

Impact Assessment of the Single Use E-Commerce Packaging Waste Management System in Romania

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Introduction

- ❖ Over the last decade, e-commerce has faced a significant market expansion among EU countries, being accentuated by the COVID-19 pandemic (in 2019) and consumers' preferences for online shopping;
- ❖ With 2019 as reference year, Romania is a case in which the e-commerce has seen significant expansions of 7.2% in 2020 and 1.4% in 2021, as well as an increase of the packaging quantities of 6.3% (2020) and 17.5% (2021);
- ❖ Single use packaging quantities for various from e-commerce that turn into waste have risen correspondingly.

Methodology

- ✓ Single use e-commerce packaging waste (SEPW) quantities in Romania over 2019-2021 were calculated based on total packaging waste generated in each year;
- ✓ SEPW material composition in Romania is: 87.61% cardboard shipping boxes, 9.95% paper envelopes, plastic cover periodicals 1.57% and plastic shipping bags 0.87%;
- ✓ The e-commerce waste management system impact is calculated by using US EPA WARM v15.2 methodology based on waste quantities and waste treatment options;
- ✓ In general over 66% of cardboard and paper PW is recycled, and 3 % is incinerated; over 46% of plastic PW is recycled and over 10% is incinerated.

Results

✓ Environmental impacts:

The Total Greenhouse Gas emissions of production and end of life stages increase over the investigated period from 2.9×10^5 tons CO_2e in 2019 to 3.54×10^5 tons CO_2e ;

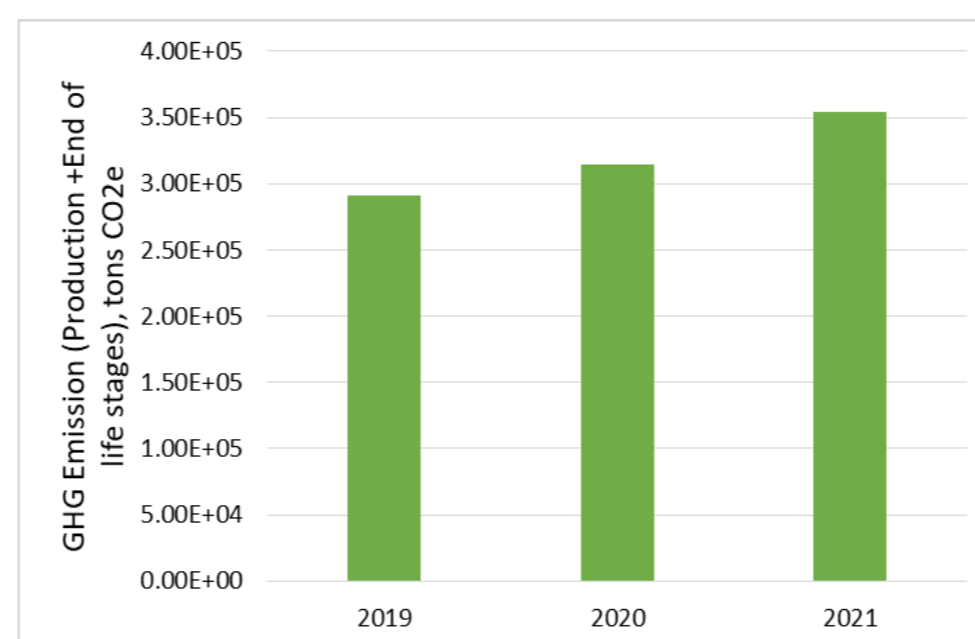
The Energy Impact indicator increased from 1.2×10^6 GJ to 1.46×10^6 GJ.

✓ Social impact:

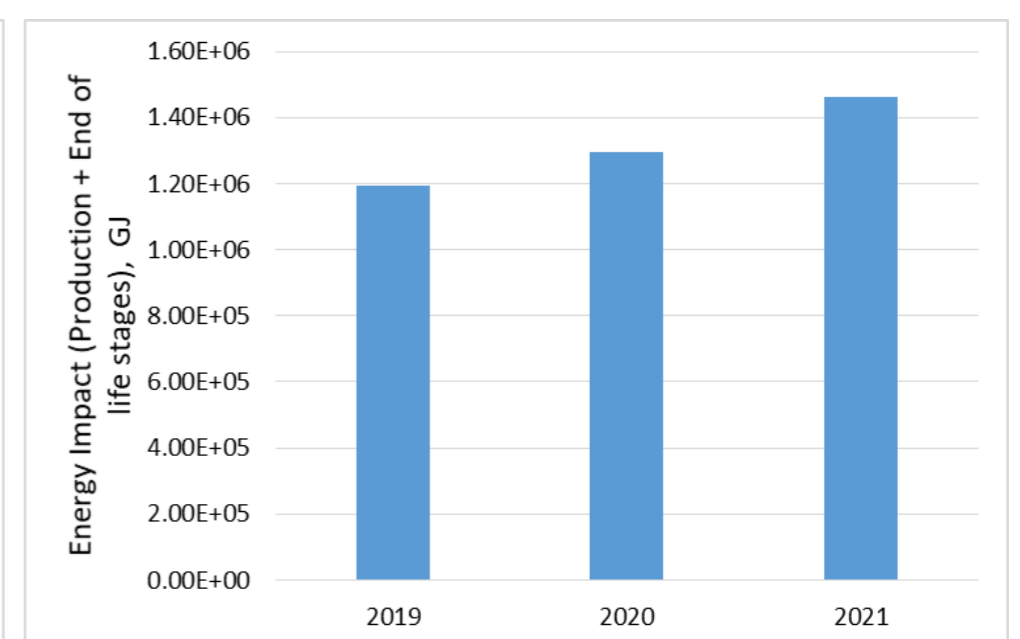
Number of full time jobs have increased from 240 in 2019, 252 in 2020 and 267 in 2021.

