household members and do not raise any issues when they go for recycling.

Eco-design includes also the use of secondary raw materials for production of packaging, thereby becoming the tool for implementing and promoting circular economy paths. In this regard, it is also necessary to introduce an unambiguous legal framework, which Poland needs to have in place to achieve the targets set out in the so-called SUP directive (Directive (EU) 2019/904). The key aim for that would be to lay down the

requirements, among other things, for a content of recycled plastic in single-use plastic beverage bottles (25% by 2025 and 30% by 2030).

As for another noticeable effect of packaging eco-design, Poland will meet recycling levels required by the European Union for individual types of packaging waste (Directive (EU) 2018/852) (Table 3).

Table 3. Recycling levels for packaging waste

Type of Packaging	Required Recycling Levels for Packaging Waste [%]		
	By 31 Dec 2021	By 31 Dec 2025	By 31 Dec 2030
Plastic packaging	23.5	50	55
Aluminium packaging	51	50	60
Steel packaging	51	70	80
Paper and cardboard packaging	61	75	85
Glass packaging	61	70	75
Wooden packaging	16	25	30

Source: Personal elaboration based upon (MPPW, 2013 and Directive (EU) 2018/852).

Table 3 shows recycling levels applicable in Poland in 2021 and to be reached by the end of 2025 and 2030, as set out by the Community. The example of plastic packaging demonstrates very clearly that without additional mechanisms, such as ecodesign, achieving the targets set in the directive will not be possible.

3.4. Raising Society's Ecological Awareness of Packaging Placed on Market and Generated Packaging Waste

Under current legislation (MPPW, 2013), entities that place packaged products on the Polish market are required to conduct public awareness campaigns, which they may run alone or through packaging recovery organisations. Nevertheless, one can still notice a low level of the ecological awareness of society, manifested in a lack of knowledge concerning basic issues, such as the proper separation of packaging waste, the need for cleaning it before disposal and understanding designations placed on packaging. On the other hand, popular demands for environmental protection and reducing a negative impact on the environment in the context of packaging have been already seen for years (Cholewa-Wójcik, Kawecka, Ingrao, Siracusa, 2019). The foregoing shows clearly that effective ecological education supporting the achievement of objectives resulting from EU membership should be also a vital component of the Polish extended producer responsibility system. Given isolated educational efforts made thus far in Poland by individual packaging recovery organisations, it is expedient to establish a nationwide educational programme in Poland, financed by economic operators placing packaged products on the market. This task could be coordinated by an advisory body appointed by the Minister of Climate and Environment, composed of representatives of all the Polish EPR system's stakeholders. The latter could include entities placing packaged products on the market, packaging recovery organisations, entities engaged in the collection and processing of packaging waste, social organisations and local governments. This would not only satisfy the requirements for a regular dialogue referred to in the EU directive (Directive (EU) 2018/851) but, first and

foremost, also provide a real opportunity for the exchange of ideas and opinions amongst system participants. Apart from matters relating to ecological education, the council would also perform, on an ongoing basis, EPR analyses, express opinions regarding legal acts and other documents, as well as draft and propose motions and legislative changes.

4. RECOMMENDATIONS ABOUT IMPROVEMENT OF EPR SYSTEM'S OPERATION IN POLAND

To make sure that waste management is developed according to the principle of a sustainable circular economy, it is required that EPR systems evolve towards an integrated holistic responsibility model. Given the identified and analysed areas for improvement, recommendations as to necessary actions designed to streamline the packaging waste management system in Poland were formulated by this team of authors. Amongst all the necessary actions to be performed, according to this papers' authors, the following deserve special attention:

- Forming an advisory body for packaging and packaging waste management, to be appointed by the Minister of Climate and Environment;
- Introducing additional legal requirements for the operation of packaging recovery organisations;
- Appointing the Polish regulator of EPR system;
- Observing the packaging eco-design principles;
- Classifying and categorising packaging placed on the market into household packaging and other packaging;
- Creating an additional "financial reporting module" operating as part of BDO;
- Determining the amount of financial expenses to be incurred by economic operators that place packaged products on the market based on the actual costs of the management of respective types of packaging waste;
- Ensuring that packaging recovery organisations' operations are focused on packaging waste collection or that they play an intermediary role in trade in such waste;
- Terminating voluntary agreements between self-regulatory organisations and voivodship marshals;
- Establishing a nationwide educational programme in Poland for the proper handling with packaging and packaging waste.

