

MANAGEMENT OF PACKAGING WASTE IN THE EU AND UKRAINE IN THE CONTEXT OF CIRCULAR ECONOMY PRINCIPLES

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Abstract. *The analysis delves into the specifications outlined in EU regulations concerning packaging and its treatment within the context of waste management. An assessment is made of the recycling rates pertaining to packaging waste across the EU's member states. Concrete instances are furnished to exemplify proficient methods for effectively managing such waste in adherence to the principles of the circular economy. And although the EU has achieved high levels of recycling and waste recovery, the amount of packaging waste continues to grow year after year. As a result, the EU is actively immersed in the process of reevaluating its legislation, particularly within the domain of waste management. Central aspects of the newly introduced EU Proposal for Packaging and Packaging Waste Regulation are outlined including recyclability and reusability issues related to packaging waste treatment. For comparison, the situation with waste management in Ukraine is considered. Statistical data showing that the level of waste recycling and recovery is unsatisfactorily low are given. The main obstacles to achieving high rates of waste recycling are highlighted, as well as possible ways of more effective management of packaging waste in Ukraine are investigated. The need to adapt national legislation to EU legislation regarding the handling of packaging waste is emphasized, especially given Ukraine's aspirations for European integration. The importance of the EU's achievements in the field of waste management, in particular, regarding packaging waste, is emphasized as very relevant and instructive for Ukraine.*

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Introduction. Lately, the problem related to the environmental deterioration and the depletion of natural resources has reached unprecedented levels. Across the globe, numerous countries have directed their attention towards combatting the escalating challenge of global warming, attributed to the growing emission of greenhouse gases into the atmosphere. Notably, the European Union (EU) has emerged as a prominent advocate in the battle against climate adversities. With a target set for 2050, the EU aims to attain climate neutrality. This endeavor involves a gradual transition by EU member states from a linear economic model to a circular economy—a paradigm characterized by resource circulation.

On the 11th of March 2020, the European Commission introduced the Circular Economy Action Plan (European Commission, Directorate-General for Communication, 2020a), a pivotal component of the European Green Deal (European Commission, 2019) strategy. This plan is designed to curtail resources consumption rates within the EU, increase the reutilization of resources in the forthcoming decades, and concurrently stimulate economic growth. Comprehensive in scope, the Plan encompasses the complete product lifecycle, from inception and production to consumption, repair, reuse, recycling, and the reintroduction of resources into the economy. Hence, a central facet of building a circular economy involves optimizing resource usage and adopting innovative approaches to waste management, particularly concerning packaging waste. Within the EU, robust emphasis is

placed on effective packaging waste management. A slew of organizational and legislative measures has been implemented to curtail packaging waste generation and enhance the efficiency of waste management. Thanks to the established measures, EU member states have been able to achieve some success in managing packaging waste and building effective systems for recycling and recovery of waste. As for Ukraine, it can be noted that the amount of waste generation continues to grow, and the level of its processing, for example, recycling or recovery with obtaining energy, remains at a low level. Given this context, the exploration and application of the EU's experience holds exceptional relevance for Ukraine.

The objective of the research is to analyze the organizational and legal systems of the EU and Ukraine in the field of packaging waste management and consider possible ways to improve the packaging waste management system in Ukraine based on European experience.

Materials and methods. The analysis drew upon regulatory frameworks from both the EU and Ukraine within the realm of waste management. Additionally, analytical reports, scholarly publications addressing challenges and advancements in waste management, specifically in the context of packaging waste, along with statistical data were analyzed.

Presentation of the main results of the study. The general principles concerning waste management are outlined in Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Waste Framework Directive) [EU, 2008]. The Directive delineates the hierarchy guiding waste management practices, with foremost emphasis placed on waste prevention, while waste disposal receives the least priority.

It should be noted that the Waste Framework Directive is the most general, which applies to all types of waste. In 2018, this Directive was amended, which is reflected in Directive (EU) 2018/851 (EU, 2018a). Issues related to requirements for packaging and handling of packaging waste are regulated by Directive 94/62/EC (EU, 1994) of the European Parliament and the Council of December 20, 1994 on packaging and packaging waste (PPWD). PPWD has been repeatedly revised. The last revision was adopted in 2018 (EU, 2018b). PPWD encompasses specific objectives for the recovery of packaging waste, as well as contingent upon the nature of the packaging material. In the wake of the most recent update to the PPWD, a mandated objective is established that, by 2025, a minimum of 65% of packaging waste, by weight, must undergo recycling. Furthermore, this target is slated to rise to 70% by the year 2030. The PPWD also outlines tailored goals, delineated by the packaging material, to be achieved both in 2025 and 2030. These specific targets pertain to materials such as plastic, wood, ferrous metals, aluminum, glass, as well as paper and cardboard. Notably, for plastic packaging, the recycling target set for the year 2030 stands at 55%.

