



“Gheorghe Asachi” Technical University of Iasi, Romania



SUSTAINABILITY ASSESSMENT OF SINGLE-USE VERSUS REUSABLE BEVERAGE PACKAGING WASTE: A ROMANIAN CASE STUDY

Constantin-Bogdan Seto^{1,2}, Daniela Gavrilescu^{1*}, Carmen Teodosiu^{1*}

¹*“Gheorghe Asachi” Technical University of Iasi, “Cristofor Simionescu” Faculty of Chemical Engineering and Environmental Protection, Department of Environmental Engineering and Management, 73 Prof. Dimitrie Mangeron Street, 700050, Iasi, Romania*

²*Green Point Management, 9-13 București-Ploiești Street, Bucharest, Romania*

Abstract

Packaging is a key component in the current day to day life because of the vital role played in preserving and protecting the products properties. In fulfilling this role for the beverage industry, some packaging materials have been designed and produced for a single-use cycle making them Single-Use Packaging Beverages (SUBP), such as for alcoholic drinks (wine, beer) or soft drinks (juice, soda, sparkling and still water). The SUBP produced becomes waste within a very short timeframe once the product has been consumed and will generate impact in the End of Life (EoL) stage. The main objective of this paper is to evaluate the sustainability of the SUBP waste EoL treatment options. The methodology proposed has enabled the material flow analysis of SUBP waste in the Romanian context, followed by the sustainability assessment in the reference year 2019 and finally a sustainability profile comparison with the case in which the transition from single use to reuse of packaging is achieved by 2030 and 2040. Sustainability is described based on the environmental aspects: greenhouse gas emissions (GHG) and energy consumption, social component: number of full-time jobs and economic aspects: wages and taxes associated to EoL of SUBP waste. The main findings point out that, even though environmental benefits from EoL treatment options are expected to increase with the implementation of reuse targets, the social and economic benefits are reduced.

Key words: beverages, packaging waste, single-use packaging, sustainability assessment

Received: January, 2025; Revised final: March, 2025; Accepted: March, 2025; Published in final edited form: March, 2025

* Author to whom all correspondence should be addressed: E-mail: daniela.gavrilescu@academic.tuiasi.ro; teodosiu.carmen@gmail.com