

OVERVIEW OF WASTE GLASS CONTAINER MANAGEMENT IN SERBIA ACCORDING TO THE DECREE ON ESTABLISHMENT OF CONTAINER WASTE REDUCTION PLAN

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Abstract

The aim of this paper is to assess the current state of waste glass container management (WGCM) in Serbia, as developing country, by analyzing a legal framework: National Waste Management Strategy and Law on Packaging and Packaging Waste Management. The analysis is mostly based on the available data from Serbian Environmental Protection Agency (SEPA). According to the Specific National targets of packaging and packaging waste, for 2016, minimum percentage for the glass containers recycling is 25%, indicating that the current situation of WGCM is not satisfactory, because only 16% from produced glass containers are recycled, not for making the new bottles, but only for making glass cullet for some other purpose.

Introduction

In view of the deteriorating ecological situation in Serbia and abroad, the problem of utilization of solid household waste, which keeps occupying large areas, is very urgent. The interest in glass waste, whose share in solid household waste reaches 5 – 6%, has grown lately in Serbia. Glass waste remains resistant to atmospheric precipitation for many years, therefore, its storage on urban dumping areas is economically ineffective. Glass is used for many purposes, but in the waste system glass is predominantly found as a beverage and food containers with a relatively short lifetime before ending up in the waste [1]. An efficient glass collection and recycling scheme is an important driver to move towards a circular economy where waste is not dumped but become the essential raw materials used to manufacture new products, same or some other new products. The management of packaging and packaging waste is regulated by the Law on Packaging and Packaging Waste [2].

Evaluating how to avoid or dispose of waste in more environmentally respectful ways has become critical to waste management. Landfill space is becoming increasingly scarce and the assimilative capacity of Earth is reaching its limits, but landfilling is still the most common method of managing waste [3, 4]. The objective of a landfill is to safely dispose of solid waste for a long timeframe as it is actually a long-term storage of inert waste and a place of decomposition for biodegradable waste. This decomposition means emissions are inevitable and controlling these is an important aspect of the landfilling process [5]. Container glass, also called packaging glass, is the product used for packaging primarily food products. Glass is distinctive in its claim to be 100% recyclable [6, 7]. Container glass waste can be used instead of raw material as input for the manufacture of new glass. It can be mixed with raw materials or theoretically used as the only input for new glass manufacture, although in practicality only about 80% of new container glass input can be cullet, which is crushed glass used as an ingredient in glass manufacture [8].

The legislation of waste management contains various requirements to recycling of waste and sets political targets for recycling in order to minimize the environmental damage caused by waste management. Long-term strategy of Republic of Serbia in the area of environment protection shall mean the improvement of population's living quality by providing desirable conditions of environment and conservation of nature based on sustainable environment management. Key steps shall include strengthening of the existing and development of new measures for establishment of integrated waste management system, further integration of environmental policy into other sector policies, acceptance of extended individual responsibility for environment and more active participation of public in decision making processes. The National Waste Management Strategy shall be a fundamental document providing requisites for rational and sustainable waste management at the Republic of Serbia level. The Strategy has to be supported by large number of implementation plans for management of specific waste streams (biodegradable, packaging and other). Establishment of economic instruments and financial mechanisms shall be necessary in order to provide for the system for national and international investments into long-term sustainable activities. Also, the Strategy shall consider needs for institutional strengthening, legislation development, regulations implementation at all levels, education and development of public awareness. The objective of this paper was to compare and analyze the current percent of glass container recycling according to the legal framework, such as decree on establishment of waste reduction plan.

Experimental

All flows and processes associated with glass containers consumed and discarded in Serbia in 2014 are within the system boundary in this paper. The year 2014 was chosen because the data from this year were the most recent available data. The official data were used from Serbian Environmental Protection Agency (SEPA) [9], from the Report on the management of containers and containers waste in the Republic of Serbia (Table 1.).

Table 1. Official data about waste glass container amount from Serbian Environmental Protection Agency in 2014 [9]

	Operator 1 (t)	Operator 2 (t)	Operator 3 (t)	Operator 4 (t)	Operator 5 (t)	Operator 6 (t)	Total (t)
The amount of glass containers released on the market	28,013.9	21,603.4	769.6	1,408.1	1,748.0	1,693.7	55,236.8
The amount of glass containers taken by operators	4,589.0	3,296.4	129.1	284.9	384.2	263.7	8,947.2
The amount of recycled waste glass container	4,589.0	3,296.4	129.1	284.9	384.2	263.7	8,947.2

The license for container waste management has 6 operators in Serbia. The operator is obliged, on behalf of its members, to provide that: the local utility company regularly takes municipal container waste, to regularly receive and collect container waste that is not municipal waste from

end users, to ensure reuse, recycling or disposal in accordance with the Law.