The regulation governing the domain of packaging waste generation and management has resulted in notable advancements. Figure 1 illustrates the recycling rates of packaging waste within the EU for the year 2020 (data sourced from Eurostat, 2023). Collectively, an impressive 64% of packaging waste underwent recycling. When evaluating the processing of packaging waste according to the specific packaging materials, the highest recycling rate is recorded for paper and cardboard packaging waste, standing at 81.5%. Metal packaging waste (75.7%) and glass packaging waste (75.9%) have comparable recycling levels. Lower levels of recycling were achieved for plastic and wooden packaging (37.6% and 31.9%, respectively).

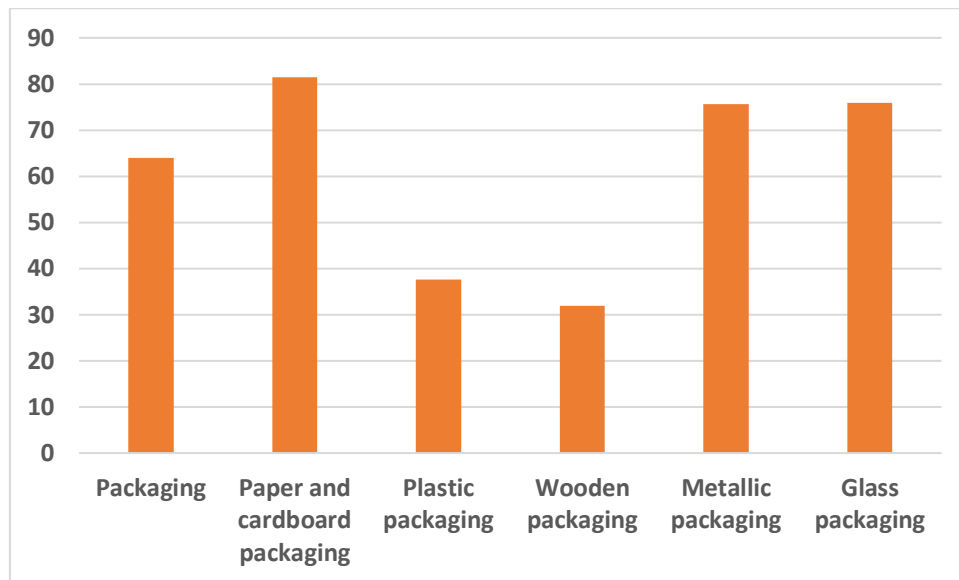


Fig. 1. Recycling rate (%) of packaging waste in the EU in 2020 (Eurostat, 2023a)

Figure 2 displays the accomplishments in packaging waste recycling across individual EU member states. According to Eurostat statistics for the year 2020, Belgium secured the highest recycling rate for packaging waste, reaching an impressive 79.7%. The second and third positions were claimed by the Netherlands and Finland, attaining recycling levels of 76.5% and 73.2%, respectively.