Introducing solutions that make a producer responsible for all products placed on the market is one of the preconditions for closing the loop of resources within economy (Leal Filho et al., 2019). The aforesaid direction for the EPR development is reflected in amendments to the EU legislation, which require the inspection of solutions adopted thus far and necessitate imposing minimum requirements for producers' responsibility for products placed on the market, including packaged products. The implementation of the EPR system, including the covering of the so-called net costs of packaging waste management in communes' municipal waste management systems, will mean the performance of the waste directive provisions, make the achievement of closed-loop economy objectives more viable and notably contribute to a reduction in costs borne by citizens and consumers.

5. SUMMARY

Given applicable EU regulations on post-consumer waste management, the EPR system must be changed. Improvements to the EPR system are necessary in order to ensure that the costs of all processes related to the management of waste covered by EPR are paid in the proper amount by manufacturers placing products on the market and to make sure that the EU requirements setting out the degree of recycling of specific waste types are satisfied. In view of the fact that 65% of the weight of municipal waste should be ultimately recycled in 2035, with the current levels not exceeding 30%, the situations appears to be seen as a matter of extreme urgency.

It must be remembered that EPR is the most relevant instrument for shaping the policy of closed-loop economy in the case of packaging and packaging waste. Hence raising funds is not an objective in itself for extended producer responsibility and cannot be perceived as such. Money obtained as part of EPR from entities placing packaged products on the market must cover specific costs, which are precisely set out in the EU directive (Directive (EU) 2018/851). This is particularly important to the Member States which perceive the stream of new funds as an opportunity for pursuing further social programmes covering, e.g. a direct reduction in the amount of charges for the collection of municipal waste generated in households. What deserves attention is the fact that consumers, as primary generators of waste, are responsible for its separate collection, hence they should independently cover the costs arising from the management of mixed waste which in the majority of cases is generated as a result of improper separation. Where the financing of the collection and processing of mixed waste or waste other than packaging waste is passed to entities placing packaged products on the market (e.g. through defective EPR mechanisms), this will result in worse effectiveness of waste separation by consumers, who will no longer have any incentives in this regard. Therefore funds raised and collected as part of EPR must be designated for streamlining national packaging and packaging waste management systems, and not provided to citizens of communes in the form of direct concessions or lower fees. On the other hand, the provisions of law must be also drafted in a manner ensuring that costs relating to EPR are not included in the prices of products and services straight away. In this case, there will be indeed a smooth shift from the polluter pays principle to the society pays principle and all costs will be ultimately borne by consumers, who purchase packaged products from retailers and wholesalers.

The improvement of EPR may substantially contribute to the achievement of existing EU targets relating to waste and new ambitious targets set in the EU's circular economy package. The implementation of EPR in respect of the streams of waste with plastic content in the EU demonstrated problems and weaknesses, from a lack of binding mechanisms to a lack of incentives, in order for companies to become fully engaged. Therefore, an EPR framework must be re-designed, and this should also encompass specific actions which will make it possible to apply the extended producer responsibility concept holistically.

The results of the research may support changes in EU legislation through the revision of existing solutions and the implementation of minimum requirements for the responsibility of producers for introduced products, including products in packaging.

The limitations of the conducted research result from the high volatility of trends resulting, for example, from changes introduced in legal regulations regarding topics directly and indirectly related to the subject of extended producer responsibility.

It is worth conducting further research on the impact of changes in legal regulations after the implementation of the ROP system in Poland in terms of its effectiveness and the possibility of implementing improvement measures.

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