Law on Packaging and Packaging Waste Management (Official Gazette of RS, no. 36/09) sets forth environmental requirements which packaging must meet in order to be marketed; packaging and packaging waste management, reporting on packaging and packaging waste, economic instruments, as well as other relevant issues with regard to packaging and packaging waste management. The Law also regulates imported packaging, produced, i.e. marketed packaging, as well as packaging waste generated in the course of business activities on the territory of the Republic of Serbia, regardless of its origin or purpose, and used packaging material.

The Decree on establishing a plan to reduce container waste for the period 2015 – 2019 defines the targets for recovery and recycling.

Tabela 2. Recycling and recovery targets under Serbian legislation for the period 2015. – 2019.

		Specific recycling targets				
		2015	2016	2017	2018	2019
Paper/cardboard	%	35,0	40,0	45,0	50,0	60,0
Plastic	%	13,0	17,0	19,0	21,0	22,5
Glass	%	19,0	25,0	31,0	37,0	43,0
Metal	%	23,0	29,0	34,0	39,0	44,0
Wood	%	10,0	12,0	13,0	14,0	15,0

Results and discussion

Quantities of recovered container waste again by operators, waste types and manner of treatment, are shown in Table 1, and then these data are used to obtain a realistic picture of the WGCM in Serbia, which is shown in Figure 1.

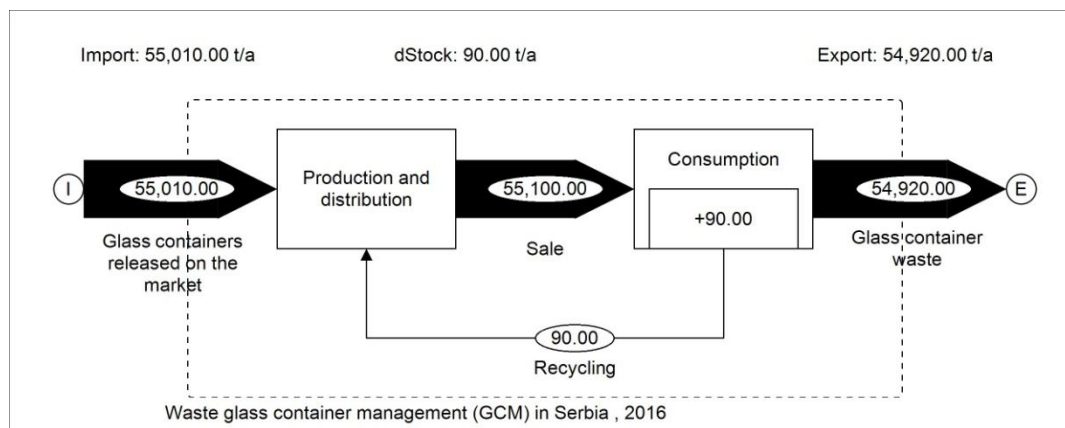


Figure 1. Waste glass container management (WGCM) in Serbia

The amount of glass containers released on the market is approximately 55,237 tons per year, of which 46,290 tons ends up in landfill, and only less than 9,000 tons of waste glass goes to recycling process. It means that only 16% from produced glass containers are recycled, not for making the new bottles, but only for making glass cullet for some other purpose.

According to the Specific National targets of packaging and packaging waste for 2016 [10],

minimum percentage for the glass containers recycling is 25%, indicating that the current situation of WGCM in Serbia, with reached only 16% of glass recycling, is not satisfactory.

Conclusion

Well planned waste management systems, may reduce imports of glass containers and increase the economy of the country. Based on EUROSTAT's statistical data, the glass container waste generation per inhabitant has steadily increased since 1998 and the price of glass cullet has increased over the years as the amount put on the market has also increased, which can contribute to economic development in Serbia in the field of WGCM.

From the aforementioned reasons, it is necessary to Serbia continue work on activities aimed at raising awareness and capacity of legal persons, to closer involvement of the public utility companies in local governments in the implementation of the system of packaging and packaging waste and aimed to more intensive inspection over the implementation of the Law on packaging and packaging waste. In the future, the results of these examples could be useful for the implementation of changes in the WGCM system in Serbia.

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