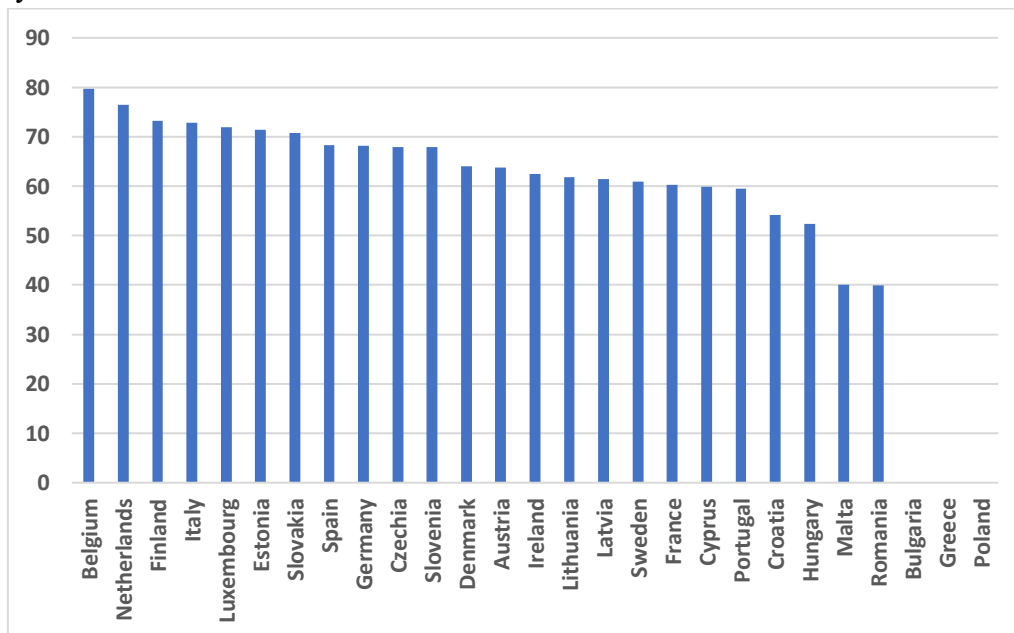


Fig. 2. Recycling rate (%) of packaging waste in the EU in 2020; data for Bulgaria, Greece and Poland are not available (Eurostat, 2023b)

EU member states use different models for packaging waste management systems. For example, an identifying feature of the French approach involves a central coordinating body responsible for establishing the environmental impact fee. This fee is subject to fluctuations through a system of incentives and penalties based on the packaging's recyclability. The extent of this fee

adjustment provides advantages to those who align with the preventative program directives. Entities tasked with certifying the packaging's recyclability also extend their support to users engaged in eco-design endeavors (Di Foggia, G., & Beccarello, M., 2022). The Portuguese system stands out with its waste trading platform, acting as a nexus for waste transactions that effectively balances supply and demand, thereby stimulating market growth. This system in Portugal holds promise as a means to foster the expansion of secondary raw material markets (Di Foggia, G., & Beccarello, M., 2022). The European Commission's website offers valuable resources that provide insights into the waste management status of individual EU member states. It presents comprehensive analyses of the challenges and opportunities within this domain, accompanied by pertinent recommendations aimed at enhancing waste management systems within each country. Additionally, the website showcases exemplary practices that can serve as models for emulation (European Commission, Directorate-General for Environment, 2023b). The following can be cited as examples of good practices. For example, in Sweden there is a ban on landfilling certain types of waste, such as organic waste and combustible waste. This, among other measures, made it possible to reach the share of waste disposed of in landfills up to 1% (European Commission, Directorate-General for Environment, 2023c). In Austria, a very interesting practice of taxation in the field of waste management has been implemented. The fee for waste disposal at landfills depends, first of all, on the type of waste. Secondly, the received funds are directed to the protection of old landfills. Austria has announced the remediation of contaminated sites by 2050 (European Commission, Directorate-General for Environment, 2023d). In Ireland, a national campaign has been launched to increase the awareness of the general public in the concept of circular economy. At the same time, organizations of extended producer responsibility take part in this campaign (European Commission, Directorate-General for Environment, 2023e). In Finland, an effective system of returning used packaging with reimbursement of its deposit value is used. The convenience of this scheme has resulted in the country achieving very high levels of container return (e.g. plastic bottles 92%, aluminum cans 96%) (European Commission, Directorate-General for Environment, 2023f; ELY Centres, 2023). And the list of such good practices of EU member states can be continued.

However, in spite of notable progress in the realm of packaging waste recycling and recovery, the production of diverse packaging waste types within the EU persists in its upward trajectory. Eurostat data reveals that the quantity of packaging waste generated in the year 2020 escalated to 177.92 kg per person (as depicted in Figure 3). This trajectory stands in contrast to the waste management hierarchy, which places a premium on preventing waste generation at the outset.

