Let's Be Clear(er) about Substitution A Reporting Framework to Account for Product Displacement in Life Cycle Assessment - DTU Orbit (30/04/2019)

Let's Be Clear(er) about Substitution A Reporting Framework to Account for Product Displacement in Life Cycle Assessment: A Framework to Account for Substitution in LCA

The multifunctional character of resource recovery in waste management systems is commonly addressed through system expansion/substitution in life cycle assessment (LCA). Avoided burdens credited based on expected displacement of other product systems can dominate the overall results, making the underlying assumptions particularly important for the interpretation and recommendations. Substitution modeling, however, is often poorly motivated or inadequately described, which limits the utility and comparability of such LCA studies. The aim of this study is therefore to provide a structure for the systematic reporting of information and assumptions expected to contribute to the substitution potential in order to make substitution modeling and the results thereof more transparent and interpretable. We propose a reporting framework that can also support the systematic estimation of substitution potentials related to resource recovery. Key components of the framework include waste-specific (physical) resource potential, recovery efficiency, and displacement rate. End-use-specific displacement rates can be derived as the product of the relative functionality (substitutability) of the recovered resources compared to potentially displaced products and the expected change in consumption of competing products. Substitutability can be determined based on technical functionality and can include additional constraints. The case of anaerobic digestion of organic household waste illustrates its application. The proposed framework enables well-motivated substitution potentials to be accounted for, regardless of the chosen approach, and improves the reproducibility of comparative LCA studies of resource recovery.

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