✓ Economic impact indicators:

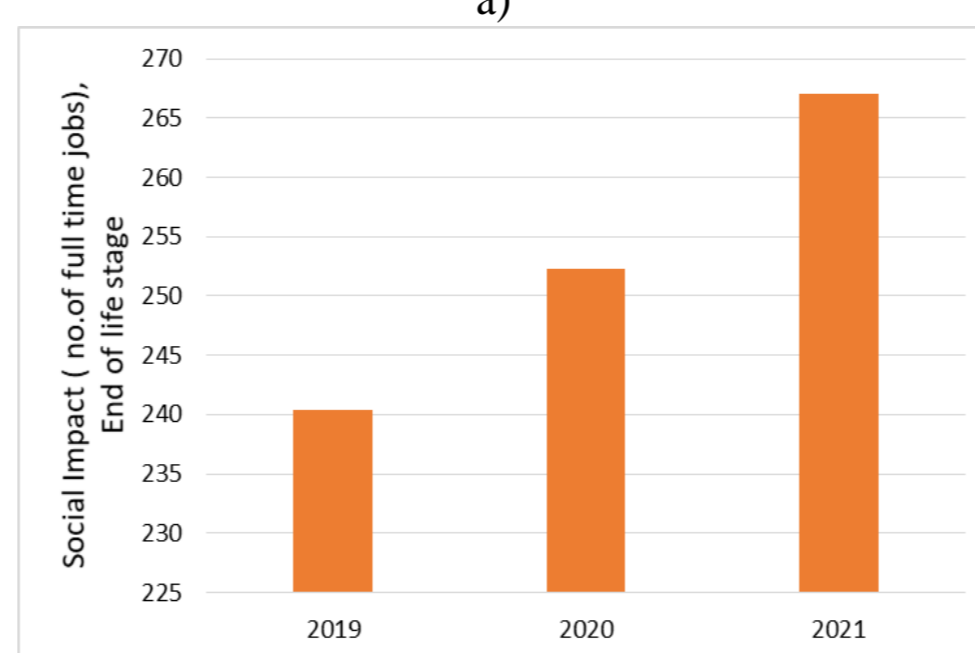
Wages and Taxes follow the same increase tendency with the maximum results registered in 2021, 16 million USD in wages and 4 million USD.



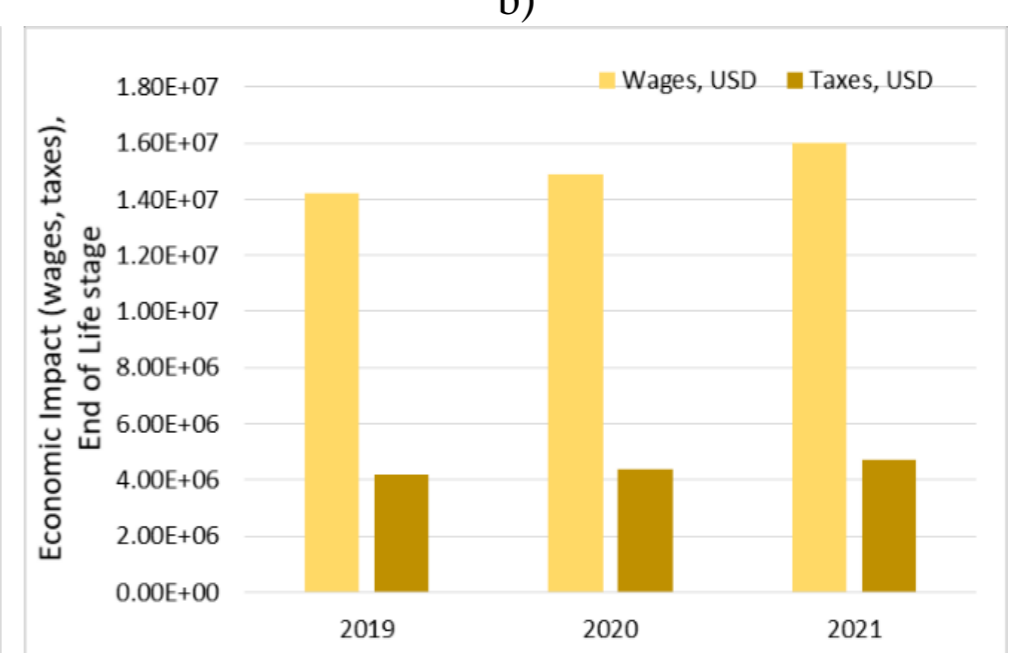
a)



b)



c)



d)

E-commerce waste management system impact assessment in Romania, over 2019-2021, a) Environmental impact expressed as total greenhouse gas emissions, b) Environmental impact as total energy impact, c) Social impact as number of full time jobs, d) Economic impact as wages and taxes

Conclusions

Although SEPW does not have a significant weight contribution to the total packaging waste stream, and its composition consists of mainly recyclables such as cardboard and paper and plastic waste, the sustainability profile for Romania show that all impacts increased over the investigated period 2019-2021.