Additionally, it's important to recognize the evolving policy landscape that has unfolded since the initial establishment of fundamental prerequisites for handling packaging waste and its treatment. Particularly noteworthy is the European Commission's dedicated endeavor to foster a circular economy, evident in its EU Circular Economy Action Plan. Most recently, the Commission unveiled a Strategy for Plastics in the Circular Economy (European Committee of the Regions, 2018), outlining a vision for the future where, by 2030, all plastic packaging should be designed for reusability or recyclability. This strategy lays the groundwork for a new era of plastics usage—one that prioritizes design, production, and materials used that align with the principles of reuse, repair, recycling, and the advancement of more sustainable alternatives. Concurrently, the Commission has pledged to cultivate a more comprehensive and equitable Single Market. This commitment involves addressing restrictions within the retail sector, encompassing e-commerce, and undertaking a modernization of the EU standards system, all aimed at fortifying cross-border trade.

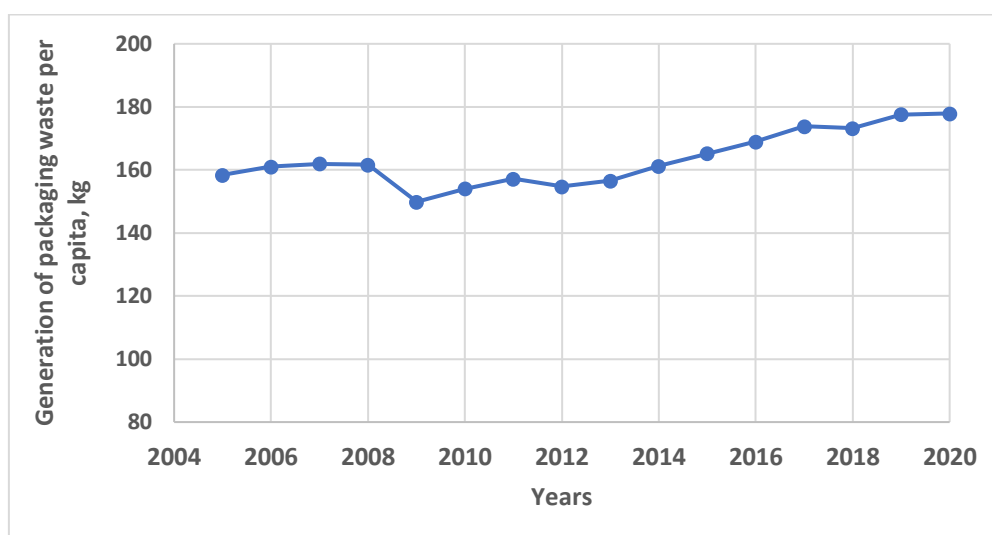


Fig. 3. Packaging waste generation in the EU (Eurostat^c, 2023c)

Taking into account ambitious climate goals of the EU, it was proposed to revise the existing PPWD. The proposed Packaging and Packaging Waste Regulation (European Commission, 2022) distinctly emphasizes the augmentation of packaging's recyclability, reusability, and the integration of recycled elements. The proposed Regulation unequivocally states that the weight and dimensions of each package should be minimized to the greatest extent feasible. Furthermore, the Proposal includes a prohibition on specific types of compact-format packaging. The document is currently undergoing standard legislative scrutiny.

Focusing attention on the situation in Ukraine, the following can be noted. The management of packaging waste stands as an integral facet within the broader framework of solid household waste handling. Presently, this process predominantly involves burying such waste in landfills, many of which are strained beyond capacity and fail to meet stipulated environmental safety standards.

At the national level, there exists a conspicuous shortage of infrastructure for the distinct collection and recovery of packaging waste. This insufficiency culminates in the wasteful loss of a substantial repository of valuable resources, encompassing materials like paper, cardboard, plastic, glass, metals and wood. These materials hold the latent potential for the reintroduction into the economic cycle, subsequently serving as raw materials for the fabrication of novel products.

In 2022, only 9.9% of household waste, which also includes packaging waste, was incinerated or recirculated, namely, 1.66% was incinerated, and 8.24% of household waste went to collection points for secondary raw materials and waste processing lines. The number of overloaded landfills is 163 units (2.8%), while 693 units (12%) do not meet environmental safety standards (Ministry of Community Development, Territory and Infrastructure of Ukraine, 2023).

