ANALYSIS ON QUALITY OF LIFE CYCLE ASSESSMENT STUDIES ON SINGLE-USE AND MULTI-USE SYSTEMS FOR DINE-IN AND TAKE-AWAY SECTOR

Considering the current discussion on Packaging and Packaging Waste Regulation (PPWR) reuse targets and the following debate on single-use (SU) and reusable (multi-use, MU) tableware for instore consumption and packaging for take-away, the Life Cycle Assessment (LCA) studies which have been considered by policy makers are here analysed in order to assess their conformity with respect to the criteria set out in the open letter. These criteria should be met by a LCA study to be considered robust i.e. scientifically and methodologically reliable.

Read the Open letter here

Legend
Satisfied criteria
Criteria partially fulfilled
Not satisfied criteria

Name of study	*No silver bullet. Why a mix of solutions will achieve circularity in Europe's informal eating out (IEO) sector*	*Comparative Life Cycle Assessment (LCA) Single-Use And Multiple-Use Dishes Systems For In-Store Consumption In Quick Service Restaurants*	*Comparative Life Cycle Assessment (LCA) Single-Use And Multiple-Use Tableware Systems For Take-Away Services In Quick Service Restaurants*	*Assessing Climate Impact: Reusable Systems vs. Single-use Takeaway Packaging*
Author	Kearney	Ramboll	Ramboll	Eunomia
Date	2022	December 2020	November 2022	September 2023

LCA experts' criteria

Follows ISO LCA frameworks	⊘	⊘	⊘	⊘
Peer-review (i.e. reviewed by third parties)	⊘	It has undergone critical review (by TÜV NORD CERT)	It has undergone critical review (Reviewer panel: Michael Sturges – RISE; Prof. Umberto Arena - Università Vanvitelli; Frank Wellenreuther – ifeu)	⊘
Independent (without conflicts of interest)	No, commissioned by McDonald's	No, commissioned by European Paper Packaging Alliance which is an industrial actor having clear interests in demostrating that single-use paper packaging options are better	No, commissioned by European Paper Packaging Alliance which is an industrial actor having clear interests in demostrating that single-use paper packaging options are better	No, Commissioned by Tomra (a company specialised in production of machines for the return and recycling of empty bottles and cans)
Clear goal and scope definition	⊘	The reference flows (related to the defined functional unit) are missing	The reference flows (related to the defined functional unit) are missing	⊘

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LCA experts' criteria				
Transparency of inventory data	⬡	No, the whole single use system is modelled based on primary data from representative industries, but the data are not disclosed due to confidentiality. The multi-use system instead is modelled with secondary data.	No, the whole single use system is modelled based on primary data from representative industries, but the data are not disclosed due to confidentiality. Also the recycling of wastepaper is based on confidential data. The multi-use system instead is modelled with secondary data.	Even if some inventory data are mentioned (es. weights and materials of containers), some others are not (es. which datasets are used? from which databases?)
Inclusion of sufficient and relevant environmental indicator	⬡	Selected LCIA method: ReCiPe 2016 midpoint (hierarchist perspective); 9 selected impact categories (out of 18 midpoint indicators) Excluded: ecotoxicity (marine, terrestrial and freshwater), human toxicity (cancer and non-cancer), land use. Reasoning: the focus is on environmental impacts and not on toxicity (whose assessment is also controversial); land use is excluded due to lack of data. However, land use is a relevant impact category for paper production activities	Selected LCIA method: Environmental Footprint (EF) 2.0; 11 selected impact categories (out of 16) + Recipe 2016 midpoint (H) for water consumption Excluded: ecotoxicity, human toxicity, land use. Reasoning: primary data of some paperboards (LCIAs) used in the modelled SU system in this study are not compatible with these categories). However, land use is a relevant impact category for paper production activities	Only Climate Change is assessed
Inclusion of full life-cycle	⬡	⬡	⬡	⬡

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LCA experts' criteria				
Clear assumptions on breakage rate, return rate, weight and end-of-life	🔴	- Assumption of reuse per multi-use (MU) item: 100 **but lacks information on breakage rate** - Specifications of all modelled products (although **results are given in aggregated form**) - Clearly defined scenarios of EoL (share of recycling, WtE and landfill).	- Average reuse rate per multi-use (MU) item: 50 reuses; average return rate: 50% - Specifications of all modelled products (although **results are given in aggregated form**) - Clearly defined scenarios of EoL (share of recycling, WtE and landfill).	🟢
Sensitivity analysis on key parameters and assumptions	🔴	Some sensitivity analysis are made on e.g. recycling rates, reuse rate for MU but **missing analysis on relevant assumptions** (e.g. electricity mix for dishwashing which is the main contributor to the MU hotspot)	Some sensitivity analysis are made on: number of reuses, return rate, number of dedicated trips, EoL scenarios, but **missing sensitivity analysis on relevant assumptions** (e.g. electricity mix for dishwashing and means of transport)	🟢
Scenario analysis on model configurations for use & end of life	🔴	Examples of analysed configurations: optimised washing, external washing and alternative materials	Examples of analysed configurations:optimised washing and external washing	Some model configurations about washing are not analysed (e.g. preliminary washing)
Integration of static comparisons with dynamic ones (break-even points)	🔴	🔴	🔴	🟢
Source	https://www.kearney.com/industry/consumer-retail/article/-/insights/no-silver-bullet	https://eppa-eu.org/wp-content/uploads/2023/06/LCA-In-Store-Sudy-Ramboll.pdf	https://eppa-eu.org/wp-content/uploads/2023/05/news-40684-EPPA-ACV-emballages-vente-emporter.pdf	https://circulareconomy.europa.eu/platform/sites/default/files/2023-09/Assessing-the-Climate-Impact-Reusable-systems-vs.-Single-Use-Takeaway-Packaging-v-2.2.pdf