Guidelines for evaluating the environmental performance of Product/Service-Systems through life cycle assessment - DTU Orbit (18/08/2019)

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Product/Service-Systems (PSS) such as integrated solutions, performance-based contracts or sharing systems are often proposed as means to enable improved environmental sustainability. However, PSS are not necessarily environmentally benign compared to conventional systems. Quantitative environmental performance evaluations of PSS are hence needed. Life cycle assessment (LCA) is a commonly used method for environmental performance evaluation. However, applying LCA in the context of PSS requires specific considerations, which are not sufficiently addressed by current LCA guidelines. In this article, we propose a set of guidelines consisting of six steps, which elaborates the LCA process with respect to the specific consideration for PSS assessment. The guidelines were developed based on identified challenges for the application of LCA on PSS, a review of existing LCAs on PSS case studies, expert consultations, case study applications, and structured user feedback. The use of the guidelines is demonstrated on three exemplifying cases, covering three different scopes for PSS evaluation. By applying the guidelines, the risk of biased results, predictable rebound effects and significant cut-off errors should be reduced. Future work includes evaluating the guidelines through full-scale case applications and further development of dynamic and prospective modelling approaches for assessing systemic consequences and rebound effects.

General information
Publication status: Published
Organisations: Department of Mechanical Engineering, Engineering Design and Product Development, Department of Management Engineering, Quantitative Sustainability Assessment
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Pages: 666-678
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Journal of Cleaner Production
Volume: 190
ISSN (Print): 0959-6526
Ratings:
BFI (2018): BFI-level 2
Scopus rating (2018): CiteScore 7.32 SJR 1.62 SNIP 2.308
Web of Science (2018): Indexed yes
Original language: English
Keywords: Circular economy, Environmental evaluation, Environmental impact, Life cycle assessment, Product/service-systems, Rebound effects
DOIs: 10.1016/j.jclepro.2018.04.108
Source: FindIt
Source-ID: 2419106070
Research output: Contribution to journal › Journal article – Annual report year: 2018 › Research › peer-review