By signing the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states, on the other hand, Ukraine committed to the step-by-step alignment of its waste management regulations with the standards set by the European Union. In the National Report "Sustainable Development Goals: Ukraine" (Ministry of Economy of Ukraine, 2017) (developed on the basis of the global goals of sustainable development), the task of transitioning to the principles of a circular economy was identified as a priority development goal. This report notes the need for the "the introduction of a circular economy

model, primarily by focusing on energy saving, sustainable environmentally friendly production and consumption". Another document that sets the task of transitioning to the principles of a circular economy is the National Waste Management Strategy in Ukraine until 2030, approved by Decree of the Cabinet of Ministers of Ukraine dated November 8, 2017, No. 820 (Cabinet of Ministers of Ukraine, 2017). Among the principles on which the strategy is based, the "transition to a closed cycle economy, which assumes that the volume of products, materials and resources is used in the economy as long as possible and the generation of waste is minimized," is also mentioned. The Strategy defines the priorities of state regulation in the field of waste management, taking into account European regulatory documents, in particular Directive 2008/98/EC and Directive 94/62/EC "On packaging and packaging waste".

In 2019, the National Waste Management Plan until 2030 was approved (Cabinet of Ministers of Ukraine, 2019). This Plan provides specific indicators that Ukraine must achieve in the field of waste management, and also notes the need to develop and implement a special law of Ukraine regarding packaging requirements and packaging waste management. As of today, the draft law "On packaging and packaging waste" (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023) is under discussion. The enactment and execution of the "On Packaging and Packaging Waste" law will serve to align national regulations more closely with EU legislation.

The provisions of Directive 2008/98/EC have been implemented into Ukrainian legislation by the Law of Ukraine "On Waste Management" (Verkhovna Rada of Ukraine, 2022). This Law (entered into force on 07/09/2023) provides for the reform of waste management, which will contribute to the transition of Ukraine to models of circular economy and sustainable development, as well as the introduction at the legislative level of the main European approaches and principles, including the five-level hierarchy of waste management and the principle of extended responsibility of the producer.

At the same time, it's crucial to recognize that for building the efficient packaging waste management systems in Ukraine, it is prudent to examine and adopt the exemplary practices observed within EU member states. Acknowledging that waste generation prevention holds prime importance in the EU's waste management hierarchy, it becomes pertinent to elaborate packaging waste management approaches in Ukraine that closely align with the EU's commendable accomplishments in this realm.

Taking into account the achievements of EU member states in the management of packaging waste, we propose the following measures to improve packaging waste management systems at the national, regional and local levels. In our view, the incorporation of mandatory deposit return systems for plastic bottles and aluminum cans is a vital step, as this practice has proven itself very successfully in some EU member states. Furthermore, in response to conspicuously excessive packaging waste generation, the prohibition of specific packaging types is advisable. For instance, the use of single-use packaging for food and beverages within dining establishments, single-use packaging for fruits and vegetables, and miniature packaging such as hotel shampoo bottles, should either be restricted or altogether banned. In tandem, it's essential to endorse initiatives focused on enhancing the recyclability of packaging. This necessitates the formulation of measures that establish design criteria for packaging, clearly delineating which specific forms of packaging should be compostable, allowing consumers to dispose of them as biowaste. Moreover, the national producers should be compelled to incorporate defined proportions of recycled content within new plastic packaging. This measure aims to elevate the worth of recycled plastic as a valuable raw material.

Lastly, the effective implementation of a "polluter pays" system should be imperative. This system serves to motivate packaging manufacturers to integrate circular economy principles into their production practices.

Conclusions. The present status and regulatory framework governing packaging waste management are examined within the contexts of both the EU and Ukraine. It is shown that various measures undertaken in the EU in the domain of packaging waste management have resulted in notable advancements. At the same time, it is worth noting that the amount of packaging waste continues to grow in the EU, which contradicts the hierarchy of waste management. Therefore, in the near future, the EU plans to update the regulatory document on packaging and packaging waste, one of the goals of which is to reduce the generation of new waste.

In contrast, Ukraine significantly lags behind the majority of EU member states in terms of waste recycling and recovery rates, particularly concerning packaging waste. The predominant practice involves disposing of waste in landfills. To address this, the formulation of waste management legislation, coupled with the enactment of a dedicated law "On Packaging and Packaging Waste," is poised to establish a more efficient organizational and economic framework. This, in turn, will invigorate the integration of packaging waste into a new resource cycle.

Given Ukraine's trajectory towards European integration, the application of superior European practices in packaging waste management, especially in the realms of recycling, reuse, and recovery, holds tremendous significance.

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